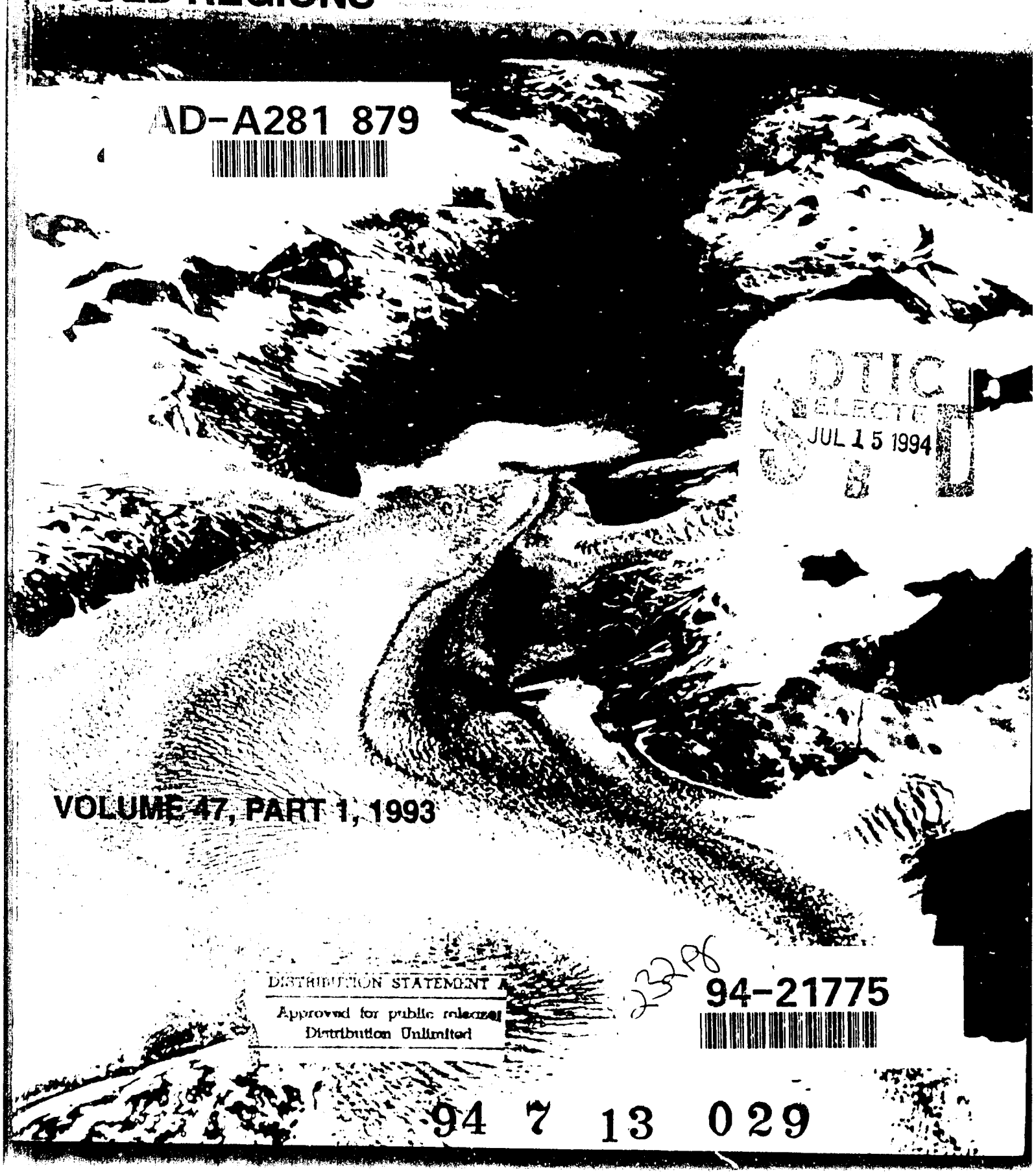
Best Available Copy

(0)

Bibliography on COLD REGIONS

AD-A281 879



DTIC
ELECTE
JUL 15 1994
S B D

VOLUME 47, PART 1, 1993

DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

94-21775

94 7 13 029



U.S. Army Corps of Engineers
Cold Regions Research & Engineering Laboratory

Bibliography on COLD REGIONS SCIENCE AND TECHNOLOGY

VOLUME 47, PART 1

Stuart G. Hibben, Editor

DTIC QUALITY INSPECTED 5

BIBLIOGRAPHY ON COLD REGIONS SCIENCE AND TECHNOLOGY
Volume 47, Part 1

The *Bibliography on Cold Regions Science and Technology* was first published in 1951 and is a continuing publication of the Cold Regions Bibliography Project in the Science and Technology Division of the Library of Congress. It is sponsored by and prepared for the Cold Regions Research and Engineering Laboratory (formerly Snow, Ice and Permafrost Research Establishment) of the U.S. Army Corps of Engineers. Volumes 1–15 were issued as the *Bibliography on Snow, Ice and Permafrost*, SIPRE Report 12. Beginning with volume 16 the designation was changed to CRREL Report 12. With volume 20 the title was changed to *Bibliography on Snow, Ice and Frozen Ground, with Abstracts*, and with volume 23 the current title was adopted.

The present volume contains material accessioned between October 1992 and September 1993. It contains full citations of 5273 items, in many cases with abstracts. Indexing for the volume is issued as Volume 47, Part 2.

This publication is the result of a coordinated effort. The bibliography work was done by the Cold Regions Bibliography Project Staff who entered all data on a single computerized data base that accommodates both the *Bibliography on Cold Regions Science and Technology* and the *Antarctic Bibliography*, thus eliminating duplication of effort between the two bibliographies. The data processing, based on MARC II input, was handled by the Library's Information Technology Services and the photocomposition by the Cataloging Distribution Service.

This publication is available from the National Technical Information Service, Springfield, Virginia 22151. When ordering, the author and subject indexes (Part 2) should also be requested, as the usefulness of the bibliography would be severely limited without them.

The items contained herein are also available for on-line access on the ORBIT system. For information write to ORBIT Information Technologies, 8000 Westpark Drive, McLean, Virginia 22102 (800-421-7229 or 703-442-0900).

For information on the CD-ROM version of the database call National Information Services Corporation (410-243-0797).

Accession For	
NTIS GRA&I	☑
DTIC TAB	☐
Unannounced	☐
Justification	
By See AD-A272 991	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	

Stuart G. Hibben, Head
Cold Regions Bibliography Project
Science and Technology Division
Library of Congress

47-1
Finite element analysis of cold embedments in fresh concrete.
Swift, D.P., et al. *Journal of cold regions engineering*, June 1992, 6(2), p.41-57, 12 refs.
Puckett, J.A., Edgar, T.V.
Reinforced concretes, Concrete placing, Concrete freezing, Concrete strength, Formwork (construction), Ice formation, Winter concreting, Analysis (mathematics), Subsurface structures, Nomographs.

47-2
Microorganism survival in ice-covered marine environment.
Stanley, S.J., et al. *Journal of cold regions engineering*, June 1992, 6(2), p.58-72, 11 refs.
Smith, D.W., Milne, G.D.
Marine biology, Sea water, Waste disposal, Water treatment, Bacteria, Ice cover effect, Decomposition, Water temperature, Temperature effects, Water pollution, Subglacial observations.

47-3
Design method for frozen-soil retaining wall.
Soo, S., et al. *Journal of cold regions engineering*, June 1992, 6(2), p.73-89, 8 refs.
Muvdi, B.B.
Walls, Stress strain diagrams, Supports, Earthwork, Artificial freezing, Soil freezing, Design criteria, Frozen ground strength, Soil creep, Analysis (mathematics), Flexural strength, Mechanical properties.

47-4
Roof-snow load for seismic-design calculations.
O'Rourke, M.J., et al. *Journal of structural engineering*, Sep. 1992, 118(9), p.2338-2350, 8 refs.
Speck, R.S., Jr.
Roofs, Snow loads, Snow cover effect, Seismology, Design criteria, Earthquakes, Statistical analysis, Building codes, Structural analysis.

47-5
***In situ* spectroradiometric estimation of microalgal biomass in first-year sea ice.**
Legendre, L., et al. *Polar biology*, 1991, 11(2), p.113-115, 13 refs.
Gosselin, M.
Sea ice, Marine biology, Radiance, Subglacial observations, Biomass, Ice cover effect, Ice optics, Algae, Radiometry, Photosynthesis.

47-6
Evolution of stratiform cirrus simulated in a lifting layer.
Zhang, Y., et al. *Contributions to atmospheric physics*, Feb. 1992, 65(1), p.23-33, With German summary. 15 refs.
Laube, M., Raschke, E.
Cloud physics, Ice air interface, Radiation balance, Ice crystal growth, Ice sublimation, Air flow, Convection, Mathematical models, Particle size distribution, Atmospheric physics.

47-7
New explicit equations for the accurate calculation of the growth and evaporation of hydrometeors by the diffusion of water vapor.
Srivastava, R.C., et al. *Journal of the atmospheric sciences*, Sep. 1, 1992, 49(17), p.1643-1651, 20 refs.
Coen, J.L.
Precipitation (meteorology), Cloud physics, Ice crystal growth, Ice sublimation, Vapor diffusion, Evaporation, Ice air interface, Water vapor, Analysis (mathematics), Temperature effects.

47-8
Freezing and thawing heat transfer with water flow around isothermally cooled cylinders in staggered and aligned arrangements.
Hirata, T., et al. *Journal of heat transfer*, Aug. 1992, 114(3), p.681-687, 8 refs.
Matsui, H.
Pipes (tubes), Water flow, Liquid solid interfaces, Ice formation, Ice melting, Heat transfer, Orientation, Analysis (mathematics), Ice models.

47-9
Australian Winter Storms Experiment (AWSE) I: supercooled liquid water and precipitation-enhancement opportunities.
Long, A.B., et al. *Journal of applied meteorology*, Sep. 1992, 31(9), p.1041-1055, 15 refs.
Huggins, A.W.
Storms, Cloud seeding, Precipitation (meteorology), Supercooled clouds, Water transport, Air water interactions, Cloud physics, Radiometry, Meteorological factors, Wind factors.

47-10
Microclimate and soils of the central part of the Hämeenkangas interlobate complex in western Finland.
Rajakorpi, A., *Fennia*, 1984, 162(2), p.237-337, Refs. p.328-337.
Microclimatology, Forest soils, Insolation, Moraines, Soil profiles, Snow cover effect, Topographic effects, Vegetation patterns, Climatic factors, Soil temperature, Soil science, Temperature effects.

47-11
Freeze-salt resistance of superplasticized concrete.
Berntsson, L., International Seminar on Some Aspects of Admixtures and Industrial By-products on the Durability of Concrete, 2nd, Goteborg, Sweden, June 26-27, 1989. Edited by L. Berntsson et al, Stockholm, Swedish Council for Building Research, 1989, p.18-22, D9-1989, 6 refs.
DLC TP884.A3 D87 1989
Concrete admixtures, Concrete durability, Air entrainment, Frost resistance, Frost protection, Porosity, Freeze thaw tests, Salting.

47-12
Effect of industrial by-products on the frost resistance of concrete.
Fagerlund, G., International Seminar on Some Aspects of Admixtures and Industrial By-products on the Durability of Concrete, 2nd, Goteborg, Sweden, June 26-27, 1989. Edited by L. Berntsson et al, Stockholm, Swedish Council for Building Research, 1989, p.33-52, D9-1989, 17 refs.
DLC TP884.A3 D87 1989
Concrete durability, Concrete admixtures, Frost resistance, Porosity, Air entrainment, Structural analysis, Freeze thaw cycles.

47-13
Durability of concrete incorporating high-volume of low-calcium (ASTM class F) fly ash.
Malhotra, V.M., International Seminar on Some Aspects of Admixtures and Industrial By-products on the Durability of Concrete, 2nd, Goteborg, Sweden, June 26-27, 1989. Edited by L. Berntsson et al, Stockholm, Swedish Council for Building Research, 1989, p.93-104, D9-1989, 6 refs.
DLC TP884.A3 D87 1989
Concrete aggregates, Minerals, Concrete durability, Frost resistance, Frost action, Freeze thaw tests, Cold weather performance.

47-14
Effect of condensed silica fume on the frost resistance of concrete.
Opsahl, O.A., et al, International Seminar on Some Aspects of Admixtures and Industrial By-products on the Durability of Concrete, 2nd, Goteborg, Sweden, June 26-27, 1989. Edited by L. Berntsson et al, Stockholm, Swedish Council for Building Research, 1989, p.149-160, D9-1989, 6 refs.
Gjörv, O.E.
DLC TP884.A3 D87 1989
Concrete durability, Concrete aggregates, Frost resistance, Air entrainment, Freeze thaw tests, Minerals.

47-15
Use of air-conditioning and plasticizing admixtures for producing concrete with good salt-frost resistance.
Petersson, P.E., International Seminar on Some Aspects of Admixtures and Industrial By-products on the Durability of Concrete, 2nd, Goteborg, Sweden, June 26-27, 1989. Edited by L. Berntsson et al, Stockholm, Swedish Council for Building Research, 1989, p.161-169, D9-1989, 5 refs. For another version see 44-2807.
DLC TP884.A3 D87 1989
Concrete durability, Frost resistance, Concrete admixtures, Air entrainment, Freeze thaw tests, Degradation, Salting.

47-16
Salt-scaling resistance of concrete with air-entraining and superplasticizing admixtures.
Ranisch, E.H., et al, International Seminar on Some Aspects of Admixtures and Industrial By-products on the Durability of Concrete, 2nd, Goteborg, Sweden, June 26-27, 1989. Edited by L. Berntsson et al, Stockholm, Swedish Council for Building Research, 1989, p.170-178, D9-1989, 3 refs.
Rostásy, F.S.
DLC TP884.A3 D87 1989
Concrete admixtures, Concrete pavements, Frost resistance, Air entrainment, Freeze thaw tests, Road maintenance, Bridges, Salting.

47-17
Frost-salt scaling tests on concrete-effects of test parameters and condensed silica fume.
Sellevold, E.J., International Seminar on Some Aspects of Admixtures and Industrial By-products on the Durability of Concrete, 2nd, Goteborg, Sweden, June 26-27, 1989. Edited by L. Berntsson et al, Stockholm, Swedish Council for Building Research, 1989, p.215-217, D9-1989, 2 refs.
DLC TP884.A3 D87 1989
Concrete admixtures, Concrete pavements, Frost resistance, Frost action, Freeze thaw tests, Salting.

47-18
Chemical resistance of alkali-activated concrete.
Talling, B., International Seminar on Some Aspects of Admixtures and Industrial By-products on the Durability of Concrete, 2nd, Goteborg, Sweden, June 26-27, 1989. Edited by L. Berntsson et al, Stockholm, Swedish Council for Building Research, 1989, p.252-257, D9-1989, 2 refs.
DLC TP884.A3 D87 1989
Concrete aggregates, Degradation, Frost resistance, *Chemical properties*, *Freeze thaw tests*, *Air entrainment*, Salting, Temperature effects.

47-19
Scattering by rain and melting snow.
Kharadly, M.M.Z., International Symposium on Antennas and Propagation, 6th, University of Warwick, Coventry, UK, Apr. 4-7, 1989. Part 2: propagation, London, Institution of Electrical Engineers, 1989, p.406-410, Pub.301, 8 refs.
DLC TK871.6.I47a pt.2 1989
Radio waves, Drops (liquids), Telecommunication, Wave propagation, Scattering, Polarization (charge separation), Precipitation (meteorology), Snow melting, Mathematical models.

47-20
Cost of tundra plant structures: evaluation of concepts and currencies.
Chapin, F.S., III, *American naturalist*, Jan. 1989, 133(1), p.1-19, 54 refs.
Tundra, Plant ecology, Plant physiology, Plant tissues, Biomass.

47-21
Swedes develop deicing system.
Macdougall, N., *Aviation and aerospace*, May 1990, 63(5), p.7.
Aircraft icing, Ice removal, Cost analysis.

47-22
Proceedings.
International Symposium of Glacier Caves and Karst in Polar Regions, 1st, Madrid, Oct. 1-5, 1990, Madrid, Instituto Tecnológico GeoMinero de España, 1991, 237p., Refs. passim. For individual papers see 47-23 through 47-35.
Eraso, A., ed.
Glacial hydrology, Subglacial drainage, Subglacial caves, Meltwater, Glacial rivers, Subglacial observations, Glacier surveys, Karst.

47-23
Cavities in Hansbreen hollowed out by meltwater. Svalbard, 77 Lat. N. [Les cavités du Hansbreen creusées par les eaux de fonte. Svalbard, 77 Lat. N].
Schroeder, J., International Symposium of Glacier Caves and Karst in Polar Regions, 1st, Madrid, Oct. 1-5, 1990. Proceedings. Edited by A. Eraso, Madrid, Instituto Tecnológico GeoMinero de España, 1991, p.21-33, In French with English summary. 6 refs.
Glacial hydrology, Subglacial drainage, Subglacial caves, Meltwater.

47-24
Loven-East glacier ice sheet: a distinctive site due to the subglacial run-off. [Les marges glacées du glacier Loven-Est, Spitsberg: un milieu original lié aux écoulements sous-glaciaires].
Griselin, M., International Symposium of Glacier Caves and Karst in Polar Regions, 1st, Madrid, Oct. 1-5, 1990. Proceedings. Edited by A. Eraso, Madrid, Instituto Tecnológico GeoMinero de España, 1991, p.35-67, In French with English summary. 11 refs.
Subglacial drainage, Glacial rivers, Glacial hydrology, Meltwater, Subglacial observations, Norway—Spitsbergen.

47-25
Time series correlogramme and spectral analysis of the Cazadora Glacier drainage and meteorological parameters, Spanish Antarctic Base (BAE), Livingston Island (South Shetland, Antarctic).
Eraso, A., et al, International Symposium of Glacier Caves and Karst in Polar Regions, 1st, Madrid, Oct. 1-5, 1990. Proceedings. Edited by A. Eraso, Madrid, Instituto Tecnológico GeoMinero de España, 1991, p.69-91, With French and Spanish summaries. 8 refs.
Antiguedad, I., Mangin, A.
Subglacial drainage, Glacier melting, Glacial rivers, Meltwater, Glacial hydrology, Glacier surveys, Air temperature, Meteorological factors, Antarctica—Juan Carlos I Station.
The authors analyze the hydrogram characteristics of the river close to the Spanish Antarctic Base Juan-Carlos I which drains the Cazadora glacier. These data had been obtained by a limnigraph in Feb. 1989, and by establishing the discharge curve calculated by watermill daily measurements. The hydrogram shapes are explained and cause-effect relationships are found between glacier discharge and meteorological parameters, i.e. air temperature, atmospheric pressure, precipitation, relative humidity and insolation. Correlation and spectral analysis enabled the authors to fix these relationships. (Auth. mod.)

47-26
Glacial caves in Spitsbergen.
Pulina, M., et al, International Symposium of Glacier Caves and Karst in Polar Regions, 1st, Madrid, Oct. 1-5, 1990. Proceedings. Edited by A. Eraso, Madrid, Instituto Tecnológico GeoMinero de España, 1991, p.93-117, 20 refs.
Rehak, J.
Subglacial caves, Subglacial drainage, Glacial hydrology, Subglacial observations, Glacier surveys, Norway—Spitsbergen.

47-27
Physics of water-hollowed cavities. [Fisica dei buchi nell'acqua].
Badino, G., International Symposium of Glacier Caves and Karst in Polar Regions, 1st, Madrid, Oct. 1-5, 1990. Proceedings. Edited by A. Eraso, Madrid, Instituto Tecnológico GeoMinero de España, 1991, p.119-133, In Italian.
Glacial hydrology, Subglacial caves, Subglacial drainage, Karst.

47-28
Climatic conditions of outflow ablative waters from Werenskiold Glacier in Spitsbergen.
Pereyma, J., International Symposium of Glacier Caves and Karst in Polar Regions, 1st, Madrid, Oct. 1-5, 1990. Proceedings. Edited by A. Eraso, Madrid, Instituto Tecnológico GeoMinero de España, 1991, p.135-146, 7 refs.
Subglacial drainage, Glacial hydrology, Glacier surveys, Climatic factors, Meltwater, Glacier ablation, Glacial rivers, Norway—Spitsbergen.

47-29
Influence of Pleistocene glaciation on location and morphology of deep pothole. Example: Montenegro's mountains.
Ljesevic, M., International Symposium of Glacier Caves and Karst in Polar Regions, 1st, Madrid, Oct. 1-5, 1990. Proceedings. Edited by A. Eraso, Madrid, Instituto Tecnológico GeoMinero de España, 1991, p.147-150, 6 refs.
Alpine glaciation, Karst, Glacial geology, Caves, Pleistocene.

47-30
Possibilities for studying the structure and the regime of Svalbard tide water glaciers by remote sensing methods.
Glazovskii, A.F., et al, International Symposium of Glacier Caves and Karst in Polar Regions, 1st, Madrid, Oct. 1-5, 1990. Proceedings. Edited by A. Eraso, Madrid, Instituto Tecnológico GeoMinero de España, 1991, p.151-161, 17 refs.
Jania, J., Moskalevskii, M.IU.
Glacial hydrology, Glacier surveys, Subglacial drainage, Subglacial observations, Glacier beds, Glacier ice, Radio echo soundings, Remote sensing, Norway—Spitsbergen.

47-31
Characteristics of karst in the ice of Heim Glacier (Patagonia, Argentina). Prediction of the subglacial drainage. [Caracteristicas del karst en hielo del glaciar Heim (Patagonia, Argentina). Prediccion del drenaje subglaciar].
Lario Gomez, J., International Symposium of Glacier Caves and Karst in Polar Regions, 1st, Madrid, Oct. 1-5, 1990. Proceedings. Edited by A. Eraso, Madrid, Instituto Tecnológico GeoMinero de España, 1991, p.163-170, In Spanish with English summary. 8 refs.
Subglacial drainage, Glacial hydrology, Glacier surveys, Subglacial caves, Patagonia.

47-32
First results of the Greenland '90 Expedition. Ilulissat and Alfred-Wegener Peninsula glaciers.
Eraso, A., et al, International Symposium of Glacier Caves and Karst in Polar Regions, 1st, Madrid, Oct. 1-5, 1990. Proceedings. Edited by A. Eraso, Madrid, Instituto Tecnológico GeoMinero de España, 1991, p.171-184, With French and Spanish summaries. 15 refs.
Martinez, A.
Glacier surveys, Subglacial drainage, Glacial hydrology, Glacier melting, Icebergs, Calving, Greenland.

47-33
Thermokarstic and glaciokarstic hydrology in Spitsbergen glaciers.
Krawczyk, W.E., et al, International Symposium of Glacier Caves and Karst in Polar Regions, 1st, Madrid, Oct. 1-5, 1990. Proceedings. Edited by A. Eraso, Madrid, Instituto Tecnológico GeoMinero de España, 1991, p.185-198, With French summary. 14 refs.
Pulina, M.
Subglacial drainage, Glacial hydrology, Glacier surveys, Subglacial caves, Karst, Thermokarst, Hot springs, Norway—Spitsbergen.

47-34
Influence of air flows on glacier caves forming.
Mavliudov, B.R., International Symposium of Glacier Caves and Karst in Polar Regions, 1st, Madrid, Oct. 1-5, 1990. Proceedings. Edited by A. Eraso, Madrid, Instituto Tecnológico GeoMinero de España, 1991, p.199-206, 4 refs.
Subglacial drainage, Glacial hydrology, Subglacial caves, Air flow, Ice melting, Ice air interface.

47-35
Some regularities of spreading and evolution of glacial caves of the eastern Tien-Shan.
Mikhailov, V.N., International Symposium of Glacier Caves and Karst in Polar Regions, 1st, Madrid, Oct. 1-5, 1990. Proceedings. Edited by A. Eraso, Madrid, Instituto Tecnológico GeoMinero de España, 1991, p.207-214, With Spanish summary. 14 refs.
Subglacial caves, Subglacial drainage, Glacial hydrology, Glacier surveys, USSR—Tien Shan.

47-36
Stratigraphy, density and crystal structure of firn-ice at DE08—a very high accumulation site on Law Dome, Antarctica.
Li, J., et al, *Antarctic research*, Dec. 1991, 2(2), p.1-14, 23 refs.
Young, N.W., Wookey, C.W.
Ice cores, Firn stratification, Crystal growth, Antarctica—Law Dome.
An approximately 195 mm diameter firn/ice core, 234 m long, was thermally drilled and analyzed in 1987 austral summer at Law Dome. The snow stratigraphy is characterized by the lack of coarse-grained snow and other distinctly visible features normally corresponding to the annual layers. There is a smooth transformation from fine-grained snow at shallow depth to ice at about 80-90 m, which is greater than that at most other polar locations, due to its abnormally high accumulation rate. According to the marked change in the trend of density with depth and in the crystal properties, 4 stages of the transformation of snow to ice and development of crystal structure can be distinguished: settling stage (0-10 m); sintering stage (10-90 m); rapid crystal growth stage (90-170 m); and dynamic metamorphism stage (170-234 m). The rates of densification and crystal growth from the surface to the depth of the firn-ice transition closely depend on the general temperature. Below the transition zone, the crystal growth rate is higher by a factor of 4.3 in comparison with that at other sites. (Auth. mod.)

47-37
Comparison: Palaeoenvironmental change record of Chinese loess and antarctic ice cores over the last 150,000 years.
Kang, J.C., et al, *Antarctic research*, Dec. 1991, 2(2), p.15-23, 21 refs.
Wen, J.H.
Ice cores, Paleoclimatology, Loess.
Studies of Chinese loess and a comparison with antarctic ice cores provide a general pattern of global environmental change and regional differentiation over the last 150,000 years. Climatic changes revealed by magnetic susceptibility of the Linxia loess section in China were parallel to temperature variations revealed by delta D of the Vostok ice core over the last 150,000 years, which indicates a pattern of climatic change tendencies on a long scale. The ranges of variation during the last Interglacial age have greater differences between these two records. When compared with deep sea records, marine and terrestrial environmental records are markedly different in the early and late stages of the last Glaciation. (Auth. mod.)

47-38
Characteristics of the active layers on Fildes Peninsula of King George Island, Antarctica.
Zhu, C., et al, *Antarctic research*, Dec. 1991, 2(2), p.24-37, 13 refs.
Cui, Z.J., Xiong, H.G.
Active layer, Permafrost, Frost heave, Electrical resistivity, Salinity, Geoelectricity, Antarctica—Fildes Peninsula.
From the data of pitting, geoelectrical prospecting, temperature measurement, salt content analysis and detection by layering frost-heaving instruments, the structural features of sediments in the active layers of Fildes Peninsula are discussed. The presence of a bowl-shaped frost table in the stone-circles area is noted. Temperature distribution in the active layer, effects of salt content on electrical resistivity, thaw-settlement and frost-heaving, and their control on periglacial landform development are analyzed. It is suggested that 5 layers exist in the subsurface structure: the active layer, frost sand and gravel layer, frost volcanic rock permeated by sea water, frost volcanic rock unpermeated by sea water, and unfrosted ancient continental basement. Finally, the permafrost table and its vertical gradient are determined. (Auth. mod.)

47-39
Thermal properties and temperature distribution of snow/firn on the Law Dome ice cap, Antarctica.
Ren, J.W., et al, *Antarctic research*, Dec. 1991, 2(2), p.38-46, 14 refs.
Qin, D.H., Huang, M.H.
Ice cores, Snow temperature, Snow thermal properties, Firn, Temperature measurement, Antarctica—Law Dome.
Based on detailed measurements of density and numerous data on temperature in shallow boreholes (about 20 m deep), the thermal properties and temperature distribution of snow/firn layer on the Law Dome ice cap are discussed. According to a review of works on thermal properties of snow by Yen (1981), a relationship between thermal conductivity (K) and density (rho) is proposed. An equation of heat transfer in a deformed nonuniform medium is applied and solved analytically by two approaches. Comparison of calculated and measured temperatures indicates that the difference depends mainly on the determination of boundary conditions. (Auth. mod.)

47-40
ARCTIC '91: The Expedition ARK-VIII/3 of RV *Polarstern* in 1991. [ARCTIC '91: Die Expedition ARK-VIII/3 mit FS *Polarstern* 1991].
Fütterer, D.K., ed, *Berichte zur Polarforschung*, 1992, No.107, 267p., Refs. p.130-132.
Sea ice, Sea water, Sediments, Seismic surveys, Norway—Svalbard, Arctic Ocean.

47-41
Radiation and eddy flux experiment 1991 (REFLEX I).
Hartmann, J., et al, *Berichte zur Polarforschung*, 1992, No.105, 72p., 5 refs.
Kottmeier, C., Wamser, C.
Sea ice, Sea water, Air temperature, Measuring instruments, Air ice water interaction, Airborne equipment, Turbulence.

47-42
Antarctic climate research data. Part 5: PPI radar data at Syowa Station, Antarctica, from February to December 1989.
Konishi, H., *Japanese Antarctic Research Expedition. JARE data reports*, Mar. 1992, No.173, 60p., 3 refs.
Cloud cover, Meteorological data, Weather observations, Precipitation (meteorology), Radar tracking, Antarctica—Showa Station.

47-43
Meteorological data at Asuka Station, Antarctica in 1990.
Iwasaki, A., et al, *Japanese Antarctic Research Expedition. JARE data reports*, Mar. 1992, No.179, 110p., 2 refs.
Yamanouchi, T.
Air temperature, Meteorological data, Weather observations, Surface temperature, Antarctica—Asuka Station.

47-44
Report of the International Ice Patrol in the North Atlantic, 1991 season.
U.S. Coast Guard, *U.S. Coast Guard. Bulletin*, 1991, No.77, 51p., CG-188-46, 7 refs.
Ice reporting, Sea ice distribution, Icebergs, Ice conditions, Ice detection, Drift.

47-45
Report of the International Ice Patrol in the North Atlantic, 1990 season.
U.S. Coast Guard. *U.S. Coast Guard. Bulletin*, 1990, No.76, 86p., CG-188-45, Refs. passim.
Ice reporting, Sea ice distribution, Icebergs, Ice conditions, Ice detection, Drift.

47-46
Study of methanesulfonic acid in ice cores.
Whung, P.Y., Coral Gables, University of Miami, 1991, 173p., University Microfilms order No. 92-01127, Ph.D. thesis. Refs. p.130-152.
Ice cores, Ice composition, Snow composition, Atmospheric composition, Polar regions, Antarctica—Dominion Range.
Methanesulfonic acid (MSA), an oxidation product of DMS, has been used as a biogenic sulfur tracer in deposited snow layers to better understand the relative importance of various sulfur inputs (biogenic, volcanic and anthropogenic sulfur) to both polar regions in the past. The ice cores and snowpit samples were collected from the 20D site (Greenland) and the Dominion Range site (Antarctica). A suppressed ion chromatographic method was used to measure MSA in snow and ice. The mean concentrations of MSA in the Dominion Range snowpit and ice core are 2.76 ppb and 0.94 ppb, respectively. The mean MSA total S(VI) ratio is below 1% at the Dominion Range site. These data confirm that the MSA fraction in the high plateau is considerably lower than in coastal Antarctica and in the low- and the high-latitude marine boundary layer. Possible causes include volcanic sulfate input, long range transport of low-latitude biogenic sulfur, and additional stratospheric sulfate input. In summary, all of the above suggests that transport-related sulfur source changes may primarily control the atmospheric chemistry, and consequently the ice chemistry, in both polar regions. (Auth. mod.)

47-47
Cloud acidity and acidic deposition in the lower troposphere and ozone depletion in the antarctic stratosphere: modeling and data analysis regarding the role of atmospheric aerosol.
Lin, N.H., Raleigh, North Carolina State University, 1991, 190p., University Microfilms order No. 92-06141, Ph.D. thesis. Refs. p.168-183.
Clouds (meteorology), *Chemical properties*, Ozone, Aerosols, Models.
This study is focused on the role of atmospheric aerosols in determining the cloud acidity and acidic deposition in the lower troposphere and the ozone depletion in the antarctic stratosphere. For the former, a cloud chemistry model is developed to study the in-cloud chemistry and acidity in cloud droplets. The features of the antarctic stratospheric aerosols during the ozone depletion episode of Oct. 1987 are investigated based on the SAGE II (Stratospheric Aerosol and Gas Experiment II) data. The study focuses on inferring the aerosol size spectrum using a modified randomized minimization-search-technique (RMST), and investigating the vertical, zonal and columnar *averages of aerosol properties, together with the ozone concentration*. The aerosol size distribution is found to be bimodal in several instances. An enhanced aerosol layer of relatively larger particles at altitudes between 21-23 km was found in the antarctic region. The relatively abundant population of smaller particles is associated with the region of severe ozone depletion. Smaller and larger particles dominate at higher and lower latitudes, respectively. It is pointed out that the reported features of the stratospheric aerosols in the antarctic region are useful in providing insights into the mechanisms for ozone depletion. (Auth. mod.)

47-48
Detection of polar stratospheric clouds from NOAA-HIRS data: a case study.
Meerkoetter, R., *Geophysical research letters*, July 6, 1992, 19(13), p.1351-1354, 9 refs.
Clouds (meteorology), Stratosphere, Polar regions.

47-49
Adsorption of HCl on ice under stratospheric conditions: a computational study.
Kroes, G.J., et al, *Geophysical research letters*, July 6, 1992, 19(13), p.1355-1358, 14 refs.
Clary, D.C.
Atmospheric composition, Clouds (meteorology), Stratosphere, Ice crystals, Mathematical models.
In modelling surface adsorption of HCl on type II PSC's, the authors performed computer simulations of adsorption of HCl on single crystal ice. For stratospheric conditions, the maximum surface coverage of ice by HCl is calculated to be 0.0000001 monolayer. This value was obtained by taking surface disorder into account. It is much too low for the reaction of HCl with chloronitrate to proceed rapidly on ordinary ice in one step. The calculated value of the surface coverage is much lower than recent experimental values for the uptake of HCl by polycrystalline ice, so the validity of the interpretation of the uptake of HCl by polycrystalline ice as being due to surface adsorption is questioned. Antarctica is identified as the locale at which this computational study could be advantageously applied. (Auth. mod.)

47-50
Traffic safety of porous asphalt surface layers during winter—results of a study on highways. [Verkehrssicherheit von offenporigen Asphaltdeckschichten im Winter—Ergebnisse einer Untersuchung auf Bundesautobahnen].
Ferrero, T., et al, *Strasse & Autobahn*, June 1992, 43(6), p.359-362, In German.
Levin, C., Roth, J.
Roads, Safety, Pavements, Bitumens, Cold weather performance, Route surveys.

47-51
Frozen assets. *Offshore engineer*, Aug. 1992, p.33-36.
Offshore drilling, Exploration, Petroleum industry, Hydrocarbons, Cold weather operation, Natural resources.

47-52
Lichenometric and radiocarbon dating of Holocene glaciation, Cordillera Blanca, Peru.
Rodbell, D.T., *Holocene*, 1992, 2(1), p.19-29, 40 refs.
Glaciation, Lichens, Radioactive age determination, Moraines, Mountain glaciers, Climatic changes, Glacier oscillation, Quaternary deposits.

47-53
What were the primary forcing mechanisms of high-frequency Holocene climate and glacier variations.
Nesje, A., et al, *Holocene*, 1992, 2(1), p.79-84, 65 refs.
Johannessen, T.
Glacier oscillation, Climatic factors, Climatic changes, Volcanic ash, Ice cores, Insolation, Correlation, Radioactive age determination, Aerosols.

47-54
Behaviour of New Zealand glaciers and atmospheric circulation changes over the past 130 years.
Fitzharris, B.B., et al, *Holocene*, 1992, 2(2), p.97-106, 50 refs.
Hay, J.E., Jones, P.D.
Glacier oscillation, Climatic factors, Atmospheric circulation, Climatic changes, Ice air interface, Alpine glaciation, Periodic variations, Global change.

47-55
Geomorphological evidence of Holocene climatic change from northwest Ellesmere Island, Canadian high arctic.
Evans, D.J.A., et al, *Holocene*, 1992, 2(2), p.148-158, 65 refs.
England, J.
Climatic changes, Paleoclimatology, Glacier oscillation, Glacier ice, Geomorphology, Glacial deposits, Global change, Deserts, Ice cores.

47-56
Properties of no-fines concrete containing silica fume.
Tamai, M., *International Conference on Fly Ash, Silica Fume, Slag, and Natural Pozzolans in Concrete*, 3rd, Trondheim, Norway, June 18-23, 1989. Proceedings, Vol.2. Edited by V.M. Malhotra, Detroit, MI, American Concrete Institute, 1989, p.799-814, SP-114, 3 refs.
DLC TP884.A3 F5892 1989
Concrete aggregates, Concrete durability, Frost resistance, Flexural strength, Physical properties, Freeze thaw cycles, Mechanical tests.

47-57
Behaviour of high erosion-resistant silica fume-mortars for repair of hydraulic structures.
Berra, M., et al, International Conference on Fly Ash, Silica Fume, Slag, and Natural Pozzolans in Concrete, 3rd, Trondheim, Norway, June 18-23, 1989. Proceedings, Vol.2. Edited by V.M. Malhotra, Detroit, MI, American Concrete Institute, 1989, p.827-847, SP-114, 13 refs.
Ferrara, G., Tavano, S.
DLC TP884.A3 F5892 1989
Hydraulic structures, Concrete admixtures, Concrete durability, Frost resistance, Water erosion, Mortars, Mechanical properties, Freeze thaw tests.

47-58
Resistance of microsilica concrete to steel corrosion, erosion, and chemical attack.
Berke, N.S., International Conference on Fly Ash, Silica Fume, Slag, and Natural Pozzolans in Concrete, 3rd, Trondheim, Norway, June 18-23, 1989. Proceedings, Vol.2. Edited by V.M. Malhotra, Detroit, MI, American Concrete Institute, 1989, p.861-886, SP-114, 32 refs.
DLC TP884.A3 F5892 1989
Concrete aggregates, Reinforced concretes, Concrete durability, Corrosion, Frost resistance, Steel structures, Chemical properties, Compressive properties, Countermeasures.

47-59
Cryogenic frost resistance of lightweight concrete containing silica fume.
Khayat, K.H., et al, International Conference on Fly Ash, Silica Fume, Slag, and Natural Pozzolans in Concrete, 3rd, Trondheim, Norway, June 18-23, 1989. Proceedings, Vol.2. Edited by V.M. Malhotra, Detroit, MI, American Concrete Institute, 1989, p.915-928, SP-114, 16 refs.
Polivka, M.
DLC TP884.A3 F5892 1989
Lightweight concretes, Cryogenic structures, Concrete aggregates, Frost resistance, Saturation, Concrete durability, Freeze thaw tests, Thermal stresses, Liquefied gases, Storage tanks.

47-60
Resistance of condensed silica fume concrete to the combined action of freezing and thawing cycling and de-icing salts.
Bilodeau, A., et al, International Conference on Fly Ash, Silica Fume, Slag, and Natural Pozzolans in Concrete, 3rd, Trondheim, Norway, June 18-23, 1989. Proceedings, Vol.2. Edited by V.M. Malhotra, Detroit, MI, American Concrete Institute, 1989, p.945-970, SP-114, 3 refs.
Carette, G.G.
DLC TP884.A3 F5892 1989
Concrete durability, Concrete admixtures, Frost resistance, Degradation, Freeze thaw tests, Concrete curing, Pavements, Salting.

47-61
Influence of curing on the salt scaling resistance of concrete with and without silica fume.
Langlois, M., et al, International Conference on Fly Ash, Silica Fume, Slag, and Natural Pozzolans in Concrete, 3rd, Trondheim, Norway, June 18-23, 1989. Proceedings, Vol.2. Edited by V.M. Malhotra, Detroit, MI, American Concrete Institute, 1989, p.971-989, SP-114, 12 refs.
Beaupre, D., Pigeon, M., Foy, C.
DLC TP884.A3 F5892 1989
Concrete admixtures, Concrete durability, Concrete curing, Frost resistance, Degradation, Salting, Porosity, Chemical composition.

47-62
Properties of high-strength concrete with silica fume using high-range water reducer of slump retaining type.
Mitsui, K., et al, International Conference on Superplasticizers and Other Chemical Admixtures in Concrete, 3rd, Ottawa, Canada, Oct. 1989. Proceedings. Edited by V.M. Malhotra, Detroit, MI, American Concrete Institute, 1989, p.79-97, SP-119, 6 refs.
Kasami, H., Yoshioka, Y., Kinoshita, M.
DLC TP884.A3 S94 1989
Concrete admixtures, Concrete strength, Frost resistance, Water cement ratio, Physical properties, Compressive properties, Mechanical tests.

47-63
Air-void characteristics and freezing and thawing resistance of superplasticized air-entrained concrete with high workability.
Siebel, E., International Conference on Superplasticizers and Other Chemical Admixtures in Concrete, 3rd, Ottawa, Canada, Oct. 1989. Proceedings. Edited by V.M. Malhotra, Detroit, MI, American Concrete Institute, 1989, p.297-319, SP-119, 10 refs.
DLC TP884.A3 S94 1989
Concrete admixtures, Air entrainment, Concrete durability, Freeze thaw tests, Frost resistance, Porosity, Plastic properties, Winter concreting, Chemical analysis.

47-64
Model for deicer scaling resistance of field concretes containing high-range water reducers.
Whiting, D., et al, International Conference on Superplasticizers and Other Chemical Admixtures in Concrete, 3rd, Ottawa, Canada, Oct. 1989. Proceedings. Edited by V.M. Malhotra, Detroit, MI, American Concrete Institute, 1989, p.343-359, SP-119, 21 refs.
Schmitt, J.
DLC TP884.A3 S94 1989
Concrete admixtures, Concrete durability, Concrete structures, Air entrainment, Degradation, Water cement ratio, Surface properties, Frost resistance, Porosity, Freeze thaw cycles, Salting, Models.

47-65
Use of concrete admixtures to provide long-term durability from steel corrosion.
Berke, N.S., et al, International Conference on Superplasticizers and Other Chemical Admixtures in Concrete, 3rd, Ottawa, Canada, Oct. 1989. Proceedings. Edited by V.M. Malhotra, Detroit, MI, American Concrete Institute, 1989, p.383-403, SP-119, 27 refs.
Roberts, L.R.
DLC TP884.A3 S94 1989
Concrete admixtures, Countermeasures, Concrete durability, Reinforced concretes, Steel structures, Corrosion, Frost resistance, Water cement ratio, Permeability, Concrete placing.

47-66
Year-round accelerating admixture.
Brook, J.W., et al, International Conference on Superplasticizers and Other Chemical Admixtures in Concrete, 3rd, Ottawa, Canada, Oct. 1989. Proceedings. Edited by V.M. Malhotra, Detroit, MI, American Concrete Institute, 1989, p.535-555, SP-119, 7 refs.
Ryan, R.J.
DLC TP884.A3 S94 1989
Concrete admixtures, Winter concreting, Concrete durability, Frost resistance, Concrete curing, Physical properties, Temperature effects, Frost protection.

47-67
Evaluation of superplasticizers in concrete.
Mukherjee, P.K., International Conference on Superplasticizers and Other Chemical Admixtures in Concrete, 3rd, Ottawa, Canada, Oct. 1989. Proceedings. Edited by V.M. Malhotra, Detroit, MI, American Concrete Institute, 1989, p.625-644, SP-119, 5 refs.
DLC TP884.A3 S94 1989
Concrete structures, Concrete admixtures, Concrete durability, Frost resistance, Plastic properties, Porosity, Chemical properties, Nuclear power.

47-68
Predicting ice formation parameters in closed systems. [Prognoz parametrov l'doobrazovaniia v zamknutnykh ob"emakh].
Dubina, M.M., et al, *Akademiia nauk SSSR. Doklady*, Jan.-Feb. 1992, 322(1), p.91-97, In Russian. 4 refs.
Argunova, L.S.
Mathematical models, Phase transformations, Salinity, Freezing front, Deformation.

47-69
Lithology of glacial deposits in the western part of the Don Glacier tongue. [K litologii lednikovykh otlozhenii zapadnoi chasti Donskogo lednikovogo iazyka].
Gaigalas, A.I., et al, Litogenez i obrazovanie poleznykh iskopaemykh fanerozoia Voronezhskoi anteklizy; sbornik nauchnykh trudov (Lithogenesis and the formation of mineral deposits in the phanerozoic of the Voronezh anteclise: collected scientific papers). Edited by O.P. Shishova, Voronezh, Izd-vo VGU, 1992, p.118-135, In Russian. 14 refs.
Meleshite, M.I., Glushkov, B.V., Kholmovoi, G.V.
Glacial deposits, Glacier tongues, Lithology, Moraines.

47-70
Geographical forecasting of the consequences of hydropower construction in Siberia and the Far East. [Geograficheskie prognozy posledstvii gidroenergeticheskogo stroitel'stva v Sibiri i na Dal'nem Vostoke].
Malik, L.K., Moscow, Institut geografii AN SSSR, 1990, 316p. (Pertinent p.49-52), In Russian with English summary. Refs. p.288-308.
Frozen rocks, Permafrost distribution, Electric power, Hydraulic structures, Environmental impact, Cold weather construction.

47-71
Growth of the Müller Ice Shelf during the later half of the Little Ice Age as documented by glacial marine sediments and radiogeochemistry.
Stein, A.B., Clinton, Hamilton College, 1992, 56p., B.A. thesis. 19 refs.
Ice shelves, Glacial deposits, Paleoclimatology, Glacier oscillation, Sediment transport, Antarctica—Müller Ice Shelf.
From 2 cores collected in Lallemand Fjord, evidence suggests that the Müller Ice Shelf has migrated during the last 600 years over one of the core sites. From approximately 1200 to 1650 AD, eolian sediment deposition and total organic carbon values indicate an open marine environment throughout the fjord as the ice shelf retreated shoreward. Sediment analyses indicate a pronounced progradation of the Müller Ice Shelf through the Little Ice Age to approximately 1860 AD. Eolian debris was deposited in the fjord, facilitated by the extension of the Müller Ice Shelf which transported sediments over the calving line and into the marine environment. Further variation in the sediment record demonstrates another regression of the Müller Ice Shelf after it reached its maximum during the Little Ice Age in 1869 as sediment levels decreased. Up to 1974, continued growth of the shelf has been documented by sediment and visual observations. After this time, the Müller Ice Shelf has continued to disintegrate to its present day location. This paper utilizes sediment grain size, total organic carbon, and Pb-210 analyses in an attempt to support these contentions.

47-72
Changes of crystal c-axis orientation fabric in uniaxial extension tests.
Li, J., et al, *Antarctic research (Chinese edition)*, Mar. 1992, 4(1), p.29-35, In Chinese with English summary. 11 refs.
Wang, W.L.
Strain tests, Crystals, Rheology, Shear strain, Ice crystals, Polar regions.

47-73
Review of antarctic sea ice problems: observations.
Jia, P.Q., et al, *Antarctic research (Chinese edition)*, Mar. 1992, 4(1), p.51-58, In Chinese with English summary. 22 refs.
Bian, L.G., Lu, L.H.
Sea ice distribution, Spaceborne photography, Polar regions.
The history of antarctic sea ice observations is reviewed, with special emphasis on visible and infrared imagery available from the NOAA satellite series since the launch of NOAA 2 in Oct. 1972. A table showing monthly estimates of sea ice cover in the Antarctic in millions of sq km, from different sources, is presented.

47-74
Final report of Operation Deep Freeze '92 (1991-1992).
U.S. Naval Support Force Antarctica, 1992, var. p.
Research projects, Expeditions, Sea ice, Logistics, Antarctica.
This report describes the military support provided to the National Science Foundation in conjunction with the U.S. Antarctic Program from Aug. 1991 to Mar. 1992 as Operation Deep Freeze 91/92. This included providing the fundamental life support requirements of food and medical services to McMurdo Station residents and the logistic pipeline for resupply of McMurdo, South Pole and Byrd Surface Camp, plus support of Scott Base, the nearby New Zealand station. Inherent in the support requirements is the objective of safe operations. A chronological summary of significant events during the operating period is given. The various organizations, units and commands participating in Operation Deep Freeze 91/92 are listed, and their activities are described in sufficient detail to provide guidance for following years.

47-75
Predicting pipeline frost load.
Fielding, M.B., et al, *American Water Works Association. Journal*, Nov. 1988, 80(11), p.62-69, 9 refs.
Cohen, A.
Soil freezing, Underground pipelines, Frost heave, Frost forecasting, Pipeline freezing, Soil pressure, Mathematical models.

47-76
Upgrading sand, gravel to meet freeze-thaw specs.
Magerowski, A., et al, *Pit and quarry*, June 1989, 81(12), p.62,64,66.
Cieslak, R.
Concrete aggregates, Frost resistance, Freeze thaw tests, Concrete freezing, Waste treatment, Specifications.

47-77
On the age of stratospheric air and ozone depletion potential in polar regions.
Pollock, W.H., et al, *Journal of geophysical research*, Aug. 20, 1992, 97(D12), p.12,993-12,999, 20 refs.
Polar atmospheres, Atmospheric composition, Ozone, Chemical properties, Air pollution, Age determination, Atmospheric attenuation, Stratosphere, Photochemical reactions, Hydrocarbons.

47-78
Comparison of Nimbus 7 limb infrared monitor of the stratosphere and radiosonde temperature in the lower stratosphere poleward of 60N.
Remsberg, E.E., et al, *Journal of geophysical research*, Aug. 20, 1992, 97(D12), p.13,001-13,014, 37 refs.
Bhatt, P.P., Miles, T.
Polar atmospheres, Heterogeneous nucleation, Atmospheric composition, Air temperature, Chemical properties, Sounding, Infrared reconnaissance, Stratosphere, Correlation, Accuracy.

47-79
Optical effects of polar stratospheric clouds on the retrieval of TOMS total ozone.
Torres, O., et al, *Journal of geophysical research*, Aug. 20, 1992, 97(D12), p.13,015-13,024, 34 refs.
Ahmad, Z., Herman, J.R.
Polar atmospheres, Atmospheric composition, Ozone, Atmospheric density, Measurement, Accuracy, Cloud cover, Optical properties, Albedo, Radiation balance.
Small areas of sharply reduced ozone density appear frequently in the maps produced from polar region total ozone mapping spectrometer (TOMS) data. These mini-holes are of the order of 1000 km in extent, with a lifetime of a few days. On the basis of measurements from ground-based instruments, balloon-borne ozonesondes, and simultaneous measurements of aerosol and ozone concentrations during aircraft flights in the arctic and antarctic regions, the appearance of polar stratospheric clouds (PSCs) are frequently associated with false reductions in ozone derived from the TOMS albedo data. By combining radiative transfer calculations with the observed PSC and ozone data, it is shown that PSCs located near or above the ozone density maximum (with optical thickness greater than 0.1) can explain most of the differences between TOMS ozone data and ground or *in-situ* ozone measurements. Several examples of the real and false TOMS mini-hole phenomenon are investigated using data from the 1989 Airborne Arctic Stratospheric Expedition (AASE) and from balloon flights over Norway and Sweden. (Auth. mod.)

47-80
Reactive nitrogen, ozone, and nitrate aerosols observed in the arctic stratosphere in January 1990.
Kondo, Y., et al, *Journal of geophysical research*, Aug. 20, 1992, 97(D12), p.13,025-13,038, 47 refs.
Polar atmospheres, Atmospheric composition, Ozone, Chemical properties, Sounding, Heterogeneous nucleation, Aerosols, Stratosphere, Cloud physics.

47-81
Phenomenology of a water venting in low earth orbit.
Kofsky, I.L., et al, *Acta astronautica*, May 1992, 26(5), p.325-347, 19 refs.
Spacecraft, Atmospheric physics, Water vapor, Ice formation, Ice crystal optics, Radiance, Light scattering, Imaging, Waste disposal.

47-82
Influence of soluble alkalies on the production and stability of the air-void system in superplasticized and nonsuperplasticized concrete.
Pigeon, M., et al, *ACI materials journal*, Jan.-Feb. 1992, 89(1), p.24-31, 15 refs.
Plante, P., Pleau, R., Banthia, N.
Concrete admixtures, Concrete durability, Air entrainment, Frost resistance, Porosity, Chemical properties, Solubility, Physical properties.

47-83
Mass balance, terminus behavior and runoff of North Cascade, Washington glaciers.
Pelto, M.S., Farmington, University of Maine, 1989, 135p., University Microfilms order No.AAC9023867, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Oct. 1990, p.1714.
Glacier mass balance, Runoff, Glacier ablation, Climatic factors, Glacier surveys, Measurement, Accuracy, Seasonal variations, Meltwater.

47-84
Effect of corrosion, freeze-thaw cycles, and their combined effects on the fatigue behavior of reinforced concrete.
Radian, T.A., Kingston, University of Rhode Island, 1989, 220p., University Microfilms order No.AAC9023245, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Dec. 1990, p.3040.
Reinforced concretes, Frost action, Concrete durability, Frost resistance, Corrosion, Fatigue (materials), Mechanical tests, Freeze thaw cycles.

47-85
Polarimetric radar remote sensing of hailstorms.
Zhao, Y., University Park, Pennsylvania State University, 1989, 256p., University Microfilms order No.AAC9018303, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Aug. 1990, p.914.
Storms, Hailstones, Remote sensing, Radar echoes, Polarization (waves), Scattering, Ice optics, Ice melting, Analysis (mathematics), Wave propagation, Ice detection.

47-86
Dendritic crystallization of supercooled solutions.
Harrison, K.M., Reno, University of Nevada, 1988, 113p., University Microfilms order No.AAC1335171, MS. thesis. For abstract see Master abstracts international, Vol.27(3), 1989, p.391.
Cloud physics, Solutions, Supercooling, Ice crystal growth, Dendritic ice, Heterogeneous nucleation, Chemical properties, Simulation, Optical properties.

47-87
Development and verification of a three-dimensional large-scale cloud model.
Lee, J.L., Salt Lake City, University of Utah, 1991, 165p., University Microfilms order No.AAC9129287, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Oct. 1991, p.2095.
Cloud physics, Cloud cover, Atmospheric physics, Ice formation, Radiation balance, Forecasting, Simulation, Phase transformation, Climatic factors.

47-88
Numerical model of polar mesospheric cloud formation and evolution.
Jensen, E.J., Boulder, University of Colorado, 1989, 183p., University Microfilms order No.AAC9024834, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Oct. 1990, p.1877.
Cloud physics, Clouds (meteorology), Ice formation, Polar atmospheres, Mathematical models, Brightness, Particle size distribution, Atmospheric physics.

47-89
Experimental and theoretical investigation of the ice-breaking cycle in two dimensions.
Valanto, P.U., Berkeley, University of California, 1989, 129p., University Microfilms order No.AAC9029056, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Nov. 1990, p.2554.
Ice breaking, Floating ice, Hydrodynamics, Ice solid interface, Icebreakers, Dynamic loads, Ice mechanics, Mathematical models.

47-90
Fundamentals of the theory of calculating the navigation value of ice data. [Osnovy teorii rascheta navigatsionnoĭ tsennosti ledovoĭ informatsii].
Likhachev, A.V., Radiosviaz' na more; sbornik nauchnykh trudov (Radio communications at sea; collected scientific papers). Edited by A.I. Balashov, Moscow, Transport, 1991, p.15-33, In Russian. 6 refs.
Ice navigation, Data processing, Ice reporting, Mathematical models, Ice cover.

47-91
Differential method of multivariate analysis of ice data. [Differentsial'nyĭ metod mnogomernogo analiza ledovoĭ informatsii].
Likhachev, A.V., Radiosviaz' na more; sbornik nauchnykh trudov (Radio communications at sea; collected scientific papers). Edited by A.I. Balashov, Moscow, Transport, 1991, p.60-73, In Russian. 12 refs.
Ice navigation, Data processing, Ice reporting, Mathematical models, Sea ice, Ice cover.

47-92
Optimal amounts of organic ice-forming reagents in clouds in order to produce precipitation. [*Ob* optimal'nykh raskhodakh organicheskikh l'doobrazuiushchikh reagentov pri vozdeĭstvii na oblaka s tsel'iu vyzyvaniia iz nikh osadkov].
Stalevich, D.D., et al. *Leningrad. Glavnaia geofizicheskaia observatoriia. Trudy*, 1991, Vol.534, p.34-43, In Russian. 10 refs.
Uchevatkina, T.S.
Cloud seeding, Nucleating agents, Artificial nucleation, Artificial precipitation, Ice crystal nuclei.

47-93
Study of the ice-forming properties of copper acetylacetonate with admixtures of a copper complex of acetoacetic ester. [Issledovanie l'doobrazuiushcheĭ aktivnosti atsetilatsetonata medi s dobavkami mednogo kompleksa atsetouksusnogo efira].
Molotkova, I.A., et al. *Leningrad. Glavnaia geofizicheskaia observatoriia. Trudy*, 1991, Vol.534, p.44-48, In Russian. 6 refs.
Pershina, T.A.
Nucleating agents, Artificial nucleation, Ice crystal nuclei, Cloud seeding, Artificial precipitation, Aerosols.

47-94
Using ice and ice phenomena in the national economy: geophysical aspect. [Ispol'zovanie l'da i ledovykh iavleniĭ v narodnom khoziaĭstve: geofizicheskiĭ aspekt].
Faĭko, L.I., Krasnoyarsk, Izd. Krasnoiarskogo universiteta, 1986, 155p., In Russian. Refs. p.148-155.
Lake ice, Sea ice, River ice, Ice formation, Ice (construction material), Engineering, Ice dams.

47-95
Efficiency of hydraulic gears of motor vehicles at low temperatures. [Rabotosposobnost' gidravlicheskogo privoda samokhodnykh mashin pri nizkikh temperaturakh].
Kaverzin, S.V., Krasnoyarsk, Izd. Krasnoiarskogo universiteta, 1986, 141p., In Russian. 38 refs.
Motor vehicles, Engines, Cold weather performance, Analysis (mathematics).

47-96
Frozen ground landscapes of Yakutia: methods of detection and problems in mapping. [Merzlotnye landshafty IAkutii: metodika vydeleniia i voprosy kartografirovaniia].
Fedorov, A.N., Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1991, 140p., In Russian. Refs. p.130-139.
Geocryology, Landscape types, Frozen ground, Mapping.

47-97
Hydrotechnical construction in the Far North and problems with the surrounding environment. [Gidrotekhnicheskoe stroitel'stvo na Kraĭnem Severe i problemy okruzhaiushchei sredy].
Sergeev, I.P., et al. *Sbornik nauchnykh trudov Gidroproekta*, 1990, Vol.144, p.130-138, In Russian.
Cold weather construction, Environmental impact, Electric power.

47-98
Performance of piles in thawing ground. [Rabota svai v ottaivaiushchikh gruntakh].
Torgashev, V.V., et al, Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1990, 96p., In Russian. 54 refs.
Sal'nikov, P.I.
Piles, Geocryology, Engineering geology, Ground thawing, Permafrost beneath structures, Pile load tests, Thaw depth.

47-99
Regional characteristics governing permafrost thickness. [Regional'nye zakonomernosti povedeniia moshchnosti merzlykh tolshch].
Kalinin, V.M., et al, Yakutsk, Nauchnyĭ tsentr SO AN SSSR, 1989, 142p., Refs. p.135-140.
IAkupov, V.S.
Permafrost thickness, Frozen ground strength, Geocryology, Ground water, Salinity.

47-100
Soils of the valley near the middle course of the Amga River. [Pochvy doliny srednego techeniia reki Amga].
Desiatkin, R.V., et al, Yakutsk, Nauchnyĭ tsentr SO AN SSSR, 1989, 120p., In Russian. Refs. p.116-119.
Romanov, V.I.
Alassy, Valleys, Cryogenic soils, Soil chemistry, Soil formation, USSR—Amga River.

47-101
Thermal and moisture dust control treatment of a perennially frozen disturbed coal mine. [Termovlazhnostnaia obespylivaiushchaia obrabotka mnogoletnemerzlogo razrushennogo ugol'nogo massiva].
Kudriashov, V.V., et al, Moscow, IPKON AN SSSR, 1991, 135p., In Russian. 71 refs.
Umantsev, R.F., Shurinova, M.K.
Mining, Dust control, Countermeasures, Geocryology, Coal, Moisture, Air temperature, Analysis (mathematics), Salinity.

47-102
Evolution of alassy in Central Yakutia. [Evoliutsiia alasov Tsentral'noĭ IAkutii].
Bosikov, N.P., Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1991, 127p., In Russian. Refs. p.115-127.
Alassy, Landscape development, Ground ice, Lakes, Shores, USSR—Yakutia.

47-103
Characteristics of the occurrence of gas hydrates in the cryolithozone. [Osobennosti sushchestvovaniia gazovykh gidratov v kriolitozone].
Ershov, E.D., et al. *Akademiia nauk SSSR. Doklady*, 1991, 321(4), p.788-791, In Russian. 5 refs.
Hydrates, Geocryology, Microstructure.

47-104
Igor Ilinskiy—multi-purpose arctic cargo ship. *Marine log*, Dec. 1990, 95(11), p.28.
Ships, Ice navigation, Ice breaking, Cargo, Cost analysis.

47-105
Whales save USCG icebreaker. *Marine log*, Jan. 1989, 94(1), p.40-41.
Icebreakers, Ice breaking, Ice navigation, Cost analysis.

47-106
Abstracts.
International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, 415p., In English and Japanese. Refs. passim. For selected papers see 47-107 through 47-168.
Air ice water interaction, Ice solid interface, Ice loads, Offshore structures, Ice surveys, Sea ice distribution, Ice cover strength, Ice reporting, Ice forecasting, Ice cover thickness, Ice control, Ocean currents, Oceanographic surveys, Cryobiology, Remote sensing.

47-107
Carbon dioxide and other trace gases in arctic seas.
Kelley, J.J., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.3-20, 33 refs.
Gosink, T.A., Kline, T.C., Aota, M.
Air ice water interaction, Polar atmospheres, Atmospheric composition, Carbon dioxide, Global warming.

47-108
Problems of choice of sea ice cover parameters design criteria.
Truskov, P.A., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.21-26, 7 refs.
Astafiev, V.N., Surkov, G.A.
Ice solid interface, Ice loads, Offshore structures, Offshore drilling, Ice pressure, Ice cover strength, Ice cover thickness, Design criteria, Statistical analysis, USSR—Sakhalin Island.

47-109
New sea ice normals (1961-90) and the latest sea ice condition in the Sea of Okhotsk.
Kamihira, E., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.27-29, In Japanese with English summary. 3 refs.
Sato, K., Kondo, S.
Ice reporting, Sea ice distribution, Ice conditions, Fast ice, Accidents, Japan—Hokkaido.

47-110
On the interannual variation in sea ice area of the Okhotsk Sea.
Sekine, Y., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.30-33, In Japanese with English summary.
Nakagawa, M.
Sea ice distribution, Marine meteorology, Seasonal variations, Okhotsk Sea.

47-111
Variation in sea ice area of the Okhotsk Sea and its relationship to the global change in atmospheric circulation.
Sekine, Y., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.34-36, In Japanese with English summary. 5 refs.
Nakagawa, M., Suzuki, Y.
Sea ice distribution, Atmospheric circulation, Global change, Air ice water interaction, Okhotsk Sea.

47-112
Climatology of atmospheric cyclones over the Sea of Okhotsk.
Umemoto, T., International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.37-40, 3 refs.
Atmospheric disturbances, Air ice water interaction, Marine atmospheres, Storms, Okhotsk Sea.

47-113
Relation between atmospheric and ice conditions along the Okhotsk Sea coast of Hokkaido.
Murai, K., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.41-46, In Japanese with English summary. 4 refs.
Tsurubayashi, T., Aota, M., Ishikawa, M.
Sea ice distribution, Air ice water interaction, Ice conditions, Fast ice, Freezeup, Ice forecasting, Sea water freezing, Japan—Hokkaido.

47-114
Relation between coastal boundary current and sea level. Part 1. The Soya warm current.
Tsurubayashi, T., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.47-50, In Japanese with English summary. 3 refs.
Ocean currents, Sea level, Shores, Okhotsk Sea.

47-115
Probabilistic estimate of the Okhotsk Sea ice vertical profile.
Truskov, P.A., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.57-61, 4 refs.
Kalinin, E.N.
Ice solid interface, Ice cover strength, Ice loads, Offshore structures, Ice pressure, Ice cover thickness, Statistical analysis, USSR--Sakhalin Island.

47-116
Theoretical approach of thermal regime of snow-covered sea ice.
Krass, M.S., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.62-64, 6 refs.
Ono, N.
Ice thermal properties, Snow ice interface, Snow cover effect, Sea ice.

47-117
Kinematics of two dimensional granular material on a non-linear viscous base.
Ito, H., International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.65-68.
Pack ice, Ice water interface, Drift, Ice floes, Ice bottom surface.

47-118
JAMSTEC's ice sea study program—from the Okhotsk Sea to the Arctic Ocean.
Sasaki, Y., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.69-74.
Air ice water interaction, Ice surveys, Research projects.

47-119
Momentum and heat fluxes over open water, sea ice and snow cover on an arctic lagoon.
Shirasawa, K., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.75-80.
Takatsuka, T., Ikeda, M.
Ice heat flux, Ice air interface, Wind velocity, Ice cover effect, Snow cover effect, Snow air interface.

47-120
Field survey of freezing in ports.
Yamamoto, Y., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.81-85, In Japanese with English summary. 3 refs.
Sea water freezing, Ports, Ice surveys, Ice control, Ice forecasting, Japan--Hokkaido.

47-121
Interaction between sea ice floes and protective coastal structure.
Roppongi, K., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.86-90, In Japanese with English summary. 1 ref.
Akihara, S., Kitamura, T., Saeki, H.
Ice solid interface, Ice control, Offshore structures, Ice push, Ice pileup, Ice loads.

47-122
Experimental study on overtopping of ice floes at breakwater.
Sasajima, T., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.91-95, In Japanese with English summary. 2 refs.
Ice control, Offshore structures, Ice pileup, Ice push, Ice loads, Ocean waves.

47-123
On double-barriered ice-resistant structure.
Hagiwara, K., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.96-100, In Japanese with English summary. 11 refs.
Takeuchi, T., Tatsumi, I., Arai, K.
Ice control, Offshore structures, Ice pileup, Ice push, Ice loads, Ice solid interface, Ocean waves.

47-124
Earthquake response characteristics of offshore structures in the presence of ice floes (Part 5: properties of urea ice).
Sugai, K., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.101-105, In Japanese with English summary. 5 refs.
Ice solid interface, Offshore structures, Ice cover strength, Ice loads, Earthquakes, Urea.

47-125
Earthquake response characteristics of offshore structures in the presence of ice floes (Part 6: indentation test).
Takada, Y., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.106-110, In Japanese with English summary. 5 refs.
Ice solid interface, Offshore structures, Ice cover strength, Ice loads, Ice pressure, Earthquakes.

47-126
Characteristic of the ice boom for control of the ice floes movement.
Enoki, K., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.111-115, In Japanese with English summary.
Ice control, Ice booms, Sea ice.

47-127
Characteristic of new type ice boom and environmental force.
Enoki, K., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.116-120, In Japanese with English summary. 6 refs.
Ice control, Ice booms, Ice loads, Sea ice.

47-128
Study on the abrasion of the structure surface due to a movement of ice sheet.
Takahashi, Y., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.121-125, In Japanese with English summary. 8 refs.
Ice solid interface, Offshore structures, Ice loads, Ice friction, Abrasion.

47-129
Approximate equations including effects of friction coefficient for the buckling failure load of an ice sheet.
Kato, K., International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.126-130, In Japanese with English summary. 14 refs.
Ice solid interface, Ice cover strength, Ice loads, Ice friction, Ice deformation, Offshore structures, Mathematical models.

47-130
Friction coefficient between model ice and roughened model surface.
Kishi, S., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.131-137, In Japanese with English summary. 6 refs.
Yamauchi, Y., Inoue, M., Narita, S.
Ice solid interface, Ice cover strength, Ice friction, Ice loads, Ice deformation.

47-131
On the development of small icebreaker.
Wilkman, G., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.138-144, 8 refs.
Icebreakers, Ice solid interface, Ice loads, Ice navigation, Metal ice friction, Environmental tests, Test chambers.

47-132
Study on the improvement of the airport functions in cold regions (Part 1).
Hirasawa, M., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.145-149, In Japanese with English summary.
Nakamura, N., Tokikawa, K.
Runways, Cold weather operation, Safety, Accidents, Japan—Hokkaido.

47-133
Exposure test for protective effect of surface coatings on frost damage and salt injury of concrete.
Tanikawa, S., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.150-154, In Japanese with English summary. 1 ref.
Concrete freezing, Concrete durability, Frost protection, Protective coatings.

47-134
Study on protective effect of finish coatings on frost damage of aerated lightweight concrete.
Irita, H., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.155-159, In Japanese with English summary. 1 ref.
Concrete freezing, Concrete durability, Frost protection, Protective coatings.

47-135
Seasonal sea-level variation at Syowa Station.
Kawamiya, M., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.165-169, 5 refs.
Nagata, Y., Michida, Y., Odamaki, M.
Sea level, Ocean currents, Oceanographic surveys, Seasonal variations, Antarctica—Showa Station.
Sea level was measured at Showa Station from 1979 through 1988. The range of the seasonal variation averages about 26 cm, with the highest level in early winter and the lowest level in mid summer. Contributing factors to the higher sea level in winter may include decreases in salinity and density in the surface layers as the heavier saltier water sinks to the bottom, and increases in the coastal current and wind velocities, with katabatic winds being the major factor.

47-136
Water exchange between Kuril Basin and Pacific Ocean.
Kawasaki, Y., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.173-176, 5 refs.
Kono, T.
Ocean currents, Water transport, Oceanographic surveys, Okhotsk Sea.

47-137
Seasonal variation of Oyashio Water southeast off Hokkaido.
Kono, T., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.177-181, 2 refs.
Yoshimori, A., Kawasaki, Y.
Ocean currents, Water transport, Water temperature, Oceanographic surveys, Seasonal variations, Okhotsk Sea.

47-138
Seasonal cycle of plankton biomass distributed above the thermocline in the Oyashio region, western subarctic Pacific.
Saito, H., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.182-187, 9 refs.
Kasai, H., Kono, T., Taguchi, S.
Ocean currents, Water temperature, Water transport, Oceanographic surveys, Seasonal variations, Plankton, Biomass, Okhotsk Sea.

47-139
Utilization of psychrophilic microorganisms isolated from low-temperature environments.
Hamamoto, T., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p 200-205, 5 refs.
Horikoshi, K.
Cryobiology, Marine biology, Cold tolerance, Ecology, Bacteria, Soil microbiology, Ocean bottom.

47-140
Chlorophyll *a* biomass and growth of sea-ice microalgae along a salinity gradient (southeastern Hudson Bay, Canadian Arctic).
Legendre, L., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.206-210, 15 refs.
Martineau, M.J., Therriault, J.C., Demers, S.
Cryobiology, Algae, Marine biology, Ecology, Biomass, Chlorophylls, Sea ice, Ice water interface, Salinity, Canada—Hudson Bay.

47-141
Ice algae in Lake Saroma: review.
Taguchi, S., International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.211-220, 29 refs.
Cryobiology, Algae, Ecology, Lake ice, Ice water interface, Biomass, Salinity, Japan—Hokkaido.

47-142
Unusual antifreeze in the fishes of northern Japan.
Raymond, J.A., International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.221-224, 9 refs.
Cryobiology, Antifreezes, Marine biology, Cold tolerance.

47-143
Transmission system for Q/L image of earth observation satellite data (2).
Ito, N., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.244-248, In Japanese with English summary.
Ogawa, M., Igarashi, T.
Ice reporting, Data transmission, Spaceborne photography, Ice surveys, Remote sensing.

47-144
Near-real-time data distribution plan of ADEOS data.
Nakanishi, I., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.249-253, In Japanese with English summary. 3 refs.
Suzuki, S., Umezawa, K., Tsuji, M.
Ice reporting, Data transmission, Spaceborne photography, Ice surveys, Oceanographic surveys, Surface temperature, Remote sensing.

47-145
Active remote sensing of the earth using a powerful dye laser.
Jyumonji, M., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.254-258, 7 refs.
Uchiyama, H.
Snowstorms, Cloud cover, Weather observations, Spaceborne photography, Remote sensing, Lasers, Lidar.

47-146
Surface-based radar remote sensing of ice in Canada.
Lewis, E.O., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.259-266, 9 refs.
Currie, B.W.
Ice reporting, Ice surveys, Ice detection, Sea ice distribution, Icebergs, Remote sensing, Radar tracking, Data processing, Canada.

47-147
Capability of sea ice monitoring by satellite remote sensing.
Ishida, K., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.267-271, In Japanese with English summary. 2 refs.
Ochiai, H.
Ice reporting, Ice surveys, Ice detection, Sea ice distribution, Spaceborne photography, Remote sensing.

47-148
Multi-sensor data set and sea ice study.
Nishio, F., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.272-276, In Japanese with English summary. 6 refs.
Ice reporting, Ice surveys, Sea ice distribution, Ice detection, Spaceborne photography, Remote sensing, Data processing, Okhotsk Sea, Antarctica—Showa Station.
Japan's first polar orbiting earth observation satellite series MOS-1 and MOS-1b use three different sensors, which are MESSR (Multi-spectrum Electronic Self-scanning Radiometer), VTIR (Visible Thermal Infrared Radiometer) and MSR (Microwave Scanning Radiometer. The great advantage of the MOS-1 is that it can observe the same phenomena by three different sensors at the same time. In order to contribute to the ISY (International Space Year)/PIE (Polar Ice Extent) Program, the authors have produced MOS-1 multisensor data sets of the Okhotsk Sea and Antarctica, received at Showa Station. This paper describes the uses of the data set for sea ice study and monitoring, and also further plans to produce the MOS-1 data set and other sensors in the arctic region.

47-149
Algorithm for remote sensing of vertical salt density distributions in the sea ice.
Yamakoshi, H., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.277-280, 2 refs.
Takashima, H., Maeda, T., Sakurai, A.
Ice surveys, Ice salinity, Ice cover thickness, Ice cover strength, Ice electrical properties, *Radio echo soundings*, Remote sensing, Mathematical models.

47-150
Satellite observations of the area of sea ice in the Sea of Okhotsk.
Enomoto, H., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.281-284, 3 refs.
Takahashi, S., Hyakutake, K.
Sea ice distribution, Ice surveys, Ice openings, Air ice water interaction, Wind factors, Spaceborne photography, Remote sensing, Okhotsk Sea.

47-151
Radiative temperature of ice surface in Svalbard, 1991.
Takahashi, S., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.286-289, In Japanese with English summary.
Enomoto, H., Kobayashi, S., Azuma, K.
Glacier surfaces, Ice temperature, Glacier surveys, Ice surface, Snow surface temperature, Infrared photography, Norway—Spitsbergen.

47-152
Prediction of cycles of freeze-thaw in concrete located in cold sea environment.
Sakurai, H., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.290-294, In Japanese with English summary. 7 refs.
Concrete freezing, Concrete durability, Frost forecasting, Frost resistance, Frost penetration, Freeze thaw cycles, Mathematical models.

47-153
Operational system of numerical sea ice prediction in Bohai Sea.
Cheng, B., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.295-299, 6 refs.
Yang, S.Y., Bai, S.
Sea ice distribution, Ice forecasting, Mathematical models, China—Bohai Sea.

47-154
Vibrations of offshore ice-resistant structures.
Khrapatyi, N.G., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.300-301.
Rudetskii, V.A.
Ice solid interface, Offshore structures, Ice loads, Mathematical models.

47-155
Definition of loading regime for offshore structures from drifting ice cover.
Bekker, A.T., International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.302-306, 1 ref.
Ice solid interface, Offshore structures, Ice loads, Statistical analysis.

47-156
On the relationships between air temperature fluctuations in Hokkaido and Okhotsk Sea ice.
Honda, A., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.307-310, In Japanese with English summary.
Wakatsuchi, M.
Sea ice distribution, Air ice water interaction, Air temperature, Ice forecasting, Sea water freezing, Japan—Hokkaido.

47-157
Model for vertical structure of phytoplankton community in arctic regions.
Legendre, L., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.314-316, 4 refs.
Krapivin, V.F.
Cryobiology, Algae, Marine biology, Ecology, Biomass, Ice water interface.

47-158
Ice features in Liaodong Gulf in the winter of 1988-1989.
Li, Z.J., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.317-320, 10 refs.
Zhang, T., Meng, G.L.
Sea ice distribution, Air ice water interaction, Ice cover thickness, Ice conditions, Ice surveys, Sea water freezing, China—Liaodong Gulf.

47-159
Sea level variations in the southern part of the Okhotsk Sea.
Shevchenko, G.V., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.326-328.
Kato, L.N.
Sea level, Water temperature, Surface temperature, Tides, Oceanographic surveys, Seasonal variations, USSR—Sakhalin Island.

47-160
On estimation of extreme sea level on the eastern shelf of Sakhalin as superposition of various components.
Shevchenko, G.V., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.329-333, 2 refs.
Putov, V.F.
Sea level, Tides, Sea ice distribution, Ice water interface, Oceanographic surveys, Seasonal variations, Records (extremes), USSR—Sakhalin Island.

47-161
Seasonal variability of sea ice physico-mechanical properties.
Polomoshnov, A.M., International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.336-339, 3 refs.
Ice surveys, Ice salinity, Ice loads, Ice cover thickness, Drift, Ice cover strength, Ice temperature, USSR—Sakhalin Island.

47-162
Role of Penzhinskaya Bay and Shelikhov Gulf on ice productivity of the Okhotsk Sea.
[Akunin, L.P., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.348-350, 1 refs.
Baneva, N.A.
Ice surveys, Sea ice distribution, Ice volume, Drift, Sea water freezing, Okhotsk Sea.

47-163
Large-scale probability forecast of the sea ice cover and sea ice edge position in the far eastern seas (the Sea of Japan, the Sea of Okhotsk).
Plotnikov, V.V., International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.351-354.
Sea ice distribution, Ice forecasting, Ice surveys, Ice edge, Statistical analysis, Japan, Sea, Okhotsk Sea.

47-164
Probability forecast of the sea ice cover and sea ice edge position in the Okhotsk Sea.
Plotnikov, V.V., International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.355-356.
Sea ice distribution, Ice forecasting, Ice surveys, Ice edge, Statistical analysis, Okhotsk Sea.

47-165
Reinforced concrete supports of the ice resistant platforms (IRP) under the action of the local ice loading.
Almazov, V.O., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.359-362.
Kopaĭgorodskiĭ, E.M.
Ice solid interface, Offshore structures, Ice loads, Concrete piles, Concrete strength, Ice pressure, Mathematical models.

47-166
Experimental research of fracture toughness of Okhotsk Sea ice.
Rogachko, S.I., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.363-366, 3 refs.
Burdiug, T.P.
Ice solid interface, Ice cover strength, Offshore structures, Ice loads, Ice breaking, Ice cracks.

47-167
Deformation of ice cover: some results of plane numerical modelling.
Gol'dshteĭn, R.V., et al, International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.367-371, 5 refs.
Danilenko, V.I., Osipenko, N.M.
Ice deformation, Ice solid interface, Ice cover strength, Offshore structures, Ice loads, Ice cracks, Mathematical models.

47-168
Use of numerical methods in ice conditions examination.
Pokrashenko, S.A., International Symposium on Okhotsk Sea and Sea Ice, 7th, Mombetsu, Hokkaido, Japan, Feb. 2-5, 1992. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1992, p.382-383.
Sea ice distribution, Drift, Ice forecasting, Air ice water interaction, Mathematical models.

47-169
Characteristics of radiogeochemical anomalies in landscapes with water-saturated glacial formations.
[Osobennosti radiogeokhimicheskikh anomaliĭ v landshaftakh obvodnennykh lednikovykh obrazovaniĭ].
Poleshchuk, A.L., et al, *Izvestiia vysshikh uchebnykh zavedeniĭ. Geologiia i razvedka*, Feb. 1991, No.2, p.26-34, In Russian. 12 refs.
Gabitov, R.M., Sinitsyn, A.IA.
Geochemistry, Geocryology, Glacial deposits, Swamps, Lakes, Gamma irradiation, Scintillation.

47-170
Problem of paleoglacioclimatic reconstruction of Pleistocene glaciations in Western Siberia. [K voprosu o paleogliatsioklimaticheskikh rekonstruktsiiakh pleistotsenovykh oledeneniĭ Zapadnoĭ Sibiri].
Sukhorukova, S.S., Evoliutsiia klimata, bioty i sredy obitaniia cheloveka v pozdnem kainozoe Sibiri; sbornik nauchnykh trudov (Evolution of climate, biota, and human living conditions in the Late Cenozoic in Siberia: collected scientific papers). Edited by V.A. Zakharov, Novosibirsk, OIGGM SO AN SSSR, 1991, p.78-84, In Russian. 12 refs.
Pleistocene, Paleoclimatology, Glaciation.

47-171
Anticipated human modifications of global climate.
Budyko, M.I., et al, *Soviet geography*, Jan. 1990, 31(1), p.11-23, Translated from Akademiia nauk SSSR. Izvestiia. Seriia geograficheskaia. 21 refs.
Efimova, N.A., Lokshina, I.IU.
Climate control, Climatic changes, Global change, Global warming, Air temperature, Precipitation (meteorology).

47-172
Glaciers of Novaya Zemlya and the climate. [Ledniki Novoĭ Zemli i klimat].
Koriakin, V.S., *Priroda*, Jan. 1990, No.1, p.23-29, In Russian. 1 ref.
Glacier surveys, Glaciation, Climatic changes, USSR—Novaya Zemlya.

47-173
Influence of avalanche snow transport on snowmelt runoff.
De Scally, F.A., *Journal of hydrology*, Aug. 15, 1992, 137(1-4), p.73-97, 27 refs.
Avalanche tracks, Snow hydrology, Snowmelt, Snow compaction, Runoff, Mass transfer, Snow density, Surface properties, River basins.

47-174
Parameter uncertainty and simulation of design floods in Sweden.
Harlin, J., et al, *Journal of hydrology*, Aug. 15, 1992, 137(1-4), p.209-230, 27 refs.
Kung, C.S.
Hydrology, Accuracy, Dams, Flood forecasting, Design criteria, Snowmelt, Watersheds, Precipitation (meteorology), Simulation, Snow water equivalent.

47-175
Modulation of the diurnal streamflow response by the seasonal snowcover of an alpine basin.
Caine, N., *Journal of hydrology*, Aug. 15, 1992, 137(1-4), p.245-260, 23 refs.
Watersheds, Stream flow, Snowmelt, Snow cover effect, Diurnal variations, Snow hydrology, Seepage, Alpine landscapes.

47-176
Hydrological modelling of a medium-size mountainous catchment from incomplete meteorological data.
Panagoulia, D., *Journal of hydrology*, Aug. 15, 1992, 137(1-4), p.279-310, 24 refs.
Watersheds, Snowmelt, Snow hydrology, Meteorological data, Runoff forecasting, Accuracy, Simulation, Hydrography.

47-177
Probing an iceberg barrier.
Carroll, M., *Earth*, May 1992, 1(3), p.24-33.
Glacier surveys, Icebergs, Calving, Glacial hydrology, Ice water interface, Glacier oscillation, Glacier surges, Climatic changes.

47-178
Glacier recession in Iceland and Austria.
Hall, D.K., et al, *Earth in space*, Apr. 1992, 4(8), p.10-13.
Williams, R.S., Jr., Bayr, K.J.
Glacier oscillation, Glacier ablation, Glacier surveys, Spaceborne photography, Photointerpretation, Periodic variations, Glacier mass balance, Correlation.

47-179
How to measure a glacier.
National Committee on Climate and Glaciers, *Earth in space*, Dec. 1991, 4(4), p.6-7.
Glacier surveys, Remote sensing, Measurement, Climatic changes, Glacier oscillation, Glacier mass balance.

47-180
Freezing in confined geometries.
Sokol, P.E., et al, *Applied physics letters*, Aug. 17, 1992, 61(7), p.777-779, 18 refs.
Freezing, Frozen liquids, Liquid solid interfaces, Supercooling, Molecular structure, Neutron scattering, Low temperature research, Simulation, Porosity.

47-181
Theory of ice premelting in monosized powders.
Cahn, J.W., et al, *Journal of crystal growth*, Sep. 1992, 123(1-2), p.101-108, 23 refs.
Dash, J.G., Fu, H.Y.
Ice water interface, Ice melting, Porous materials, Melting points, Topographic effects, Particles, Soil freezing, Unfrozen water content, Theory.

47-182
Theoretical approaches to the study of ecosystems in the arctic and subarctic seas. [Teoreticheskie podkhody k izucheniiu ekosistem morei Arktiki i Subarktiki].
Matishov, G.G., ed, Apatity, Kol'skiĭ nauchnyĭ tsentr RAN, 1992, 162p., In Russian. Refs. p.149-162.
Ecosystems, Marine biology, Microbiology, Plankton, Environmental impact, Water pollution.

47-183
Contemporary periglacial nature in connection with problems of its management. [Sovremennaia perigliatsial'naia priroda v sviazi s problemami ee osvoeniia].
Golubchikov, IU.N., *Moscow. Universitet. Vestnik. Seriia 5: Geografiia*, May-June 1992, No.3, p.3-10, In Russian with English summary. 15 refs.
Periglacial processes, Landscape development.

47-184
Characteristics of avalanche-forming snow on Sakhalin Island. [Kharakteristika lavinoobrazuiushchego snega ostrova Sakhalina].
Danilina, A.V., et al, *Moscow. Universitet. Vestnik. Seriia 5: Geografiia*, May-June 1992, No.3, p.51-57, In Russian. 7 refs.
Avalanche formation, Snow mechanics, USSR—Sakhalin Island.

47-185
Distinguishing feature of frost and salt penetration corrosion. [Otlichitel'naia osobennost' morozosolevoĭ korrozii].
Koreniuk, A.G., et al, *Izvestiia vysshikh uchebnykh zavedeniĭ. Stroitel'stvo*, Apr. 1992, No.4, p.57-60, In Russian. 6 refs.
Dumanova, L.S.
Frost penetration, Salinity, Corrosion.

47-186
Engineering geological conditions, bases and foundations of transport structures in Siberia; interuniversity collected scientific papers. [Inzhenerno-geologicheskie usloviia, osnovaniia i fundamenty transportnykh sooruzheniĭ v Sibiri; mezhvuzovskiĭ sbornik nauchnykh trudov].
Chernousov, S.I., ed, Novosibirsk, NIIZhT, 1991, 109p., In Russian. For selected papers see 47-187 through 47-191.
Engineering geology, Frost heave, Ground thawing, Frozen ground strength, A alysis (mathematics), Embankments, USSR—Siberia

47-187
Characteristics of frost heave properties of freezing ground during engineering geological investigations for construction purposes. [Kharakteristika puchinistykh svoĭstv promerzaiushchikh gruntov pri inzhenerno-geologicheskikh izyskaniiakh dlia tseleĭ stroitel'stva].
Puskov, V.I., Inzhenerno-geologicheskie usloviia, osnovaniia i fundamenty transportnykh sooruzheniĭ v Sibiri; mezhvuzovskiĭ sbornik nauchnykh trudov (Engineering geological conditions, bases and foundations of transport structures in Siberia; interuniversity collected scientific papers). Edited by S.I. Chernousov, Novosibirsk, NIIZhT, 1991, p.21-28, In Russian. 8 refs.
Engineering geology, Frost heave, Soil freezing, Frozen ground mechanics, Cold weather construction.

47-188
Calculating embankments built of geotextile blocks filled with water-saturated soil. [Raschet nasypi iz geotekstil'nykh paketov, zapolnennykh pereuvlazhennym gruntom].
Karaulov, A.M., et al, Inzhenerno-geologicheskie usloviia, osnovaniia i fundamenty transportnykh sooruzheniĭ v Sibiri; mezhvuzovskiĭ sbornik nauchnykh trudov (Engineering geological conditions, bases and foundations of transport structures in Siberia; interuniversity collected scientific papers). Edited by S.I. Chernousov, Novosibirsk, NIIZhT, 1991, p.66-72, In Russian. 7 refs.
Vaganov, P.S.
Analysis (mathematics), Embankments, Geotextiles, Cryogenic soils, Freeze thaw cycles.

47-189
Settlement of lumpy frozen soil during thawing under conditions of compression. [Osadka komkovatogo merzlogo grunta pri ottaivanii v usloviiakh kompressionnogo uplotneniia].
Solov'ev, IU.I., et al. Inzhenerno-geologicheskie usloviia, osnovaniia i fundamenty transportnykh sooruzhenii v Sibiri; mezhvuzovskii sbornik nauchnykh trudov (Engineering geological conditions, bases and foundations of transport structures in Siberia; interuniversity collected scientific papers). Edited by S.I. Chernousov, Novosibirsk, NIIZhT, 1991, p.72-76, In Russian. 2 refs.
Klepikov, V.S., Derbentsev, A.S.
Ground thawing, Frozen ground settling, Frozen ground compression, Analysis (mathematics).

47-190
Forecasting the bearing strength of a thawing railroad embankment. [Prognoz nesushchei sposobnosti ottaivaiushchego zheleznodorozhnogo zemlianogo polotna].
Prokudin, I.V., et al. Inzhenerno-geologicheskie usloviia, osnovaniia i fundamenty transportnykh sooruzhenii v Sibiri; mezhvuzovskii sbornik nauchnykh trudov (Engineering geological conditions, bases and foundations of transport structures in Siberia; interuniversity collected scientific papers). Edited by S.I. Chernousov, Novosibirsk, NIIZhT, 1991, p.76-83, In Russian. 3 refs.
Petriaev, A.V.
Embankments, Forecasting, Bearing strength, Ground thawing, Frozen ground strength, Analysis (mathematics), Railroads.

47-191
Calculating the mutual effect of piles on the magnitude of frost heave forces. [Uchet vzaimnogo vliianiia svai na velichinu sil moroznogo pucheniia].
Puskov, V.I., et al. Inzhenerno-geologicheskie usloviia, osnovaniia i fundamenty transportnykh sooruzhenii v Sibiri; mezhvuzovskii sbornik nauchnykh trudov (Engineering geological conditions, bases and foundations of transport structures in Siberia; interuniversity collected scientific papers). Edited by S.I. Chernousov, Novosibirsk, NIIZhT, 1991, p.83-92, In Russian. 8 refs.
Kritskii, M.IA.
Analysis (mathematics), Piles, Frost heave.

47-192
Calculating corrections for low frequency radio-navigation systems for sea routes covered with ice. [Vychislenie popravok dlia nizkochastotnykh RNS na morskikh trassakh, pokrytykh l'dom].
Pylaev, A.A., et al. Morskaia navigatsiia pri geologo-geofizicheskikh issledovaniiakh Mirovogo okeana; sbornik nauchnykh trudov (Sea navigation during geological-geophysical investigations of the world ocean; collected scientific papers). Edited by S.I. Kotiashkin, Gelendzhik, NPO "IUzhmorgeologiia," 1991, p.106-111, In Russian. 2 refs.
Tregubov, V.S.
Ice navigation, Sea ice, Low frequencies, Ice electrical properties, Ice cover, Analysis (mathematics).

47-193
Finite element modelling of natural-convection-controlled change of phase.
Usmani, A.S., et al. *International journal for numerical methods in fluids*, May 15, 1992, 14(9), p.1019-1036, 22 refs.
Lewis, R.W., Seetharamu, K.N.
Phase transformations, Fluid dynamics, Liquid solid interfaces, Convection, Solidification, Isotherms, Latent heat, Thermal analysis, Mathematical models, Advection, Density (mass/volume).

47-194
Surfactant-electrolyte interactions in concentrated water-in-oil emulsions: FT-IR spectroscopic and low-temperature differential scanning calorimetric studies.
Ganguly, S., et al. *Colloids and surfaces*, Aug. 26, 1992, 65(4), p.243-256, 20 refs.
Colloids, Surfactants, Temperature measurement, Explosives, Freezing points, Homogeneous nucleation, Stability, Liquid phases, Chemical properties.

47-195
Inelastic incoherent neutron scattering study of D2O and H2O ice VIII in the range 2-140 meV.
Kolesnikov, A.I., et al. *Physics letters A*, Aug. 31, 1992, 168(4), p.308-312, 14 refs.
Ice physics, High pressure ice, Deuterium oxide ice, Neutron scattering, Ice structure, Molecular structure, Spectra, Hydrogen bonds, Latticed structures, Protons.

47-196
Finite element modelling of pressuremeter tests and footings on frozen soils.
Puswewala, U.G.A., et al. *International journal for numerical and analytical methods in geomechanics*, May 1992, 16(5), p.351-375, 29 refs.
Rajapakse, R.K.N.D., Domaschuk, L., Lach, R.P.
Frozen ground settling, Frozen ground mechanics, Settlement (structural), Soil creep, Footings, Ice solid interface, Computerized simulation, Loading, Rheology.

47-197
Coldest places in the solar system.
Dyer, A., *Weatherwise*, Aug.-Sep. 1992, 45(4), p.30-33.
Satellites (natural), Extraterrestrial ice, Atmospheric physics, Geologic processes, Seasonal variations, Insolation.

47-198
Equilibrium line altitude variations with latitude, today and during the late Wisconsin.
Pelto, M.S., *Palaeogeography, palaeoclimatology, palaeoecology*, Aug. 1992, 95(1-2), p.41-46, 40 refs.
Glacier oscillation, Paleoclimatology, Cirque glaciers, Snow line, Ice sheets, Climatic changes, Altitude.

47-199
Radiolarian fauna at the ice edge in the Greenland Sea during summer, 1988.
Swanberg, N.R., et al. *Journal of marine research*, May 1992, 50(2), p.297-320, Refs. p.317-320.
Eide, L.K.
Marine biology, Sea ice, Plankton, Ice edge, Ice cover effect, Nutrient cycle, Distribution, Biomass, Chlorophylls.

47-200
Ice jam flood forecasting: Hay River, N.W.T.
Stanley, S.J., et al. *Canadian journal of civil engineering*, Apr. 1992, 19(2), p.212-223, With French summary. 11 refs.
Gerard, R.
River ice, River flow, Deltas, Ice jams, Ice breakup, Flood forecasting, Water level, Snow accumulation.

47-201
Hydrometeorological analysis of ice breakup on the Nashwaak River, New Brunswick. [Analyse hydrométéorologique des débâcles de glaces de la rivière Nashwaak (Nouveau-Brunswick)].
Hebabi, S., et al. *Canadian journal of civil engineering*, Apr. 1992, 19(2), p.349-354, In French with English summary. 15 refs.
El-Jabi, N., Sarraf, S.
River ice, River flow, Ice breakup, Ice jams, Meteorological factors, Correlation, Flood forecasting.

47-202
NO adsorption on ice at low concentrations.
Sommerfeld, R.A., et al. *Journal of colloid and interface science*, Mar. 15, 1992, 149(2), p.569-574, 26 refs.
Conklin, M.H., Laird, S.K.
Ice vapor interface, Ice surface, Adsorption, Ice melting, Temperature effects, Isotherms, Heterogeneous nucleation, Snow impurities.

47-203
Geometry of OH- defect in condensed water phase. Defect localization and cooperative interaction of H-bonds.
Isaev, A.N., et al. *Journal of structural chemistry*, July 1992, 33(1), p.14-19, Translated from Zhurnal strukturnoi khimii. 9 refs.
Levin, A.A.
Ice structure, Molecular structure, Defects, Charge transfer, Hydrogen bonds, Ice electrical properties, Latticed structures, Orientation, Ice physics.

47-204
MNDO/HB study of proton transfer in the condensed phase of H2O including medium effects in the combined "supermolecule and pseudo-continuum" model.
Isaev, A.N., et al. *Journal of structural chemistry*, July 1992, 33(1), p.19-25, Translated from Zhurnal strukturnoi khimii. 15 refs.
Levin, A.A.
Ice structure, Molecular structure, Charge transfer, Proton transport, Hydrogen bonds, Ice electrical properties, Ice physics, Polarity (charge separation).

47-205
Principles of development of diesel fuel composition with pour-point depressants.
Mitusova, T.N., et al. *Chemistry and technology of fuels and oils*, Sep. 1992, 28(1-2), p.3-7, Translated from Khimiia i tekhnologiia topliv i masel, 1992, No.1, 3 refs.
Veretennikova, T.N.
Fuels, Fuel additives, Viscosity, Petroleum industry, Chemical composition, Cold weather performance, Diesel engines, Manufacturing.

47-206
Low-temperature properties of desorbed raffinates and their hydrocarbon group components.
Alekhina, N.I., et al. *Chemistry and technology of fuels and oils*, Sep. 1992, 28(1-2), p.44-48, Translated from Khimiia i tekhnologiia topliv i masel, 1992, No.1, 4 refs.
Lubricants, Hydrocarbons, Viscosity, Frost resistance, Temperature effects, Physical properties, Cold weather performance, Manufacturing, Chemical composition.

47-207
Atmospheric durability of polymer-fiber composites in cold climates.
Bulmanis, V.N., et al. *Mechanics of composite materials*, May 1992, 27(6), p.698-705, Translated from Mekhanika kompozitnykh materialov, 1991, No.6, 22 refs.
Composite materials, Polymers, Cold weather performance, Cold weather tests, Temperature effects, Cellular plastics, Cold weather construction, Mechanical tests, Strength.

47-208
Structure and thermodynamic properties of water-methanol mixtures: role of the water-water interaction.
Tanaka, H., et al. *Journal of chemical physics*, Aug. 15, 1992, 97(4), p.2626-2634, 31 refs.
Gubbins, K.E.
Solutions, Water structure, Solubility, Thermodynamic properties, Ice structure, Clathrates, Hydrates, Temperature effects, Simulation.

47-209
German Meteorologists Meeting 1992.
Deutsche Meteorologen-Tagung, Berlin, Mar. 16-20, 1992, *Deutscher Wetterdienst, Offenbach am Main. Annalen der Meteorologie*, 1992, No.27, 425p., In German. Refs. passim. For selected papers see 47-210 through 47-218 or I-46925 through I-46928.
Polar atmospheres, Atmospheric circulation, Air ice water interaction, Ozone, Stratosphere, Atmospheric composition, Air temperature, Ice heat flux.
This is one of a series of German meteorologists meetings. The main topics of this meeting are synoptics and fronts, interaction of the atmosphere and biosphere, current problems of theoretical meteorology, the middle atmosphere, ocean circulation, climate diagnostics and modeling, and mesoscale processes. Of pertinence to the Antarctic are papers on ozone and planetary waves; geostrophic wind and sea ice motion; and heat exchange between sea ice, the ocean, and the atmosphere.

47-210
Variability of the arctic stratosphere in winter. [Über die Variabilität der arktischen Stratosphäre im Winter].
Labitzke, K., et al. *Deutscher Wetterdienst, Offenbach am Main. Annalen der Meteorologie*, 1992, No.27, Deutsche Meteorologen-Tagung (German Meteorologists Meeting), Berlin, Mar. 16-20, 1992, p.179-180, In German. 2 refs.
Van Loon, H.
Polar atmospheres, Stratosphere, Atmospheric circulation, Air temperature, Atmospheric pressure, Solar activity, Ozone, Winter.

47-211
European Arctic Stratospheric Ozone Experiment (EASOE) in the winter of 1991/92: dynamics of stratospheric polar vortices. [European Arctic Stratospheric Ozone Experiment (EASOE) im Winter 1991/92: Dynamik des stratosphärischen Polarwirbels].
Petzoldt, K., *Deutscher Wetterdienst, Offenbach am Main. Annalen der Meteorologie*, 1992, No.27, Deutsche Meteorologen-Tagung (German Meteorologists Meeting), Berlin, Mar. 16-20, 1992, p.181-182, In German.
Polar atmospheres, Ozone, Atmospheric circulation, Stratosphere, Air temperature, Atmospheric pressure.

47-212
Model for quasi-stationary planetary waves in the total ozone. [Ein Modell für quasi-stationäre planetare Wellen im Gesamtozon].
Wirth, V., *Deutscher Wetterdienst, Offenbach am Main. Annalen der Meteorologie*, 1992, No.27, Deutsche Meteorologen-Tagung (German Meteorologists Meeting), Berlin, Mar. 16-20, 1992, p.192-193, In German. 5 refs.
Polar atmospheres, Ozone, Atmospheric circulation, Atmospheric composition, Air temperature, Stratosphere.
The stationary total ozone wave may vary from the average by more than 12 Dobson units, with the lowest levels occurring in January in the Northern Hemisphere and in October in the Southern Hemisphere. Temperature and dynamic wave processes in the lower stratosphere appear to be more significant than photochemical processes. The proposed model simulates wave number 1 well in both hemispheres and wave number 2 as well in the Southern Hemisphere.

47-213
Column amounts and vertical distribution of atmospheric trace gases in the Arctic in late winter 1990. [Säulengehalte und Vertikalverteilung atmosphärischer Spurengase im arktischen Spätwinter 1990].
Adrian, G.P., et al, *Deutscher Wetterdienst, Offenbach am Main. Annalen der Meteorologie*, 1992, No.27, Deutsche Meteorologen-Tagung (German Meteorologists Meeting), Berlin, Mar. 16-20, 1992, p.210-211, In German. 4 refs.
Fischer, H., Frank, E., Oelhaf, H.
Polar atmospheres, Atmospheric composition, Air pollution, Atmospheric circulation, Winter.

47-214
Geostrophic wind and sea ice motion in the Weddell Sea. [Geostrophischer Wind und Meereisbewegung in der Wedde!!-See].
Olf, J., *Deutscher Wetterdienst, Offenbach am Main. Annalen der Meteorologie*, 1992, No.27, Deutsche Meteorologen-Tagung (German Meteorologists Meeting), Berlin, Mar. 16-20, 1992, p.228-229, In German. 4 refs.
Air ice water interaction, Drift, Atmospheric circulation, Ocean currents, Sea ice, Wind factors, Drift stations, Data transmission, Antarctica—Weddell Sea.
Sea ice drift in the Weddell Sea was measured by satellite tracking of Argos drift buoys in October 1986 as part of the Winter Weddell Sea Project 1986. The large-scale structure of the Weddell Gyre may be derived from the ice drift data. The ice drift vector, D, is found from the equation D = AG + M + epsilon, where G and M are the geostrophic wind and ocean current vectors, A is a complex coefficient taking into account the wind factor and the angle between the current direction and the geostrophic wind, and epsilon includes all the other parts of the ice drift vector that are neither constants nor linear functions of the geostrophic wind. Here, A = |A| e exp -i theta. The average value of |A| was 0.015 and theta was 3.6.

47-215
Variations in the ice edge in the European North Sea, 1966-1991, from satellite data. [Die Veränderungen der Eisgrenze im Europäischen Nordmeer von 1966-1991 anhand von Satellitendaten].
Eckardt, M., et al, *Deutscher Wetterdienst, Offenbach am Main. Annalen der Meteorologie*, 1992, No.27, Deutsche Meteorologen-Tagung (German Meteorologists Meeting), Berlin, Mar. 16-20, 1992, p.241-242, In German.
Gallas, J., Tonn, W.
Sea ice distribution, Ice edge, Ice surveys, Spaceborne photography, North Sea.

47-216
Snow cover model for global applicability. [Ein Schneedeckenmodell für globale Anwendbarkeit].
Loth, B., *Deutscher Wetterdienst, Offenbach am Main. Annalen der Meteorologie*, 1992, No.27, Deutsche Meteorologen-Tagung (German Meteorologists Meeting), Berlin, Mar. 16-20, 1992, p.268-269, In German. 8 refs.
Snow cover distribution, Snow air interface, Global change.

47-217
Sensible heat flux over open water and sea ice in the Weddell Sea. [Strom fühlbarer Wärme über offenem Wasser und Meereis in der Weddell-See].
Dutz, S., et al, *Deutscher Wetterdienst, Offenbach am Main. Annalen der Meteorologie*, 1992, No.27, Deutsche Meteorologen-Tagung (German Meteorologists Meeting), Berlin, Mar. 16-20, 1992, p.317-318, In German. 5 refs.
Roth, R.
Air ice water interaction, Ice heat flux, Ice heat loss, Ice growth, Atmospheric circulation, Air temperature, Drift stations, Antarctica—Weddell Sea.
Sensible heat flux between open water, sea ice, and the atmosphere in the Weddell Sea, was measured by drift buoys from February through July 1989. The heat loss from the ocean through the ice cover to the atmosphere was noticeably less than expected. The average monthly sensible heat fluxes in W/sq m, from February through July, were respectively, 31, 22, 25, 8, -1, and 7. The growth rate of the ice in February was .09 cm/d and in May was only .02 cm/d.

47-218
Turbulent heat exchange between sea ice and the atmosphere in the Weddell Sea (Antarctica). [Turbulenter Wärmeaustausch zwischen Meereis und Atmosphäre im Weddell-Meer (Antarktis)].
Frieden, W., *Deutscher Wetterdienst, Offenbach am Main. Annalen der Meteorologie*, 1992, No.27, Deutsche Meteorologen-Tagung (German Meteorologists Meeting), Berlin, Mar. 16-20, 1992, p.338-339, In German. 3 refs.
Air ice water interaction, Ice heat flux, Atmospheric circulation, Ice growth, Antarctica—Weddell Sea.
Turbulent heat exchange between the sea ice and atmosphere was measured in the Winter Weddell Gyre Study 1989. There was only a slight heat flux between the atmosphere and ice from +25 to -35 W/sq m. In late winter, there was an average thermal conductive flux from the ice to the atmosphere of 20-30 W/sq m, indicating an ice growth of 6-9 mm/day. Turbulent flow in the atmospheric boundary layer is strongly affected by the wind velocity and air temperature spectra. The shape of the wind velocity spectra in the inertial subrange corresponds to the 5/3 law of Kolmogorov and the air temperature spectra are strongly suppressed in the inertial subrange.

47-219
Early diagenesis and biogeochemistry of iodine in west antarctic ocean.
Cheng, X.H., et al, *Oceanologia et limnologia sinica*, Mar. 1992, 23(2), p.115-123, In Chinese with English summary. 14 refs.
Xia, W.P., Zhang, H.S., Lu, Y.L.
Bottom sediment, Geochemistry, Marine deposits, Marine biology, Water chemistry, Nutrient cycle, Antarctica—West Antarctica.
During the First Chinese Antarctic Ocean Exploration from Dec. 1984 to Feb. 1985, 27 grab samples and 2 box samples were obtained. With tracing to the diagenetic distribution of iodine, some records relative to the reversible processes of early diagenesis and biogeochemistry of iodine are obtained. The distribution of iodine depends on biogenic materials, and thus the regeneration of bioiodine mainly occurs in early diagenesis. Furthermore, its regeneration process is closely correlated with the release of sedimentary organic nitrogen. The estimated rate of iodine regeneration is 0.023 micrograms/g/yr on average. The diffusion fluxes of iodine returned to the aquatic biogeochemical system ranged from F=0.58 picogram/sq cm/sec to F=0.083 picogram/sq cm/sec. It shows potential significant effects of pH, carbonate balance and redox conditions on the regeneration release of bioiodine; both basic and reductive conditions will facilitate the release of iodine from sediments in an early diagenetic environment. (Auth. mod.)

47-220
Aspects of ship-ice interaction in a natural ice cover. Report from Finnish-Canadian Joint Research Project No.5.
Daley, C., *Helsinki University of Technology. Laboratory of Naval Architecture and Marine Engineering. Report*, 1992, M-120, 32p. + append., 23 refs.
Ice navigation, Ice loads, Ice solid interface, Ice breaking, Ice floes, Computer programs, Mathematical models.

47-221
Wetlands sewage treatment tested in the north. *Water and pollution control*, Oct. 1991, 129(5), p.9-10.
Wetlands, Sewage treatment, Canada—Yukon Territory.

47-222
Energy and structure of Bjerrum defects in ice Ih determined with an additive and a nonadditive potential.
Hassan, R., et al, *Journal of chemical physics*, Sep. 15, 1992, 97(6), p.4326-4335, 40 refs.
Campbell, E.S.
Ice physics, Ice crystal structure, Ice relaxation, Molecular structure, Defects, Hydrogen bonds, Dielectric properties, Molecular energy levels, Water structure, Orientation.

47-223
Field-tested model for freeze protection of arctic multiphase pipelines.
Eager, K., *Journal of petroleum technology*, Feb. 1992, 44(2), p.142-145, 5 refs.
Water pipelines, Pipeline freezing, Cold weather operation, Frost protection, Antifreezes, Freezing rate, Fluid flow, Liquid cooling, Oil wells.

47-224
Retrospective of platform developmeat in Cook Inlet, Alaska.
Visser, R.C., *Journal of petroleum technology*, Feb. 1992, 44(2), p.146-150,202-203, 15 refs.
Offshore drilling, Petroleum industry, Offshore structures, Cold weather operation, Sea ice, Ice cover effect, Design criteria, Ice solid interface, Corrosion, Countermeasures.

47-225
Multiple glaciations and sea level changes, northern Ellesmere Island, high arctic Canada.
Lemmen, D.S., et al, *Boreas*, June 1, 1992, 21(2), p.137-152, Refs. p.150-152.
England, J.
Glaciation, Pleistocene, Glacial geology, Sea level, Quaternary deposits, Age determination, Glacier oscillation, Climatic changes, Geomorphology.

47-226
Boulder beach formed by waves from a calving glacier, Eqip Sermia, West Greenland.
Nielsen, N., *Boreas*, June 1, 1992, 21(2), p.159-168, 38 refs.
Shoreline modification, Rocks, Marine geology, Water waves, Calving, Sediment transport, Moraines, Glacial hydrology, Geomorphology.

47-227
Recent sedimentary processes in Scoresby Sund, East Greenland.
Marienfeld, P., *Boreas*, June 1, 1992, 21(2), p.169-186, 43 refs.
Marine geology, Glacial deposits, Sediment transport, Ice rafting, Bottom sediment, Ice scoring, Ice cover effect, Ice water interface, Calving.

47-228
Characterizing the distribution of observed precipitation and runoff over the continental United States.
Dolph, J., et al, *Climatic change*, Oct. 1992, 22(2), p.99-119, 45 refs.
Marks, D.
Precipitation (meteorology), Distribution, Runoff forecasting, Meteorological data, Snow cover effect, Snowmelt, Correlation, Accuracy, Water balance.

47-229
Theoretical studies on binary homogeneous nucleation.
Laaksonen, A., *Acta Polytechnica Scandinavica. Applied physics series*, 1992, No.183, 12p., 17 refs.
Homogeneous nucleation, Vapor pressure, Phase transformations, Atmospheric physics, Cloud physics, Cloud droplets, Chemical properties, Theory, Air pollution.

47-230
"Electric current" states of the proton in water.
Bingi, V.N., *Russian journal of physical chemistry*, 1991, 65(7), p.1068-1071, Translated from Zhurnal fizicheskoĭ khimii. 8 refs.
Water structure, Ice physics, Ice electrical properties, Magnetic resonance, Protons, Molecular energy levels, Hydrogen bonds, Physical properties.

47-231
Cold acclimation in genetically related (sibling) deciduous and evergreen peach *(Prunus persica* (L.) Batsch). 1. Seasonal changes in cold hardiness and polypeptides of bark and xylem tissues.
Arora, R., et al, *Plant physiology*, Aug. 1992, 99(4), p.1562-1568, 30 refs.
Wisniewski, M.E., Scorza, R.
Trees (plants), Plant tissues, Cold tolerance, Acclimatization, Plant physiology, Seasonal variations, Growth.

47-232
Balmy past of icy Triton.
Croswell, K., *New scientist*, Aug. 22, 1992, 135(1835), p.13.
Satellites (natural), Extraterrestrial ice, Atmospheric composition, Geologic processes, Radiation absorption, Planetary environments.

47-233
Speedy sledge offers retreat from storms.
Anderson, I., *New scientist*, Aug. 29, 1992, 135(1836), p.20.
Cold weather survival, Portable shelters, Sleds, Design, Portable equipment.

47-234
Groundwater issues relating to an Alaskan methanol spill.
Robertson, S.B., *Journal of petroleum technology*, Aug. 1992, 44(8), p.936-940, 4 refs.
Oil spills, Antifreezes, Subpermafrost ground water, Water pollution, Environmental impact, Snow cover effect, Soil freezing, Snowmelt, Wells, Monitors.

47-235
Do glaciers tell a true atmospheric CO2 story.
Jaworowski, Z., et al. *Science of the total environment.* Apr. 1992, Vol.114, p.227-284. Refs. p.276-284.
Segalstad, T.V., Ono, N.
Atmospheric composition, Carbon dioxide, Glacier ice, Gas inclusions, Ice cores, Age determination, Accuracy, Paleoclimatology, Global warming, Drill core analysis, Ice physics.
Until 1985 most studies of CO2 in gas inclusions in pre-industrial ice indicated that CO2 concentrations (up to 2450 ppm) were higher than the current atmospheric level. After 1985, lower pre-industrial CO2 values were reported, and used as evidence for a recent man-made CO2 increase. The errors in these revised values, however, are of a similar magnitude to the apparent increase in atmospheric CO2 level. The assumptions used in estimating lower CO2 values in past atmospheres have been: no liquid phase in polar ice; younger age of air than of ice due to free gas exchange between deep firn and the atmosphere; and no change in composition of air inclusions. These assumptions are shown to be invalid. Liquid saline water exists in ice at low temperatures, even below -70 C; airtight ice layers are ubiquitous in antarctic firn; and more than 20 physico-chemical processes operating *in situ* and in ice cores contribute to the alteration of the chemical composition of air inclusions. The permeable ice sheet with its capillary liquid network acts as a sieve which redistributes elements, isotopes, and microparticles. To date, glaciological studies are not able to provide a reliable reconstruction of either the CO2 level in pre-industrial and ancient atmospheres or paleoclimates. Instead, these studies have led to a widely accepted false dogma of man-made climatic warming. (Auth. mod.)

47-236
Fracture toughness Kq and fractography of S1 type freshwater ice.
Dempsey, J.P., et al. International Conference on Fracture, 7th, Houston, TX, Mar. 20-24, 1989. Proceedings, Vol.5. Advances in fracture research. Edited by K. Salama et al. Oxford, Pergamon Press, 1989, p.3421-3428, 7 refs.
Wei, Y.C.
DLC TA409.I44 1989
Ice strength, Ice crystal structure, Cracking (fracturing), Crack propagation, Ice microstructure, Anisotropy, Mechanical tests, Grain size.

47-237
Recent tendencies in climatic changes in the Arctic. [Sovremennye tendentsii izmeneniia klimata Arktiki].
Aleksandrov, E.I., et al. *Rossiĭskaia Akademiia nauk. Doklady,* 1992, 322(5), p.865-868, In Russian. 3 refs.
Nagurnyĭ, A.P.
Global warming, Climatic changes, Air temperature.

47-238
Effect of soil stress on its water permeability during freezing, and forecasting frost heave intensity in the soil of structural foundations. [Vliianie napriazhennogo sostoianiia grunta na vlagoprovodnost' ego pri promerzanii i prognoz velichiny moroznogo pucheniia grunta osnovaniia fundamentov].
Karlov, V.D., Stroitel'nye svoĭstva slabykh i merzlykh gruntov, ispol'zuemykh v kachestve osnovaniĭ sooruzheniĭ; mezhvuzovskiĭ tematicheskiĭ sbornik trudov (Structural properties of weak and frozen ground used as a foundation for structures; interuniversity thematic collected papers). Edited by L.A. Mozgunova, Leningrad, Leningradskiĭ inzhenerno-stroitel'nyĭ institut, 1991, p.77-82, In Russian. 8 refs.
Soil freezing, Permeability, Frost heave, Foundations, Frozen ground mechanics, Stresses, Analysis (mathematics).

47-239
Some aspects of the statistical evaluation of the mechanical properties of soil and foundations (with reference to permafrost regions). [Nekotorye aspekty statisticheskoĭ otsenki mekhanicheskikh kharakteristik gruntov i osnovaniĭ (primenitel'no k raĭonam vechnoĭ merzloty)].
Gerasimov, A.S., Stroitel'nye svoĭstva slabykh i merzlykh gruntov, ispol'zuemykh v kachestve osnovaniĭ sooruzheniĭ; mezhvuzovskiĭ tematicheskiĭ sbornik trudov (Structural properties of weak and frozen ground used as a foundation for structures; interuniversity thematic collected papers). Edited by L.A. Mozgunova, Leningrad, Leningradskiĭ inzhenerno-stroitel'nyĭ institut, 1991, p.82-91, In Russian. 10 refs.
Statistical analysis, Analysis (mathematics), Soil mechanics, Foundations, Frozen ground mechanics, Deformation, Ground thawing, Piles, Permafrost beneath structures.

47-240
Paleogeography of Leningrad in the post-glacial period. [Paleogeografiia Leningrada v postlednikovoe vremia].
Zavarzin, L.G., Stroitel'nye svoĭstva slabykh i merzlykh gruntov, ispol'zuemykh v kachestve osnovaniĭ sooruzheniĭ; mezhvuzovskiĭ tematicheskiĭ sbornik trudov (Structural properties of weak and frozen ground used as a foundation for structures; interuniversity thematic collected papers). Edited by L.A. Mozgunova, Leningrad, Leningradskiĭ inzhenerno-stroitel'nyĭ institut, 1991, p.91-100, In Russian.
Paleoclimatology, Geography, Engineering geology, Landscape development, Glacial geology.

47-241
Geology of Quaternary deposits and recent tectonics in glacial regions of eastern Europe. [Geologiia chetvertichnykh otlozheniĭ i noveĭshaia tektonika lednikovykh oblasteĭ Vostochnoĭ Evropy].
Evzerov, V.IA., ed, Apatity, Kol'skiĭ nauchnyĭ tsentr RAN, 1992, 55p., In Russian.
Glacial geology, Quaternary deposits, Tectonics, Paleoclimatology, Geomorphology, Stratigraphy.

47-242
Soviet arctic marine transportation 1990.
Brigham, L.W., *U.S. Naval Institute. Proceedings,* Oct. 1991, 117(10), p.109-110, 6 refs.
Marine transportation, Icebreakers, Ice navigation, Military transportation, Cold weather operation, Nuclear power.

47-243
Effect of static electric fields on protonic conductivity of ice single crystals.
Petrenko, V.F., et al, *Philosophical magazine B,* Sep. 1992, 66(3), p.341-353, 15 refs. For another source see 46-3850.
Schulson, E.M.
Ice crystals, Ice physics, Electric fields, Ice electrical properties, Electrical resistivity, Proton transport, Ice solid interface, Charge transfer, Temperature effects.

47-244
Investigation of evolution of the Arctic shelf cryolithozone by mathematical simulation.
Sigunov, IU.A., et al, *Soviet geology and geophysics,* 1992, 32(8), p.13-19, Translated from Geologiia i geofizika. 24 refs.
Fartyshev, A.I.
Geocryology, Temperature distribution, Permafrost transformation, Degradation, Sea level, Ice shelves, Forecasting, Mathematical models, Thermal regime.

47-245
Low-temperature shaping of thick-walled composite rings.
Stephanychev, E.I., et al, *Mechanics of composite materials,* Jan. 1992, 27(4), p.478-481, Translated from Mekhanika kompozitnikh materialov, 1991, No.4. 7 refs.
Composite materials, Polymers, Manufacturing, Cryogenics, Low temperature research, Viscosity, Temperature effects, Cellular plastics, Physical properties.

47-246
High porosity of basal till at Burroughs glacier, southeastern Alaska.
Ronnert, L., et al, *Geology,* Sep. 1992, 20(9), p.849-852, 28 refs.
Mickelson, D.M.
Glacial geology, Sediment transport, Glacial deposits, Glacier ice, Ice melting, Soil structure, Porosity, Subglacial observations, Grain size, Ice composition.

47-247
Third moments and correlation moments for supercooled liquid water N,P,T ensembles: low-temperature singularity and critical point.
Walrafen, G.E., et al, *Journal of physical chemistry,* Apr. 30, 1992, 96(9), p.3840-3846, 22 refs.
Chu, Y.C.
Water, Thermodynamic properties, Supercooling, Temperature effects, Homogeneous nucleation, Correlation, Low temperature research.

47-248
Reaction of chlorine nitrate with protonated water clusters: a model for heterogeneous reactions on polar stratospheric clouds.
Nelson, C.M., et al, *Journal of physical chemistry,* July 23, 1992, 96(15), p.6112-6115, 28 refs.
Okumura, M.
Cloud physics, Simulation, Ice vapor interface, Ice surface, Heterogeneous nucleation, Chemical properties, Ionization, Atmospheric density, Protons.

47-249
Molecular interactions with icy surfaces: infrared spectra of CO absorbed in microporous amorphous ice.
Devlin, J.P., *Journal of physical chemistry,* July 23, 1992, 96(15), p.6185-6188, 16 refs.
Ice physics, Amorphous ice, Absorption, Ice vapor interface, Ice surface, Molecular structure, Ice spectroscopy, Surface properties, Deuterium oxide ice.

47-250
Increasing ion pairing and aggregation in supercooled and glassy dilute aqueous electrolyte solution as seen by FTIR spectroscopy of alkali metal thiocyanates.
Hage, W., et al, *Journal of physical chemistry,* July 23, 1992, 96(15), p.6488-6493, 47 refs.
Hallbrucker, A., Mayer, E.
Solutions, Supercooling, Water structure, Temperature effects, Ions, Infrared spectroscopy, Spectra, Cryobiology, Density (mass/volume).

47-251
Far-IR study of irradiated amorphous ice: an unreported oscillation between amorphous and crystalline phases.
Hudson, R.L., et al, *Journal of physical chemistry,* July 23, 1992, 96(15), p.6500-6504, 33 refs.
Moore, M.H.
Ice physics, Amorphous ice, Phase transformations, Stability, Radiation absorption, Ionization, Extraterrestrial ice, Simulation, Spectra.

47-252
Effects of high liquid water content on thunderstorm charging.
Saunders, C.P.R., et al, *Journal of geophysical research,* Sep. 20, 1992, 97(D13), p.14,671-14,676, 17 refs.
Brooks, I.M.
Thunderstorms, Cloud electrification, Cloud physics, Ice crystal collision, Snow pellets, Water films, Ice accretion, Charge transfer, Atmospheric physics, Simulation, Cloud chambers.

47-253
Characteristics of rhizobia isolated from three legumes indigenous to the Canadian high arctic: *Astragalus alpinus, Oxytropis maydelliana,* and *Oxytropis arctobia.*
Prévost, D., et al, *Plant and soil,* 1987, 98(3), p.313-324, 27 refs.
Soil microbiology, Plant ecology, Bacteria, Nutrient cycle, Roots, Plant physiology, Acclimatization, Cold tolerance, Canada.

47-254
Bothnian Experiment in Preparation for ERS-1, 1988 (BEPERS-88)—an overview.
Askne, J., et al, *International journal of remote sensing,* Sep. 10, 1992, 13(13), p.2377-2398, 39 refs.
Leppäranta, M., Thompson, T.
Sea ice, Remote sensing, Ice conditions, Ice surveys, Classifications, Airborne radar, Synthetic aperture radar, Performance, Ice reporting, Sensor mapping, Research projects.

47-255
Classification of low-salinity sea ice types by ranging scatterometer.
Hyyppä, J., et al, *International journal of remote sensing,* Sep. 10, 1992, 13(13), p.2399-2413, 10 refs.
Hallikainen, M.
Sea ice, Airborne radar, Synthetic aperture radar, Classifications, Radar echoes, Backscattering, Salinity, Polarization (waves), Ice conditions.

47-256
Relation between SAR imagery and regional sea ice ridging characteristics from BEPERS-88.
Similä, M., et al, *International journal of remote sensing,* Sep. 10, 1992, 13(13), p.2415-2432, 35 refs.
Leppäranta, M., Granberg, H.B., Lewis, J.E.
Sea ice, Airborne radar, Synthetic aperture radar, Pressure ridges, Detection, Radar photography, Backscattering, Surface structure, Data processing, Correlation.

47-257
Observations of the snowcover on sea ice in the Gulf of Bothnia.
Crocker, G.B., *International journal of remote sensing,* Sep. 10, 1992, 13(13), p.2433-2445, 14 refs.
Sea ice, Snow cover, Snow cover effect, Physical properties, Sampling, Remote sensing, Synthetic aperture radar, Backscattering, Surface roughness, Accuracy, Image processing.

47-258
C-band radar backscatter of Baltic Sea ice: theoretical predictions compared with calibrated SAR measurements.
Ulander, L.M.H., et al, *International journal of remote sensing*, Sep. 10, 1992, 13(13), p.2447-2468, 38 refs.
Johansson, R., Askne, J.
Sea ice, Radar echoes, Backscattering, Synthetic aperture radar, Snow cover effect, Airborne radar, Surface roughness, Polarization (waves), Correlation.

47-259
Effects of ice ridge properties on calculated surface backscattering in BEPERS-88.
Manninen, A.T., *International journal of remote sensing*, Sep. 10, 1992, 13(13), p.2469-2487, 15 refs.
Sea ice, Ice models, Radar echoes, Backscattering, Synthetic aperture radar, Pressure ridges, Surface roughness, Specular reflection, Polarization (waves).

47-260
SAR image classification of ice in the Gulf of Bothnia.
Sun, Y., et al, *International journal of remote sensing*, Sep. 10, 1992, 13(13), p.2489-2514, 27 refs.
Carlström, A., Askne, J.
Sea ice, Radar photography, Synthetic aperture radar, Classifications, Image processing, Performance, Surface structure.

47-261
Arctic contaminants: sources, occurrence and pathways.
Barrie, L.A., et al, *Science of the total environment*, July 15, 1992, 122(1-2), p.1-74, Refs. p.64-74.
Ecosystems, Snow impurities, Air pollution, Water pollution, Origin, Hydrocarbons, Fallout, Chemical analysis, Environmental protection, Atmospheric circulation.

47-262
Arctic marine ecosystem contamination.
Muir, D.C.G., et al, *Science of the total environment*, July 15, 1992, 122(1-2), p.75-134, Refs. p.125-134.
Ecosystems, Ecology, Ocean environments, Marine biology, Water pollution, Chemical analysis, Atmospheric circulation, Hydrocarbons, Environmental protection.

47-263
Arctic terrestrial ecosystem contamination.
Thomas, D.J., et al, *Science of the total environment*, July 15, 1992, 122(1-2), p.135-164, Refs. p.161-164.
Tracey, B., Marshall, H., Norstrom, R.J.
Ecosystems, Ecology, Soil pollution, Fallout, Waste disposal, Chemical analysis, Hydrocarbons, Environmental protection, Petroleum industry.

47-264
Presence and implications of chemical contaminants in the freshwaters of the Canadian Arctic.
Lockhart, W.L., et al, *Science of the total environment*, July 15, 1992, 122(1-2), p.165-245, Refs. p.233-245.
Ecosystems, Ecology, Surface waters, Water pollution, Water chemistry, Chemical analysis, Hydrocarbons, Environmental protection.

47-265
Solution of inverse heat conduction problems with phase changes by the mollification method.
Murio, D.A., *Computers & mathematics with applications*, Oct. 1992, 24(7), p.45-57, 12 refs.
Liquid solid interfaces, Phase transformations, Heat flux, Stefan problem, Analysis (mathematics), Computer programs.

47-266
Case studies of the atmospheric boundary layer structure over sea ice for weakly unstable conditions.
Myrhaug, D., *Journal of wind engineering and industrial aerodynamics*, Apr. 1992, 40(1), p.93-99, 5 refs.
Atmospheric physics, Shear stress, Boundary layer, Temperature inversions, Air flow, Ice air interface, Ice cover effect, Sea ice, Temperature gradients.

47-267
Spatial-temporal variability of surface inversions in the Arctic.
Timerev, A.A., et al, *Soviet meteorology and hydrology*, 1991, No.7, p.39-44, Translated from Meteorologiia i gidrologiia, 17 refs.
Egorova, S.A.
Polar atmospheres, Atmospheric composition, Temperature inversions, Aerosols, Air pollution, Sounding, Periodic variations, Atmospheric circulation.

47-268
Examination of the binding energy of small to medium sized systems using ab initio and semi-empirical calculations.
White, J.C., Bloomington, Indiana University, 1991, 159p., University Microfilms order No.DA9212308, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, May 1992, 52(11), p.5854.
Hydrogen bonds, Molecular energy levels, Ice crystal structure, Mathematical models.

47-269
Physics of fracture in ice.
Wei, Y.C., Potsdam, Clarkson University, 1991, 80p., University Microfilms order No.DA9207825, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Apr. 1992, 52(10), p.5481.
Ice cracks, Ice deformation, Ice creep, Ice strength, Ice microstructure, Crack propagation.

47-270
Influence of air-void system on freeze-thaw durability of concrete.
Malik, Z.A., Ann Arbor, University of Michigan, 1991, 255p., University Microfilms order No.-DA9208611, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Apr. 1992, 52(10), p.5423.
Concrete freezing, Concrete durability, Air entrainment, Frost resistance, Frost protection, Freeze thaw tests, Mathematical models.

47-271
Nitrogen oxides in the arctic troposphere.
Honrath, R.E., Jr., Fairbanks, University of Alaska, 1991, 289p., University Microfilms order No.-DA9209707, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Apr. 1992, 52(10), p.5173.
Polar atmospheres, Air pollution, Atmospheric composition, Atmospheric circulation, Photochemical reactions, Ozone, Mathematical models.

47-272
Simulation of the recurrence probability of ice islands in the Arctic Ocean.
Li, F.C., Fairbanks, University of Alaska, 1991, 169p., University Microfilms order No.DA9209700, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Apr. 1992, 52(10), p.5159.
Ice islands, Drift, Sea ice distribution, Ice forecasting, Statistical analysis, Mathematical models.

47-273
Numerical study of movement of an icebreaking tanker moored to an offshore SPM terminal in arctic condition.
Jo, C.H., College Station, Texas A and M University, 1991, 152p., University Microfilms order No.-DA9206514, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Mar. 1992, 52(9), p.4875.
Ice solid interface, Ice loads, Ice pressure, Ice cover strength, Ice breaking, Ice deformation, Moorings, Metal ice friction, Tanker ships, Mathematical models.

47-274
D-crackability: a finite element measure.
Blanpied, G.D., Jr., Rolla, University of Missouri, 1991, 310p., University Microfilms order No.-DA9206122, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Mar. 1992, 52(9), p.4872.
Concrete durability, Concrete freezing, Frost resistance, Freeze thaw tests, Cracking (fracturing), Mathematical models.

47-275
Optical search for surface melting of ice.
Elbaum, M., Seattle, University of Washington, 1991, 166p., University Microfilms order No.DA9131641, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Mar. 1992, 52(9), p.4801.
Ice melting, Ice crystal optics, Ice surface.

47-276
Bacterial ice nucleation proteins: kinetics of assembly and membrane locations of functional ice nuclei.
Ruggles, J.A., Boulder, University of Colorado, 1991, 140p., University Microfilms order No.DA9206631, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Mar. 1992, 52(9), p.4713.
Cryobiology, Organic nuclei, Bacteria, Ice nuclei.

47-277
Frost tolerance of tobacco plants transformed with the gene encoding the antifreeze-protein from winter flounder *(Pseudopleuronectes americanus)*.
Lee, J.S., Baton Rouge, Louisiana State University, 1991, 136p., University Microfilms order No.-DA9207516, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Mar. 1992, 52(9), p.4709.
Cryobiology, Antifreezes, Plant physiology, Plant tissues, Frost resistance.

47-278
Rock glaciers and the Holocene paleoclimatic record of the La Sal Mountains, Utah.
Nicholas, J.W., Athens, University of Georgia, 1991, 208p., University Microfilms order No.DA9206973, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Mar. 1992, 52(9), p.4651.
Rock glaciers, Paleoclimatology, Glacier formation, Glacial deposits, Geochronology, Soil dating, United States—Utah.

47-279
Dendritic growth of ice crystals with natural convection.
Koo, K.K., Troy, Rensselaer Polytechnic Institute, 1991, 192p., University Microfilms order No.-DA9202185, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Feb. 1992, 52(8), p.4345.
Dendritic ice, Ice crystal growth, Convection, Surface energy, Mathematical models.

47-280
Effect of stress state on the brittle compressive failure of columnar ice.
Smith, T.R., Hanover, Dartmouth College, 1991, 223p., University Microfilms order No.DA9130841, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Jan. 1992, 52(7), p.3867.
Ice cover strength, Ice loads, Ice pressure, Ice cracks, Ice deformation, Ice microstructure, Crack propagation, Strain tests, Mathematical models.

47-281
Application of seismic processing techniques to ice and ground penetrating radar data.
Fisher, E.A., Dallas, University of Texas, 1991, 145p., University Microfilms order No.DA9135511, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Jan. 1992, 52(7), p.3499.
Subglacial observations, Glacier thickness, Glacier surveys, Bottom topography, Radio echo soundings, Seismic reflection, Data processing.

47-282
Late Quaternary glaciation and climatic change in the northern Peruvian Andes.
Rodbell, D.T., Boulder, University of Colorado, 1991, 233p., University Microfilms order No.DA9132607, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Jan. 1992, 52(7), p.3495.
Alpine glaciation, Quaternary deposits, Paleoclimatology, Glacial deposits, Geochronology, Glacial geology, Peru.

47-283
Hydrologic control of sliding velocity in two Alaskan glaciers: observation and theory.
Fahnestock, M.A., Pasadena, California Institute of Technology, 1991, 120p., University Microfilms order No.DA9137228, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Jan. 1992, 52(7), p.3490.
Basal sliding, Glacial hydrology, Glacier flow, Glacier surges, Subglacial drainage, Mathematical models.

47-284
Design of systems for time-delayed activated internal release of chemicals in concrete from porous fibers, aggregates or prills, to improve durability.
Dry, C.M., Blacksburg, Virginia Polytechnic Institute, 1991, 224p., University Microfilms order No.-DA9126872, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Oct. 1991, 52(4), p.2238.
Concrete admixtures, Concrete durability, Frost protection, Antifreezes.

47-285
Microwave remote sensing of random media using multiple scattering theory.
Mudaliar, S., Syracuse, Syracuse University, 1990, 244p., University Microfilms order No.DA9126119, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Oct. 1991, 52(4), p.2114.
Remote sensing, Scattering, Microwaves, Wave propagation, Ice surveys, Ice detection, Ice reporting, Mathematical models.

47-286
Structure-function relationships of insect antifreeze proteins.
Wu, D.W., South Bend, University of Notre Dame, 1991, 187p., University Microfilms order No.-DA9121288, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Oct. 1991, 52(4), p.2014.
Cryobiology, Antifreezes, Organic nuclei, Cold tolerance.

47-287
Effect of ice nucleating active bacteria on insect cold-hardiness.
Strong-Gunderson, J.M., Oxford, Miami University, 1991, 83p., University Microfilms order No.-DA9127145, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Oct. 1991, 52(4), p.1831.
Cryobiology, Organic nuclei, Bacteria, Ice nuclei, Cold tolerance.

47-288
Laboratory measurements of the single-scattering properties of ammonia ice crystals.
Pope, S.K., Tucson, University of Arizona, 1991, 130p., University Microfilms order No.DA9123146, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Sep. 1991, 52(3), p.1494.
Extraterrestrial ice, Ice spectroscopy, Planetary environments, Ice detection, Ice crystals.

47-289
Sequence and characterization of *Xanthomonas campestris* pv. *translucens* ice nucleation gene *inaX*.
Zhao, J.L., Moscow, University of Idaho, 1990, 179p., University Microfilms order No.DA9122141, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Sep. 1991, 52(3), p.1420.
Cryobiology, Organic nuclei, Bacteria, Microbiology, Ice nuclei.

47-290
Quaternary geology and late-Quaternary environments of the Holitna lowland and Chuilnuk-Kiokluk Mountains region, interior southwestern Alaska.
Waythomas, C.F., Boulder, University of Colorado, 1990, 305p., University Microfilms order No.-DA9122656, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Sep. 1991, 52(3), p.1320.
Alpine glaciation, Quaternary deposits, Stratigraphy, Glacial deposits, Geochronology, Geological surveys, Paleoclimatology, United States—Alaska.

47-291
Postglacial deformation.
James, T.S., Princeton, Princeton University, 1991, 198p., University Microfilms order No.DA9124900, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Sep. 1991, 52(3), p.1314.
Glaciation, Isostasy, Gravity anomalies, Earth crust, Tectonics, Mathematical models.

47-292
Lithologic mapping in the southwestern Greenland and Nubian shields using field, laboratory, and Landsat thematic mapper data.
Rivard, B., St. Louis, Washington University, 1990, 238p., University Microfilms order No.DA9122397, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Sep. 1991, 52(3), p.1309.
Soil mapping, Terrain identification, Soil surveys, Lithology, Tundra, Spaceborne photography, LANDSAT, Greenland.

47-293
Soil-geomorphic analysis of late-Quaternary glaciation and faulting, eastern escarpment of the central Sierra Nevada, California.
Berry, M.E., Boulder, University of Colorado, 1990, 376p., University Microfilms order No.DA9123429, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Sep. 1991, 52(3), p.1303.
Alpine glaciation, Quaternary deposits, Soil dating, Glacial deposits, Geochronology, Geomorphology, United States—California—Sierra Nevada.

47-294
Geochemical heterogeneity in a glacial outwash aquifer: effect of particle size and mineralogy on sorption of nonionic organic solutes.
Barbar, L.B., II, Boulder, University of Colorado, 1990, 247p., University Microfilms order No.-DA9123426, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Sep. 1991, 52(3), p.1302.
Outwash, Ground water, Soil pollution, Water pollution, Geochemistry, Soil chemistry.

47-295
Processes controlling nitrogen release and turnover in arctic tundra.
Kielland, K., Fairbanks, University of Alaska, 1990, 192p., University Microfilms order No.DA9121905, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Sep. 1991, 52(3), p.1193.
Tundra, Nutrient cycle, Soil chemistry, Plant ecology, Plant physiology, Ecosystems, Soil microbiology, Biomass.

47-296
Plant reproductive ecology and community structure along a subalpine snowmelt gradient.
Ingersoll, C.A., Corvallis, Oregon State University, 1991, 184p., University Microfilms order No.-DA9125148, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Sep. 1991, 52(3), p.1192.
Snowmelt, Plant ecology, Vegetation patterns, Snow cover effect, Snow line, Alpine landscapes, Phenology.

47-297
Influence of topography on soil acidity and hydrogen ion budgets in an arctic landscape.
Valentine, D.W., Durham, Duke University, 1990, 146p., University Microfilms order No.DA9119336, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Aug. 1991, 52(2), p.705.
Tundra, Soil chemistry, Nutrient cycle, Arctic landscapes, Topographic effects.

47-298
Experiments on the solidification of a binary alloy in a rectangular cavity.
Cao, W.Z., Chicago, University of Illinois, 1990, 186p., University Microfilms order No.DA9115001, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, July 1991, 52(1), p.470.
Solidification, Phase transformations, Liquid solid interfaces, Solid phases, Artificial ice.

47-299
Stochastic approaches for forecasting monthly streamflows.
Wang, D.C., Fort Collins, Colorado State University, 1990, 278p., University Microfilms order No.-DA9117216, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, July 1991, 52(1), p.412.
Runoff forecasting, Stream flow, Snow water equivalent, Statistical analysis.

47-300
Backscattering by nonspherical particles, using the coupled-dipole method: an application in radar meteorology.
Dungey, C.E., University Park, Pennsylvania State University, 1990, 152p., University Microfilms order No.DA9117673, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, July 1991, 52(1), p.296.
Ice detection, Weather observations, Ice crystal size, Weather forecasting, Meteorological instruments, Backscattering, Radar echoes, Mathematical models.

47-301
Investigations in Martian geology. Part 1: Nature of the mantling deposit in the heavily cratered terrain of northeastern Arabia, Mars. Part 2: Experimental studies of clean and dust-or-sand covered ice sublimation under Mars-like conditions.
Moore, J.M., Tempe, Arizona State University, 1990, 179p., University Microfilms order No.DA9116769, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, July 1991, 52(1), p.294.
Mars (planet), Extraterrestrial ice, Ice sublimation, Planetary environments.

47-302
Stochastic model of flow duration curves for rivers in British Columbia, Canada.
Leboutillier, D.W., Gainesville, University of Florida, 1990, 148p., University Microfilms order No.-DA9116003, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, July 1991, 52(1), p.133.
River flow, Runoff forecasting, Snowmelt, Meltwater, Stream flow, Statistical analysis, Canada—British Columbia.

47-303
Stratigraphy of Late Wisconsinan deposits in the lower Sandy River valley, New Sharon and Mercer, Maine, and relations with till stratigraphy in adjacent areas.
Weddle, T.K., Boston Boston University, 1991, 422p. (2 vols.), University Microfilms order No.-DA9113525, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, July 1991, 52(1), p.128.
Glacial deposits, Stratigraphy, Quaternary deposits, Geochronology, Soil classification, United States—Maine.

47-304
Heat transfer and population characteristics in multiphase-dispersed media with phase change.
Core, K.L., Raleigh, North Carolina State University, 1990, 99p., University Microfilms order No.-DA9112148, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, June 1991, 51(12), p.6061.
Heat transfer, Phase transformations, Coolants, Desalting.

47-305
Chemical and physical processes affecting the transport and fate of semivolatile organic contaminants in the environment.
Cotham, W.E., Jr., Columbia, University of South Carolina, 1990, 208p., University Microfilms order No.DA9113792, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, June 1991, 51(12), p.5835.
Air pollution, Atmospheric circulation, Atmospheric composition, Polar atmospheres.

47-306
Studies in cloud physics: electrification, glaciation, and turbulence.
Baker, B.A., Seattle, Univ[illegible]y of Washington, 1990, 97p., University Microfilms order No.DA9109781, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, June 1991, 51(12), p.5923.
Cloud electrification, Cloud physics, Ice crystal collision, Ice nuclei, Thunderstorms, Turbulence.

47-307
Growth, evaporation and melting of ice crystals: implications for radiation, atmospheric dynamics and particle scavenging.
Oraltay, R.G., Reno, University of Nevada, 1990, 126p., University Microfilms order No.DA9110599, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, May 1991, 51(11), p.5378.
Ice crystal growth, Ice sublimation, Ice melting, Scavenging, Aerosols, Cloud physics.

47-308
Microphysical, chemical and meteorological aspects of aerosol hazes in the Arctic.
Brock, C.A., Seattle, University of Washington, 1990, 323p., University Microfilms order No.DA9109786, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, May 1991, 51(11), p.5377.
Polar atmospheres, Haze, Air pollution, Atmospheric circulation, Atmospheric composition, Aerosols.

47-309
Motion of a weighted wire through ice in the regelation and recrylation regimes.
Cowles, J.H., Jr., Storrs, University of Connecticut, 1990, 201p., University Microfilms order No.-DA9100609, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Feb. 1991, 51(8), p.4014.
Regelation, Ice deformation, Recrystallization.

47-310
Mathematical simulation and laboratory duplication of concrete scaling.
Adkins, D.F., Logan, Utah State University, 1990, 202p., University Microfilms order No.DA9023867, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Jan. 1991, 51(7), p.3487.
Concrete freezing, Concrete durability, Concrete pavements, Cost analysis, Environmental tests, Laboratory techniques, Mathematical models.

47-311
Climate processes of lake evaporation and snowmelt runoff: Part I. Evaporation rates from temperature-stratified saline lakes—Mono Lake as a case study. Part II. Snowmelt runoff and climate change—Emerald Lake basin as a case study.
Tsuang, B.J., Los Angeles, University of California, 1990, 380p., University Microfilms order No.-DA9035262, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Jan. 1991, 51(7), p.3296.
Snowmelt, Runoff forecasting, Watersheds, Salt lakes, Evaporation, Climatic factors, Global warming, Computerized simulation.

47-312
Autecology of aquatic and terrestrial growth forms of *Arctophila fulva*, an arctic tundra grass of northern Alaska.
Dobson, J.L., Moscow, University of Idaho, 1989, 73p., University Microfilms order No.DA9022080, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Jan. 1991, 51(7), p.3227.
Tundra, Grasses, Plant ecology, Plant physiology, Phenology, Growth, Biomass, United States—Alaska.

47-313
Quantifying ice nucleation by silver iodide aerosols.
DeMott, P.J., Fort Collins, Colorado State University, 1990, 281p., University Microfilms order No.-DA9029411, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Dec. 1990, 51(6), p.2940.
Cloud seeding, Artificial nucleation, Silver iodide, Aerosols, Weather modification, Cloud physics, Cloud chambers, Ice forecasting, Mathematical models.

47-314
Hormonal control of hemolymph lipoprotein ice nucleators and antifreeze proteins in freeze-resistant insects.
Xu, L., South Bend, University of Notre Dame, 1990, 106p., University Microfilms order No.DA9033094, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Dec. 1990, 51(6), p.2728.
Cryobiology, Antifreezes, Organic nuclei, Cold tolerance.

47-315
Glaciological zonation and seasonal snow resources throughout the world. [Gliatsiologicheskoe raĭonirovanie i sezonnye snegozapasy zemnogo shara]
Kotliakov, V.M., et al, *Materialy gliatsiologicheskikh issledovanĭ*, May 1991, Vol.72, p.4-19, In Russian with English summary.
Snow cover distribution, Glaciation, Glaciology.
The areas and volumes (in the water equivalent) of seasonal snow cover in 10 sub-latitudinal glaciological zones have been calculated from the maps of snow and ice storage in the World Atlas of Snow and Ice Resources. These zones are united into five glaciological belts, subdivided by submeridional boundaries into 36 glaciological provinces. The area of sea ice and snow cover spreading on it in both the hemispheres is nearly equal, while the areas of inland snow cover differ greatly. The volumes of snow cover on the Southern and Northern Hemispheres as well as the volumes of snow cover on the land and sea ice are close. The volumes of snow storage formed by the moisture of different oceans correlate with the value of corresponding snow-covered areas, where the thickness of snow layer formed by the moisture of different oceans equals 20 cm. 50% of solid precipitation falls outside the limits of the ocean basin—the source of moisture. (Auth. mod.)

47-316
Macroscale characteristics of snow cover distribution throughout the world. [Makromasshtabnye osobennosti raspredeleniia snezhnogo pokrova na zemnom share]
Loktionova, E.M., *Materialy gliatsiologicheskikh issledovanĭ*, May 1991, Vol.72, p.20-28, In Russian with English summary.
Snow cover distribution, Snow accumulation.
Changes in the snow cover of the globe are analyzed in this paper. The regularities of the interrelations between these properties in the Northern and Southern Hemispheres have been established. On the basis of the data obtained, it is assumed that the change of circulation epochs in the Northern Hemisphere can be brought about, along with other causes, by the changing areas occupied by seasonal snow cover. The spatial generalization of the regime regularities of snow cover and its distribution over all climatic belts of the Earth was conducted with due regard to the typization of snow cover in mountain systems. (Auth.)

47-317
Snow cover of non-Soviet Asia. [Snezhnyĭ pokrov zarubezhnoĭ Azii]
Kadomtseva, T.G., *Materialy gliatsiologicheskikh issledovanĭ*, May 1991, Vol.72, p.28-34, In Russian with English summary.
Snow cover, Snow cover distribution, Snow depth.

47-318
Snow cover distribution in the upland zones of the Greater Caucasus. [Raspredelenie snezhnogo pokrova v vysotno-landshaftnykh zonakh Bol'shogo Kavkaza]
Loktionova, E.M., et al, *Materialy gliatsiologicheskikh issledovanĭ*, May 1991, Vol.72, p.34-39, In Russian with English summary.
Kadomtseva, T.G.
Snow cover distribution, Snow surveys, Landscape types, USSR—Caucasus.

47-319
Regularities and distribution of snow cover in the high mountain regions of the Greater Caucasus. [Zakonomernosti formirovaniia i raspredeleniia snezhnogo pokrova vysokogorii Bol'shogo Kavkaza]
Menshutin, V.M., *Materialy gliatsiologicheskikh issledovanĭ*, May 1991, Vol.72, p.39-43, In Russian with English summary.
Snow cover, Snow cover distribution, Snow density, USSR—Caucasus.

47-320
Main factors in the distribution of snow cover on mountain slopes. [Osnovnye faktory raspredeleniia snezhnogo pokrova na gornykh sklonakh]
Kravchenko, G.N., *Materialy gliatsiologicheskikh issledovanĭ*, May 1991, Vol.72, p.43-48, In Russian with English summary.
Snow cover distribution, Slopes.

47-321
Mesoscale interactions in the snow cover-atmosphere system during a period of snow melting on the southern slope of the Greater Caucasus. [Mezomasshtabnye vzaimodeĭstviia v sisteme snezhnyĭ pokrov-atmosfera v period snegotaianiia na iuzhnom sklone Bol'shogo Kavkaza]
Loktionova, E.M., et al, *Materialy gliatsiologicheskikh issledovanĭ*, May 1991, Vol.72, p.48-53, In Russian with English summary.
Menshutin, V.M.
Snow air interface, Snow melting, USSR—Caucasus.

47-322
Current state of the regime of glacier systems in the world. [Sovremennoe sostoianie rezhima lednikovykh sistem zemli]
Krenke, A.N., et al, *Materialy gliatsiologicheskikh issledovanĭ*, May 1991, Vol.72, p.55-66, In Russian with English summary.
Rototaeva, O.V., Chernova, L.P.
Glacier ablation, Glacier alimentation, Glacier mass balance, Glacier oscillation.
Results of the analysis of spatial changes in mass balance components of glaciers—accumulation and ablation—lead to the conclusion that the main regularities of their regime variations are, first of all, the relationship to geographical latitude; secondly, the distance from the oceans nourishing glaciers with precipitation; and thirdly, the location of glaciers on the windward or leeward sides of mountain systems. The global surface of the chionosphere, the influence of climatic conditions and topography on the extent and spatial structure of glacierization in different latitudinal zones, the contribution of accumulation and ablation conditions to the formation of mass-exchange fields, and the main processes of ice formation, are characterized. The role of glaciers in the moisture-exchange of the planet has been evaluated. Features of time changes of glaciers for the last 400 years, and in particular in the third quarter of the 20th century, are shown. (Auth.)

47-323
Interrelations of the characteristics of glaciation in regional glacier systems. [Vzaimosviazi kharakteristik oledeneniia v regional'nykh lednikovykh sistemakh]
Glebova, L.N., et al, *Materialy gliatsiologicheskikh issledovanĭ*, May 1991, Vol.72, p.67-76, In Russian with English summary.
Glaciation, Mapping, Glacier surveys, Topographic maps, Glacier alimentation.

47-324
Glacier system of Afghanistan: morphology, climate, mass exchange, and runoff. [Lednikovaia sistema Afganistana: morfologiia, klimat, massoobmen, stok]
Lebedeva, I.M., et al, *Materialy gliatsiologicheskikh issledovanĭ*, May 1991, Vol.72, p.76-87, In Russian with English summary.
Larin, A.D.
Glacier surveys, Glacier mass balance, Glacier flow, Glacial meteorology, Glacial rivers, Runoff, Afghanistan.

47-325
Evaluating the distribution and regime of Karakorum glaciers using data from space images. [Otsenka raspredeleniia i rezhima lednikov Karakoruma po materialam kosmicheskikh s"emok]
Nosenko, G.A., *Materialy gliatsiologicheskikh issledovanĭ*, May 1991, Vol.72, p.87-94, In Russian with English summary.
Spaceborne photography, Glacier surveys, Glacier mass balance, Glacier alimentation, Pakistan—Karakoram Range.

47-326
Calculating and mapping the fields of components in the water-ice balance of glaciers. [Raschet i kartirovanie polei elementov vodno-ledovogo balansa lednikov]
Bazhev, A.B., et al, *Materialy gliatsiologicheskikh issledovanĭ*, May 1991, Vol.72, p.94-102, In Russian with English summary.
Rototaeva, O.V., Khmelevskoĭ, I.F.
Glacier ice, Glacier alimentation, Ice water interface, Mapping, Analysis (mathematics), Glacier melting

47-327
Studying the stability of a snow catchment on a glacier. [Izuchenie ustoĭchivosti polia snegonakoplen na lednike]
Kunakhovich, M.G., *Materialy gliatsiologicheskikh issledovanĭ*, May 1991, Vol.72, p.102-107, In Russian with English summary.
Glacier surfaces, Snow accumulation, Snow cover stability.

47-328
Mass balance of the Altay glaciers and its climatic causes. [Balans massy lednikov Altaia i ikh klimaticheskaia obuslovlennost']
Narozhnyĭ, IU.K., *Materialy gliatsiologicheskikh issledovanĭ*, May 1991, Vol.72, p.107-116, In Russian with English summary.
Glacier mass balance, Climatic factors, Glacier alimentation, Glacier melting.

47-329
Numerical studies of the temperature, ice age and conditions of a glacier bed using the drilling results from Vostok Station in Antarctica. [Chislennoe izuchenie temperatury, vozrasta l'da i usloviĭ na dne lednika po rezul'tatam bureniia na stantsii Vostok v Antarktide]
Larina, T.B., *Materialy gliatsiologicheskikh issledovanĭ*, May 1991, Vol.72, p.123-131, In Russian with English summary. 10 refs.
Analysis (mathematics), Glacier ice, Glacier surfaces, Glacier beds, Glacier alimentation, Ice sheets, Ice temperature, Boreholes, Antarctica—Vostok Station.
Comprehensive experimental data obtained from the results of deep drilling at Vostok Station were assembled. The measurements conducted in the borehole yielded the temperature profile and age of the ice; the temperature and accumulation on the glacier surface in the area of the station for 165,000 years are known from the results of the isotope analysis. The behavior of the ice sheet surface in the same area and during the same period was estimated from the gas content in the ice. This paper also deals with the problem of vertical ice flow in ice sheets and with conditions on the glacier bed. Computations have been made for different basal conditions: freezing, melting-freezing and the presence of a subglacial lake. The borehole was not drilled on the ice divide, and therefore its results are for evaluation purposes only. If data on the ice divide were available, it would have been possible to make more reliable predictions. (Auth. mod.)

47-330
Integrating the equations of motion of an ice sheet. [Integrirovanie uravneniĭ dvizheniia pokrovnogo lednika]
Ivanov, A.I., *Materialy gliatsiologicheskikh issledovanĭ*, May 1991, Vol.72, p.131-136, In Russian with English summary. 5 refs.
Mathematical models, Ice creep, Ice cover, Hydrodynamics, Ice mechanics.

47-331
Model evaluations of the Aksay and At-Bashi river runoff with regard to the role of snow cover and glaciers. [Model'nye otsenki stoka rek Ak-Saĭ i At-Bashy s uchetom roli snezhnogo pokrova i lednikov]
Shentsis, I.D., *Materialy gliatsiologicheskikh issledovanĭ*, May 1991, Vol.72, p.136-142, In Russian with English summary. 5 refs.
Runoff, Runoff forecasting, Rivers, Snow cover effect, Mathematical models, Glacier melting, USSR—Aksay River, USSR—Atbashi River.

47-332
Effect of the morphology of Alpine glaciers on the interrelations between their termini displacement and annual mass balance. [Vliianie morfologii lednikov Al'p na vzaimosviaz' peremeshcheniia ikh kontsov s godovym balansom massy]
Tiulina, T.IU., *Materialy gliatsiologicheskikh issledovanii*, May 1991, Vol.72, p.142-147, In Russian with English summary. 4 refs.
Glacier tongues, Glacier mass balance, Glacier oscillation, Glacier surveys.

47-333
Mineralization of natural waters on Spitsbergen. [Mineralizatsiia prirodnykh vod na Shpitsbergene]
Gokhman, V.V., *Materialy gliatsiologicheskikh issledovanii*, May 1991, Vol.72, p.147-155, In Russian with English summary. 24 refs.
Water chemistry, Minerals, Runoff, Snow composition, Ice composition, Norway—Spitsbergen.

47-334
Morphological classification of the sites of origin of water-snow streams in Khibiny for estimating the range of their outburst. [Morfologicheskaia klassifikatsiia ochagov vodosnezhnykh potokov Khibin dlia opredeleniia dal'nosti ikh vybrosa]
Evteev, A.O., *Materialy gliatsiologicheskikh issledovanii*, May 1991, Vol.72, p.155-160, In Russian with English summary. 4 refs.
Stream flow, Streams, Slush, Snowmelt, USSR—Khibiny Mountains.

47-335
Scientific Workshop on Glaciology in the Institute of Geography, USSR Academy of Sciences: June 1990-March 1991. [Nauchnyi seminar po gliatsiologii v Institute geografii AN SSSR: iiun' 1990-mart 1991]
Shishorina, Zh.G., *Materialy gliatsiologicheskikh issledovanii*, May 1991, Vol.72, p.160, In Russian.
Glaciology, Meetings, Research projects.

47-336
Ice thickness and subglacial topography of the Fridtjof Glacier based on data from ground-based radar sounding. [Tolshchina l'da i podlednyi rel'ef lednika Frit'ofa po dannym nazemnoi radiolokatsionnoi s"emki]
Glazovskii, A.F., et al, *Materialy gliatsiologicheskikh issledovanii*, May 1991, Vol.72, p.161-166, In Russian with English summary. 10 refs.
Subglacial observations, Radio echo soundings, Glacier thickness, Glacier surfaces, Mapping, Radar echoes, Norway—Fridtjof Glacier.

47-337
Mass balance of Spitsbergen glaciers in 1988/89 and 1989/90 balance years. [Balans massy lednikov Shpitsbergena v 1988/89 i 1989/90 balansovykh godakh]
Troitskii, L.S., *Materialy gliatsiologicheskikh issledovanii*, May 1991, Vol.72, p.167-170, In Russian with English summary. 6 refs.
Glacier mass balance, Glacier surveys, Glacier ablation, Norway—Spitsbergen.

47-338
Distribution of chemical elements in the glacier cores obtained at Nordaustlandet. [Raspredelenie khimicheskikh elementov v lednikovykh kernakh s Severo-Vostochnoi Zemli]
Punning, IU.-M.K., et al, *Materialy gliatsiologicheskikh issledovanii*, May 1991, Vol.72, p.170-176, In Russian with English summary. 15 refs.
Tyugu, K.R.
Ice composition, Ice cores, Glacier surveys, Norway—Nordaustlandet.

47-339
Impact of summer snowfalls on glacier regimes in the Akshiyrak Massif. [Vliianie letnikh snegopadov na rezhim lednikov massiva Akshiĭrak]
Ushnurtsev, S.N., et al, *Materialy gliatsiologicheskikh issledovanii*, May 1991, Vol.72, p.176-181, In Russian with English summary. 9 refs.
Sokal'skaia, A.M.
Glaciology, Snowfall, Glacier ablation, Glacier alimentation, Snow line, Runoff, USSR—Tien Shan.

47-340
Spores and pollen from the glaciers and periglacial zone of the Arctic and Antarctica. [Pyl'tsa i spory s lednikov i prilednikovoi zony Arktiki i Antarktidy]
Surova, T.G., et al, *Materialy gliatsiologicheskikh issledovanii*, May 1991, Vol.72, p.181-185, In Russian with English summary. 9 refs.
Vtiurin, B.I., Troitskii, L.S.
Pollen, Spectra, Paleobotany, Periglacial processes, Atmospheric circulation, Antarctica, Norway—Spitsbergen.

Results of spore-pollen analysis of surface samples obtained from glaciers and in periglacial zones of the Arctic (Spitsbergen) and Antarctica are presented. Spore-pollen spectra of surface samples from Spitsbergen contain spores and pollen transported from far-away regions as well as from local vegetation. The small amount of pollen and spores in samples from glaciers is the result of transport through a single year only, while spore-pollen spectra from periglacial zones contain a combination of pollen and spores accumulated over several decades and even centuries. The composition of spectra from the Colsdalen Valley reflects, as a rule, local vegetal associations. Surface samples obtained in Antarctica mainly contain pollen and spores transported from New Zealand and South America. A man- made source of these is possible. It is evident that spore- pollen analysis of ground samples in high latitudes helps to specify the functioning of the Earth's atmospheric circulation now and in the recent past. (Auth. mod.)

47-341
Effect of ice flow on the distribution of fragmented material in a moraine. [Vozdeĭstvie dvizheniia l'da na raspredelenie oblomochnogo materiala v morene]
Demidov, I.N., *Materialy gliatsiologicheskikh issledovanii*, May 1991, Vol.72, p.186-190, In Russian with English summary. 6 refs.
Moraines, Lithology, Ice mechanics, Ice rafting.

47-342
Effect of glaciation on the paleoecological situation in northeastern USSR. [Vliianie oledeneniia na paleoekologicheskuiu obstanovku Severo-Vostoka SSSR]
Shishorina, Zh.G., *Materialy gliatsiologicheskikh issledovanii*, May 1991, Vol.72, p.190-195, In Russian with English summary. 21 refs.
Pleistocene, Paleoecology, Glaciation, Paleoclimatology, Vegetation patterns.

47-343
Classification of snow cover in avalanche-prone regions of the USSR, based on their stratigraphy and stability properties. [Tipizatsiia snezhnogo pokrova *lavinoopasnykh raĭonov SSSR na osnove ikh stratigraficheskikh* i prochnostnykh kharakteristik]
Troshkina, E.S., et al, *Materialy gliatsiologicheskikh issledovanii*, May 1991, Vol.72, p.196-200, In Russian with English summary. 8 refs.
Andreev, IU.B.
Snow stratigraphy, Snow cover stability, Snow strength, Snow cover structure.

47-344
Sixtieth birthday of Vladimir Mikhailovich Kotliakov. [Shestidesiatiletie Vladimira Mikhailovicha Kotliakova]
Grosval'd, M.G., et al, *Materialy gliatsiologicheskikh issledovanii*, May 1991, Vol.72, p.201-227, In Russian. 596 refs.
Dreĭer, N.N.
Bibliographies, Research projects.

47-345
Discovery of ice massifs in Late Pleistocene sediments in the Ural coast of Baydaratskaya Guba. [Nakhodka plastovykh l'dov v pozdnepleĭstotsenovykh otlozheniiakh ural'skogo poberezh'ia Baĭdaratskoĭ guby]
Koniakhin, M.A., et al, *Materialy gliatsiologicheskikh issledovanii*, May 1991, Vol.72, p.227-228, In Russian. 3 refs.
Ampleeva, T.V., Nikolaev, V.I.
Pleistocene, Paleoclimatology, Glacial geology.

47-346
Soviet glaciological studies in 1990. [Sovetskie gliatsiologicheskie issledovaniia v 1990 godu]
Glazovskiĭ, A.F., *Materialy gliatsiologicheskikh issledovanii*, May 1991, Vol.72, p.229-240, In Russian.
Research projects, Glaciology, Snow cover, Engineering geology, Ice cover, Glaciers, Paleoclimatology.
In 1990, glaciological studies were conducted in the Caucasus, Central Asia, the Khibiny Mountains, Siberia, the Far East and Kamchatka, and in the Arctic and Antarctica. Topics included glaciers, snow cover and avalanches, paleoglaciology, engineering geology, and ice cover. Studies in Antarctica included drilling and ice cores at Vostok Station, dynamics of regional sections of ice cover, nourishment of the ice cover by atmospheric precipitation, the absorption of electrical waves in a glacier at Vostok Station, electrical characteristics of snow-ice formation, radar characteristics of glacier ice, radar photography of glacier thickness near Progress Station, Emery Glacier, and thermal balance of glacier surfaces.

47-347
Tenth anniversary of research by the Glaciological Laboratory of the Institute of Geography, Siberian Branch of the AN SSSR. [Desiatiletie issledovanii laboratorii gliatsiologii Instituta geografii Sibirskogo otdeleniia AN SSSR]
Alekseev, V.R., *Materialy gliatsiologicheskikh issledovanii*, May 1991, Vol.72, p.240-244, In Russian. 38 refs.
Research projects, Glaciology.

47-348
Continuous 770-year record of volcanic activity from East Antarctica.
Moore, J.S., et al, *Journal of geophysical research*, Sep. 20, 1991, 96(D9), p.17,353-17,359, 23 refs.
Narita, H., Maeno, N.
Ice cores, Dielectric properties, Ice dating, Volcanic ash, Antarctica—Mizuho Plateau.
A 100 m ice core from site G15 on the Mizuho plateau has been analyzed using the dielectric profiling (DEP) technique. The capacitance and conductance of the core were measured at ac frequencies (20 Hz-300 kHz). The high-frequency conductivity profile shows variations that are primarily related to the strong acids derived from volcanic activity. The Tambora (1815) eruption can be identified with the aid of an approximate chronology based on the firn densification rate; other historic eruptions can then be recognized. Beyond about 300 years, historical observations are very few; however if a constant overall accumulation rate is assumed, a well-known eruption of 1259 A.D. can be found near the bottom of the core. Other peaks in the conductivity profile can than be assigned dates accurate to within a few years. By using the conductivity profile it is possible to estimate the relative acid deposition fluxes produced by the main eruptions with reasonable accuracy. (Auth. mod.)

47-349
Coherent Antarctic Radar Depth Sounder (CARDS) design, development and results.
Garudachar, R., Lawrence, University of Kansas, 1989, 169p., University Microfilms order No. 90-09888, Ph.D. thesis. Refs. p.136-148.
Glacier ice, Bottom topography, Radio echo soundings, Data processing, Ice electrical properties, Radar, Antarctica—West Antarctica.
A modern coherent ice probing radar for probing the ice sheets of Antarctica and Greenland has been designed and developed. It can be operated from a mobile truck or a Twin-Otter aircraft. It was successfully operated on Downstream B, a dynamic glacier in West Antarctica, in the austral summer of 1987-88. The system is an unfocused synthetic-aperture radar (SAR) where the along-track resolution is improved by coherent integration. It has a peak RF power of 20 w, range of 5 km and a range resolution of 5 m in ice. The peak power requirement is reduced by chirp technique; coherent and non-coherent integrations significantly enhance the system signal-to-noise ratio, further reducing the peak power. The system sensitivity including the antennas is -214 dB. The receiver has a dynamic range of more than 100 dB, achieved by a sensitivity time control (STC) circuit. The radar returns can be displayed in the field in near-real-time in a color image mode and also in an A-scope display. (Auth. mod.)

47-350
Laboratory studies of stratospheric trace constituents: ozone and nitric acid.
Hanson, D.R., Duluth, University of Minnesota, 1989, 85p., University Microfilms order No. 89-12805, Ph.D. thesis. Refs. passim.
Ozone, Simulation, Atmospheric composition, Human factors.
Models have been developed to understand and predict ozone trends in order to determine man-made perturbations to the ozone layer. A major anthropogenic ozone-destroying catalyst is chlorine; it is believed to be responsible for recent depletion of ozone levels at high altitudes globally and also for the antarctic ozone hole. There has been an effort to intercompare balloon-borne ozone monitors, especially at high altitudes, to develop a set of instruments to detect small changes in ozone. An ozone calibration system has been developed that simulates stratospheric ozone concentration. In the process of developing this system, a determination of the vapor pressure of ozone was made at liquid nitrogen temperatures. The pressure was measured to an accuracy within 1%, thus providing a well-known reproducible ozone concentration that can be used as an absolute ozone standard. Results support the claim that chlorine is directly responsible for the ozone hole. (Auth. mod.)

47-351
Sensitivity of glaciers and small ice caps to greenhouse warming.
Oerlemans, J., et al, *Science*, Oct. 2, 1992, 258(5097), p.115-117, 8 refs.
Fortuin, J.P.F.
Glacier mass balance, Ice sheets, Models.

47-352
Irregular oscillations of the west antarctic ice sheet.
MacAyeal, D.R., *Nature*, Sep. 3, 1992, 359(6390), p.29-32, 26 refs.
Ice sheets, Models, Ice deformation, Glacial deposits.
Model simulations of the West Antarctic ice sheet suggest that sporadic, perhaps chaotic, collapse (complete mobilization) of the ice sheet occurred throughout the past one million years. The irregular behavior is due to the slow equilibration time of the distribution of basal till, which lubricates ice-sheet motion. This nonlinear response means that predictions of future collapse of the ice sheet in response to global warming must take into account its past history, and in particular whether the present basal till distribution predisposes the ice sheet towards rapid change. (Auth.)

47-353
Numerical simulation of influence of the anomalies of the central-eastern equatorial Pacific SST and arctic sea ice cover in summer on the atmospheric circulation.
Yang, X.Q., et al, *Acta Oceanologica Sinica*, 1992, 11(3), p.401-411, 11 refs.
Huang, S.S.
Sea ice distribution, Ice cover effect, Air ice water interaction, Atmospheric circulation, Surface temperature, Heat transfer, Climatic factors, Simulation.

47-354
Foundations for statistical-physical precipitation retrieval from passive microwave satellite measurements. Part 1: brightness-temperature properties of a time-dependent cloud-radiation model.
Smith, E.A., et al, *Journal of applied meteorology*, June 1992, 31(6), p.506-531, 49 refs.
Cloud physics, Radiation balance, Precipitation (meteorology), Remote sensing, Radiometry, Ice crystal optics, Brightness, Water content, Weather forecasting, Scattering, Particle size distribution.

47-355
Rainfall estimation over oceans from SMMR and SSM/I microwave data.
Prabhakara, C., et al, *Journal of applied meteorology*, June 1992, 31(6), p.532-552, 44 refs.
Precipitation (meteorology), Radiometry, Marine meteorology, Ice crystal optics, Brightness, Scattering, Remote sensing, Weather forecasting, Accuracy.

47-356
Unsupervised segmentation of polarimetric SAR data using the covariance matrix.
Rignot, E.J., et al, *IEEE transactions on geoscience and remote sensing*, July 1992, 30(4), p.697-705, 22 refs.
Chellappa, R., Dubois, P.
Synthetic aperture radar, Airborne radar, Data processing, Backscattering, Sea ice, Classifications, Polarization (waves), Surface features, Image processing.

47-357
On the estimation of snow depth from microwave radiometric measurements.
Wang, J.R., et al, *IEEE transactions on geoscience and remote sensing*, July 1992, 30(4), p.785-792, 18 refs.
Chang, A.T.C., Sharma, A.K.
Snow depth, Remote sensing, Radiometry, Atmospheric attenuation, Radiation absorption, Snow cover effect, Brightness, Accuracy, Microwaves.

47-358
Date of snow disappearance on the arctic tundra as determined from satellite, meteorological station and radiometric *in situ* observations.
Foster, J.L., et al, *IEEE transactions on geoscience and remote sensing*, July 1992, 30(4), p.793-798, 30 refs. For another version see 46-4258.
Winchester, J.W., Dutton, E.G.
Snowmelt, Tundra, Remote sensing, Snow surveys, Radiometry, Snow cover distribution, Radiation balance, Seasonal variations, Accuracy.

47-359
Measurement on the dielectric properties of acid-doped ice at 9.7 GHz.
Fujita, S., et al, *IEEE transactions on geoscience and remote sensing*, July 1992, 30(4), p.799-803, 12 refs.
Shiraishi, M., Mae, S.
Doped ice, Ice composition, Dielectric properties, Electrical measurement, Chemical properties, Temperature effects, Remote sensing, Ice cover, Ice electrical properties.

47-360
Scattering model for snow-covered sea ice.
Tjuatja, S., et al, *IEEE transactions on geoscience and remote sensing*, July 1992, 30(4), p.804-810, 28 refs.
Fung, A.K., Bredow, J.W.
Sea ice, Snow cover effect, Remote sensing, Microwaves, Backscattering, Mathematical models, Layers, Polarization (waves), Radar echoes.

47-361
Dual polarization radar observations of anomalous wintertime thunderclouds in Japan.
Maekawa, Y., et al, *IEEE transactions on geoscience and remote sensing*, July 1992, 30(4), p.838-844, 10 refs.
Fukao, S., Sonoi, Y., Yoshino, F.
Cloud physics, Cloud electrification, Radar echoes, Scattering, Ice crystal optics, Lightning, Snow pellets, Polarization (waves), Weather forecasting.

47-362
Development of mining excavations under difficult mining engineering conditions; a handbook. [Stroitel'stvo gornykh vyrabotok v slozhnykh gornotekhnicheskikh usloviiakh; spravochnik].
Kartozia, B.A., ed, Moscow, Nedra, 1992, 319p. (Pertinent p.156-176), In Russian. 48 refs.
Engineering geology, Mining, Excavation, Cold weather operation, Permafrost, Frozen rocks, Frozen rock strength.

47-363
Severe winters and droughts. [Surovye zimy i zasukhi].
Sazonov, B.I., Leningrad, Gidrometeoizdat, 1991, 239p., In Russian. 570 refs.
Records (extremes), Climatic changes, Synoptic meteorology, Atmospheric circulation, Precipitation (meteorology).

47-364
Recommendations for forecasting moderate and heavy icing in Ukraine. [Rekomendatsii k prognozu umerennogo i sil'nogo gololeda na Ukraine].
Volevakha, V.A., et al, *Kiev. Ukrainskii regional'nyi nauchno-issledovatel'skii gidrometeorologicheskii institut. Trudy*, 1991, Vol.239, p.48-55, In Russian. 6 refs.
Prokhorenko, V.M.
Ice forecasting, Icing, Mathematical models.

47-365
Modeling ice dynamics with regard to thermal conditions. [Modelirovanie dinamiki l'da s uchetom termiki].
Taran, B.M., *Moscow. Gosudarstvennyi okeanograficheskii institut. Trudy*, 1991, Vol.199, p.137-146, In Russian. 13 refs.
Ice mechanics, Mathematical models, Sea ice, Thermodynamics.

47-366
Thermal regime of filtrating taliks in the foundation of a hydraulic power system and reservoir banks. [Temperaturnyi rezhim fil'truiushchikh talikov v osnovanii gidrouzla i beregakh vodokhranilishcha].
Sobol', S.V., et al, *Izvestiia vysshikh uchebnykh zavedenii. Stroitel'stvo*, May-June 1992, No.5-6, p.106-110, In Russian. 5 refs.
Fevralev, A.V.
Taliks, Thermal regime, Reservoirs, Foundations, Hydraulic structures, Analysis (mathematics), Banks (waterways).

47-367
Basic problems in the geoecology of the cryolithozone. [Osnovnye problemy geoekologii kriolitozony].
Solomatin, V.I., et al, *Stroitel'stvo truboprovodov*, June 1992, No.6, p.10-14, In Russian. 10 refs.
Zhigarev, L.A.
Ecology, Geocryology.

47-368
Improving the effectiveness of methods of bio-reculitivating disturbed soil under conditions of the Far North. [Povyshenie effektivnosti metodov biorekul'tivatsii narushennykh zemel' v usloviiakh Kraynego Severa],
Masalkin, S.D., et al, *Stroitel'stvo truboprovodov*, June 1992, No.6, p.22-26, In Russian.
McKendrick, J.D.
Land reclamation, Revegetation, Soil composition, Frozen ground chemistry.

47-369
Development of the fuel and electric power complex in the Far East of Russia. [Razvitie toplivno-energeticheskogo kompleksa Dal'nego Vostoka Rossii].
Moldavanov, O.I., *Stroitel'stvo truboprovodov*, June 1992, No.6, p.26-29, In Russian.
Fuels, Electric power, Cold weather operation.

47-370
Safeguarding deep excavations from snowdrifts in high-altitude sections of railroads. [Zashchita glubokikh vyemok ot snezhnykh zanosov na vysokogornykh uchastkakh zheleznykh dorog],
Lomidze, I.N., et al, *Transportnoe stroitel'stvo*, Apr. 1992, No.4, p.17, In Russian.
Koniashvili, A.F., Kupatadze, T.S.
Countermeasures, Excavation, Railroads, Snowdrifts, Design.

47-371
Protecting railroads on Sakhalin from avalanches. [Protivolavinnaia zashchita zheleznykh dorog Sakhalina],
[Adroshnikov, V.I., *Transportnoe stroitel'stvo*, June 1992, No.6, p.2-11, In Russian. 6 refs.
Railroads, Countermeasures, Avalanches, Design.

47-372
Constructing mooring structures under conditions of the Far North. [Stroitel'stvo prichal'nykh sooruzhenii v usloviiakh Kraynego Severa],
Gerasimova, E.I., *Transportnoe stroitel'stvo*, June 1992, No.6, p.15-18, In Russian.
Moorings, Cold weather construction.

47-373
Tectonic forcing of late Cenozoic climate.
Raymo, M.E., et al, *Nature*, Sep. 10, 1992, 359(6391), p.117-122, 78 refs.
Ruddiman, W.F.
Tectonics, Climatic changes, Topographic effects, Carbon dioxide, Weathering, Models, Tibet.

47-374
Increased ultraviolet radiation in New Zealand (45 deg S) relative to Germany (48 deg N).
Seckmeyer, G., et al, *Nature*, Sep. 10, 1992, 359(6391), p.135-137, 20 refs.
McKenzie, R.L.
Ultraviolet radiation, Ozone, New Zealand, Germany.

47-375
Boreal forests and climate.
Thomas, G., et al, *Royal Meteorological Society. Quarterly journal B*, Apr. 1992, 118(505), p.469-497, 29 refs.
Rowntree, P.R.
Forest land, Vegetation patterns, Vegetation factors, Snow cover effect, Albedo, Snowmelt, Climatic factors, Mathematical models, Surface energy, Climatic changes.

47-376
Laboratory investigation of the leaching of solute from snowpack by rainfall.
Tranter, M., et al, *Hydrological processes*, Apr.-June 1992, 6(2), p.169-178, 33 refs.
Tsiouris, S., Davies, T.D., Jones, H.G.
Snow hydrology, Snowmelt, Rain, Ice water interface, Meltwater, Leaching, Water chemistry, Ion density (concentration), Simulation.

47-377
Effects of material mixing on planetary gamma ray spectroscopy.
Squyres, S.W., et al, *Journal of geophysical research*, Sep. 25, 1992, 97(E9), p.14,701-14,715, 24 refs.
Evans, L.G.
Remote sensing, Neutron scattering, Gamma irradiation, Spectroscopy, Soil composition, Extraterrestrial ice, Geochemistry, Ground ice, Mars (planet), Spectra.

47-378
Depositional model for Rogen moraine, with examples from the Avalon Peninsula, Newfoundland.
Fisher, T.G., et al, *Canadian journal of earth sciences*, Apr. 1992, 29(4), p.669-686, With French summary. 45 refs.
Shaw, J.
Glacial geology, Moraines, Sedimentation, Subglacial drainage, Meltwater, Landforms, Water erosion, Soil analysis.

47-379
Suspension freezing of bottom sediment and biota in the Northwest Passage and implications for Arctic Ocean sedimentation.
Reimnitz, E., et al, *Canadian journal of earth sciences*, Apr. 1992, 29(4), p.693-703, With French summary. 53 refs.
Marincovich, L., Jr., McCormick, M., Briggs, W.M.
Sea ice, Sediment transport, Ice rafting, Bottom sediment, Sea water freezing, Suspended sediments, Oceanographic surveys, Ice composition.

47-380
Study of the processes of snow cover formation in an unirrigated agricultural zone. [Issledovaniia protsessov formirovaniia snezhnogo pokrova v zone bogarnogo zemledeliia].
Petropavlovskaia, M.S., *Leningrad. Gosudarstvennyi gidrologicheskii institut. Trudy*, 1991, Vol.346, p.3-21, In Russian. 6 refs.
Snow cover effect, Agriculture, Snow water content, Snowdrifts.

47-381
Formation and calculation of snow reserves on agricultural fields with a snow fence and an evaluation of the effectiveness of these measures. [Formirovanie i raschet snegozapasov na sel'skokhoziaĭstvennykh poliakh so snegozaderzhaniem i otsenka effektivnosti etikh meropriiatiĭ].
Kaliuzhnyĭ, I.L., et al. *Leningrad. Gosudarstvennyĭ gidrologicheskiĭ institut. Trudy*, 1991, Vol.346, p.22-34, In Russian. 13 refs.
Shutov, V.A., Delarov, D.A.
Snow accumulation, Snow fences, Snow cover, Agriculture, Analysis (mathematics), Countermeasures, Performance.

47-382
Calculating the evaporation from snow in fields with snow fences. [Raschet ispareniia so snega na poliakh so snegozaderzhaniem].
Shutov, V.A., *Leningrad. Gosudarstvennyĭ gidrologicheskiĭ institut. Trudy*, 1991, Vol.346, p.35-45, In Russian. 15 refs.
Snow evaporation, Snow fences, Analysis (mathematics), Snow cover.

47-383
Evaluating water vapor diffusion (in the example of field studies in Northern Kazakhstan). [Otsenka diffuzii vodianogo para (na primere polevykh issledovaniĭ v Severnom Kazakhstane)].
Delarov, D.A., et al. *Leningrad. Gosudarstvennyĭ gidrologicheskiĭ institut. Trudy*, 1991, Vol.346, p.46-56, In Russian. 11 refs.
Kaliuzhnyĭ, I.L.
Analysis (mathematics), Snow cover, Snow depth, Snow density, Water vapor, Vapor diffusion, USSR—Kazakhstan.

47-384
Effectiveness of snow fences in cultivated fields. [Ob effektivnosti snegozaderzhaniia na sel'skokhoziaĭstvennykh poliakh].
Petropavlovskaia, M.S., et al. *Leningrad. Gosudarstvennyĭ gidrologicheskiĭ institut. Trudy*, 1991, Vol.346, p.57-66, In Russian. 7 refs.
Dushko, N.B., Kaliuzhnyĭ, I.L.
Snow fences, Agriculture, Performance, Snow accumulation, Snow cover effect, Soil water.

47-385
Calculating the thermal regime of soils in areas with snow fences. [Raschet temperaturnogo rezhima pochv v usloviiakh snegozaderzhaniia].
Lavrov, S.A., *Leningrad. Gosudarstvennyĭ gidrologicheskiĭ institut. Trudy*, 1991, Vol.346, p.67-74, In Russian. 3 refs.
Analysis (mathematics), Soil temperature, Thermal regime, Snow fences, Agriculture, Moisture transfer, Snow cover effect, Snow depth.

47-386
Evaluating the effect of snow cover pollution on its melting rate. [Otsenka vliianiia zagriazneniia snezhnogo pokrova na intensivnost' ego taianiia].
Shutov, V.A., *Leningrad. Gosudarstvennyĭ gidrologicheskiĭ institut. Trudy*, 1991, Vol.346, p.75-86, In Russian. 12 refs.
Snow cover, Snow impurities, Snow melting, Albedo, Analysis (mathematics).

47-387
Method of determining the heat balance components of snow cover during a melting period. [Metodika opredeleniia sostavliaiushchikh teplovogo balansa snezhnogo pokrova v period snegotaianiia].
Shutov, V.A., *Leningrad. Gosudarstvennyĭ gidrologicheskiĭ institut. Trudy*, 1991, Vol.346, p.87-96, In Russian. 14 refs.
Snow cover, Snow melting, Analysis (mathematics), Heat balance, Snow thermal properties, Turbulent exchange.

47-388
Methods for improving instruments for contact determination of physical-mechanical properties of snow. [Puti usovershenstvovaniia priborov dlia kontaktnogo opredeleniia fiziko-mekhanicheskikh svoĭstv snega].
Bellinson, M.M., et al. *Leningrad. Gosudarstvennyĭ gidrologicheskiĭ institut. Trudy*, 1991, Vol.346, p.97-102, In Russian. 7 refs.
Klimin, A.I., Ovcharenko, V.G., Samoĭlov, R.S.
Indicating instruments, Snow mechanics, Snow physics.

47-389
Deformation of snow cover under static loads. [Deformatsiia snezhnogo pokrova pri staticheskikh nagruzkakh].
Bolotnikov, G.I., *Leningrad. Gosudarstvennyĭ gidrologicheskiĭ institut. Trudy*, 1991, Vol.346, p.103-106, In Russian. 2 refs.
Snow cover, Snow deformation, Static loads, Viscosity, Snow strength, Snow mechanics.

47-390
Evaluating the effect of a shock wave on snow cover. [Otsenka vozdeĭstviia udarnoĭ volny na snezhnyĭ pokrov].
Delarov, D.A., et al. *Leningrad. Gosudarstvennyĭ gidrologicheskiĭ institut. Trudy*, 1991, Vol.346, p.107-122, In Russian. 2 refs.
Kaliuzhnyĭ, I.L.
Snow strength, Shock waves, Snow mechanics, Snow density, Snow cover, Snow water content.

47-391
Correlation of turbulent coefficients in vertical heat flux and moisture in the surface boundary layer. [O sootnoshenii koeffitsientov turbulentnosti v vertikal'nykh potokakh tepla i vlagi prizemnogo sloia vozdukha].
Postnikov, A.N., *Leningrad. Gosudarstvennyĭ gidrologicheskiĭ institut. Trudy*, 1991, Vol.346, p.123-125, In Russian. 1 ref.
Analysis (mathematics), Turbulence, Heat flux, Moisture, Heat balance, Water vapor.

47-392
Upper surface layer of permafrost; collected scientific papers. [Verkhniĭ gorizont tolshchi merzlykh porod; sbornik nauchnykh trudov].
Mel'nikov, P.I., ed. Moscow, Nauka, 1991, 100p., In Russian. For individual papers see 47-393 through 47-403.
Shur, IU.L., ed.
Geocryology, Lithology, Cryogenic structures, Cryogenic textures, Alluvium, Ice veins, Ice wedges, Freeze thaw cycles, Permafrost structure, USSR—Yakutia.

47-393
Zonality of the dynamics of the active layer in landscapes in Yakutia. [Zonal'nost' dinamiki sezonnotalogo sloia v landshaftakh IAkutiia].
Vasil'ev, I.S., Verkhniĭ gorizont tolshchi merzlykh porod; sbornik nauchnykh trudov (Upper surface layer of permafrost; collected scientific papers). Edited by P.I. Mel'nikov and IU.L. Shur, Moscow, Nauka, 1991, p.3-9, In Russian. 10 refs.
Active layer, Taiga, Tundra, Landscape types, USSR—Yakutia.

47-394
Physical-mechanical types of cryogenesis. [Fiziko-khimicheskie tipy kriogeneza].
Konishchev, V.N., et al. Verkhniĭ gorizont tolshchi merzlykh porod; sbornik nauchnykh trudov (Upper surface layer of permafrost; collected scientific papers). Edited by P.I. Mel'nikov and IU.L. Shur, Moscow, Nauka, 1991, p.9-14, In Russian. 3 refs.
Rogov, V.V., Poklonnyĭ, S.A., Matkovskaia, M.A.
Geocryology, Unfrozen water content, Freeze thaw cycles, Fracturing, Hydrogen ion concentration.

47-395
Quantitative evaluation of deterioration in cryogenic erosion. [Kolichestvennaia otsenka raboty razrusheniia pri kriogennom vyvetrivaniia].
Vasil'ev, A.A., et al. Verkhniĭ gorizont tolshchi merzlykh porod; sbornik nauchnykh trudov (Upper surface layer of permafrost; collected scientific papers). Edited by P.I. Mel'nikov and IU.L. Shur, Moscow, Nauka, 1991, p.14-20, In Russian. 9 refs.
Torchinskiĭ, V.M.
Freeze thaw cycles, Rock mechanics, Erosion, Surface energy, Analysis (mathematics).

47-396
Studying recent ice formation in rocks by tritium analysis. [Izuchenie sovremennogo l'doobrazovaniia v gornykh porodakh s primeneniem tritievogo analiza].
Chizhov, A.B., Verkhniĭ gorizont tolshchi merzlykh porod; sbornik nauchnykh trudov (Upper surface layer of permafrost; collected scientific papers). Edited by P.I. Mel'nikov and IU.L. Shur, Moscow, Nauka, 1991, p.20-31, In Russian. 10 refs.
Lithology, Geocryology, Ground ice, Frozen rocks.

47-397
Formation of the structure and properties of floodplain deposits by major rivers in Northern Yakutia. [Formirovanie stroeniia i svoĭstv poimennykh otlozheniĭ krupnykh rek Severnoĭ IAkutiia].
Zaikanov, V.G., Verkhniĭ gorizont tolshchi merzlykh porod; sbornik nauchnykh trudov (Upper surface layer of permafrost; collected scientific papers). Edited by P.I. Mel'nikov and IU.L. Shur, Moscow, Nauka, 1991, p.31-47, In Russian. 13 refs.
Lithology, Geocryology, Rivers, Floodplains, Alluvium, Cryogenic textures, Ice veins, Ice wedges, USSR—Yakutia.

47-398
Role of quasi-syngenesis in the formation of the cryogenic structure of quaternary deposits in Northern Yakutia. [Rol' kvazisingeneza v formirovanii kriogennogo stroeniia chetvertichnykh otlozheniĭ Severnoĭ IAkutiia].
Kanevskiĭ, M.Z., Verkhniĭ gorizont tolshchi merzlykh porod; sbornik nauchnykh trudov (Upper surface layer of permafrost; collected scientific papers). Edited by P.I. Mel'nikov and IU.L. Shur, Moscow, Nauka, 1991, p.47-63, In Russian. 6 refs.
Quaternary deposits, Cryogenic structures, Cryogenic textures, Geocryology, Solifluction, Glacial deposits, USSR—Yakutia.

47-399
Engineering geocryological properties of deposits of cryogenic weathering crusts in Northern Yakutia. [Inzhenerno-geokriologicheskie svoĭstva otlozheniĭ kriogennykh kor vyvetrivaniia Severnoĭ IAkutiia].
Vasil'ev, A.A., Verkhniĭ gorizont tolshchi merzlykh porod; sbornik nauchnykh trudov (Upper surface layer of permafrost; collected scientific papers). Edited by P.I. Mel'nikov and IU.L. Shur, Moscow, Nauka, 1991, p.63-70, In Russian. 3 refs.
Geocryology, Engineering geology, Tectonics, Weathering, Lithology, Cryogenic structures, USSR—Yakutia.

47-400
Studying ice wedges in Mongolia. [K izucheniiu povtornozhil'nykh l'dov Mongolii].
Gorbunov, A.P., Verkhniĭ gorizont tolshchi merzlykh porod; sbornik nauchnykh trudov (Upper surface layer of permafrost; collected scientific papers). Edited by P.I. Mel'nikov and IU.L. Shur, Moscow, Nauka, 1991, p.70-76, In Russian. 5 refs.
Ice veins, Ice wedges, Terraces, Mongolia.

47-401
Cryogenic structure and properties of technogenic soils of placer mines in Northern Yakutia. [Kriogennoe stroenie i svoĭstva tekhnogennykh gruntov na rossypnykh mestorozhdeniiakh Severnoĭ IAkutiia].
Samylin, I.A., et al. *Verkhniĭ gorizont tolshchi merzlykh porod*; sbornik nauchnykh trudov (Upper surface layer of permafrost; collected scientific papers). Edited by P.I. Mel'nikov and IU.L. Shur, Moscow, Nauka, 1991, p.76-87, In Russian. 4 refs.
Kanevskiĭ, M.Z., Maksimov, V.V.
Cryogenic soils, Cryogenic structures, Cryogenic textures, Placer mining, Alluvium, Tailings, Sediments, USSR—Yakutia.

47-402
Using geophysical methods to study an ice-rich intermediate layer in permafrost. [Primenenie geofizicheskikh metodov dlia izucheniia sil'nol'distogo promezhutochnogo sloia mnogoletnemerzlykh porod].
Pugach, V.B., et al. Verkhniĭ gorizont tolshchi merzlykh porod; sbornik nauchnykh trudov (Upper surface layer of permafrost; collected scientific papers). Edited by P.I. Mel'nikov and IU.L. Shur, Moscow, Nauka, 1991, p.87-91, In Russian.
Timofeev, V.M.
Permafrost structure, Geophysical surveys, Geocryology, Lithology.

47-403
Ecological-geological regionalization of the cryolithozone in the USSR. [K ekologo-geologicheskomu raionirovaniiu kriolitozony SSSR].
Chizhov, A.B., et al. Verkhniĭ gorizont tolshchi merzlykh porod; sbornik nauchnykh trudov (Upper surface layer of permafrost; collected scientific papers). Edited by P.I. Mel'nikov and IU.L. Shur, Moscow, Nauka, 1991, p.92-100, In Russian. 7 refs.
Van'ko, IU.V., Gavrilov, A.V., Dereviagin, A.IU.
Geocryology, Ecology, Geological surveys.

47-404
U.S. Palmer Station in Antarctica.
Kaminuma, K., *Polar news*, Mar. 1991, No.52, p.3-6, In Japanese. 1 ref.
Stations, Research projects, Oceanographic ships, Laboratories, Antarctica—Palmer Station.

A general description is given of the U.S. Palmer Station on Anvers I. about 40 km off the Antarctic Peninsula and of its companion research vessel, the *Polar Duke*, chartered by the U.S. National Science Foundation, with a 14-man crew and 26 researchers. Though Palmer Station, housing a maximum of 44 people with a permanent staff of 20-40 in the summer and 6-12 in the winter, is the smallest of the U.S. stations in Antarctica, it is one of the most important for biological research. It has a 1000 sq ft aquarium to hold live specimens. Other research includes facilities for VLF observations of the upper atmosphere, and ozone observations. Tourism began in the summer of 1987-88 with about 1300 visitors that year and the number has been increasing every year since.

47-405
Sketch on West Germany antarctic station.
Nishio, F., *Polar news*, Mar. 1991, No.52, p.14-21, In Japanese.
Stations, Research projects, Oceanographic ships, Laboratories, Antarctica—Georg von Neumayer Station, Antarctica—Filchner Station.

A general description is given of Georg von Neumayer Station, the first permanent German station in Antarctica, established in Feb. 1981. Construction of the second Georg von Neumayer Station is scheduled for summer 1991-92. A brief but emotional account is given of the reception at the station of the news of the fall of the Berlin Wall in 1989. Also included are brief descriptions of the German summer stations: Filchner, Drescher, Lilli Marlene, and Gondwana, and of the German icebreaking research vessel, *Polarstern*, with a list of its cruises from Aug. 1989 to May 1991. The first all-woman overwintering team of nine members stayed at Neumayer Station in 1990-91. It is suggested that mixed teams are better.

47-406
Programs of JARE-32 in 1990-1992.
Kokubun, S., *Polar news*, Mar. 1991, No.52, p.28-34, In Japanese.
Research projects, Oceanographic surveys, Polar atmospheres, Environmental impact, Antarctica—Showa Station.

The 32nd Japanese Antarctic Research Expedition, JARE-32 for 1990-1992 is part of a continuing series of year-round observations in Antarctica, mostly at Showa Station, but also at Asuka and Mizuho stations, and onboard the Japanese ice-going research vessel *Shirase*. Programs include studies on global change from ice cores, global environmental monitoring, upper atmospheric observations from polar patrol balloons, establishment of an International Absolute Gravity Base Station Network, glacier mass balance and flow observations, manned and unmanned marine and terrestrial weather observations, ocean bottom topography and ocean chemistry observations, marine and terrestrial biology studies, and waste treatment. A table presenting an outline of the programs and a table listing the names, disciplines, and affiliations of the 55 participants are also included.

47-407
Global warming and sea level rise—discussions and report from IPCC workshop.
Higashi, A., *Polar news*, Mar. 1991, No.52, p.58-65, In Japanese. 7 refs.
Global warming, Sea level, Atmospheric circulation, Atmospheric composition, Polar atmospheres, Glacier melting.

A report on global warming and sea level rise, presented to a 1989 workshop of the Intergovernmental Panel on Climate Change (IPCC), is discussed. Contributing factors to sea level rise accompanying global warming, induced by increasing CO2 concentrations in the atmosphere, are thermal expansion of sea water and the accelerated melting of the antarctic and Greenland ice sheets and other glaciers throughout the world. The major factor is the antarctic ice sheet with its 29,330,000 cu km of ice which would raise the world sea level 65 m if it were all melted. The Greenland ice sheet with 2,950,000 cu km of ice would raise the world sea level an additional 7 m. If CO2 concentrations continue to increase at their current rate and average air temperatures increase 1.5, 2.5, or 4.5 C, the predicted rise in sea level is respectively, 8, 18, or 29 cm by the year 2030, and 31, 66, or 110 cm by the year 2100.

47-408
Expansion of the terrain input base for Nepean Tracked Vehicle Performance Model, NTVPM, to accept Swiss Rammsonde data from deep snow.
Wong, J.Y., *Journal of terramechanics*, May 1992, 29(3), p.341-357, 10 refs.
Tracked vehicles, Traction, Performance, Snow cover effect, Computerized simulation, Forecasting, Correlation, Design criteria, Military transportation.

47-409
Masonry wall and window system leakage investigation for university building.
Frauenhoffer, J., *Journal of performance of constructed facilities*, May 1992, 6(2), p.107-115.
Buildings, Damage, Structural analysis, Moisture, Leakage, Freeze thaw cycles, Detection, Masonry, Walls, Countermeasures.

47-410
Infrared emittance of water clouds.
Chýlek, P., et al, *Journal of the atmospheric sciences*, Aug. 15, 1992, 49(16), p.1459-1472, 49 refs.
Damiano, P., Shettle, E.P.
Cloud physics, Cloud droplets, Ice crystal optics, Infrared radiation, Radiation absorption, Scattering, Analysis (mathematics), Particle size distribution, Water content.

47-411
Effects of small ice crystals on cirrus infrared radiative properties.
Takano, Y., et al, *Journal of the atmospheric sciences*, Aug. 15, 1992, 49(16), p.1487-1493, 12 refs.
Liou, K.N., Minnis, P.
Cloud physics, Ice crystal optics, Light scattering, Infrared radiation, Radiation absorption, Particles, Brightness, Analysis (mathematics), Radiometry.

47-412
Dual-wavelength radar method for ice-water characterization in mixed-phase clouds.
Gosset, M., et al, *Journal of atmospheric and oceanic technology*, Oct. 1992, 9(5), p.538-547, 20 refs.
Sauvageot, H.
Cloud physics, Supercooled clouds, Remote sensing, Radar echoes, Ice crystal optics, Ice water interface, Attenuation, Detection, Analysis (mathematics), Water content.

47-413
Anomalies in the electrical conductivity of ground surface at high latitudes.
Zakharenko, V.N., et al, *Akademiia nauk SSSR. Doklady. Earth science sections*, July 1992, 314(1-6), p.32-34, Translated from Akademiia nauk SSSR. Doklady, 1990, No.5. 11 refs.
Permafrost, Electrical measurement, Frozen rocks, Electrical resistivity, Geoelectricity, Electric fields, Radio waves, Attenuation.

47-414
Electromagnetic emissions associated with dynamic processes in ice.
Bogorodskiĭ, V.V., et al, *Akademiia nauk SSSR. Doklady. Earth science sections*, July 1992, 314(1-6), p.43-46, 8 refs. For Russian original see 45-1858.
Gusev, A.V., Nikitin, V.A., Artsev, M.B.
Ice electrical properties, Electric fields, Cracking (fracturing), Mechanical tests, Electromagnetic properties, Polarization (charge separation).

47-415
Why is Antarctica aseismic.
Sadovskiĭ, M.A., et al, *Akademiia nauk SSSR. Doklady. Earth science sections*, July 1992, 314(1-6), p.54-58, 12 refs. For Russian original see 45-1859 or 19L-43506.
Avsiuk, IU.N.
Geologic processes, Seismology, Geologic structures, Stability, Tectonics, Earthquakes.

Data from seismic stations both in the interior and coast of Antarctica indicate that earthquake epicenters encircle the continent but do not occur within it, indicating that the continent is aseismic. In this paper an explanation of this paucity of seismic activity is proposed in terms of the hierarchical block structure of the antarctic continent. (Auth. mod.)

47-416
Discrete ice lens theory for frost heave beneath pipelines.
Nixon, J.F., *Canadian geotechnical journal*, June 1992, 29(3), p.487-497, With French summary. 15 refs.
Underground pipelines, Soil freezing, Frost heave, Soil temperature, Ice lenses, Soil water migration, Temperature gradients, Forecasting, Frozen ground expansion, Theory.

47-417
Developing a method of forecasting rain and snow-rain triggered floods with insufficient data. [Razrabotka metoda prognoza dozhdevykh i snegodozhdevykh pavodkov pri nedostatochnoĭ informatsiĭ].
Basilashvili, Ts.Z., *Zakavkazskiĭ regional'nyĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.92(99), p.46-59, In Russian. 7 refs.
Flood forecasting, Floods, Meltwater, Analysis (mathematics).

47-418
Mass balances of the Gergeti Glacier and fluctuations in the regimes of glaciers in the Caucasus. [Balansy massy lednika Gergeti i kolebaniia rezhima lednikov Kavkaza].
Tsomaia, V.Sh., *Zakavkazskiĭ regional'nyĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.92(99), p.72-88, In Russian. 9 refs.
Glacier mass balance, Glacier oscillation, Glacier surveys, Glacier ablation, Glacier alimentation, USSR—Caucasus.

47-419
Regions of catastrophic avalanches in Georgian territory. [Raĭony rasprostraneniia katastroficheskikh lavin na territorii Gruzii].
Salukvadze, M.E., *Zakavkazskiĭ regional'nyĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.92(99), p.100-109, In Russian. 8 refs.
Avalanches, Avalanche formation, Records (extremes), River basins, USSR—Georgia.

47-420
Mathematic modeling of conductive and convective heat transfer in the taliks of a cryolite zone.
Buldovich, S.N., et al, *Moscow University geology bulletin*, 1991, 46(5), p.55-64, Translated from Vestnik Moskovskogo Universiteta. Geologiia. 9 refs.
Garagulia, L.S., Tipenko, G.S., Seregina, N.V.
Taliks beneath rivers, Hydrogeology, Suprapermafrost ground water, Heat transfer, Rock mechanics, Convection, Geocryology, Mathematical models, Water flow.

47-421
Analysis of ice body formation within the west and central sections of Baikal-Amur main line.
Burykina, N.I., *Moscow University geology bulletin*, 1991, 46(5), p.83-86, Translated from Vestnik Moskovskogo Universiteta. Geologiia. 9 refs.
Geocryology, Hydrogeology, Ground ice, Ice formation, Cold weather construction, Route surveys, Taliks.

47-422
Natural revegetation of coal mine spoils in the Rocky Mountains of Alberta and its significance for species selection in land restoration.
Baig, M.N., *Mountain research and development*, Aug. 1992, 12(3), p.285-300, 56 refs.
Mining, Biogeography, Alpine landscapes, Wastes, Revegetation, Land reclamation, Vegetation patterns, Soil composition, Physical properties, Growth.

47-423
Rock glaciers II: models and mechanisms.
Whalley, W.B., et al, *Progress in physical geography*, June 1992, 16(2), p.127-186, Refs. p.180-186.
Martin, H.E.
Rock glaciers, Rheology, Rock mechanics, Sediment transport, Glacial geology, Periglacial processes, Permafrost transformation, Geocryology, Landslides.

47-424
Iceberg calving and the glacioclimatic record.
Warren, C.R., *Progress in physical geography*, Sep. 1992, 16(3), p.253-282, Refs. p.276-282.
Glacier oscillation, Calving, Ice water interface, Icebergs, Climatic factors, Climatic changes, Glacier mass balance, Paleoclimatology, Topographic effects, Ice cover effect.

47-425
Periglacial geomorphology.
Boardman, J., *Progress in physical geography*, Sep. 1992, 16(3), p.339-345, 52 refs.
Periglacial processes, Geomorphology, Pleistocene, Geochronology, Mass transfer, Soil physics.

47-426
Three-dimensional numerical simulation of ice phase microphysics in cumulus clouds—part 2: effects of multiplication processes.
Kong, F.Y., et al, *Chinese journal of atmospheric sciences*, 1991, 15(4), p.459-470, 11 refs.
Huang, M.Y., Xu, H.Y.
Cloud physics, Supercooled clouds, Ice crystal collision, Ice formation, Cracking (fracturing), Mathematical models, Atmospheric physics.

47-427
Significance of cryoturbation phenomena in environmental reconstruction.
Van Vliet-Lanoë, B., *Journal of Quaternary science*, 1988, 3(1), p.85-96, 65 refs.
Cryoturbation, Paleoclimatology, Patterned ground, Periglacial processes, Frost heave, Soil creep, Ice lenses, Active layer.

47-428
New directions in arctic research.
Urponen, K., Conference of Arctic and Nordic Countries on Co-ordination of Research in the Arctic, Leningrad, Dec. 12-15, 1988, Rovaniemi, Finland, 1989, 4p.
Research projects, International cooperation, Economic development, Environmental impact.

47-429
Recent iceberg groundings and scours on the Grand Banks of Newfoundland.
Erik Banke Consulting, Bedford, Nova Scotia, *Canada. Geological Survey. Open file.* Sep. 1989, No.2528, 80p. + appends., 14 refs.
Icebergs, Ice scoring, Grounded ice, Drift, Ice surveys, Ice reporting, Canada—Newfoundland—Grand Banks.

47-430
Lithologic composition and rock weathering potential of forested, glacial-till soils.
Bailey, S.W., et al, *U.S. Forest Service. Northeastern Forest Experiment Station. Research paper.* Mar. 1992, NE-662, 7p., 11 refs.
Hornbeck, J.W.
Glacial deposits, Nutrient cycle, Forest soils, Weathering, Soil chemistry, Soil formation, Lithology.

47-431
Runoff modelling and forecasting of river basins, and Himalayan Snowcover Information System (HIMSIS).
Ramamoorthi, A.S., et al, *IAHS publication,* 1991, No.201, Hydrology for the water management of large river basins. Edited by F.H.M. Van de Ven, et al, p.347-355, 10 refs. Presented at an international symposium, Vienna, Aug. 11-24, 1991.
Haefner, H.
Runoff forecasting, Snowmelt, Snow cover distribution, Snow surveys, River basins, Water reserves, Data processing, Himalaya Mountains.

47-432
Report and recommendations.
International Scientific Advisory Committee, *University of Lapland, Rovaniemi, Finland. Arctic Centre. Reports,* 1991, No.4, 34p. + appends., In English and Finnish.
Research projects, International cooperation, Environmental protection, Organizations, Regional planning.

47-433
In the Inari Arctic at the edge of Europe. [Inari Kalotin keskellä ja Euroopan laidalla].
Heininen, L., ed, *University of Lapland, Rovaniemi, Finland. Arctic Centre. Reports,* 1991, No.5, 99p., In Finnish. Refs. passim.
Research projects, International cooperation, Environmental protection, Regional planning, Finland.

47-434
Hydrometric network evaluation: an assessment of user needs.
Wedel, J.H., et al, Ottawa, Department of Indian Affairs and Northern Development, Northern Water Resources Studies Program, Oct. 1991, 110p., With French summary. 22 refs.
Wedel, R.L.
Water reserves, Hydrography, Ice breakup, Snowmelt, Regional planning, Stream flow, Water level, Data processing, Cost analysis, Canada—Yukon Territory, Canada—Northwest Territories.

47-435
Ice Brook Formation and post-Rapitan, Late Proterozoic glaciation, Mackenzie Mountains, Northwest Territories.
Aitken, J.D., *Canada. Geological Survey. Bulletin,* 1991, No.404, 43p., With French summary. 58 refs.
Alpine glaciation, Glacial deposits, Stratigraphy, Marine deposits, Exploration, Geological surveys, Geochronology, Paleoclimatology, Canada—Northwest Territories.

47-436
Relating bearing capacity to pavement condition.
Lenngren, C.A., *Sweden. Royal Institute of Technology. Department of Highway Engineering. Bulletin,* 1990, No.1, 189p., 133 refs.
Road maintenance, Trafficability, Bearing tests, Pavements, Cold weather performance, Statistical analysis, Sweden.

47-437
Investigations of frost heave as a cause of pipeline deformation.
Carleton University. Geotechnical Science Laboratories, Ottawa, Jan. 1986, 71p., Internal report, IR-50, 25 refs.
Underground pipelines, Pipeline freezing, Frost heave, Soil freezing, Soil pressure, Soil creep, Environmental tests.

47-438
Enclosed superstructures for light and sound buoys.
Cunningham, R., *Transport Canada. Publication,* Dec. 1991, TP 11289E, 40p. + appends., With French summary. 9 refs.
Ship icing, Ice prevention, Floating structures, Markers, Sea spray, Superstructures, Navigation.

47-439
Frost heaving and frost creep on an experimental slope: results for soil structures and sorted stripes.
Coutard, J.P., et al, *Zeitschrift für Geomorphologie. Supplementband,* Dec. 1988, Vol.71, p.13-23, 20 refs.
Van Vliet-Lanoë, B., Auzet, A.V.
Frost heave, Soil creep, Patterned ground, Slope processes.

47-440
Dynamics and extent of the Weichselian permafrost in western Europe (Substage 5E to Stage 1).
Van Vliet-Lanoë, B., *Quaternary international,* 1989, Vols.3/4, p.109-113, 37 refs.
Paleoclimatology, Permafrost indicators, Cryogenic soils, Permafrost dating, Permafrost distribution, Permafrost origin.

47-441
Mean wave propagation in a slab of one-dimensional discrete random medium.
Saatchi, S.S., et al, *Wave motion,* May 1992, 15(4), p.301-314, 33 refs.
Lang, R.H.
Radio waves, Wave propagation, Scattering, Remote sensing, Reflection, Atmospheric physics, Analysis (mathematics).

47-442
Sea ice diatoms and ice edge planktonic diatoms at the northern limit of the Weddell Sea pack ice.
Ligowski, R., et al, NIPR Symposium on Polar Biology, Proceedings. No.5, Tokyo, National Institute of Polar Research, 1992, p.9-20, Refs. p.18-20.
Godlewski, M., Lukowski, A.
Sea ice, Algae, Plankton, Antarctica—Weddell Sea.
Drifting brash ice and phytoplankton were collected between Elephant I. and the South Orkney Is. during the period from late Dec. 1988 to mid-Jan. 1989. In diatom assemblages from the sea ice, the highest occurrence was displayed by *Nitzschia curta, N. cylindrus* and *N. neglecta.* In phytoplankton assemblages the highest occurrence was shown by *N. curta, Actinocyclus actinochilus, Chaetoceros criophilum, Corethron criophilum, Thalassiothrix antarctica* and *N. cylindrus.* In the dendrogram of similarities of species composition, two groups of stations were distinguished. The first one was composed of the phytoplankton stations and the second one was composed of the sea ice stations. Microautoradiographic analysis revealed photosynthesis in diatoms from plankton and no photosynthesis in diatoms from brash ice after ice melting. Therefore, the sea ice diatoms could be regarded as an inoculum for the phytoplankton diatoms in the area studied. (Auth.)

47-443
Periglacial shoreline erosion of a rocky coast: George River estuary, northern Quebec.
Fournier, A., et al, *Journal of coastal research,* 1992, 8(4), p.926-942, With French, German and Spanish summaries. 28 refs.
Allard, M.
Shore erosion, Ice scoring, Shoreline modification, Periglacial processes, Bedrock, Fast ice, Frost shattering, Estuaries, Landforms, Rock properties.

47-444
Icebreaker face-off.
Cox, B., *Plane & pilot,* Nov. 1992, 28(11), p.52-53.
Aircraft icing, Ice removal, Equipment, Performance.

47-445
Big savings at the ice margin.
Knight, P., et al, *Geographical magazine,* Jan. 1992, 64(1), p.22-26.
Thompson, D.
Glacier surveys, Cost analysis, Sampling, Ice edge, Glacier ice, Ice composition, Glacier flow, Ice mechanics, Glaciology.

47-446
Submersible observations of an iceberg pit and scour on the Grand Banks of Newfoundland.
Barrie, J.V., et al, *Geo-marine letters,* 1992, 12(1), p.1-6, 21 refs.
Lewis, C.F.M., Parrott, D.R., Collins, W.T.
Marine geology, Ice scoring, Icebergs, Subsurface investigations, Pit and mound topography, Ocean bottom, Oceanographic surveys, Grounded ice, Submarines.

47-447
Topographical effects on the equilibrium-line altitude on glaciers.
Nesje, A., *GeoJournal,* Aug. 1992, 27(4), p.383-391, 27 refs.
Glacier flow, Glacier oscillation, Glacier mass balance, Climatic factors, Altitude, Topographic effects, Glacier surveys, Paleoclimatology, Slope orientation, Periodic variations.

47-448
Significance of global snow and ice cover for global change studies.
Barry, R.G., *GeoJournal,* July 1992, 27(3), p.293-297, 30 refs.
Global change, Global warming, Climatic changes, Snow cover distribution, Ice cover, Climatic factors, Geophysical surveys, Periodic variations, Carbon dioxide, Ice cover effect.

47-449
Extinction of visible and infrared beams by falling snow.
Hutt, D.L., et al, *Applied optics,* Aug. 20, 1992, 31(24), p.5121-5132, 29 refs.
Bissonnette, L.R., St. Germain, D., Oman, J.
Falling snow, Snow optics, Light scattering, Attenuation, Wave propagation, Measurement, Accuracy, Analysis (mathematics), Albedo.

47-450
Observations of acoustic surface waves propagating above a snow cover.
Albert, D.G., MP 3129, International Symposium on Long-Range Sound Propagation, 5th, Milton Keynes, England, May 24-26, 1992, Washington, D.C., National Aeronautics and Space Administration, 1992, 7p., 16 refs.
Snow acoustics, Snow air interface, Snow cover effect, Sound transmission, Sound waves.
For the first time surface acoustic waves have been experimentally observed propagating above a seasonal snow cover. Blank pistol shots were fired 1 m above the snow as the source of acoustic impulses; acoustic waveforms were measured by a vertical array of six microphones at heights between 0.1 and 4.75 m at a location 60 m away from the source. The snow cover was 0.20 m thick with an average density of 200 kg/cu m and crystal sizes of 0.5 to 1 mm. The peak pressures measured at all of the microphones were markedly reduced compared with pressures measured when a snow cover was not present because of the well-known absorptive effect of snow. Waveforms recorded near the surface displayed a strong, low-frequency "tail" following the initial impulsive arrival from the shot. This tail was found to decay exponentially with height above the surface, a diagnostic feature of surface waves, with a measured attenuation coefficient 0.5/m. Waveforms calculated using Attenborough's model of ground impedance are shown to agree with the observed waveforms when an assumed effective flow resistivity of 20 kN/s/m exp -4 is used for the snow.

47-451
Retarders keep moisture, the enemy within, at bay.
Tobiasson, W., *Roofing siding insulation,* Aug. 1990, MP 3130, p.34-35,38,40.
Roofs, Waterproofing, Vapor barriers, Moisture.

47-452
Comment on "Formic and acetic acids in coastal North Carolina rainwater".
Hewitt, A.D., et al, *Environmental science and technology,* Aug. 1992, 26(8), MP 3131, p.1666, 3 refs.
Cragin, J.H.
Air pollution, Water treatment, Water pollution, Rain, Environmental protection.

47-453
Comment on "A study of the linear ranges of several acid digestion procedures".
Hewitt, A.D., et al, *Environmental science and technology,* Sep. 1992, 26(9), MP 3132, p.1848, 3 refs.
Cragin, J.H.
Soil pollution, Waste treatment, Soil chemistry, Environmental protection.

47-454
Comment on "Acid digestion for sediments, sludges, soils, and solid wastes. A proposed alternative to EPA SW 846 method 3050".
Hewitt, A.D., et al, *Environmental science and technology*, May 1991, 25(5), MP 3133, p.985-986, 15 refs.
Cragin, J.H.
Soil pollution, Waste treatment, Sludges, Environmental protection.

47-455
Airborne EM ice measurement sensor: phases 1 and 2.
Holladay, J.S., et al, *Transport Canada. Publication*, Feb. 1992, TP 11282E, 67p., With French summary, 18 refs.
Ice cover thickness, Ice navigation, Ice reporting, Ice surveys, Ice detection, Ice electrical properties, Radio echo soundings, Route surveys, Airborne radar, Electromagnetic prospecting.

47-456
Frazil jam evolution and transport of low density granules.
Wang, D.S., Lulea, Sweden, University of Technology, Oct. 1992, 103p., Licentiate thesis. 56 refs.
River ice, Frazil ice, Ice jams, Ice bottom surface, Ice water interface, River flow, Sediment transport, Mathematical models.

47-457
Microorganism nucleic acids and biomass in alpine-forest soils in the northern Caucasus.
Aseeva, I.V., et al, *Moscow University soil science bulletin*, 1981, 36(4), p.37-43, Translated from Vestnik Moskovskogo Universiteta. Pochvovedenie. 14 refs.
Efremov, A.L., Gorcharuk, L.G.
Forest soils, Alpine landscapes, Soil microbiology, Soil analysis, Vegetation factors, Altitude, Ecology, Biomass.

47-458
Physical and climatic parameters which influence the air content in polar ice.
Martinerie, P., et al, *Earth and planetary science letters*, Aug. 1992, 112(1/4), p.1-13, 22 refs.
Ice sheets, Atmospheric pressure, Ice volume, Air temperature, Canada—Yukon Territory, Greenland, Antarctica—Amundsen-Scott Station, Antarctica—Law Dome.
Under present climatic conditions, the air content of polar ice *(V)* generally shows a high sensitivity to the atmospheric pressure and hence to the surface elevation of the ice sheet where the ice is formed. The results presented here are from 16 different sites (14 in Antarctica, one in Greenland and one in the Yukon Territory, Canada), and they allow a better understanding of the parameters which influence the air content in ice. It is demonstrated that *V* can be expressed very simply as a function of the atmospheric pressure *(Pi)*, the temperature *(Ti)* and the porous volume of ice *(Vi)* at which the air in the firn becomes isolated in terms of pressure from the atmosphere during the process of pore close-off. Results confirm a *Vi* increase with temperature and show no clear *Vi* dependence on snow accumulation rate. The possible non-linearity of the *Vi-Ti* relation obtained could be due to a wind influence on *Vi* and/or to a second-order effect of the accumulation rate. The *Vi* results are compared to measurements of the volume of closed pores versus depth in the firn. In closing, the authors discuss the parameterization that can be obtained to interpret the air content variations observed in deep ice cores (over periods covering glacial-interglacial transitions) in terms of paleoclimatic conditions prevailing at the surface of the ice sheet. (Auth.)

47-459
Glaciers of North America: a field guide.
Ferguson, S.A., Golden, CO, Fulcrum Publishing, 1992, 176p., 23 refs.
DLC GB2412.F47 1992
Glaciers, North America.

47-460
Kinetic energy of hailfalls. Part 4: patterns of hailpad and radar data.
Schmid, W., et al, *Journal of applied meteorology*, Oct. 1992, 31(10), p.1165-1178, 35 refs.
Schiesser, H.H., Waldvogel, A.
Hail, Storms, Detection, Radar echoes, Wind factors, Ice melting, Correlation, Reflectivity, Spectra.

47-461
Oscillation of the freezing potential of aqueous lithium chloride solutions containing ethanol.
Ozeki, S., et al, *Chemical Society, London. Faraday transactions*, Sep. 7, 1992, 88(17), p.2511-2516, 26 refs.
Sashida, N., Samata, T., Kaneko, K.
Solutions, Oscillations, Freezing potential (electrical), Electric potential, Ice water interface, Ion exchange, Ice growth, Electrical measurement, Ion density (concentration), Ice electrical properties.

47-462
Stress-induced foliation in the terminus of Variegated Glacier, Alaska, U.S.A., formed during the 1982-83 surge.
Pfeffer, W.T., *Journal of glaciology*, 1992, 38(129), p.213-222, 13 refs.
Glacier surges, Glaciology, Glacier tongues, Ice deformation, Ice structure, Strains, Ice mechanics, Bubbles.

47-463
Climate sensitivity of glaciers in southern Norway: application of an energy-balance model to Nigardsbreen, Hellstugubreen and Alfotbreen.
Oerlemans, J., *Journal of glaciology*, 1992, 38(129), p.223-232, 16 refs.
Glacier oscillation, Glaciology, Glacier mass balance, Glacier heat balance, Air temperature, Climatic factors, Climatic changes, Glacier surfaces, Periodic variations, Analysis (mathematics), Glacier surveys.

47-464
Hintereisferner, Austria: mass-balance reconstruction and numerical modelling of the historical length variations.
Greuell, W., *Journal of glaciology*, 1992, 38(129), p.233-244, 27 refs.
Glacier flow, Glaciology, Glacier oscillation, Glacier mass balance, Periodic variations, Climatic factors, Climatic changes, Mathematical models, Accuracy.

47-465
Flow-law hypotheses for ice-sheet modeling.
Alley, R.B., *Journal of glaciology*, 1992, 38(129), p.245-256, 45 refs.
Ice sheets, Glaciology, Glacier flow, Rheology, Ice microstructure, Ice mechanics, Recrystallization, Stresses, Ice deformation, Ice models.

47-466
Determination of glacier speed by time-lapse photography under unfavorable conditions.
Harrison, W.D., et al, *Journal of glaciology*, 1992, 38(129), p.257-265, 6 refs.
Echelmeyer, K.A., Cosgrove, D.M., Raymond, C.F.
Glacier flow, Glaciology, Velocity measurement, Photogrammetry, Photographic techniques, Accuracy, Glacier surface, Orientation.

47-467
Calculated variations of annual ice ablation at the margin of the Greenland ice sheet, West Greenland, 1961-90.
Braithwaite, R.J., et al, *Journal of glaciology*, 1992, 38(129), p.266-272, 28 refs.
Olesen, O.B., Thomsen, H.H.
Ice sheets, Glaciology, Ice edge, Glacier ablation, Glacier surveys, Glacier thickness, Periodic variations, Simulation, Global warming.

47-468
Thermal effects due to air flow and vapor transport in dry snow.
Albert, M.R., et al, *Journal of glaciology*, 1992, 38(129), MP 3134, p.273-281, 21 refs.
McGilvary, W.R.
Snow air interface, Snow thermal properties, Snow temperature, Vapor transfer, Heat transfer, Sublimation, Temperature effects, Convection, Analysis (mathematics), Forecasting, Thermal regime.
The thermal effects of air flow forced through a snow sample are investigated numerically. A new method for calculating vapor transport in snow is presented which allows for the determination of the effects of sublimation. In this method, the snow is not assumed to be saturated with water vapor. Results of the model show very good agreement with analytical and experimental results. It is demonstrated that the heat transfer associated with vapor transport is significant in the determination of the overall temperature profile of a ventilated snow sample, but that the major effects are controlled by the heat carried by the dry air flow through the snow and heat conduction due to the temperatures imposed at the boundaries. 504 Journal of glaciology

47-469
Theoretical calving rates from glaciers along ice walls grounded in water of variable depths.
Hughes, T., *Journal of glaciology*, 1992, 38(129), p.282-294, 44 refs.
Ice shelves, Glaciology, Calving, Glacier flow, Ice mechanics, Shear properties, Ice water interface, Grounded ice, Analysis (mathematics), Icebergs.

47-470
Western Barents Sea and the Svalbard archipelago 18,000 years ago—a finite-difference computer model reconstruction.
Isaksson, E., *Journal of glaciology*, 1992, 38(129), p.295-301, 44 refs.
Glaciation, Glaciology, Ice sheets, Pleistocene, Computerized simulation, Glacial geology, Marine geology, Glacier flow.

47-471
Refraction correction for radio-echo sounding of large ice masses.
Rees, W.G., et al, *Journal of glaciology*, 1992, 38(129), p.302-308, 18 refs.
Donovan, R.E.
Glacier surveys, Glaciology, Glacier thickness, Radio echo soundings, Wave propagation, Accuracy, Refractivity, Ice optics, Bedrock, Analysis (mathematics), Ice composition.

47-472
Recent fluctuations of glaciers in Valtellina (Italian Alps) and climatic variations.
Pelfini, M., et al, *Journal of glaciology*, 1992, 38(129), p.309-313, 13 refs.
Smiraglia, C.
Glacier surveys, Glaciology, Glacier oscillation, Mountain glaciers, Climatic changes, Temperature variations, Meteorological data, Periodic variations.

47-473
Ice-blister observations on glaciers, sea ice and rivers.
Kovacs, A., *Journal of glaciology*, 1992, 38(129), MP 3135, p.314-316, 15 refs.
Ice sheets, Icing, Ice surface, Frost mounds, Frost action, Surface properties.
In this letter, the author offers an elaboration of information concerning ice-blister location and morphology presented in a previous paper of the journal. This feature is not confined to glacier surfaces, but has been reported on sea ice and river surfaces as well. Details concerning the distribution and formation of ice-blisters are also related.

47-474
Opal cutans in the profile of mountain tundra sod soil in the extreme north-east of the USSR.
Pustovoitov, K.E., *Moscow University soil science bulletin*, 1990, 45(2), p.12-17, Translated from Vestnik Moskovskogo Universiteta. Pochvovedenie. 18 refs.
Mountain soils, Tundra, Soil profiles, Soil formation, Frost action, Vegetation factors, Lichens, Particle size distribution.

47-475
Some indices of the biological activity of soils of the mountain meadow belt of the northwestern Caucasus.
Efremov, A.L., *Moscow University soil science bulletin*, 1981, 36(2), p.76-78, Translated from Vestnik Moskovskogo Universiteta. Pochvovedenie. 5 refs.
Mountain soils, Meadow soils, Alpine landscapes, Soil microbiology, Soil chemistry, Vegetation factors, Altitude, Biomass.

47-476
Indices of the humus state of some high-mountain soils of Western Pamir.
Demin, V.V., *Moscow University soil science bulletin*, 1981, 36(3), p.77-79, Translated from Vestnik Moskovskogo Universiteta. Pochvovedenie. 7 refs.
Mountain soils, Organic soils, Soil analysis, Soil composition, Soil formation, Desert soils.

47-477
Snow science: reflections on the past, perspectives on the future.
Kalitowski, M., ed, Alta, UT, Center for Snow Science, 1992, 46p., Proceedings of a symposium, Apr. 20, 1991, to honor Ed LaChapelle and Binx Sandahl. Refs. passim. For individual papers see 47-478 through 47-482.
Decker, R., ed.
Snow surveys, Snow cover stability, Avalanche forecasting, Research projects, Data processing.

47-478
Snow properties research and data management.
Armstrong, R.L., Snow science: reflections on the past, perspectives on the future. Edited by M. Kalitowski and R. Decker, Alta, UT, Center for Snow Science, 1992, p.1-9, 19 refs.
Snow surveys, Snow cover distribution, Snow depth, Remote sensing, Research projects, Organizations, Data processing.

47-479
Remote sensing of alpine snow cover in visible and near-infrared wavelengths.
Dozier, J., Snow science: reflections on the past, perspectives on the future. Edited by M. Kalitowski and R. Decker, Alta, UT, Center for Snow Science, 1992, p.10-21, 33 refs.
Snow surveys, Snow cover distribution, Snow optics, Remote sensing, Spaceborne photography, Infrared mapping, Cloud cover, Alpine landscapes, Terrain identification.

47-480
Systems: the world, the flesh, the metal.
Ferguson, S.A., Snow science: reflections on the past, perspectives on the future. Edited by M. Kalitowski and R. Decker, Alta, UT, Center for Snow Science, 1992, p.22-31, 21 refs.
Avalanche forecasting, Avalanche modeling, Snow cover stability, Safety, Data processing.

47-481
Suggestions for snow research.
Schaerer, P., Snow science: reflections on the past, perspectives on the future. Edited by M. Kalitowski and R. Decker, Alta, UT, Center for Snow Science, 1992, p.32-41.
Avalanche forecasting, Snow cover stability, Snow loads, Snow surveys, Research projects, Data processing.

47-482
Five problems in avalanche research.
Perla, R., Snow science: reflections on the past, perspectives on the future. Edited by M. Kalitowski and R. Decker, Alta, UT, Center for Snow Science, 1992, p.42-45.
Avalanche forecasting, Snow cover stability, Avalanche triggering, Research projects, Data processing.

47-483
Merely the tip of the ice core.
Peel, D.A., *Nature*, Sep.24, 1992, 359(6393), p.274-275, 5 refs.
Ice cores, Paleoclimatology, Greenland.

47-484
Observation and possible causes of new ozone depletion in Antarctica in 1991.
Hofmann, D.J., et al, *Nature*, Sep.24, 1992, 359(6393), p.283-287, 23 refs.
Ozone, Stratosphere, Volcanic ash, Clouds (meteorology), Antarctica—Amundsen-Scott Station, Antarctica—McMurdo Station.
Local ozone reductions approaching 50% in magnitude were observed during the antarctic spring in the 11-13 and 25-30 km altitude regions over South Pole and McMurdo Stations in 1991. These reductions, at altitudes where depletion has not been observed previously, resulted in a late September total ozone column 10-15% lower than previous years. The added depletion in the lower stratosphere was observed to coincide with penetration into the polar vortex of highly enhanced concentrations of aerosol particles from volcanic activity in 1991.

47-485
Irregular glacial interstadials recorded in a new Greenland ice core.
Johnsen, S.J., et al, *Nature*, Sep. 24, 1992, 359(6393), p.311-313, 23 refs.
Ice cores, Paleoclimatology, Greenland.

47-486
Measurement, analysis, and modeling of deformation of the shelf flow, Byrd Glacier.
Zhao, Z.H.M., Orono, University of Maine, 1990, 108p., University Microfilms order No. 91-12796, Ph.D. thesis. Refs. p.93-98.
Ice shelves, Photogrammetry, Glacier flow, Ice deformation, Ice models, Antarctica—Byrd Glacier.
Photogrammetric measurement was used in this study to evaluate the velocity and deformation of the shelf flow of Byrd Glacier, *with special emphasis on the north rift zone*. A non-topographic approach of photogrammetric analysis of the deformation characteristics of the shelf flow was conducted. The photogrammetric measurements also served as verification of the theoretical mechanical model which describes the dynamics of the ice flow. A finite element approach was used to approximate the theoretical model. An experimental approach using this method enabled the modeling results to fit both the theory and the measurements well. This study extended the application of non-topographic photogrammetry in glacier measurement, and more importantly, provided better understanding of the ice dynamics of Byrd Glacier. (Auth. mod.)

47-487
Proceedings of the 60th annual meeting, Jackson, WY, Apr. 14-16, 1992.
Western Snow Conference, Fort Collins, Colorado State University, 1992, 153p. + appends., Refs. passim. For individual papers see 47-488 through 47-508.
Snow surveys, Snowmelt, Runoff forecasting, Snow retention, Water reserves, Snow evaporation, Snow water equivalent, Global warming, Snow depth, Snowfall, Snow hydrology.

47-488
Sublimation of intercepted snow as a global source of water vapor.
Schmidt, R.A., et al, *Western Snow Conference. Proceedings*, 1992, 60th, p.1-9, 23 refs.
Troendle, C.A.
Snow evaporation, Snow air interface, Snow retention, Forest canopy, Vegetation factors, Humidity, Water vapor, Snow water equivalent, Global change.

47-489
Snow surveying comes of age in the west.
Helms, J.D., *Western Snow Conference. Proceedings*, 1992, 60th, p.10-17, 22 refs.
Snow surveys, Runoff forecasting, Snow courses, Flood forecasting, Irrigation, History.

47-490
40 years of snow cover measurements in France: network evaluation, forecast interest (application of historical and realtime data to the multipurpose of water management).
Duband, D., et al, *Western Snow Conference. Proceedings*, 1992, 60th, p.18-27, 9 refs.
Lallement, C.
Snow surveys, Runoff forecasting, Snowmelt, Water reserves, Snow water equivalent, Snow survey tools, Data processing, France.

47-491
Expanding SCS's remote sensing program.
Werner, J.G., et al, *Western Snow Conference. Proceedings*, 1992, 60th, p.28-35, 6 refs.
Schaefer, G.L., Cooper, P.D.
Snow surveys, Runoff forecasting, Remote sensing, Data transmission, Telemetering equipment, Weather stations, Evapotranspiration, Global change.

47-492
Minimizing measurement errors in automated snowpack profile temperature measurements.
Sauter, K.A., et al, *Western Snow Conference. Proceedings*, 1992, 60th, p.36-45, 1 ref.
Tanner, B.D.
Snow surveys, Snow temperature, Temperature measurement, Thermocouples, Snow depth.

47-493
Monitoring snow grain size for passive microwave studies.
Armstrong, R.L., et al, *Western Snow Conference. Proceedings*, 1992, 60th, p.46-55, 22 refs.
Rango, A.
Snow surveys, Snow depth, Snow density, Snow stratigraphy, Radiometry, Depth hoar, Grain size.

47-494
Propylene glycol and ethanol as a replacement antifreeze for precipitation gauges: dilution, disposal, and safety.
McGurk, B.J., *Western Snow Conference. Proceedings*, 1992, 60th, p.56-65, 10 refs.
Antifreezes, Precipitation gages, Snowfall, Environmental impact.

47-495
Snowfall-event climatology: the finale.
Mahoney, J.L., et al, *Western Snow Conference. Proceedings*, 1992, 60th, p.66-77, 6 refs.
Brown, J.M.
Snowfall, Snowstorms, Precipitation (meteorology), Weather forecasting, United States—Colorado.

47-496
Environmental influences on snow algal microbes.
Hoham, R.W., *Western Snow Conference. Proceedings*, 1992, 60th, p.78-83, 28 refs.
Cryobiology, Algae, Snow cover effect, Bacteria, Ecology, Colored snow.

47-497
Where has all the snow gone? Snowpack sublimation in northern Arizona.
Avery, C.C., et al, *Western Snow Conference. Proceedings*, 1992, 60th, p.84-94, 15 refs.
Snow evaporation, Runoff forecasting, Snow air interface, Snow retention, Statistical analysis, United States—Arizona.

47-498
Prediction of snowmelt rates at a forested alpine site in northern Utah.
Sauter, K.A., et al, *Western Snow Conference. Proceedings*, 1992, 60th, p.95-102, 10 refs.
McDonnell, J.J.
Runoff forecasting, Snowmelt, Snow surveys, Snow melting, Snow heat flux, Alpine landscapes, Forest land, United States—Utah.

47-499
Hydrologic flowpaths of snowpack runoff in a high-elevation catchment.
Williams, M.W., *Western Snow Conference. Proceedings*, 1992, 60th, p.103-112, 17 refs.
Runoff forecasting, Snowmelt, Snow hydrology, Snow surveys, Seepage, Alpine landscapes.

47-500
Applying a climatic change scenario to a semi-distributed watershed model.
Kite, G.W., *Western Snow Conference. Proceedings*, 1992, 60th, p.113-120, 19 refs.
Global warming, Snowmelt, Water reserves, Water balance, Watersheds, Runoff forecasting, Mathematical models.

47-501
Harvesting snow when water levels are low.
Jairell, R.L., et al, *Western Snow Conference. Proceedings*, 1992, 60th, p.121-124, 9 refs.
Schmidt, R.A.
Snow retention, Water reserves, Snowmelt, Snowdrifts, Snow fences, Snow water equivalent, Water storage, Pits (excavations), Cost analysis.

47-502
GIS-based method of modeling water input from rain-on-snow storms, for management and regulation of clearcut forest harvest.
Brunengo, M.J., et al, *Western Snow Conference. Proceedings*, 1992, 60th, p.125-128, 5 refs.
Smith, S.D., Bernath, S.C.
Runoff forecasting, Snowmelt, Snowstorms, Forest land, Forestry, Environmental impact, Rain, Data processing.

47-503
Simulation of snowmelt in a small rangeland watershed.
Flerchinger, G.N., et al, *Western Snow Conference. Proceedings*, 1992, 60th, p.129-132, 8 refs.
Cooley, K.R.
Runoff forecasting, Snowmelt, Snow hydrology, Snow surveys, Watersheds, Computerized simulation.

47-504
Estimation of 30 year average annual precipitation for SNOTEL sites in Idaho.
Morrisey, P.S., *Western Snow Conference. Proceedings*, 1992, 60th, p.133-136.
Snow surveys, Runoff forecasting, Precipitation (meteorology), Data transmission, Telemetering equipment, Weather stations, Statistical analysis, United States—Idaho.

47-505
Predicting snow melt and streamflow volumes in the Arkansas River basin of Colorado.
Nickless, R.C., *Western Snow Conference. Proceedings*, 1992, 60th, p.137-140, 6 refs.
Runoff forecasting, Snowmelt, Snow surveys, Stream flow, River basins, Water reserves, Statistical analysis, United States—Colorado.

47-506
Computation of a snowpack-loss component for a water-budget model for the San Juan aquifer basin in New Mexico and Colorado.
Waltemeyer, S.D., et al, *Western Snow Conference. Proceedings*, 1992, 60th, p.141-145, 5 refs.
Kernodle, J.M.
Runoff forecasting, Snowmelt, Snow evaporation, Snow surveys, River basins, Water reserves, Water balance, Ground water, Mathematical models, United States—New Mexico.

47-507
Improved carrying case for snow tubes.
Gluns, D.R., et al, *Western Snow Conference. Proceedings*, 1992, 60th, p.146-149, 2 refs.
Rose, G.
Snow survey tools, Snow surveys, Portable equipment.

47-508
Snow management in the reclamation of sodic soils.
Steppuhn, H., et al, *Western Snow Conference. Proceedings*, 1992, 60th, p.150-153, 4 refs.
Curtin, D.
Snowmelt, Snow retention, Land reclamation, Saline soils, Soil water, Soil chemistry, Soil conservation.

47-509
U.S. Army Corps of Engineers response to the *Exxon Valdez* oil spill.
McDonnell, J.A., Fort Belvoir, VA, 1992, 148p., Refs. passim.
Oil spills, Oil recovery, Accidents, Tanker ships, Environmental impact, History, United States—Alaska—Prince William Sound.

47-510
Soil denitrification rates in a subalpine watershed of the eastern Sierra Nevada.
Walker, R.F., et al, *Forest ecology and management*, July 30, 1992, 50(3-4), p.217-231, 36 refs.
Hixson, S.E., Skau, C.M.
Plant ecology, Soil chemistry, Watersheds, Soil analysis, Mountain soils, Nutrient cycle, Temperature effects, Decomposition, Seasonal variations.

47-511
Structure, productivity and energy flow in an alpine grassland in the Garhwal Himalaya.
Sundriyal, R.C., *Journal of vegetation science*, Feb. 1992, 3(1), p.15-20, 38 refs.
Alpine landscapes, Meadow soils, Biomass, Vegetation patterns, Grasses, Ecosystems, Periodic variations.

47-512
Annual nutrient budget for an alpine grassland in the Garhwal Himalaya.
Sundriyal, R.C., et al, *Journal of vegetation science*, Feb. 1991, 3(1), p.21-26, 25 refs.
Joshi, A.P.
Alpine landscapes, Grasses, Meadow soils, Nutrient cycle, Biomass, Vegetation patterns, Plant ecology, Chemical analysis.

47-513
Underwater sounds of precipitation.
Crum, L.A., et al, *Naval research reviews*, 1992, 44(2), p.2-12, 32 refs.
Roy, R.A., Prosperetti, A.
Underwater acoustics, Precipitation (meteorology), Sound transmission, Snowfall, Ice water interface, Impact, Bubbles, Detection, Spectra, Artificial hailstones.

47-514
Salinity profiles of antarctic sea ice: field data and model results.
Eicken, H., *Journal of geophysical research*, Oct. 15, 1992, 97(C10), p.15,545-15,557, 47 refs.
Sea ice, Ice composition, Salinity, Distribution, Ice water interface, Ice growth, Ice cores, Snow cover effect, Air ice water interaction, Antarctica—Weddell Sea.
In order to describe and compare sea ice salinity distributions, this paper presents computed composite profiles and fitted third-degree polynomials to salinity data of 129 cores from the Weddell Sea. Four characteristic profile shapes have been recognized and described through the polynomial coefficients. The field data have been compared with "ideal" salinity profiles generated by a simulation scheme based on thermodynamic growth under climatological conditions representative of the Weddell Sea. Composite salinity profiles agree well with simulations, irrespective of the growth mechanism (i.e., frazil or congelation), suggesting that ice properties which depend on salinity or porosity may evolve independent of ice growth conditions. Analysis of salinity and (delta)O-18 data in conjunction with the simulations demonstrates that apart from meteorological conditions controlling growth rate and temperature distribution within the ice, flooding and upward brine expulsion are important in raising top salinities as frequently observed. Low top salinities are typical of ice that has undergone retexturing and differential desalination. Salinity decreases towards the bottom of a floe are a result of high oceanic heat fluxes and snow-cover effects. As a consequence of these processes the bulk salinity of Weddell Sea ice cannot be described by a simple linear age-thickness relationship as can arctic first-year ice. (Auth. mod.)

47-515
Observing the advection of sea ice in the Weddell Sea using buoy and satellite passive microwave data.
Massom, R.A., *Journal of geophysical research*, Oct. 15, 1992, 97(C10), p.15,559-15,572, 52 refs.
Sea ice distribution, Drift, Advection, Radiometry, Ice edge, Thermodynamics, Ocean currents, Ice water interface, Correlation, Antarctica—Weddell Sea.
This study examines the progress and behavior of sea ice during the growth season of 1980 as it drifts from the southwestern Weddell Sea, by using data from four buoys tracked by Nimbus 6 and concurrent ice concentrations retrieved from Nimbus 7 scanning multichannel microwave radiometer data. The overall drift characteristics, and their relationship to ice edge displacement, are examined within the framework of four zones. Three phases are identified in the large-scale behavior of the Weddell sea ice cover, namely, a rapid equatorward and eastward advance, a quasi-equilibrium phase, and a period of rapid recession. A broad division is made between the sectors to the east and west of 35-40W in terms of the nature of ice edge advance. Transient departures from the mean northward advection are linked to the passage of cyclones, which may be significant in terms of the formation and maintenance of the region of highly consolidated perennial ice observed in the western Weddell Sea. Mean daily drift rates from within the central-western Weddell pack were high in 1980, particularly early in the growth season and when compared with rates to the west of 50W. Closed loops in the buoy trajectories, which are clockwise to the south of 63S, reverse to become anticlockwise to the north. Mid-ocean islands impede the eastward progress of the ice. A coherence is noted in the response of the buoys to the passage of storms, even though the buoys were separated by over 100 km. (Auth. mod.)

47-516
Temperature-independent relationships for frozen soils.
Wijeweera, H., et al, *Journal of cold regions engineering*, Mar. 1992, 6(1), p.1-21, 11 refs.
Joshi, R.C.
Frozen ground strength, Strain tests, Soil creep, Mechanical properties, Deformation, Loading, Geocryology, Bearing strength.

47-517
Seasonal soil strength by spectral analysis of surface waves.
Alkire, B.D., *Journal of cold regions engineering*, Mar. 1992, 6(1), p.22-38, 6 refs.
Soil strength, Vibration, Soil tests, Seasonal freeze thaw, Impact tests, Wave propagation, Seismic velocity, Spectra, Frost penetration, Trafficability.

47-518
Growing season trends in the Alaskan climate record.
Sharratt, B.S., *Arctic*, June 1992, 45(3), p.124-127, With French summary. 19 refs.
Climatic changes, Surface temperature, Temperature variations, Freezing indexes, Agriculture, Growth, Global change, Meteorological data, Seasonal variations, Forecasting.

47-519
Arctic insects as indicators of environmental change.
Danks, H.V., *Arctic*, June 1992, 45(3), p.159-166, With French summary. 61 refs.
Climatic changes, Animals, Monitors, Cold weather survival, Distribution, Climatology.

47-520
Changes in the sea-ice brine community during the spring-summer transition, McMurdo Sound, Antarctica. I. Photosynthetic protists.
Stoecker, D.K., et al, *Marine ecology progress series*, Aug. 13, 1992, 84(3), p.265-278, 51 refs.
Buck, K.R., Putt, M.
Sea ice, Brines, Ecology, Biomass, Photosynthesis, Antarctica—McMurdo Sound.
During the austral spring, a characteristic microbial community develops in the sub-surface brine pockets and channels of the annual land-fast sea ice in McMurdo Sound. This community is distinct from the diatom-dominated community that develops in the channels at the base of the sea ice, at the seawater ice interface, and in the platelet layer. The photosynthetic biomass in the brine pockets is dominated by athecate dinoflagellates. Chrysophyte statocysts (sometimes known as archaeomonads) and <5 micron photosynthetic flagellates are also characteristically found in this assemblage. In Dec., chlorophyll a content and biomass peak, and photosynthetic gymnodinioid dinoflagellates can reach densities of over 1000/ml of brine. The photosynthetic dinoflagellates form cysts (hypnozygotes) during late Dec. and early Jan., and chrysophyte statocysts also become abundant. During austral summer, total autotrophic biomass in the upper ice brine decreases due to dilution by melt water, flushing of brine into the water column, and grazing. By late summer, the annual sea ice in McMurdo Sound has broken out. The yearly decay and retreat of sea ice introduces a characteristic set of brine protists and their cysts into McMurdo Sound. (Auth.)

47-521
M.V. *Arctic* ice transiting performance—continuous mode. Interim report.
Albery, Pullerits, Dickson and Associates, Nov. 1983, Var.p., 42 refs.
Ice navigation, Metal ice friction, Tanker ships, Ice solid interface, Icebreakers, Ice breaking, Ice cover strength, Statistical analysis.

47-522
1985/86 season analysis: Lancaster Sound winter ice regime. Volume II.
Intera Technologies Limited, *Transport Canada. Report*, Mar. 1986, TP-7547E, 164p. + appends bound separately.
Ice surveys, Sea ice distribution, Ice floes, Ice conditions, Drift, Spaceborne photography, Statistical analysis, Canada—Northwest Territories--Lancaster Sound.

47-523
Proceedings.
National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983, Manali, India, Snow & Avalanche Study Establishment, 1985, 2 vols., Refs. passim. For selected papers see 47-524 through 47-584.
DLC QC929.S7 N33 1983
Avalanches, Snow cover stability, Avalanche forecasting, Snow hydrology, Snow cover effect, Road maintenance, Snow surveys, Snow mechanics, Himalaya Mountains.

47-524
Impact of winter and spring time snow cover over Eurasia on the short-term climatic fluctuations of the summer monsoon over India.
Sikka, D.R., National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.47-60, Includes discussion. 33 refs.
DLC QC929.S7 N33 1983
Snow cover distribution, Snow cover effect, Precipitation (meteorology), Atmospheric circulation, Climatic factors, Seasonal variations, Avalanche forecasting, Snow air interface.

47-525
Some observations on the seasonal snow cover.
Rao, N.M., National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.65-78, 7 refs.
DLC QC929.S7 N33 1983
Snow cover distribution, Snow accumulation, Seasonal variations, Snow cover stability, Wind factors, Mountains, Metamorphism (snow), Avalanche forecasting.

47-526
Necessity for creating network for the gauging of snow in the Himalayas.
Gupta, M.P., National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.79-83, Includes discussion. 3 refs.
DLC QC929.S7 N33 1983
Snow hydrology, Snow surveys, Runoff forecasting, Snowmelt, Snow depth, Snow water equivalent, Flood forecasting, Precipitation gages, Mountains.

47-527
Density of snow and its variations in central and western Himalaya.
Rangachary, N., et al, National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.84-97, 5 refs.
Ram, T.
DLC QC929.S7 N33 1983
Snow cover structure, Snow physics, Snow density, Snow hydrology, Seasonal variations, Snowflakes, Avalanche forecasting.

47-528
Densification and stability of a seasonal snow pack.
Agrawal, K.C., et al, National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.99-111, Includes discussion. 8 refs.
Dass, T.
DLC QC929.S7 N33 1983
Snow cover stability, Snow density, Snow mechanics, Physical properties, Shear stress, Analysis (mathematics), Viscosity, Avalanche forecasting.

47-529
Integration of remote sensing and nuclear geophysics in seasonal snow cover assessment.
Bardhan, M., National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.112-119, Includes discussion. 16 refs.
DLC QC929.S7 N33 1983
Snow surveys, Spaceborne photography, Snow cover structure, Snow water equivalent, Gamma irradiation, Sampling, Correlation, Avalanche forecasting.

47-530
Possibilities of snow cover estimation using satellite imageries.
Joshi, M.D., et al, National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.120-124, 4 refs.
Kate, J.M.
DLC QC929.S7 N33 1983
Snow cover distribution, Snow depth, Spaceborne photography, Snow surveys, Photointerpretation, Avalanche forecasting, Topographic surveys.

47-531
On some meteorological aspects of snowfall over the Himalayas as observed by satellite.
Kalsi, S.R., et al. National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.125-132, 4 refs.
Mishra, D.K.
DLC QC929.S7 N33 1983
Spaceborne photography, Precipitation (meteorology), Snowfall, Weather forecasting, Cloud cover, Radiometry, Meteorological factors, Avalanche forecasting, Mountains.

47-532
On some physical properties of snowpack.
Puri, S.R., et al. National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.133-143, Includes discussion. 3 refs.
Upadhyay, D.S., Kant, R.
DLC QC929.S7 N33 1983
Snow cover structure, Physical properties, Snow density, Snow water equivalent, Snow depth, Seasonal variations, Avalanche forecasting, Ice (water storage).

47-533
Some studies in gamma attenuation for application in snow gauging.
Rao, M.V.N., et al. National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.144-148, Includes discussion. 3 refs.
Baheti, G.L., Reddy, A.R.
DLC QC929.S7 N33 1983
Snow depth, Performance, Measurement, Gamma irradiation, Snow hydrology, Snow water equivalent, Simulation, Avalanche forecasting, Laboratory techniques.

47-534
Chemical constituents of two snow falls around Manali District, Kulu, Himachal Pradesh.
Krishnan, V., et al. National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.151-156, 4 refs.
Sangewar, C.V., Mukherjee, B.P.
DLC QC929.S7 N33 1983
Snowfall, Snow composition, Chemical analysis, Sampling, Chemical composition.

47-535
Diurnal depletion characteristics of seasonal snow cover at different altitudes in Rohtang pass area, District Kulu, Himachal Pradesh.
Krishnan, V. et al. National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.157-163, 3 refs.
Sangewar, C.V.
DLC QC929.S7 N33 1983
Snow cover distribution, Ablation, Slope processes, Diurnal variations, Altitude, Avalanche forecasting, Sampling.

47-536
Initiation of first snow surveys in the Himalayas—a brief appraisal.
Dhar, O.N., et al. National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.164-174, Includes discussion. 16 refs.
Kulkarni, A.K., Mandal, B.N.
DLC QC929.S7 N33 1983
Snow surveys, Snow accumulation, Mountains, Expeditions, Runoff forecasting, Avalanche forecasting.

47-537
Winter and spring precipitation over the northwestern Himalayas—a brief appraisal.
Rakhecha, P.R., et al. National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.175-185, 6 refs.
Kulkarni, A.K., Mandal, B.N., Dhar, O.N.
DLC QC929.S7 N33 1983
Precipitation (meteorology), Snow accumulation, Snowmelt, Runoff forecasting, Seasonal variations, Mountains, Electric power.

47-538
Slope monitoring in high hills using LANDSAT imageries.
Joshi, M.D., et al. National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.196-203, Includes discussion. 3 refs.
Bagchi, A.K., Kate, J.M.
DLC QC929.S7 N33 1983
Snow cover stability, Spaceborne photography, Snow surveys, Terrain identification, Slope orientation, Photogrammetry, Avalanche forecasting.

47-539
Approach to slope and subsurface studies in avalanche prone area by air photos.
Pathak, R.C., et al. National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.204-211, Includes discussion. 8 refs.
Kate, J.M.
DLC QC929.S7 N33 1983
Avalanche forecasting, Aerial surveys, Photointerpretation, Subsurface investigations, Slope orientation, Avalanche triggering.

47-540
Avalanche dating and avalanche accident feed-back.
Rao, N.M., National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.212-225, Includes discussion. 4 refs.
DLC QC929.S7 N33 1983
Avalanche forecasting, Snow surveys, Aerial surveys, Photointerpretation, Slope orientation, Topographic surveys, Accidents.

47-541
Trials for the measurement of static and impact pressure of snow and avalanches.
Hariprasad, N.M., et al. National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.226-243, Includes discussion. 12 refs.
Sethi, D.N.
DLC QC929.S7 N33 1983
Snow cover stability, Avalanche mechanics, Snow loads, Design criteria, Measurement, Impact strength.

47-542
Single stress time parameter for snow under tension.
Kachroo, P.N., National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.244-248, 2 refs.
DLC QC929.S7 N33 1983
Snow compression, Snow strength, Snow mechanics, Tensile properties, Stress concentration, Avalanche mechanics, Rheology, Metamorphism (snow).

47-543
Single pressure-time parameter for snow under compression.
Kachroo, P.N., National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.249-256, Includes discussion. 2 refs.
DLC QC929.S7 N33 1983
Snow strength, Snow compression, Metamorphism (snow), Stress concentration, Snow mechanics, Avalanche mechanics, Rheology, Analysis (mathematical).

47-544
Study of creep in a mountain snow pack.
Ghoshal, P.R., et al. National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.257-270, 7 refs.
Sethi, D.N.
DLC QC929.S7 N33 1983
Snow cover stability, Snow creep, Snow mechanics, Avalanche mechanics, Rheology, Mountains, Sliding.

47-545
Estimation of runout distances of flowing avalanches.
Sethi, D.N., National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.271-275, 6 refs.
DLC QC929.S7 N33 1983
Avalanche mechanics, Fluid flow, Avalanche tracks, Avalanche forecasting, Accuracy, Analysis (mathematics).

47-546
Assessment of stresses and strains on an avalanche slope by indirect evidence.
Sharma, S.S., National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.276-295, Includes discussion. 3 refs.
DLC QC929.S7 N33 1983
Avalanche mechanics, Avalanche forecasting, Snow cover stability, Slope orientation, Stresses, Topographic effects, Snow deformation.

47-547
Forecasting snow versus rain in Kulu Valley.
Rangachary, N., et al. National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.304-309, Includes discussion. 5 refs.
Prashar, D.K., Ram, T.
DLC QC929.S7 N33 1983
Precipitation (meteorology), Weather forecasting, Snowfall, Air temperature, Freezing points, Altitude, Avalanche forecasting, Mountains.

47-548
Objective guidelines to avalanche forecasting in Western Himalayas.
Rangachary, N., et al. National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.310-317, Includes discussion. 1 ref.
Sarma, T.C.S.R., Ram, T.
DLC QC929.S7 N33 1983
Avalanche forecasting, Statistical analysis, Accuracy, Meteorological data, Periodic variations.

47-549
Avalanche forecasting by acoustic monitoring of snowpacks.
Koul, B.B., National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.318-323, 10 refs.
DLC QC929.S7 N33 1983
Avalanche forecasting, Snow acoustics, Acoustic measurement, Snow cover stability, Detection, Seismic surveys, Sound transmission.

47-550
Snow avalanches of Himalaya—an analysis.
Rao, N.M., et al. National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.327-340, 4 refs.
Rangachary, N.
DLC QC929.S7 N33 1983
Avalanches, Accidents, Classifications, Periodic variations, Avalanche forecasting, Countermeasures, Topographic effects.

47-551
Snow avalanches—classification, detection and search of victims.
Bhandari, R.K., et al. National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.341-346, 3 refs.
Gupta, C.
DLC QC929.S7 N33 1983
Avalanches, Classifications, Accidents, Countermeasures, Detection.

47-552
General appreciation of ice-snow avalanche and glaciers in Chandra-Bhaga valley.
Khular, Y.L., National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983 Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.347-353, Includes discussion. 5 refs.
DLC QC929.S7 N33 1983
Avalanche mechanics, Watersheds, Avalanche forecasting, Snow surveys, Glaciers.

47-553
Avalanche control in formation zone—a case study.
Rajaram, T., National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.354-368, 3 refs.
DLC QC929.S7 N33 1983
Avalanche formation, Structures, Protection, Countermeasures, Design criteria, Snow loads, Structural analysis.

47-554
New approach for design of diversion and retarding dams.
Sharma, S.S., National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.369-383, 6 refs.
DLC QC929.S7 N33 1983
Avalanche formation, Countermeasures, Structures, Avalanche mechanics, Design criteria.

47-555
Avalanche control project: what does it involve.
Rajaram, T., National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.384-391, 1 ref.
DLC QC929.S7 N33 1983
Avalanches, Countermeasures, Cost analysis.

47-556
Afforestation for avalanche prevention and control.
Tiwari, K.M., et al, National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.1, Manali, India, Snow & Avalanche Study Establishment, 1985, p.392-395, 5 refs.
Mathur, H.N., Singh, R.P.
DLC QC929.S7 N33 1983
Avalanches, Snow stabilization, Snow cover stability, Revegetation, Trees (plants).

47-557
Some aspects of snow hydrology.
Kango, G.H., National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.2, Manali, India, Snow & Avalanche Study Establishment, 1985, p.6-10, 26 refs.
DLC QC929.S7 N33 1983
Snow hydrology, Research projects, Snow surveys.

47-558
Snowmelt runoff using Landsat imageries.
Jeyaram, A., et al, National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol 2, Manali, India, Snow & Avalanche Study Establishment, 1985, p.11-21, 16 refs.
Tiwari, R.S., Sharma, K.P.
DLC QC929.S7 N33 1983
Snowmelt, River basins, Spaceborne photography, Runoff forecasting, Snow hydrology, LANDSAT, Simulation.

47-559
Nomograms for estimating rate of snow-melting from routine meteorological data.
Daoo, V.J., et al, National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.2, Manali, India, Snow & Avalanche Study Establishment, 1985, p.22-31, Includes discussion. 5 refs.
Shirvaikar, V.V.
DLC QC929.S7 N33 1983
Glacier melting, Snowmelt, Meteorological data, Snow hydrology, Runoff forecasting, Radiation absorption, Nomographs.

47-560
Estimation of flow yield in a snow-bound catchment.
Abbi, S.D.S., et al, National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.2, Manali, India, Snow & Avalanche Study Establishment, 1985, p.32-42.
Upadhyay, D.S., Mathur, H.N.
DLC QC929.S7 N33 1983
Watersheds, Snow hydrology, Snowmelt, Snow water equivalent, Runoff forecasting, Degree days, Seasonal variations, Avalanche forecasting.

47-561
Snow melt runoff for a sub-catchment of Beas basin.
Agrawal, K.C., et al, National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.2, Manali, India, Snow & Avalanche Study Establishment, 1985, p.43-63, Includes discussion. 18 refs.
Kumar, V.S., Das, T.
DLC QC929.S7 N33 1983
Watersheds, Snowmelt, Snow hydrology, Runoff forecasting, Mass balance, Latent heat, Degree days, Radiation absorption, Avalanche forecasting.

47-562
Review of isotopic techniques for snow and glacier hydrology of mountain watersheds.
Bahadur, J., National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.2, Manali, India, Snow & Avalanche Study Establishment, 1985, p.64-75, Includes discussion. 44 refs.
DLC QC929.S7 N33 1983
Snow hydrology, Watersheds, Isotope analysis, Snow cover structure, Radioactive isotopes, Snow water equivalent, Glacier ice.

47-563
Empirical model for prediction of snowmelt runoff in Sutlej.
Upadhyay, D.S., et al, National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.2, Manali, India, Snow & Avalanche Study Establishment, 1985, p.76-103, 5 refs.
Chaudhury, J.N., Katyal, K.N.
DLC QC929.S7 N33 1983
Watersheds, Snow hydrology, Runoff forecasting, Snowmelt, Mathematical models, Periodic variations, Avalanche forecasting.

47-564
Modelling of daily snowmelt runoff during pre-monsoon months for Beas basin up to Manali.
Seth, S.M., National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.2, Manali, India, Snow & Avalanche Study Establishment, 1985, p.104-115, Includes discussion. 3 refs.
DLC QC929.S7 N33 1983
River basins, Snowmelt, Runoff forecasting, Snow hydrology, Altitude, Avalanche forecasting, Seasonal variations.

47-565
Recent advance and retreat of Bara Shigri glacier of eastern Lahaul.
Bandyopadhyay, M.K., et al, National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.2, Manali, India, Snow & Avalanche Study Establishment, 1985, p.121-125, 12 refs.
Bandyopadhyay, G.
DLC QC929.S7 N33 1983
Glacier oscillation, Glacier surveys, Periodic variations.

47-566
Net energy budget over a snow surface.
Upadhyay, D.S., et al, National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.2, Manali, India, Snow & Avalanche Study Establishment, 1985, p.129-143, 3 refs.
Adhikari, R.N., Chaudhury, J.N.
DLC QC929.S7 N33 1983
Snow cover, Snowmelt, Surface energy, Snow heat flux, Insolation, Snow hydrology.

47-567
Short review on the potentialities of isotope techniques in snow hydrology.
Jain, S.K., et al, National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.2, Manali, India, Snow & Avalanche Study Establishment, 1985, p.144-150, 11 refs.
Navada, S.V.
DLC QC929.S7 N33 1983
Snow hydrology, Isotope analysis, Snow cover structure, Radioactive isotopes.

47-568
Estimation of stored water in the seasonal snow cover by ground surveys in the upper reaches of Beas basin during 1980.
Krishnan, V., et al, National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.2, Manali, India, Snow & Avalanche Study Establishment, 1985, p.152-162, 3 refs.
Sangewar, C.V., Mukherjee, B.P.
DLC QC929.S7 N33 1983
Snow cover, Ice (water storage), Snow surveys, Snow hydrology, Snow water content.

47-569
Relationship between snow fall and lean season-discharge of river Sainj at Larji, Himachal Pradesh.
Krishnan, V., National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.2, Manali, India, Snow & Avalanche Study Establishment, 1985, p.163-173, 6 refs.
DLC QC929.S7 N33 1983
River flow, Snow accumulation, Correlation, Runoff forecasting, Snow hydrology.

47-570
Investigations of Himalayan glaciers using radioactive and stable isotopes: a review.
Nijampurkar, V.N., et al, National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.2, Manali, India, Snow & Avalanche Study Establishment, 1985, p.174-179, 22 refs.
Bhandari, N.
DLC QC929.S7 N33 1983
Glacier surveys, Isotope analysis, Glacier ice, Ice dating, Glacier mass balance, Glacier oscillation.

47-571
Factors affecting snow hydrology.
Singh, L.D., National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.2, Manali, India, Snow & Avalanche Study Establishment, 1985, p.180-182.
DLC QC929.S7 N33 1983
Snow hydrology, Meteorological factors, Water balance, Avalanche forecasting.

47-572
Solar chest for melting snow performance evaluation.
Hariprasad, N.M., et al, National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.2, Manali, India, Snow & Avalanche Study Establishment, 1985, p.203-211, 3 refs.
Thakur, M.S.
DLC QC929.S7 N33 1983
Water supply, Cold weather performance, Snow melting, Meltwater, Steel structures, Design, Solar radiation.

47-573
Problems of snow on road and airfields.
Ghosal, D.N., National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.2, Manali, India, Snow & Avalanche Study Establishment, 1985, p.212-221.
DLC QC929.S7 N33 1983
Avalanches, Snow removal, Road maintenance, Winter maintenance.

47-574
Use of radiation absorbing for clearing snow in mountainous regions.
Vombatkere, S.G., National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.2, Manali, India, Snow & Avalanche Study Establishment, 1985, p.222-239.
DLC QC929.S7 N33 1983
Mountains, Road maintenance, Snow removal, Snow melting, Materials, Radiation absorption, Solar radiation, Heat transfer.

47-575
Use of radiation absorbing materials for clearing snow in mountainous areas.
Sharma, H.D., National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.2, Manali, India, Snow & Avalanche Study Establishment, 1985, p.240-247, Includes discussion.
DLC QC929.S7 N33 1983
Mountains, Snow removal, Materials, Radiation absorption, Snow melting, Road maintenance, Cold weather performance, Heat transfer.

47-576
Experiments on artificial acceleration of ice and snow thawing and its suitability in clearing roads, helipads, runways, etc. from accumulated snow in the snow-bound areas.
Bhattacharya, U., et al, National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.2, Manali, India, Snow & Avalanche Study Establishment, 1985, p.248-263, 16 refs.
Ghosh, A.K.
DLC QC929.S7 N33 1983
Snow melting, Ice melting, Artificial melting, Dusting, Snow removal, Winter maintenance, Materials, Radiation absorption, Thermal insulation.

47-577
Deicing of roads.
Ghosh, S., National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.2, Manali, India, Snow & Avalanche Study Establishment, 1985, p.264-278, 5 refs.
DLC QC929.S7 N33 1983
Road icing, Winter maintenance, Trafficability, Ice removal, Snow removal, Ice control, Salting, Mountains.

47-578
Some typical problems encountered in roads and airfield pavements in snowbound areas.
Arya, I.R., et al, National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.2, Manali, India, Snow & Avalanche Study Establishment, 1985, p.279-286, 5 refs.
Vermani, N.D.
DLC QC929.S7 N33 1983
Pavements, Cold weather performance, Damage, Countermeasures, Frost action, Snow cover effect, Winter maintenance, Mountains, Runways.

47-579
Snow effects on roads.
Dhir, M.P., National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.2, Manali, India, Snow & Avalanche Study Establishment, 1985, p.287-292, 20 refs.
DLC QC929.S7 N33 1983
Road icing, Snow cover effect, Snow removal, Ice removal, Winter maintenance, Mountains.

47-580
Construction techniques for expedient air strips in snowbound regions.
Natarajan, T.K., et al, National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.2, Manali, India, Snow & Avalanche Study Establishment, 1985, p.293-317, 18 refs.
Phull, Y.R., Rao, P.J.
DLC QC929.S7 N33 1983
Cold weather construction, Aircraft landing areas, Snow (construction material), Mountains, Snow strength, Synthetic materials.

47-581
Special consideration in the construction and maintenance of cement concrete pavements in snowfall areas.
Phull, Y.R., et al, National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.2, Manali, India, Snow & Avalanche Study Establishment, 1985, p.318-344, Includes discussion. 59 refs.
Vijayaragaavan, S.R.
DLC QC929.S7 N33 1983
Winter maintenance, Concrete pavements, Cold weather construction, Frost action, Snow cover effect, Concrete durability, Design criteria.

47-582
Construction and maintenance of roads and runways in snowbound region.
Shukla, R.S., et al, National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.2, Manali, India, Snow & Avalanche Study Establishment, 1985, p.345-365, 12 refs.
Prashar, B.L.
DLC QC929.S7 N33 1983
Cold weather construction, Snow removal, Winter maintenance, Runways, Roads, Snow cover effect, Countermeasures, Equipment.

47-583
Systems approach to management of roads and airfields in snowbound areas.
Bose, S., et al, National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.2, Manali, India, Snow & Avalanche Study Establishment, 1985, p.366-380, 7 refs.
Singh, B., Ratnam, S.V.
DLC QC929.S7 N33 1983
Roads, Runways, Winter maintenance, Snow removal, Pavements, Design criteria.

47-584
Pavements in seasonal frost areas.
Aggarwal, R.C., et al, National Symposium on Seasonal Snow Cover, New Delhi, India, Apr. 28-30, 1983. Proceedings, Vol.2, Manali, India, Snow & Avalanche Study Establishment, 1985, p.381-386, 9 refs.
Chari, C.T.
DLC QC929.S7 N33 1983
Pavements, Winter maintenance, Frost action, Countermeasures, Design criteria, Seasonal freeze thaw.

47-585
Ice loads on vertical bridge pier at two different model scales.
Christensen, F.T., et al, *Journal of cold regions engineering*, Sep. 1992, 6(3), p.93-110, 20 refs.
Klinting, P.
Ice loads, Bridges, Pile structures, Simulation, Artificial ice, Impact tests, Ice solid interface, Oscillations, Accuracy, Laboratory techniques, Ice cover strength.

47-586
Safety and service life of equipment designed for cold climate operation.
Larionov, V.P., *Journal of cold regions engineering*, Sep. 1992, 6(3), p.111-123, 10 refs.
Equipment, Cold weather operation, Design criteria, Cold tolerance, Safety, Research projects, Temperature effects.

47-587
Winter operability: equipment problems and their remedies.
Diemand, D., *Journal of cold regions engineering*, Sep. 1992, 6(3), MP 3136, p.124-137, 23 refs.
Motor vehicles, Countermeasures, Construction equipment, Cold weather operation, Lubricants, Heating, Design, Admixtures, Plastics, Temperature effects.
With increased construction activities in cold regions, many remedies for low-temperature problems have been developed, and active research on new methods and improvements of existing techniques continues. Recent research in this area has included lubricants, plastics and elastomers, and heaters for the engine and other components. The recent development of synthetic hydrocarbon and silicone lubricants has alleviated many problems in the cold, and the current proliferation of plastics, elastomers, and composites has yielded promising materials for low-temperature use. Electric immersion heaters and fuel-fired units are commonly used for engine heating; research in the area of engine and equipment heating has resulted in the development of sophisticated programmable units as well as new devices using thermoelectric technology and latent-heat storage.

47-588
Hydrate dissociation enthalpy and guest size.
Sloan, E.D., et al, *Fluid phase equilibria*, Aug. 21, 1992, Vol.76, Symposium on Thermophysical Properties, 11th, Boulder, CO, June 23-27, 1991. Proceedings, Part II. Edited by J.F. Ely, p.123-140, Refs. p.137-140.
Fleyfel, F.
Hydrates, Clathrates, Stability, Decomposition, Enthalpy, Fluid dynamics, Thermodynamics, Physical properties, Natural gas.

47-589
Calculation of phase diagrams of gas-hydrates.
Lundgaard, L., et al, *Fluid phase equilibria*, Aug. 21, 1992, Vol.76, Symposium on Thermophysical Properties, 11th, Boulder, CO, June 23-27, 1991. Proceedings, Part II. Edited by J.F. Ely, p.141-149, 9 refs.
Mollerup, J.
Hydrates, Clathrates, Phase transformations, Stability, Fluid dynamics, Gas inclusions, Temperature effects, Natural gas, Thermodynamics.

47-590
Evidence of ascent in a sloped barrier jet and an associated heavy-snow band.
Dunn, L.B., *Monthly weather review*, June 1992, 120(6), p.914-924, 17 refs.
Snowstorms, Meteorological factors, Air flow, Atmospheric physics, Radar echoes, Topographic effects, Boundary layer, Temperature inversions, Synoptic meteorology.

47-591
Major cloud plumes in the Arctic and their relation to fronts and ice movement.
Fett, R.W., *Monthly weather review*, June 1992, 120(6), p.925-945, 8 refs.
Cloud cover, Polar atmospheres, Fronts (meteorology), Radiometry, Sea ice distribution, Drift, Ice air interface, Ice edge, Advection, Detection, Weather forecasting.

47-592
Heat Wave introduced for cold weather starting. *Diesel progress—engines & drives*, Feb. 1992, 58(2), p.42.
Diesel engines, Cold weather operation, Engine starters, Electric equipment, Heating, Fuels.

47-593
Packaging emergency power for Alaska.
Clevenger, M., *Diesel progress—engines & drives*, May 1992, 58(5), p.36-38.
Electric power, Diesel engines, Electric equipment, Cold weather operation, Design, Vehicles.

47-594
Compact, disengaging pump drive aids cold weather starts. *Diesel progress—engines & drives*, Aug. 1992, 58(8), p.56-57.
Diesel engines, Engine starters, Pumps, Cold weather operation, Heating, Design, Construction equipment.

47-595
Distribution and forms of lead compounds in the environment near southern Finland highways.
Vuorinen, A., *Moscow University soil science bulletin*, 1986, 41(1), p.30-33, Translated from Vestnik Moskovskogo Universiteta. Pochvovedenie. 7 refs.
Roads, Sampling, Soil pollution, Snow impurities, Aerosols, Environmental tests, Lichens, Chemical analysis.

47-596
Mineralogy of silt material of soils of the forest tundra and northern taiga of the Kola Peninsula.
Gradusov, B.P., et al, *Moscow University soil science bulletin*, 1987, 42(2), p.7-14, 13 refs. For Russian original see 42-407.
Urusevskaya, I.S.
Tundra, Forest soils, Taiga, Weathering, Mineralogy, Soil formation, Soil analysis, Soil profiles.

47-597
Structure-forming ability of the cold-tolerant soil bacteria *Pseudomonas*.
Mosolova, A.I., et al, *Moscow University soil science bulletin*, 1987, 42(3), p.29-33, Translated from Vestnik Moskovskogo Universiteta. Pochvovedenie. 9 refs.
Skvortsova, I.N., Chernomorchenko, N.I.
Soil microbiology, Soil tests, Bacteria, Soil aggregates, Soil formation, Soil structure, Podsol, Temperature effects.

47-598
Effect of agricultural development on the variation of thixotropic properties of tundra soils.
Manucharov, A.S., et al, *Moscow University soil science bulletin*, 1987, 42(3), p.45-49, 7 refs. For Russian original see 42-408.
Abrukova, V.V.
Tundra, Thixotropy, Coagulate soils, Soil strength, Agriculture, Geocryology, Soil colloids.

47-599
Review of full-scale trial propulsion system R and D. Volume I—main report. Volume II—appendices.
Cowper, D.N.B., *Transport Canada. Publication*, Apr. 1992, TP 11260E, 156p. + appends. bound separately (2 vols.), With French summary. 38 refs.
Propellers, Ice loads, Metal ice friction, Ice solid interface, Icebreakers, Ice navigation, Tests.

47-600
35th conference, University of Waterloo, Ontario, May 31-June 4, 1992.
International Association for Great Lakes Research, Ann Arbor, MI, 1992, 193p., Abstracts only.
Lake effects, Water pollution, Lacustrine deposits, Bottom sediment, Stratigraphy, Ecosystems, Environmental protection, Great Lakes.

47-601
Field manual for the U.S. Antarctic Program. Englewood, CO, Antarctic Support Associates, 1992, 207p.
Cold weather operation, Shelters, Safety, Portable equipment, Clothing, Radio communication, Rescue operations, Traverses, Waste disposal, Manuals, Antarctica—McMurdo Station.
Procedures and equipment for field trips from McMurdo Station are described. Information is provided on supplies issued such as clothing, food, radios, and stoves; helicopter and LC-130 put-in and safety procedures; snow shelter making and tent set-up; waste disposal; snowmobile troubleshooting; roped travel with snowmobile and sleds in crevassed areas; and crevasse rescue. A list of emergency cache and hut locations is also included.

47-602
Canada's northern stations: a directory of Canadian northern field research stations 1991.
Adams, P., Ottawa, Department of Indian Affairs and Northern Development, Circumpolar and Scientific Affairs Directorate, Jan. 1992, 52p., 21 refs.
Research projects, Stations, Organizations, Canada.

47-603
Cold weather countermobility analysis: mine, explosive, constructed and expedient obstacles.
Richmond, P.W., MP 3137, Mobility/Countermobility Simulation and Analysis Symposium, Apr. 8-10, 1992, 1992, 7p., 15 refs.
Cold weather operation, Military operation, Tanks (combat vehicles), Military research, Mines (ordnance), Explosives.
The cold weather environment and its effect on mobility/countermobility operations must be understood and exploited by winter battlefield commanders. Simulations, computerized planning tools and war game models should offer the user an opportunity to exercise any given scenario in a winter or transitional environment. The winter, and especially the transitional environment, is easy to overlook, and the required data are difficult to obtain, for a number of reasons. This paper describes data and algorithms and the author's perceptions of these operations under winter conditions. Specifically, mine

warfare and the use of constructed, explosive and expedient obstacles on the winter battlefield are discussed.

47-604
Final test report for the Production Qualification Test (PQT) of the Mobile Oversnow Transport (MOST) (snowmobile), TECOM Project No.8-VS-150-MST-003 and Production Qualification Test (PQT) of the Mobile Oversnow Transport (MOST) (sled).
Todd, W.E., Seattle, U.S. Army Cold Regions Test Center, Sep. 1992, 44p. + appends., U.S. Army Test and Evaluation Command, TECOM project No.8-VS-150-MST-003/004, 18 refs.
Snow vehicles, Sleds, Military equipment, Cold weather tests.

47-605
Second generation ice navigation system: implementation phase II.
Gautier, C., *Transport Canada. Publication*, Apr. 1992, TP 11410E, 47p. + appends., With French summary. 3 refs.
Ice navigation, Ice detection, Ice reporting, Radar tracking, Synthetic aperture radar, Computer applications, Data processing.

47-606
Concreting at subfreezing temperatures.
Korhonen, C.J., et al, MP 3138, Materials Engineering Congress, Atlanta, GA, Aug. 10-12, 1992. Proceedings. Materials: performance and prevention of deficiencies and failures. Edited by T.D. White, New York, American Society of Civil Engineers, 1992, p.382-397, 7 refs.
Cortez, E.R., Charest, B.A.
Winter concreting, Concrete freezing, Concrete strength, Concrete admixtures, Antifreezes.
Temperature affects the rate at which portland cement concrete develops strength. Below about 20 C, strength gain is retarded, whereas at higher temperatures it is accelerated. Strength gain is essentially stopped at temperatures below -5 C because water that otherwise would be available for hydration freezes. A series of chemicals was tested for the ability to promote strength gain of concrete at 20, -5, -10, and -20 C. The results show that low-temperature strength gain of concrete containing certain chemicals can be comparable to that of additive-free concrete cured at normal temperature. The best admixtures were those that depressed the freezing point of the mix water and accelerated the hydration of cement.

47-607
Second generation ice navigation system: implementation phase I.
Gautier, C., *Transport Canada. Publication*, June 1991, TP 11077E, 35p. + appends., With French summary.
Ice navigation, Ice detection, Ice reporting, Radar tracking, Synthetic aperture radar, Data processing.

47-608
Geologic studies in Alaska by the U.S. Geological Survey, 1990.
Bradley, D.C., ed, *U.S. Geological Survey. Bulletin*, 1992, No.1999, 244p., Refs. passim. For selected papers see 47-609 through 47-620.
Ford, A.B., ed.
Geological surveys, Exploration, Geochemistry, Geochronology, Paleoclimatology, Stratigraphy, Marine deposits, Tectonics, Fossils, United States—Alaska.

47-609
Deformation history of the McHugh Complex, Seldovia Quadrangle, south-central Alaska.
Bradley, D.C., et al, *U.S. Geological Survey. Bulletin*, 1992, No.1999, Geologic studies in Alaska by the U.S. Geological Survey, 1990. Edited by D.C. Bradley and A.B. Ford, p.17-32, 34 refs.
Kusky, T.M.
Geological surveys, Glacial geology, Tectonics, Glacial erosion, Glacial deposits, Glaciation, Stratigraphy, Geological maps, United States—Alaska—Kenai Peninsula.

47-610
Occurrence of platinum-group elements in some gold-mining districts of Alaska.
Cathrall, J.B., et al, *U.S. Geological Survey. Bulletin*, 1992, No.1999, Geologic studies in Alaska by the U.S. Geological Survey, 1990. Edited by D.C. Bradley and A.B. Ford, p.33-43, 29 refs.
Antweiler, J.C.
Exploration, Minerals, Geochemistry, Gold, Geological surveys, Natural resources, United States—Alaska.

47-611
Age of the late Cenozoic Bigbendian marine transgression of the Alaskan arctic coastal plain: significance for permafrost history and paleoclimate.
Carter, L.D., et al, *U.S. Geological Survey. Bulletin*, 1992, No.1999, Geologic studies in Alaska by the U.S. Geological Survey, 1990. Edited by D.C. Bradley and A.B. Ford, p.44-51, 29 refs.
Hillhouse, J.W.
Marine deposits, Permafrost dating, Paleoclimatology, Permafrost origin, Sea level, Fossils, Stratigraphy, Geochronology, Remanent magnetism, United States—Alaska—North Slope.

47-612
Clay mineral depositional facies and uranium resource potential in part of the Tertiary Kenai Group, Kenai Peninsula, Alaska.
Dickinson, K.A., et al, *U.S. Geological Survey. Bulletin*, 1992, No.1999, Geologic studies in Alaska by the U.S. Geological Survey, 1990. Edited by D.C. Bradley and A.B. Ford, p.81-99, 25 refs.
Skipp, G.L.
Exploration, Minerals, Geochemistry, Geological surveys, Stratigraphy, Natural resources, United States—Alaska—Kenai Peninsula.

47-613
Early Holocene calcretes from the subarctic active Nogahabara Sand Dune field, northern Alaska.
Galloway, J.P., et al, *U.S. Geological Survey. Bulletin*, 1992, No.1999, Geologic studies in Alaska by the U.S. Geological Survey, 1990. Edited by D.C. Bradley and A.B. Ford, p.100-111, 24 refs.
Huebner, M., Lipkin, R., Dijkmans, J.W.A.
Eolian soils, Soil dating, Paleoclimatology, Soil formation, Sands, Quaternary deposits, Periglacial processes, United States—Alaska.

47-614
Tectonics and petroleum potential of the Brooks Range fold and thrust belt—a progress report.
Howell, D.G., et al, *U.S. Geological Survey. Bulletin*, 1992, No.1999, Geologic studies in Alaska by the U.S. Geological Survey, 1990. Edited by D.C. Bradley and A.B. Ford, p.112-126, 61 refs.
Bird, K.J., Lu, H.F., Johnsson, M.J.
Exploration, Crude oil, Tectonics, Natural gas, Geological surveys, Stratigraphy, Natural resources, United States—Alaska—Brooks Range.

47-615
Geochemically anomalous areas in the eastern Goodnews Bay 1 deg by 3 deg quadrangle, southwest Alaska.
Kilburn, J.E., et al, *U.S. Geological Survey. Bulletin*, 1992, No.1999, Geologic studies in Alaska by the U.S. Geological Survey, 1990. Edited by D.C. Bradley and A.B. Ford, p.156-162, 18 refs.
Box, S.E., Goldfarb, R.J., Gray, J.E.
Exploration, Minerals, Geochemistry, Geological surveys, Natural resources, United States—Alaska.

47-616
Reevaluation of coal resources in the Late Cretaceous-Tertiary Sagavanirktok Formation, North Slope, Alaska.
Roberts, S.B., et al, *U.S. Geological Survey. Bulletin*, 1992, No.1999, Geologic studies in Alaska by the U.S. Geological Survey, 1990. Edited by D.C. Bradley and A.B. Ford, p.196-203, 17 refs.
Stricker, G.D., Affolter, R.H.
Exploration, Coal, Geological surveys, Geochemistry, Stratigraphy, Natural resources, United States—Alaska—North Slope.

47-617
Fluvial facies architecture in the Tertiary Usibelli Group of Suntrana, central Alaska.
Stanley, R.G., et al, *U.S. Geological Survey. Bulletin*, 1992, No.1999, Geologic studies in Alaska by the U.S. Geological Survey, 1990. Edited by D.C. Bradley and A.B. Ford, p.204-211, 33 refs.
Flores, R.M., Wiley, T.J.
Exploration, Coal, Crude oil, Geological surveys, Stratigraphy, Natural resources, United States—Alaska.

47-618
Postulated new source for the White River Ash, Alaska.
McGimsey, R.G., et al, *U.S. Geological Survey. Bulletin*, 1992, No.1999, Geologic studies in Alaska by the U.S. Geological Survey, 1990. Edited by D.C. Bradley and A.B. Ford, p.212-218, 6 refs.
Richter, D.H., DuBois, G.D., Miller, T.P.
Volcanic ash, Glacial deposits, Glacier beds, Mountain glaciers, Volcanoes.

47-619
Preliminary interpretation of vegetation and paleoclimate in northern Alaska during the late Pliocene Colvillian marine transgression.
Nelson, R.E., et al, *U.S. Geological Survey. Bulletin*, 1992, No.1999, Geologic studies in Alaska by the U.S. Geological Survey, 1990. Edited by D.C. Bradley and A.B. Ford, p.219-222, 18 refs.
Carter, L.D.
Marine deposits, Paleoclimatology, Sea level, Pollen, Paleobotany, Glaciation, Stratigraphy, Geochronology, United States—Alaska—North Slope.

47-620
Gold placers, gold source, and high terrace gravels in the Fortymile River area, Alaska.
Yeend, W., *U.S. Geological Survey. Bulletin*, 1992, No.1999, Geologic studies in Alaska by the U.S. Geological Survey, 1990. Edited by D.C. Bradley and A.B. Ford, p.228-230, 6 refs.
Exploration, Gold, Minerals, Placer mining, Geological surveys, Natural resources, United States—Alaska.

47-621
Low-temperature microscopy and analysis.
Echlin, P., New York, Plenum Press, 1992, 539p., Refs. p.499-528.
Cryobiology, Artificial freezing, Electron microscopy, Freeze drying, Microanalysis, Low temperature research, Ice crystal structure, Molecular structure, Thin sections, Preserving.

47-622
What is being done to reduce ice jam damages.
Gruntfest, E., MP 3139, Multi-objective approaches to floodplain management, Madison, WI, Association of State Floodplain Managers, 1992, p.243-245, 4 refs. Proceedings of the 16th annual conference, Grand Rapids, MI, May 18-22, 1992.
Ice jams, Ice control, Flood control, River ice, Cost analysis, Data processing.

47-623
Field ice measurements for emergency and project operations.
Pomerleau, R.T., Multi-objective approaches to floodplain management, Madison, WI, Association of State Floodplain Managers, 1992, p.246-249, Proceedings of the 16th annual conference, Grand Rapids, MI, May 18-22, 1992.
Ice jams, Flood forecasting, River ice, Ice surveys, Ice reporting, Ice forecasting.

47-624
Ice jam flood mitigation: Salmon River, Idaho.
White, K.D., MP 3140, Multi-objective approaches to floodplain management, Madison, WI, Association of State Floodplain Managers, 1992, p.250-253, 5 refs. Proceedings of the 16th annual conference, Grand Rapids, MI, May 18-22, 1992.
Ice jams, Ice control, Flood control, Ice booms, River ice, Frazil ice, Cost analysis.

47-625
Effects of hydropower development on ice jamming.
Zufelt, J.E., MP 3141, Multi-objective approaches to floodplain management, Madison, WI, Association of State Floodplain Managers, 1992, p.254-257, 2 refs. Proceedings of the 16th annual conference, Grand Rapids, MI, May 18-22, 1992.
Ice jams, Dams, Flood control, River ice, Frazil ice, Electric power.

47-626
1991 annual report on Alaska's mineral resources.
Schneider, J.L., ed, *U.S. Geological Survey. Circular*, 1991, No.1072, 69p., Refs. p.56-66.
Exploration, Geological surveys, Minerals, Natural resources, Coal, Crude oil, Peat, United States—Alaska.

47-627
Structure of a winter storm producing heavy precipitation over Nova Scotia.
Stewart, R.E., et al, *Monthly weather review*, Feb. 1990, 118(2), p.411-426, 26 refs.
Lin, C.A., Macpherson, S.R.
Ice storms, Snowstorms, Marine meteorology, Winter, Weather observations, Precipitation (meteorology), Mathematical models, Canada—Nova Scotia.

47-628
Crystal desert: summers in Antarctica.
Campbell, D.G., Boston, MA, Houghton Mifflin Company, 1992, 308p., Refs. p.282-297.
Ecology, Ecosystems, Cryobiology, Cold weather survival, Marine biology, Deserts, Environmental impact, History, Antarctica.
A general history of Antarctica, a description of the plant and animal life, and personal observations during a summer stay at the Brazilian Comandante Ferraz Station on King George Island to do biological research, are presented. Adaptations,

ecological niches, evolution, life cycles, feeding, predation, and effects of humans from both unintentional disturbance and hunting are described in non-technical language. Plants and animals discussed include albatrosses, lichens, mosses, mites, midges, penguins, plankton, algae, amphipods, copepods, krill, diatoms, isopods, sponges, seals, fish, parasites, terns, skuas, and whales.

47-629

Pliocene climates of the Northern Hemisphere.

Thompson, R.S., ed. *U.S. Geological Survey. Open-file report*, 1991, No.91-447, 45p., Abstracts of the Joint US/USSR Workshop on Pliocene Paleoclimates, Moscow, Apr. 1990. Refs. passim.

Borisova, O.K., ed. Svetlitskaia, T.V., ed.

Paleoclimatology, Global warming.

47-630

Proceedings.

International Conference on Ground Penetrating Radar, 4th, Rovaniemi, Finland, June 8-13, 1992, *Finland. Geological Survey. Special paper*, 1992, No.16, 365p., Refs. passim. For selected papers see 47-631 through 47-636.

Hänninen, P., ed. Autio, S., ed.

Radar photography, Subsurface investigations, Soil surveys, Subglacial observations, Electromagnetic prospecting, Geophysical surveys, Bottom topography, Peat.

47-631

Geo-Radar in tunneling—the tunnel radar.

Westerdahl, H., et al, *Finland. Geological Survey. Special paper*, 1992, No.16, International Conference on Ground Penetrating Radar, 4th, Rovaniemi, Finland, June 8-13, 1992. Edited by P. Hänninen and S. Autio, p.41-45, 1 ref.

Austvik, R., Kong, F.N.

Tunneling (excavation), Subglacial observations, Radar photography, Rock excavation, Glacier beds.

47-632

Multistatic radar system—MRS.

Ulriksen, P., *Finland. Geological Survey. Special paper*, 1992, No.16, International Conference on Ground Penetrating Radar, 4th, Rovaniemi, Finland, June 8-13, 1992. Edited by P. Hänninen and S. Autio, p.57-63, 3 refs.

Radar photography, Subglacial observations, Electromagnetic prospecting, Ice surveys, Snow surveys, Bottom topography, Electromagnetic prospecting.

47-633

GPR and dielectric classification of glacial materials.

Sutinen, R., et al, *Finland. Geological Survey. Special paper*, 1992, No.16, International Conference on Ground Penetrating Radar, 4th, Rovaniemi, Finland, June 8-13, 1992. Edited by P. Hänninen and S. Autio, p.133-138, 11 refs.

Hänninen, P., Cromwell, R., Hyvönen, E.

Glacial deposits, Radar photography, Soil surveys, Soil mapping, Electromagnetic prospecting, Unfrozen water content, Dielectric properties, Subsurface investigations.

47-634

Sub-bottom profiling: a comparison of short-pulse radar and acoustic data.

Delaney, A.J., et al, *Finland. Geological Survey. Special paper*, 1992, No.16, MP 3142, International Conference on Ground Penetrating Radar, 4th, Rovaniemi, Finland, June 8-13, 1992. Edited by P. Hänninen and S. Autio, p.149-157, 15 refs.

Sellmann, P.V., Arcone, S.A.

Radar photography, Underwater acoustics, Lacustrine deposits, Bottom sediment, Bottom topography, Subsurface investigations, Acoustic measurement, Lakes.

To compare their abilities to map sub-bottom features, short-pulse radar and an acoustic system were operated on freshwater lakes. Data were recorded on lakes with varying water depth, conductivity, and bed conditions. This report provides a qualitative discussion of the results, as samples from and velocities of the bed were not obtained. The radar antennas were resistively loaded linear dipoles operating at a center frequency of 50 MHz and excited by a 1000-W peak power transmitter. The antennas and electronics were sealed in watertight tubes and floated alongside the survey boat. The acoustic system operated at 7 kHz with peak output power of 2000 W. Both systems had a pulse length in water of about 50-170 cm, and the acoustic system had a slightly narrower beam width. Both the radar and acoustic profiles show distinct reflections from the bed, the bedrock beneath the bed, discrete targets within the bed, and sedimentary horizons. Acoustics has the potential for greater sub-bottom penetration. At the sites studied, radar appeared to show better detail on sedimentary layering, with an estimated penetration of 3-5 m beneath the bed. In lakes having water of low conductivity, sub-bottom layering was apparent for water depths exceeding 25 m. Radar performance appears reduced in low-density bed sediments. Isolated targets within the bed sediments, which were not always detected by both methods, were better defined by the acoustic system; closely spaced targets on the bed were better defined by radar. The radar also performed well in shallow water where the acoustic system would not trigger reliably. These observations indicate that radar and acoustics can provide an effective complementary means for acquiring sub-bottom data in freshwater surveys.

47-635

Application of ground penetrating radar techniques to peatland investigations.

Hänninen, P., *Finland. Geological Survey. Special paper*, 1992, No.16, International Conference on Ground Penetrating Radar, 4th, Rovaniemi, Finland, June 8-13, 1992. Edited by P. Hänninen and S. Autio, p.217-221, 16 refs.

Peat, Radar photography, Soil surveys, Soil water, Subsurface investigations, Finland.

47-636

GPR applications in geotechnical investigations of peat for road survey purposes.

Saarenketo, T., et al, *Finland. Geological Survey. Special paper*, 1992, No.16, International Conference on Ground Penetrating Radar, 4th, Rovaniemi, Finland, June 8-13, 1992. Edited by P. Hänninen and S. Autio, p.293-305.

Hietala, K., Salmi, T.

Peat, Radar photography, Soil surveys, Site surveys, Highway planning, Subsurface investigations, Finland.

47-637

IGARSS '92. International space year: space remote sensing.

International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992, New York, Institute of Electrical and Electronics Engineers, 1992, 1776p. (2 vols.), Refs. passim. For selected papers see 47-638 through 47-691.

Ice surveys, Ice reporting, Snow surveys, Remote sensing, Spaceborne photography, Ice detection, Ice conditions, Sea ice, Ice electrical properties, Snow electrical properties, Synthetic aperture radar, Radar echoes, Data processing.

47-638

Use of satellite data for short term streamflow forecasting with the HYDROTEL model.

Fortin, J.P., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1992, p.51-53, 8 refs.

Bernier, M., Bisson, J.L.

Snow surveys, Runoff forecasting, Stream flow, Snowmelt, Spaceborne photography, Remote sensing, Data processing, Computerized simulation.

47-639

Characterization of intrinsic optical properties for sea ice and snow.

Tanis, F.J., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1992, p.125-127, 7 refs.

Shuchman, R.A., Onstott, R.G.

Ice surveys, Ice optics, Ice floes, Snow ice interface, Snow optics, Air ice water interaction, Ice openings, Sea ice distribution, Lasers.

47-640

System for monitoring ice in polar regions by SAR.

Schistad, A.H., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1992, p.128-130, 2 refs.

Solberg, R., Raheim, E.

Ice reporting, Ice detection, Ice surveys, Sea ice distribution, Ice edge, Drift, Radar tracking, Spaceborne photography, Synthetic aperture radar.

47-641

Beaufort Sea Ice-1: selected SAR results.

Lukowski, T.I., et al, MP 3143, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1992, p.131-133, 6 refs.

Livingstone, C.E., August, N.M., Nordstrom, P.A., Farmer, L.D.

Ice surveys, Ice cover thickness, Sea ice distribution, Drift, Aerial surveys, Airborne radar, Synthetic aperture radar, Radiometry, Data processing, Beaufort Sea.

Beaufort Sea Ice-1 was an international experiment carried out in the early spring of 1990 in the Alaskan Beaufort Sea. SAR imagery was acquired by the CCRS C/X-SAR at the onset of melt over an eleven day period in wide swath and nadir mode. Initial efforts in analysis of the SAR imagery have been in the radiometric calibration of nadir mode imagery, especially that of C-band. This has provided refinement of techniques, study of limitations of the methodology, and experience in the utilization of the CCRS software for calibration. In this paper, the details of the acquisition are given, procedures in calibration outlined, and results for differential scattering coefficient for the shear zone for an incidence angle range of 5 to 60 deg are presented.

47-642

Analysis of scattering behavior and radar penetration in AIRSAR data.

Rignot, E.J., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1992, p.134-136, 4 refs.

Van Zyl, J.J.

Glacier surveys, Glacier surfaces, Radio echo soundings, Backscattering, Aerial surveys, Airborne radar, Synthetic aperture radar.

47-643

New fractal texture classification of cloud and ice cap surface features from LANDSAT imagery.

Lin, I.I., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1992, p.137-139, 9 refs.

Rees, W.G.

Glacier surfaces, Terrain identification, Glacier surveys, Cloud cover, Spaceborne photography, Data processing.

47-644

Physiological and spectral analysis of the effects of sodium chloride on *Syringa vulgaris*.

Lauten, G.N., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1992, p.236-238, 10 refs.

Rock, B.N.

Salting, Environmental impact, Road maintenance, Plant physiology, Spectroscopy.

47-645

Radar sounding of a temperate glacier: modelling and interpretation.

Nicollin, F., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1992, p.278-280, 7 refs.

Kofman, W., Barbin, Y.

Glacier surveys, Glacier thickness, Subglacial observations, Mountain glaciers, Glacier beds, Radio echo soundings.

47-646

Greenland observed at high resolution by the Seasat scatterometer.

Long, D.G., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1992, p.327-329, 3 refs.

Hardin, P.J., Shaw, R.A.

Glacier surveys, Glacier oscillation, Ice sheets, Spaceborne photography, Data processing, Remote sensing, Backscattering, Greenland.

47-647

Integrated multi-sensor mission concepts for the Canadian ice community.

Luscombe, A., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1992, p.334-336, 2 refs.

Montpetit, M.J.

Ice surveys, Ice reporting, Spaceborne photography, Data processing, Remote sensing.

47-648
High-resolution land/ice imaging using Seasat scatterometer measurements.
Long, D.G., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1992, p.440-442, 6 refs.
Whiting, P.T., Hardin, P.J.
Ice surveys, Ice reporting, Spaceborne photography, Data processing, Remote sensing, Backscattering.

47-649
Monitoring of environmental conditions in the Alaskan forests using ERS-1 SAR data.
Rignot, E.J., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1992, p.530-532, 5 refs.
Phenology, Seasonal freeze thaw, Forest land, Forest canopy, Plant ecology, Spaceborne photography, Synthetic aperture radar, United States—Alaska.

47-650
Preliminary results from the ASF/GPS ice classification algorithm.
Cunningham, G., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1992, p.573-575, 1 ref.
Kwok, R., Holt, B.
Ice surveys, Ice reporting, Ice conditions, Sea ice, Spaceborne photography, Synthetic aperture radar, Photointerpretation, Data processing.

47-651
On the application of multifrequency polarimetric radar observations to sea-ice classification.
Rignot, E.J., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1992, p.576-578, 6 refs.
Drinkwater, M.R.
Ice surveys, Ice reporting, Ice conditions, Sea ice, Spaceborne photography, Synthetic aperture radar, Photointerpretation, Data processing.

47-652
Assimilation of a knowledge base and physical models to reduce errors in passive-microwave classifications of sea ice.
Maslanik, J.A., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1992, p.579-581, 8 refs.
Key, J.R.
Ice surveys, Ice reporting, Sea ice distribution, Ice conditions, Ice models, Spaceborne photography, Radiometry, Data processing.

47-653
Automatic tracking ice floe from satellite imagery via invariant moment matching.
Zhang, H.J., International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1992, p.582-584, 9 refs.
Ice reporting, Ice detection, Ice surveys, Ice floes, Drift, Radar tracking, Spaceborne photography, Synthetic aperture radar, Data processing.

47-654
Ice motion retrieval from SAR imagery in terms of intensity derivative.
Yan, S., International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1992, p.585-587, 6 refs.
Ice reporting, Ice detection, Ice surveys, Drift, Radar tracking, Spaceborne photography, Synthetic aperture radar, Data processing.

47-655
Performance of the ice motion tracker at the Alaska SAR Facility.
Kwok, R., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1992, p.588-590, 3 refs.
Pang, A.
Ice reporting, Ice detection, Ice surveys, Drift, Radar tracking, Spaceborne photography, Synthetic aperture radar, Data processing.

47-656
Extinction behavior of snow between 18 GHz and 90 GHz: comparison between theory and experiments.
West, R., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1992, p.809-811, 7 refs.
Tsang, L., Winebrenner, D.P., Kuga, Y.
Snow surveys, Snow electrical properties, Snow density, Attenuation, Radar echoes.

47-657
Development and intercomparisons of snow mapping algorithms based on SSM/I data.
Nagler, T., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1992, p.812-814, 6 refs.
Rott, H.
Snow surveys, Snow cover distribution, Snow depth, Spaceborne photography, Data processing.

47-658
Comparison of millimeter-wave radar observations of snow with energy and mass transfer simulation.
Davis, R.E., et al, MP 3144, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1992, p.815-817, 5 refs.
Jordan, R., Nagle, J.A., Boyne, H.S.
Snow surveys, Snow water content, Snow heat flux, Snow thermal properties, Snow density, Radar echoes, Backscattering, Computerized simulation.
This study compares variations in measurements of FM-CW radar backscatter with simulated snow properties from a model based on mass and energy transfer and surface energy budgets. The radar frequency range is 26.5-40 GHz. The backscatter response to wet snow is highly sensitive to fluctuations of the surface energy exchange when the snow has a low liquid water content. Analysis of the net radiation, turbulent exchange and net energy budget in the top few millimeters of snow provides a reasonable explanation of the observed backscatter variations. The near-surface liquid water content simulated by the model does not show the magnitude of changes expected when compared with the radar return. This allows a detailed evaluation of model algorithms, which account for liquid water drainage and evaporation from the surface as well as densification and consolidation of the top snow layer.

47-659
Validation of passive microwave snow cover algorithms using spatially interpolated surface point measurements.
Hardman, M., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1992, p.818-819, 9 refs.
Armstrong, R.L.
Snow surveys, Snow depth, Radar echoes, Computerized simulation, Data processing.

47-660
Dielectric properties of ice and snow at 26.5 to 40 GHz.
Koh, G., MP 3145, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1992, p.820-822, 9 refs.
Snow surveys, Snow electrical properties, Ice electrical properties, Snow density, Dielectric properties, Ice crystal size, Snow ice interface, Radar echoes, Attenuation.
A network analyzer based system operating at 26.5 to 40 GHz was used to measure the propagation velocity and attenuation of synthetically generated pulses in ice and snow in order to obtain their dielectric properties. The real part of ice dielectric constant was 3.155 and independent of frequency. The imaginary part increased from 0.002 at the lower frequencies to 0.004 at the higher frequencies. The effective dielectric constant of snow as a function of snow volume fraction was measured. The real part was proportional to the snow volume fraction; however the loss factor in snow showed a more complicated relationship.

47-661
T-matrix approach to scattering from a snow layer.
Tzeng, Y.C., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1992, p.828-829, 6 refs.
Tjuatja, S., Fung, A.K.
Snow surveys, Snow electrical properties, Snow density, Ice crystal size, Radar echoes, Backscattering.

47-662
Radar backscattering response to wet snow.
Shi, J.C., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1992, p.927-929, 6 refs.
Dozier, J.
Snow surveys, Snow water content, Snow electrical properties, Wet snow, Radar echoes, Backscattering.

47-663
Measurement of pressure ridges in SAR images of sea ice: preliminary results on scattering theory.
Vesecky, J.F., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1992, p.955-957, 8 refs.
Ice surveys, Ice reporting, Pressure ridges, Scattering, Aerial surveys, Synthetic aperture radar, Radar echoes.

47-664
C-band backscatter signatures of old ice in the central Arctic.
Ulander, L.M.H., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1992, p.958-960, 4 refs.
Carlström, A.
Ice surveys, Ice cover thickness, Ice floes, Snow ice interface, Radar echoes, Backscattering.

47-665
Review of the microwave dielectric and extinction properties of sea ice and snow.
Hallikainen, M., International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1992, p.961-965, 24 refs.
Ice surveys, Snow electrical properties, Ice electrical properties, Snow ice interface, Snow water content, Sea ice, Radar echoes, Dielectric properties, Attenuation.

47-666
Polarimetric emission from anisotropic media for passive remote sensing of sea ice.
Yueh, S.H., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1992, p.966-968, 6 refs.
Nghiem, S.V., Kwok, R.
Ice surveys, Ice cover thickness, Sea ice, Ice temperature, Radiometry, Remote sensing.

47-667
Combined surface/volume scattering retracking algorithm for ice sheet satellite altimetry.
Davis, C.H., International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1992, p.969-971, 9 refs.
Glacier surveys, Glacier thickness, Glacier surfaces, Ice sheets, Spaceborne photography, Data processing, Radar echoes, Height finding, Scattering, Mathematical models.

47-668
Polarimetric remote sensing of sea ice in the Beaufort Sea.
Nghiem, S.V., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1992, p.972-974, 8 refs.
Kwok, R., Drinkwater, M.R.
Ice surveys, Sea ice distribution, Ice reporting, Ice detection, Drift, Radar tracking, Data processing, Aerial surveys, Synthetic aperture radar, Beaufort Sea.

47-669
Inversion of snow parameters by neural network with iterative inversion.
Chen, Z.X., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1992, p.1061-1063, 4 refs.
Snow surveys, Snow density, Snow temperature, Snow depth, Snow water equivalent, Radiometry, Remote sensing, Computerized simulation, Data processing

47-670
Sea ice classification using fast learning neural networks.
Dawson, M.S., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1992, p.1070-1071, 9 refs.
Fung, A.K., Manry, M.T.
Ice surveys, Ice reporting, Ice conditions, Radiometry, Remote sensing, Computerized simulation, Data processing.

47-671
Long-term study of microwave propagation over changing ground and snow cover.
Peck, L., MP 3146, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1992, p.1144-1146, 6 refs.
Snow surveys, Snow electrical properties, Snow cover effect, Snow depth, Snow water content, Soil water, *Microwaves, Radar echoes, Wave propagation.*
A year-round experiment with a bistatic microwave (10.5-GHz) radar has documented environmental effects on microwave propagation on both daily and seasonal time scales. The continuously monitored automatic gain control (AGC) of the receiver provides a long-term record of relative changes in the microwave field due to such factors as characteristics of the snow cover, soil moisture, frozen/thawed state of the soil, and vegetation type and height.

47-672
Towards a quantitative characterization of sea ice microstructure.
Perovich, D.K., et al, MP 3147, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1992, p.1249-1252, 11 refs.
Gow, A.J.
Ice surveys, Ice electrical properties, Ice microstructure, Sea ice, Ice surface, Radiometry, Remote sensing, Microwaves, Statistical analysis.
Sea ice has an intricate and highly variable microstructure consisting of ice platelets, brine inclusions, and air bubbles. Current microwave models require a quantitative description of this microstructure. One such descriptor is the inclusion size distribution. A variety of thin sections were processed in order to investigate the effects of spatial variability, changes in ice temperature, and different ice types on the inclusion size distribution. The distributions were determined by using a personal-computer-based image processing system to analyze horizontal thin sections of the ice. Results indicate that, in general, size distributions are governed by a negative power law relating the number of inclusions to the inclusion area. Mean diameters were tenths of a millimeter for brine inclusions and millimeters for air bubbles.

47-673
Passive microwave signatures of simulated pancake ice and young pressure ridges.
Grenfell, T.C., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1992, p.1253-1255, 10 refs.
Winebrenner, D.P., Wensnahan, M.R.
Ice surveys, Pressure ridges, Ice reporting, Ice detection, Radiometry, Remote sensing, Microwaves.

47-674
Effective permittivity of saline ice under thermal variation.
Nghiem, S.V., et al, MP 3148, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1992, p.1256-1258, 7 refs.
Kwok, R., Kong, J.A., Shin, R.T., Gow, A.J., Arcone, S.A.
Ice surveys, Ice electrical properties, Salt ice, Sea ice, Ice salinity, Ice temperature, Radiometry, Remote sensing.
A model to calculate the effective permittivity of saline ice under thermal variation is presented in this paper. The model includes multi-phase inhomogeneities with multiple species characterized by orientation, size, and shape distributions. The model is then used to derive the effective permittivity as a function of temperature under the strong fluctuation theory which is extended to account for the complexity. The results calculated from the model are compared with experimental data at 4.8 GHz for saline ice grown at the US Army Cold Regions Research and Engineering Laboratory (CRREL). The comparison between measured and calculated complex permittivities is good for the imaginary part, and the difference is within 10% for the real part.

47-675
Examination of the physical, electrical, and microwave evolution of sea water into young ice.
Onstott, R.G., International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1992, p.1259-1261.
Ice surveys, Ice electrical properties, Sea water freezing, Young ice, Ice growth, Remote sensing, Microwaves.

47-676
Analysis of scattering from a thin saline ice layer.
Fung, A.K., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1992, p.1262-1264, 6 refs.
Dawson, M.S., Tjuatja, S.
Ice surveys, Ice electrical properties, Salt ice, Air ice water interaction, Scattering, Remote sensing.

47-677
Application of theoretical models to active and passive remote sensing of saline ice.
Han, H.C., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1992, p.1265-1267, 5 refs.
Ice surveys, Ice electrical properties, Salt ice, Scattering, Remote sensing, Mathematical models.

47-678
Microwave sea ice signature modeling: connecting models to the real world.
Winebrenner, D.P., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1992, p.1268-1270, 10 refs.
Grenfell, T.C., Tsang, L., West, R.D.
Ice surveys, Ice electrical properties, Sea ice, Ice models, Remote sensing, Microwaves, Scattering.

47-679
Development of instrumentation for measuring dielectric constant of sea ice.
Ma, H.J., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1992, p.1271-1272, 3 refs.
Plumb, R.G.
Ice surveys, Ice electrical properties, Sea ice, Dielectric properties, Radar echoes, Remote sensing.

47-680
Radar backscatter signatures of Baltic Sea ice.
Toikka, M., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1992, p.1527-1529, 2 refs.
Hallikainen, M.
Ice surveys, Backscattering, Ice reporting, Ice conditions, Sea ice distribution, Ice cover thickness, Aerial surveys, Synthetic aperture radar, Baltic Sea, Bothnia, Gulf.

47-681
Radar backscatter from arctic sea ice during IAOE '91.
Beaven, S.G., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1992, p.1530-1532, 3 refs.
Gogineni, S.P.
Ice surveys, Backscattering, Ice reporting, Ice conditions, *Ice detection, Snow ice interface, Oceanographic* surveys, Icebreakers, Radar echoes.

47-682
Comparison of radar backscatter from antarctic and arctic sea ice.
Hosseinmostafa, R., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1992, p.1533-1535, 6 refs.
Lytle, V.I.
Ice surveys, Backscattering, Ice reporting, Snow ice interface, Ice detection, Ice conditions, Slush, Ice surface, Oceanographic ships, Radar echoes, Antarctica —Weddell Sea.
Two ship-based step-frequency radars, one at C band (5.3 GHz) and one at Ku band (13.9 GHz), measured backscatter from ice in the Weddell Sea in 1989 from the research vessel F.S. *Polarstern*. Most of the backscatter data were from first-year (FY) and second-year (SY) ice at the ice stations where the ship was stationary, and detailed snow and ice characterizations were performed. The presence of a slush layer at the snow-ice interface masks the distinction between FY and SY ice in the Weddell Sea, whereas in the Arctic the separation is quite distinct. The effect of snow-covered ice on backscattering coefficients from the Weddell Sea region indicates that surface scattering is the dominant factor. Measured backscattering coefficient values were compared with Kirchhoff and regression-analysis models. Finally, the Weibull power-density function was used to fit the measured backscattering coefficients at 45 deg. (Auth.)

47-683
Calibrated ERS-1 SAR signatures and video underflights over arctic ice.
Ulander, L.M.H., et al, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1992, p.1536-1538, 5 refs.
Askne, J., Johannessen, B.O.
Ice surveys, Backscattering, Ice reporting, Ice openings, Ice detection, Ice conditions, Synthetic aperture radar.

47-684
Ice patterns and hydrothermal plumes, Lake Baikal, Russia: insights from space shuttle hand-held photography.
Evans, C.A., et al. International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1992, p.1559-1561, 9 refs.
Helfert, M.R., Helms, D.R.
Ice surveys, Lake ice, Ice water interface, Ice conditions, Hydrothermal processes, Spaceborne photography, Aerial surveys, Photographic techniques, USSR—Baykal, Lake.

47-685
Use of expert systems in combination with active and passive microwave data to classify sea ice.
Haverkamp, D., et al. International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1992, p.1625-1627, 4 refs.
Tsatsoulis, C.
Ice surveys, Ice reporting, Radiometry, Ice conditions, Synthetic aperture radar, Remote sensing, Microwaves, Computerized simulation, Data processing.

47-686
Comparison of normalized radar cross section measurements and models for snow cover at 35, 95, and 225 GHz.
Lohmeier, S.P., et al. MP 3149, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1992, p.1655-1657, 2 refs.
Langlois, P.M., Colom, J.G., Davis, R.E., Boyne, H.S., McIntosh, R.E.
Snow surveys, Snow electrical properties, Snow cover effect, Snow depth, Snow water content, Snow density, Snow temperature, Radar echoes, Backscattering.
During the winter of 1990-1991, 35, 95 and 225 GHz radar cross section measurements were made at the University of Massachusetts in Amherst, MA and at the U.S. Army Cold Regions Research and Engineering Laboratory in Hanover, NH. Parameters characterizing the snow and weather condition were measured concurrently with the radar measurements. A theoretical model proposed by Narayanan and McIntosh was able to predict the value for radar cross section with good accuracy and minimal computation. However, this model fails to predict the measured bias of VV over HH polarization that consistently occurs with increasing incidence angle. Variations in snow liquid water content have the greatest effect on the measured and predicted values of radar cross section at all three frequencies. The presence of water has the effect of decreasing NRCS. This effect is deemphasized as water content increases. One problem in making comparisons is the accuracy of the liquid water content measurements. Current methods of measuring liquid water content are only accurate to 1%, while smaller changes in liquid water content have an appreciable effect on the radar cross section of the snow.

47-687
Polarimetric and multifrequency SAR signatures of wet snow.
Rott, H., et al. MP 3150, International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1992, p.1658-1660, 5 refs.
Davis, R.E., Dozier, J.
Snow surveys, Snow water content, Wet snow, Snow electrical properties, Snow surface, Synthetic aperture radar, Radar echoes, Aerial surveys.
C-, L- and P-band polarimetric signatures of wet snow surfaces have been analyzed, based on AIRSAR surveys of the Alpine test site in Ötztal in the summers of 1989 and 1991. The importance of surface roughness is evident in the C- and L-band signatures, whereas the diffuse scattering contribution by internal inhomogeneities in the snowpack increases from the C- to the P-band at incidence angles below 50 deg due to increasing penetration.

47-688
Application of ERS-1 SAR data to remote sensing of snow in Finland.
Hallikainen, M., et al. International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1992, p.1661-1663, 3 refs.
Snow surveys, Snow cover distribution, Snowmelt, Runoff forecasting, Spaceborne photography, Synthetic aperture radar, Data processing, Finland.

47-689
Potential of ERS-1 SAR data for snow cover monitoring.
Bernier, M., et al. International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1992, p.1664-1666, 8 refs.
Fortin, J.P.
Snow surveys, Snow cover distribution, Snow water equivalent, Spaceborne photography, Synthetic aperture radar, Data processing.

47-690
Two-parameter backscatter model of snowcover at millimeter wavelengths.
Chang, P., et al. International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1992, p.1667-1669, 8 refs.
Snow surveys, Snow electrical properties, Snow surface, Snow cover effect, Snow water content, Snow density, Radar echoes, Backscattering.

47-691
Dual-polarization radar measurements in an Oklahoma hailstorm.
Aydin, K., et al. International Geoscience and Remote Sensing Symposium, 12th, Houston, TX, May 26-29, 1992. IGARSS '92. International space year: space remote sensing. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1992, p.1734-1736, 6 refs.
Walsh, T.M., Zrnić, D.S.
Hail, Weather observations, Storms, Weather forecasting, Meteorological instruments, Radar echoes.

47-692
Buckling of unidirectional graphite/epoxy composite plates at low temperatures.
Dutta, P.K., et al. *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Nov. 1991, SR 91-20, 11p., ADA-246 602, 18 refs.
Hui, D., Traynham, Y.M.
Composite materials, Low temperature tests, Cold weather performance, Cold weather tests.
A theoretical and experimental study of the buckling and postbuckling behavior of unidirectionally laminated graphite/epoxy plates was conducted under combined thermal cooling and compressive loading. The rectangular plates were simply supported at the loaded edges and free in the remaining edges. The plates were found to bend during cooling even without mechanical loads because of the negative thermal expansion coefficient of the material in the loading direction and in-plane end constraints at the two loaded edges. Such bending from thermal load was treated as an initial geometric imperfection, and the analysis was based on Koiter's theory of elastic stability. The experimental postbuckling curves agreed well with the theoretical values.

47-693
Simulation of oil slick transport in Great Lakes connecting channels: user's manual for the lake-river oil spill simulation model.
Shen, H.T., et al. *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1991, SR 91-22, 69p., ADA-247 141, 10 refs.
Yapa, P.D., Petroski, M.E.
Oil spills, Environmental impact, Computerized simulation, Channels (waterways), Great Lakes.
The growing concern over the impacts of oil spills on aquatic environments has led to the development of many computer models for simulating the transport and spreading of oil slicks in surface water. Almost all of these models were developed for coastal environments. In this study, two computer models, named ROSS and LROSS, were developed for simulating oil slick transport in rivers and lakes, respectively. This report explains how to use LROSS, the Lake-River Oil Spill Simulation model.

47-694
Environmental monitoring and performance evaluation of roller-compacted concrete pavement: Conley Terminal, Boston, Massachusetts.
Cortez, E.R., et al. *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1991, SR 91-25, 16p., ADA-247 319, 6 refs.
Eaton, R.A.
Concrete pavements, Freeze thaw cycles, Cold weather performance.
The Massachusetts Port Authority (MASSPORT) built 53,800 sq m (13.3 acres) of roller compacted concrete (RCC) pavement at the Paul W. Conley Terminal, Castle I, South Boston, MA, during the 1986 and 1987 construction seasons. This was the first time an RCC pavement was built in the multiple freeze-thaw environment of the northern United States. A system of sensors was installed at this project to monitor the main environmental parameters that affect pavements. This report describes the instrumentation system, presents a summary of the recorded data, and discusses cause-and-effect relationships between construction procedures and pavement performance.

47-695
Determining the intrinsic permeability of frazil ice. Part 2: field investigations.
White, K.D., et al. *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, May 1992, CR 92-07, 15p., ADA-255 410, 20 refs.
Lawson, D.E.
Frazil ice, Permeability, Boreholes, Seepage, Porosity.
The intrinsic permeability of a frazil deposit can be used to describe its flow capacity and structure. Because of the nature of frazil ice, an *in-situ* test is desirable when determining this parameter in natural frazil deposits. This report describes the application of the borehole dilution test to determine seepage velocity, which is then used to calculate intrinsic permeability and estimate porosity. Seepage velocities ranged from .00029 to .00598 cm/s (.00256 cm/s average), with an average intrinsic permeability of .000275 sq cm. Porosities for d10 grain sizes of 0.5 and 3.5 were 82.9 and 47.5%, respectively. Seepage velocity and porosity data are also compared to laboratory data from borehole dilution tests, data measured previously at the same location with an *in-situ* groundwater flow meter, and to permeameter test results on remolded samples.

47-696
Softening of rigid polyvinyl chloride by high concentrations of aqueous solutions of methylene chloride.
Parker, L.V., et al. *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, May 1992, SR 92-12, 40p., ADA-255 453, 5 refs.
Ranney, T.A., Taylor, S.
Environmental tests, Water pollution, Ground water, Polymers, Pipes (tubes).
In this experiment, small pieces of rigid PVC pipe were exposed to high aqueous concentrations of methylene chloride corresponding to 0.2, 0.4, 0.6, 0.8 and 1.0 activity solutions. Samples were exposed to the test solutions for 4, 8, 15, 22 and 33 days. Samples exposed to the highest activity solution (1.0) softened within the first 4 days, while samples exposed to the 0.8 activity solution took 22 days to soften. Samples exposed to the lowest activity solution (0.2) showed no signs of softening, while the results for the samples exposed to the 0.4 and 0.6 activity solutions showed some slight changes, indicating some softening. These results reveal that concentrations of methylene chloride below 3340 mg/L (0.2 activity) will not cause softening or serious swelling of rigid PVC.

47-697
Unconventional energy sources for ice control at lock and dam installations.
Nakato, T., et al. *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, June 1992, SR 92-13, 37p., ADA-255 715, 15 refs.
Ettema, R., Toda, K.
Locks (waterways), Dams, Ice control, Electric power, Ground water.
Operation of lock and dam installations is made troublesome and hazardous by ice growth along lock walls and by freezing of gates to ice covers. Since considerable amounts of power are required for ice control, lock operators are interested in utilizing economical power sources other than that generated by commercial utilities. This study attempted to determine the feasibilities of using several unconventional power sources for ice control at navigation locks and dams. Considered were sensible heat from groundwater, solar power, wind power and portable hydroelectric sources. Only portable hydroelectric power is feasible. Groundwater is at best of marginal feasibility, and solar and wind power sources are unreliable.

47-698
Effects of severe freezing periods and discharge on the formation of ice jams at Salmon, Idaho.
Zufelt, J.E., et al. *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, Aug. 1992, CR 92-14, 12p., ADA-255 876, 11 refs.
Bilello, M.A.
Flood control, Flooding, Ice booms, Ice control, Ice jams, Air temperature, Degree days, Freezeup, United States—Idaho—Salmon River.
Large ice jams on the Salmon River have reached Salmon, ID, and resulted in major flood damage during 16 winters since the winter of 1936-37. Two recent ice jams, in Feb. 1982 and Jan. 1984, caused flooding that resulted in damages of 1 and 1.8 million dollars, respectively. A detailed analysis of the winter air temperature records from 1936-37 through 1991-92 revealed a strong relationship between the duration and intensity of severe cold periods, the air temperature record prior to the severe cold periods, and the occurrence of ice jams reaching the city of Salmon that result in flooding. A threshold condition is identified from which the probability of ice jams reaching the city can be determined from inspection of forecasted air temperatures. It was found that once an ice jam reaches the city, average daily air temperature of approximately 18 deg F are necessary to keep the jam in place. The effects of discharge on ice thickness, and therefore ice jam length, are shown to be minor and no relation could be found in this study. An ice control structure located upstream of the city of Salmon appears to be helping to alleviate ice-jam flooding.

47-699
Identification of TNT transformation products in soil.
Walsh, M.E., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, June 1992, SR 92-16, 31p., ADA-255 308, 18 refs.
Jenkins, T.F.
Explosives, Degradation, Soil pollution, Transformations, Military operation, Military research.
Solvent-extractable TNT transformation products have been identified in explosive-contaminated soils. Soils from U.S. Army installations were extracted with a variety of solvents (acetonitrile, methanol, acetone and methylene chloride) and the extracts were analyzed by RP-HPLC-UV or GC/MS, or both. The TNT transformation products TNB, TNBA, 2-amino-4,6-DNT and 4-amino-2,6-DNT were generally found in concert with TNT. Dinitroaniline, a reduction product of TNB, was also identified in several soils.

47-700
Snow conditions during MLRS-TGW BBU1 Captive Flight Program, Fort Drum, New York, January-February 1991.
Fisk, D.J., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, July 1992, SR 92-17, 76p., ADB-167 012, 5 refs.
Lemieux, G.E.
Snow density, Snow depth, Military operation, Snow cover effect, Airborne radar, Snow crystals, Snow surface, Surface roughness.
A version of the proposed Multiple Launch Rocket System Terminally Guided Warhead's (MLRS-TGW) radar system was tested at Fort Drum, NY. The radar system was mounted on an airplane and, during the flight, scanned the ground for various targets. The background of the targets (soil, vegetation, water and snow) affects the ability of the radar system to differentiate between targets or even to see the targets, and snow, in some forms, is an especially troublesome background. The purpose of the flight test was to further refine the radar hardware and software to reduce the effects of a snow background, or to develop criteria for the use of the MLRS-TGW. To do this, radar performance must be related to snow conditions. Therefore, while the radar was flying, CRREL measured snow conditions: vertical profiles of depth, density, wetness, and crystal sizes and types, and surface roughness. And since snow conditions are closely related to weather conditions, and weather conditions are more commonly reported, weather conditions as measured at Fort Drum's Wheeler-Sack Airfield were reported. This may ultimately aid in developing weather-based criteria for the use of MLRS-TGW.

47-701
Longbow-Apache field experiment: data report.
Bates, R.E., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, July 1992, SR 92-19, 53p., ADB-167 107, 5 refs.
Fiori, J.E., Fisk, D.J., Harrington, B.G.
Icing, Military operation, Snow density, Snow depth, Snow cover effect, Snow crystals, Snow surface, Thermocouples.
U.S. Army Aviation Systems Command (AVSCOM) winter field experiments were conducted from Feb. 24 through Mar. 16, 1991 at Fort Drum, NY. The Longbow millimeter wave (mmw) seeker was flown over appropriate target arrays while ground-based sensors were used to evaluate the sensor system under development and to evaluate target-background interaction. In addition, the winter background environmental conditions encountered during the 20-day test period were documented. There was an extreme icing event during the test period, but the Longbow systems were grounded while it was going on owing to its severity.

47-702
Salmon River experimental ice boom: 1989-90 and 1990-91 winter seasons.
White, K.D., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, July 1992, SR 92-20, 17p., ADA-255 230, 34 refs.
Frazil ice, Ice booms, Ice control, Ice jams, Design, United States—Idaho—Salmon River.
The city of Salmon, ID, is affected by flooding resulting from a frazil ice jam, known as the Deadwater jam, which forms annually on the Salmon River. Because the river has considerable environmental, economic, aesthetic, and recreational value, an innovative approach to frazil ice control is needed. The steep slope and turbulence of the river also add to ice control design constraints. Past investigations have examined a number of different methods to control the ice. This report documents two years of testing of an experimental ice formation boom located upstream from the city of Salmon. The observations show that boom configuration is an important factor in ice capture efficiency, and that conventional boom siting criteria may be modified under certain conditions.

47-703
Expedition huts in Antarctica: 1899-1917.
Pearson, M., *Polar record*, Oct. 1992, 28(167), p.261-276, 49 refs.
Cold weather construction, Construction materials, Shelters.
During the 'Heroic Era' of antarctic exploration, which lasted from 1895 to 1917, nine huts were erected in Antarctica, three of Scandinavian design, three British, and three Australian. Although all of the huts were specially designed to house expedition personnel, each group drew on different precedents, regional architectural influences, and degrees of conscious innovation for polar conditions. Of particular note was the use of different insulation materials, some of which were traditional and some of which were new or experimental. This paper looks at the details of design and construction of each hut, and at the factors that might have contributed to the success or failure of a particular hut. These factors included the theoretical thermal efficiency of the design and the construction materials, the effectiveness of the heating and ventilation systems installed, and the amount of floor space available to each man. It is concluded that efficiency depended on a combination of these factors rather than on any one, and that the 'Heroic Era' was probably too short a period of time for the best combination (if one existed) to be recognized and adopted to produce a consistently efficient antarctic hut design. (Auth.)

47-704
Physical and dynamic properties of sea ice in the polar oceans.
Gow, A.J., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Monograph*, Sep. 1991, M 91-01, 46p., ADA-256 303, Refs. p.42-46.
Tucker, W.B.
Ice growth, Sea ice, Ice structure, Sea ice distribution, Ice salinity, Air water interactions, Ocean currents, Ice density, Ice cover thickness, Surface roughness, Antarctica—Weddell Sea, Antarctica—McMurdo Sound, Fram Strait, USSR—Kara Sea, United States—Alaska—Kotzebue Sound.
This monograph provides a current review of the state of knowledge of the growth, properties, and small- and large-scale behavior of sea ice found in the polar oceans of the northern and southern hemispheres. A major focus of the report is to contrast and compare the physical and dynamic properties of ice found in the Arctic seas with those found in the seas surrounding the antarctic continent. Very significant differences in the physical and dynamic properties of the ice are shown to exist that derive directly from differences in land-sea relationships between the two polar regions and their effect on ocean-atmosphere interaction and oceanic circulation. The same factors also determine, to a large degree, major differences in the seasonal distribution and extent of sea ice in the arctic and antarctic oceans. (Auth.)

47-705
Shock response of snow: analysis of experimental methods and constitutive model development.
Johnson, J.B., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, July 1992, CR 92-12, 19p., ADA-256 300, 25 refs.
Brown, J.A., Gaffney, E.S., Blaisdell, G.L., Solie, D.J.
Snow mechanics, Shock waves, Stress strain diagrams, Models.
A shock impact test was conducted on snow with an initial density of 400 kg/cu m using a large-diameter gas gun and Lagrangian stress gauges between layers of snow. The shock propagation velocity ranged from 240 to 207 m/sec, the peak stresses in the snow were between 20 and 40 MPa, and the compacted snow density was less than 860 kg/cu m. Interpretation of the stress records was complicated by the unsteady nature of the shock, impedance mismatching between gauges and snow, multiply-reflected pulses, and release waves generated at the edge of the target. A dynamic finite-element analysis was used to interpret the data, to construct a constitutive relationship for the snow, and to examine the importance of the release waves. Model calculations indicate two release wave sources: the free edge of the target aluminum buffer and the edge of the snow in contact with the copper container. The aluminum buffer release waves contain both shear and dilatational components. Transmission across the aluminum/snow interface significantly attenuated dilatational waves and essentially eliminated the shear waves. The snow/copper release wave did not arrive at the stress gauge position until after the end of the experiment. With the aid of model calculations, the pressure volumetric-strain (P-V) curve for initial shock loading was determined from arrival time information and stress measurements at the embedded gauges. Stress signals caused by reflected waves were used to determine the reloading and unloading P-V curve. The P-V response for shock loading was found to be much stiffer than that for quasi-static loading. The unloading P-V curves used in model calculations were nonlinear functions of volumetric strain with linear reloading.

47-706
Petrographic and salinity characteristics of brackish water ice in the Bay of Bothnia.
Gow, A.J., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, July 1992, CR 92-13, 36p., ADA-256 302, 31 refs.
Weeks, W.F., Kosloff, P., Carsey, S.
Ice growth, Ice structure, Ice temperature, Ice crystals, Ice salinity, Frazil ice, Synthetic aperture radar, Bothnia, Bay.
Field observations made during the Mar. 1988 BEPERS (Bothnian Experiment in Preparation for ERS-1) remote sensing experiment included measurements of the snow and ice thickness, temperature, salinity and crystal structure profiles of the different types of brackish ice that form in the Bay of Bothnia. Both undeformed fast ice and ice that had formed under more disturbed conditions were sampled. Ice thickness varied from 36 to 64 cm in the bay to the east of Umea, Sweden, with somewhat thicker ice (76 cm) occurring in the northernmost, nearly fresh water areas of the Bay of Bothnia. Three major ice crystal types or textures were identified: granular, transition and columnar ice, with the amount of each depending on the level of disturbance in the water column. At seven of the sixteen sites investigated, granular (mainly frazil) ice was the dominant component. At six of the remaining nine sites, columnar-congelation ice was the predominant ice crystal type. A mix of transition and transition-congelation ice types dominated the structure of the remaining three sites. At all but two sites the bottom ice consisted of congelation ice, which in many instances exhibited the ice plate and brine layer substructure so typical of arctic sea ice. A variety of c-axis fabrics were observed in the columnar-congelation ice, including random, vertical and horizontal (planar) orientations. Aligned c-axes were observed at several locations, but in most cases there was no obvious pattern to the geographic arrangement of these fabrics. Surface water salinities ranged from 3.6 to 4.1 per mill except at the northernmost sites near Tornio, where essentially riverine fresh water was present. Bulk salinities ranged from 1.21-0.58 per mill in the area of the main experiment to as low as 0.06 per mill near Tornio. Ice temperatures were usually higher than -3.5 C. Brine volume profiles were used to estimate representative ice property profiles for comparison with those of more typical sea ice of similar thicknesses from the Arctic Ocean. A variety of structural factors contributing to specific areas of high and low radar return from ice in the Bay of Bothnia are also discussed.

47-707
State-of-the-art survey of flexible pavement crack sealing procedures in the United States.
Eaton, R.A., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, Sep. 1992, CR 92-18, 19p., ADA-258 050, 11 refs.
Ashcraft, J.
Concrete pavements, Cracks, Sealing, Cold weather operation, Meetings.
A survey of all 50 United States was conducted in September of 1990 to determine the state of the art of crack sealing procedures on flexible asphalt concrete pavements. The results were tabulated and a summary report prepared. A meeting was held at the U.S. Army Cold Regions Research and Engineering Laboratory to discuss the draft report; the comments and suggestions received were incorporated into this report. At the meeting the group identified the need for a trade organization to develop uniform specifications and terminology and to promote proper equipment, methodology, materials, training and education in the pavement crack sealing industry.

47-708
Supercritical fluid chromatography for the analysis of nitroaromatics, nitramines and nitrate esters.
Miyares, P.H., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Aug. 1992, SR 92-21, 14p., ADA-256 297, 42 refs.
Explosives, Military operation, Environmental impact, Pollution.
A supercritical fluid chromatographic (SFC) system equipped with a capillary column and a thermionic ionization detector (TID) was evaluated as a potential analytical tool for the simultaneous determination of nitroaromatics, nitramines and nitrate esters. Examination of several stationary phases and modified fluids was carried out while determining optimal conditions for a suitable separation. The results indicate that a cyanopropyl stationary phase is best suited for these analytes, but the available percentages of cyanopropyl in the phase (i.e. 25% and 50%) do not give total resolution. The performance and usability of the TID was evaluated. Detection limits are estimated to be several times greater than those for standard HPLC and GC methods. Also, the usability and performance of the SFC were compared with HPLC and GC. SFC-TID can be used for the simultaneous determination of nitroaromatic, nitramines and nitrate esters, but current column and detection capability limitations greatly reduce its potential.

47-709
Spectral signature of coupled flow in the refreezing active layer, northern Alaska.
Outcalt, S.I., et al, *Physical geography*, July-Sep. 1992, 13(3), p.273-284, 17 refs.
Hinkel, K.M., Nelson, F.E.
Active layer, Soil freezing, Permafrost heat transfer, Permafrost thermal properties, Frozen ground thermodynamics, Seasonal freeze thaw, United States—Alaska.

47-710
Grímsvötn Caldera, Vatnajökull: subglacial topography and structure of caldera infill.
Gudmundsson, M.T., *Jökull*, 1989, No.39, p.1-20, With Icelandic summary. 37 refs.
Glacial lakes, Subglacial observations, Volcanoes, Bottom topography, Icebound lakes, Ice dams, Subglacial drainage, Mountain glaciers, Lake bursts, Iceland.

47-711
Ages of the Fossvogur layers and the Álftanes end-moraine, SW-Iceland.
Hjartarson, Á., *Jökull*, 1989, No.39, p.21-31, With Icelandic summary. 44 refs.
Glacial deposits, Stratigraphy, Paleoclimatology, Moraines, Soil dating, Geochronology, Marine deposits, Quaternary deposits, Iceland.

47-712
Volume of Graenalón and changes in the size and frequency of jökulhlaups. [Rúmmál Graenalóns og breytingar á staerd og tídni jökulhlaupa].
Björnsson, H., et al, *Jökull*, 1989, No.39, p.90-95, In Icelandic with English summary. 9 refs.
Pálsson, F.
Glacial lakes, Lake bursts, Icebound lakes, Ice dams, Subglacial drainage, Iceland.

47-713
Icequakes in Entujökull and Kötlujökull. [Isskjálftar í Entujökli og Kötlujökli].
Brandsdóttir, B., et al, *Jökull*, 1989, No.39, p.96-98, In Icelandic with English summary. 7 refs.
Menke, W.H.
Icequakes, Glacier flow, Glacier surveys, Earthquakes, Iceland.

47-714
Glacier variations: 1930-1960, 1960-1980, 1980-1987 and 1987-1988. [Jöklabreytingar 1930-1960, 1960-1980, 1980-1987 og 1987-1988].
Sigurdsson, O., *Jökull*, 1989, No.39, p.108-113, In Icelandic with English summary.
Glacier surveys, Glacier oscillation, Iceland.

47-715
Snow avalanches in Iceland during the winter 1987/88. [Snjóflód á Íslandi veturinn 1987/88].
Magnússon, M.M., *Jökull*, 1989, No.39, p.114-117, In Icelandic with English summary.
Avalanches, Snow cover stability, Avalanche tracks, Iceland.

47-716
Proceedings.
Nordic Expert Meeting on River Ice, Espoo, Finland, Nov. 2-4, 1987, Nordic Hydrological Programme, NHP report, No.21, Helsinki, Suomen Akatemia (Finnish Academy), 1988, 243p., Refs. passim. For individual papers see 47-717 through 47-736.
Laasanen, O., ed, Forsius, J., ed.
River ice, Runoff forecasting, Ice forecasting, Ice control, Frazil ice, Ice cover effect, River flow, Ice water interface, Ice growth.

47-717
Current North American trends in river ice research.
Beltaos, S., Nordic Expert Meeting on River Ice, Espoo, Finland, Nov. 2-4, 1987. Proceedings. Edited by O. Laasanen and J. Forsius, Helsinki, Suomen Akatemia (Finnish Academy), 1988, p.3-29, 45 refs.
River ice, Research projects, Frazil ice, Ice jams.

47-718
Discharge and runoff in rivers influenced by ice.
Thomsen, T., Nordic Expert Meeting on River Ice, Espoo, Finland, Nov. 2-4, 1987. Proceedings. Edited by O. Laasanen and J. Forsius, Helsinki, Suomen Akatemia (Finnish Academy), 1988, p.33-51, 19 refs.
River ice, Runoff forecasting, Ice cover effect, River flow, Ice water interface, Seasonal variations.

47-719
Adjustments for backwater effects due to ice cover—the SMHI method.
Westman, S.E., Nordic Expert Meeting on River Ice, Espoo, Finland, Nov. 2-4, 1987. Proceedings. Edited by O. Laasanen and J. Forsius, Helsinki, Suomen Akatemia (Finnish Academy), 1988, p.53-66, 1 ref.
River ice, Runoff forecasting, Ice cover effect, River flow, Ice water interface, Sweden.

47-720
Measuring water level and discharge—practical experiences in Greenland.
Kern-Hansen, C., Nordic Expert Meeting on River Ice, Espoo, Finland, Nov. 2-4, 1987. Proceedings. Edited by O. Laasanen and J. Forsius, Helsinki, Suomen Akatemia (Finnish Academy), 1988, p.67-84, 6 refs.
Runoff forecasting, Water level, River flow, Flow measurement, Recording instruments, River ice, Ice cover effect, Greenland.

47-721
Some new technics in river ice measuring.
Maunula, M., Nordic Expert Meeting on River Ice, Espoo, Finland, Nov. 2-4, 1987. Proceedings. Edited by O. Laasanen and J. Forsius, Helsinki, Suomen Akatemia (Finnish Academy), 1988, p.87-93, 1 ref.
River ice, Runoff forecasting, Ice cover effect, River flow, Ice water interface, Ice surveys, Finland.

47-722
New equipment for measuring ice thickness.
Wold, K., Nordic Expert Meeting on River Ice, Espoo, Finland, Nov. 2-4, 1987. Proceedings. Edited by O. Laasanen and J. Forsius, Helsinki, Suomen Akatemia (Finnish Academy), 1988, p.95-97.
Lake ice, Ice cover thickness, Ice surveys, Thickness gages.

47-723
Measurement of the spatial distribution of ice thickness and water temperature in the vicinity of a thermal power plant.
Hari, J., Nordic Expert Meeting on River Ice, Espoo, Finland, Nov. 2-4, 1987. Proceedings. Edited by O. Laasanen and J. Forsius, Helsinki, Suomen Akatemia (Finnish Academy), 1988, p.99-103, 1 ref.
River ice, Ice cover thickness, Ice water interface, Water temperature, Ice surveys, Electric power.

47-724
Lomen project.
Roen, S., et al, Nordic Expert Meeting on River Ice, Espoo, Finland, Nov. 2-4, 1987. Proceedings. Edited by O. Laasanen and J. Forsius, Helsinki, Suomen Akatemia (Finnish Academy), 1988, p.105-109.
Wold, K.
Lake ice, Ice cover thickness, Ice water interface, Ice conditions, Water temperature, Electric power.

47-725
River ice forecasting.
Bengtsson, L., Nordic Expert Meeting on River Ice, Espoo, Finland, Nov. 2-4, 1987. Proceedings. Edited by O. Laasanen and J. Forsius, Helsinki, Suomen Akatemia (Finnish Academy), 1988, p.113-137, 28 refs.
River ice, Ice forecasting, Ice conditions, Ice growth, Ice water interface, Frazil ice, Freezeup, Ice breakup, Mathematical models.

47-726
Frazil production in partly filled tunnels. [Sarrdannelse i delvis fylte tunneler].
Horjen, I., Nordic Expert Meeting on River Ice, Espoo, Finland, Nov. 2-4, 1987. Proceedings. Edited by O. Laasanen and J. Forsius, Helsinki, Suomen Akatemia (Finnish Academy), 1988, p.139-140, In Norwegian with English summary.
Tunnels, Frazil ice, Culverts.

47-727
Frazil ice in rivers near power stations.
Andersson, A., et al, Nordic Expert Meeting on River Ice, Espoo, Finland, Nov. 2-4, 1987. Proceedings. Edited by O. Laasanen and J. Forsius, Helsinki, Suomen Akatemia (Finnish Academy), 1988, p.141-146.
Andreasson, P.
River ice, Frazil ice, Research projects, Ice water interface, Electric power.

47-728
Numerical model for ice cover formation in rivers.
Huokuna, M., Nordic Expert Meeting on River Ice, Espoo, Finland, Nov. 2-4, 1987. Proceedings. Edited by O. Laasanen and J. Forsius, Helsinki, Suomen Akatemia (Finnish Academy), 1988, p.147-164, 9 refs.
River ice, Ice formation, Ice forecasting, Ice growth, Ice water interface, Frazil ice, Ice breakup, River flow, Mathematical models.

47-729
Mathematical model of border ice formation in rivers.
Hammar, L., Nordic Expert Meeting on River Ice, Espoo, Finland, Nov. 2-4, 1987. Proceedings. Edited by O. Laasanen and J. Forsius, Helsinki, Suomen Akatemia (Finnish Academy), 1988, p.165-179.
River ice, Ice formation, Fast ice, Ice forecasting, Ice growth, Ice water interface, Ice cover effect, River flow, Mathematical models.

47-730
On the crystal structure and growth of river ice.
Leppäranta, M., et al, Nordic Expert Meeting on River Ice, Espoo, Finland, Nov. 2-4, 1987. Proceedings. Edited by O. Laasanen and J. Forsius, Helsinki, Suomen Akatemia (Finnish Academy), 1988, p.181-190, 5 refs.
Kosloff, P.
River ice, Ice crystal structure, Ice growth.

47-731
Case study of whirl ice-holes.
Hyvärinen, V., Nordic Expert Meeting on River Ice, Espoo, Finland, Nov. 2-4, 1987. Proceedings. Edited by O. Laasanen and J. Forsius, Helsinki, Suomen Akatemia (Finnish Academy), 1988, p.191-193, 1 ref.
Lake ice, Snow ice interface, Snow ice, Ice water interface.

47-732
Statistical model for prediction of ice breakup in river Torneälven.
Forsius, J., et al, Nordic Expert Meeting on River Ice, Espoo, Finland, Nov. 2-4, 1987. Proceedings. Edited by O. Laasanen and J. Forsius, Helsinki, Suomen Akatemia (Finnish Academy), 1988, p.195-204, 2 refs.
Granholm, G.
River ice, Ice forecasting, Ice breakup, Statistical analysis, Finland.

47-733
Technical measures for reduction of ice damage.
Carstens, T., et al, Nordic Expert Meeting on River Ice, Espoo, Finland, Nov. 2-4, 1987. Proceedings. Edited by O. Laasanen and J. Forsius, Helsinki, Suomen Akatemia (Finnish Academy), 1988, p.207-216, 9 refs.
Tesaker, E.
River ice, Ice control.

47-734
Reduction of damages from ice jam flooding in river Torneälven.
Zachrisson, G., Nordic Expert Meeting on River Ice, Espoo, Finland, Nov. 2-4, 1987. Proceedings. Edited by O. Laasanen and J. Forsius, Helsinki, Suomen Akatemia (Finnish Academy), 1988, p.217-225.
River ice, Ice control, Ice jams, Flood forecasting, Finland.

47-735
Ice problems in the Arendal River system, Norway. [Isproblemer i Arendalsvassdraget, Norge].
Björkenes, A., Nordic Expert Meeting on River Ice, Espoo, Finland, Nov. 2-4, 1987. Proceedings. Edited by O. Laasanen and J. Forsius, Helsinki, Suomen Akatemia (Finnish Academy), 1988, p.227-234, In Norwegian with English summary.
River ice, Ice control, Norway.

47-736
Ice problems in power plants and rivers in Norway. Results from an inquiry. [Isproblemer ved kraftverk og i vassdrag i Norge. Oppsumering fra en spörreundersökelse].
Fossdal, M.L., et al, Nordic Expert Meeting on River Ice, Espoo, Finland, Nov. 2-4, 1987. Proceedings. Edited by O. Laasanen and J. Forsius, Helsinki, Suomen Akatemia (Finnish Academy), 1988, p.235-236, In Norwegian with English summary.
Björkenes, A.
River ice, Ice control, Norway.

47-737
Mercury radar imaging: evidence for polar ice.
Slade, M.A., et al, *Science*, Oct.23, 1992, 258(5082), p.635-640, 31 refs.
Butler, B.J., Muhleman, D.O.
Ice sheets, Mercury (planet), Polar regions.

47-738
Thermal stability of water ice at the poles of Mercury.
Paige, D.A., et al, *Science*, Oct.23, 1992, 258(5082), p.643-646, Numerous refs.
Wood, S.E., Vasavada, A.R.
Ice sheets, Mercury (planet), Polar regions.

47-739
Ozone 'minihole' over northern Scandinavia.
Rabbe, A., et al, *Journal of atmospheric and terrestrial physics*, Nov./Dec. 1992, 54(11/12), p.1447-1451, 3 refs.
Larsen, S.H.H.
Ozone, Atmospheric circulation, Scandinavia.

47-740
Simple theoretical model of the diffraction of VLF electromagnetic waves by the antarctic icecap.
Barr, R., *Journal of atmospheric and terrestrial physics*, Nov./Dec. 1992, 54(11/12), p.1527-1533, 19 refs.
Ice sheets, Electromagnetic properties.
The antarctic continent has been modelled as a spherical cap whose pole is coincident with that of the South Pole, which totally absorbs VLF radio waves attempting to propagate over it. The propagation of Omega navigation signals around this model icecap has then been computed using the Kirchhoff diffraction theory. Spherical caps extending to 66.5 and 75.5S have been found to accurately model the signals from Omega La Reunion and Argentina, respectively, received on flights between Christchurch, New Zealand and Scott Base in Antarctica, up to the boundary of the theoretical icecap. These model icecaps were found to be good fits to the boundary of the antarctic continent, when measured at the 1-1.5 km contour of ice thickness, in the region where the VLF waves diffracted around the icecap. The good agreement obtained between the experimental field strength data and those computed theoretically, using only simple diffraction theory, suggests that coastal refraction plays at most only a secondary role in circumpolar propagation. (Auth.)

47-741
Neural network-based adaptive radar detection scheme for small ice targets in sea clutter.
Bhattacharya, T.K., et al. *Electronics letters*, July 30, 1992, 28(16), p.1528-1529, 3 refs.
Haykin, S.
Floating ice, Icebergs, Remote sensing, Radar echoes, Detection, Data processing, Performance, Radar tracking, Accuracy.

47-742
Karstic denudation and tufas deposits in high alpine mountains (Alpes, France).
Chardon, M., *Zeitschrift für Geomorphologie*, Feb. 1992, Vol.85(Suppl), International Conference on Geomorphology: Geomorphology and Geoecology, Frankfurt/Main, Germany, Sep., 1989. Proceedings, Vol.7, Karst. Edited by J. Nicod et al, p.19-38, With German and French summaries. 17 refs.
Karst, Landforms, Alpine landscapes, Periglacial processes, Glacial geology, Decomposition, Water erosion, Glacier melting, Springs (water).

47-743
Transitions in frozen gelatinized-starch systems studied by differential scanning calorimetry.
Liu, H., et al, *Carbohydrate polymers*, 1992, 19(3), p.179-183, 17 refs.
Lelièvre, J.
Polymers, Frozen liquids, Temperature measurement, Phase transformations, Heating, Solidification, Ice melting, Temperature effects.

47-744
Poly(vinyl alcohol) hydrogels prepared by freezing-thawing cyclic processing.
Stauffer, S.R., et al, *Polymer*, Sep. 1992, 33(18), p.3932-3936, 12 refs.
Peppas, N.A.
Polymers, Low temperature research, Frozen liquids, Freeze thaw cycles, Hydrocarbons, Thermal expansion, Rheology, Mechanical properties, Temperature effects.

47-745
Assessment of respiration rate and nitrogen-fixing and denitrifying activity in high-meadow alpine soils of northwestern Caucasus.
Stepanov, A.L., et al, *Moscow University soil science bulletin*, 1989, 44(2), p.55-57, Translated from Vestnik Moskovskogo Universiteta. Pochvovedenie. 11 refs.
Onipchenko, V.G.
Mountain soils, Alpine landscapes, Soil microbiology, Plant ecology, Snow cover effect, Nutrient cycle, Soil tests.

47-746
Model for managing the formation of the microstructure of hail clouds. [O modeli upravleniia formirovaniem mikrostruktury gradovykh oblakov].
Ashabokov, B.A., et al, *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy*, 1991, Vol.80, p.3-8, In Russian. 3 refs.
Shapovalov, A.V.
Mathematical models, Microstructure, Hail clouds.

47-747
Algorithm for calculating the components and spatial orientation of air flow and water drops in a hail cloud. [Ob odnom algoritme rascheta sostavliaiushchikh skorosti i prostranstvennoĭ orientatsii vozdushnykh potokov i gidrometeorov v gradovom oblake].
Baragunov, V.S., et al, *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy*, 1991, Vol.80, p.8-14, In Russian. 3 refs.
Shoranov, R.A.
Analysis (mathematics), Hail clouds, Air flow, Cloud droplets.

47-748
Possibility of using the third central moment of doppler spectra to indicate ice particles with a diameter of less than 0.5 cm. [Vozmozhnost' primeneniia tret'ego tsentral'nogo momenta dopplerovskogo spektra dlia indikatsii ledianykh chastits diametrom menee 0.5 cm].
Marchenko, P.E., et al, *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy*, 1991, Vol.80, p.14-18, In Russian. 7 refs.
Tkhamokov, B.Kh.
Analysis (mathematics), Spectra, Raindrops, Particles, Hailstones.

47-749
Third central moment of falling velocity of water drops and its relationship to variabilities in the microstructure of hailstorm clouds. [Tretiĭ tsentral'nyĭ moment skorosti padeniia gidrometeorov i ego zavisimost' ot izmenchivosti mikrostruktury v grozogradovykh oblakakh].
Marchenko, P.E., et al, *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy*, 1991, Vol.80, p.19-31, In Russian. 20 refs.
Tkhamokov, B.Kh.
Analysis (mathematics), Spectra, Velocity, Cloud droplets, Hail clouds, Hailstones.

47-750
Finite-difference Lyapunov functions used in creating an algorithm for calculating radar and radiometer equations. [Setochnye funktsii Liapunova v primenenii k postroeniiu algoritma rascheta uravneniĭ radiolokatora i radiometra].
Karmov, L.N., et al, *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy*, 1991, Vol.80, p.32-39, In Russian. 15 refs.
Karmov, Kh.N.
Analysis (mathematics), Radar, Radiometry, Hail clouds.

47-751
Problem of evaluating the accuracy of radar measurements. [K voprosu otsenki tochnosti radiolokatsionnykh izmereniĭ].
Abshaev, M.T., et al, *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy*, 1991, Vol.80, p.40-44, In Russian. 3 refs.
Iniukhin, V.S.
Radar, Accuracy, Hailstones.

47-752
Algorithms for mapping radar data. [Algoritmy otobrazheniia radiolokatsionnoĭ informatsii].
Abshaev, M.T., et al, *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy*, 1991, Vol.80, p.44-50, In Russian. 5 refs.
Hail clouds, Analysis (mathematics), Mapping, Radar.

47-753
Theoretical and experimental studies of heat and mass transfer processes during the nucleation, growth and melting of hailstones. [Teoreticheskie i eksperimental'nye issledovaniia protsessov teplomassoobmena pri zarozhdenii, roste i taianii gradin].
Filatkin, V.N., et al, *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy*, 1991, Vol.80, p.50-68, In Russian. 22 refs.
Tlisov, M.I., Pilip, I.I.
Hailstone growth, Hailstones, Heat transfer, Mass transfer, Ice nuclei, Ice melting, Raindrops, Test equipment, Analysis (mathematics).

47-754
Methodology of airborne tests of anti-hail products in stratiform clouds. [Metodicheskie aspekty samoletnykh ispytaniĭ protivogradovykh izdeliĭ v sloistykh oblakakh].
Berezinskiĭ, N.A., et al, *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy*, 1991, Vol.80, p.68-74, In Russian. 4 refs.
Miakon'kiĭ, G.B., Tlisov, M.I.
Hail prevention, Countermeasures, Probes.

47-755
Characteristics of the structure and dynamics of the development of hail clouds in the central part of Transcaucasia. [Osobennosti struktury i dinamika razvitiia gradovykh oblakov v tsentral'noĭ chasti Zakavkaz'ia].
Safarov, S.G., *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy*, 1991, Vol.80, p.74-93, In Russian. 9 refs.
Hail clouds, Radio echo soundings, USSR—Transcaucasia.

47-756
Distribution of paths of movement of multi-cell hail clouds in the Northern Caucasus. [Raspredelenie traektoriĭ peremeshcheniia mnogoiacheĭkovykh gradovykh protsessov na Severnom Kavkaze].
Gazaeva, Z.A., et al, *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy*, 1991, Vol.80, p.93-99, In Russian. 9 refs.
Makitov, V.S.
Hail clouds, Clouds (meteorology), USSR—Caucasus.

47-757
Interrelationship of the structure of hail clouds with the vertical structure of wind in the troposphere. [Vzaimosviaz' struktury gradovykh oblakov s vertikal'noĭ strukturoĭ vetra v troposfere].
Mal'bakhova, N.M., *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy*, 1991, Vol.80, p.99-106, In Russian. 7 refs.
Hail clouds, Wind (meteorology).

47-758
Designing technology for cloud modification. [Voprosy razrabotki tekhnologii aktivnykh vozdeĭstviĭ na oblaka].
Dinevich, L.A., et al, *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy*, 1991, Vol.80, p.106-112, In Russian. 8 refs.
Il'in, V.M., Shilin, V.S.
Cloud seeding, Hail prevention, Analysis (mathematics).

47-759
Statistical-mathematical processing of data from a land-based network of passive hail indicators. [Statistiko-matematicheskaia obrabotka dannykh nazemnoĭ seti passivnykh indikatorov grada].
Zhakamikhov, Kh.M., et al, *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy*, 1991, Vol.80, p.112-122, In Russian. 7 refs.
Tlisov, M.I.
Data processing, Statistical analysis, Analysis (mathematics), Indicating instruments, Hail.

47-760
Evaluating the effectiveness of hail modification products. [Otsenka effektivnosti aktivnogo vozdeĭstviia na gradovye protsessy].
Abshaev, M.T., et al, *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy*, 1991, Vol.80, p.122-136, In Russian. 6 refs.
Safarov, S.G.
Hail prevention, Cloud seeding, Analysis (mathematics).

47-761
Statistical evaluation of the correlations among the parameters of hail clouds during cloud seeding. [Statisticheskaia otsenka korreliatsionnykh zavisimosteĭ mezhdu parametrami gradovykh oblakov pri provedenii vozdeĭstviia].
Kozhevnikova, I.A., et al, *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy*, 1991, Vol.80, p.136-143, In Russian. 5 refs.
Bocharova, V.A., Kalov, Kh.M., Fedchenko, L.M.
Cloud seeding, Hail clouds, Hail prevention, Statistical analysis.

47-762
Variations in the diameter of hailstones during the seeding of hail clouds. [Ob izmenenii fakticheskogo diametra gradin pri aktivnykh vozdeĭstviiakh na gradovye oblaka].
Bocharova, V.A., et al, *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy*, 1991, Vol.80, p.143-149, In Russian. 4 refs.
Hail clouds, Cloud seeding, Hailstones, Analysis (mathematics).

47-763
Estimating the time needed for hail cloud modifications to take effect. [Otsenka vremeni dostizheniia effekta vozdeĭstviia na gradovye oblaka].
Berezkin, V.V., et al, *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy*, 1991, Vol.80, p.149-156, In Russian. 8 refs.
Vatiashvili, M.R., Makitov, V.S., Fedchenko, L.M.
Hail prevention, Cloud seeding, Time factor, Statistical analysis.

47-764
Evaluating the possibility of using hail prevention shells and rockets in high-mountain regions. [Otsenka vozmozhnosti primeneniia protivogradovykh snariadov i raket v vysokogornykh raĭonakh strany].
Dubinin, B.N., et al, *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy*, 1991, Vol.80, p.156-160, In Russian.
Kliger, B.A.
Hail prevention, Cloud seeding, Isotherms.

47-765
Technical and economic analysis of anti-hail launching devices. [Tekhniko-ekonomicheskiĭ analiz protivogradovykh puskovykh ustanovok].
Dubinin, B.N., *Nal'chik. Vysokogornyĭ geofizicheskiĭ institut. Trudy*, 1991, Vol.80, p.160-171, In Russian. 3 refs.
Hail prevention, Cloud seeding, Equipment, Economic analysis, Analysis (mathematics).

47-766
Geology of the Innuitian orogen and arctic platform of Canada and Greenland.
Trettin, H.P., ed. Canada. Geological Survey. Geology of Canada, No.3, Ottawa, 1991, 569p. + maps in separate book jacket (Pertinent p.27-56,497-553), Refs. passim. This is also volume E of the Geological Society of America's Geology of North America series.
Geological surveys, Stratigraphy, Geochronology, Tectonics, Exploration, Geological maps, Geochemistry, Minerals, Geomorphology, Quaternary deposits, Canada—Northwest Territories—Arctic Archipelago, Greenland.

47-767
Seed entrapment in alpine ecosystems: effects of soil particle size and diaspore morphology.
Chambers, J.C., et al. *Ecology*, Oct. 1991, 72(5), p.1668-1677, 38 refs.
MacMahon, J.A., Haefner, J.H.
Alpine landscapes, Revegetation, Plant ecology, Dispersions, Soil texture, Particle size distribution, Mountain soils, Wind factors, Surface properties.

47-768
Cyclic voltammetry at gold, platinum and carbon microelectrodes in ice without added supporting electrolyte: evidence for liquid microphases at temperatures well below the freezing point of water.
Bond, A.M., et al. *Journal of electroanalytical chemistry*, Sep. 15, 1992, 335(1-2), p.281-295, 19 refs.
Pfund, V.B.
Electrical resistivity, Metals, Frozen liquids, Ice solid interface, Electrical measurement, Mass transfer, Liquid phases, Ion diffusion, Freezing points, Ice electrical properties.

47-769
Controlling nucleation in protein solutions.
DeMattei, R.C., et al. *Journal of crystal growth*, Aug. 11, 1992, 122(1-4), International Symposium on Crystal Growth of Biological Macromolecules, 4th, Freiburg, Germany, Aug. 18-24, 1991. Proceedings. Edited by J.J. Stezowski et al, p.21-30, 4 refs.
Feigelson, R.S.
Solutions, Microbiology, Crystal growth, Supersaturation, Laboratory techniques, Phase transformations, Artificial nucleation, Liquid solid interfaces, Ice growth.

47-770
Numerical modeling of the development of U-shaped valleys by glacial erosion.
Harbor, J.M., *Geological Society of America. Bulletin*, Oct. 1992, 104(10), p.1364-1375, 70 refs.
Glacial geology, Glacial erosion, Valleys, Alpine landscapes, Landforms, Glacier flow, Ice solid interface, Mathematical models, Sliding, Landscape development.

47-771
Freezing of water in hardboard: absence of changes in mechanical properties.
George, M.F., et al. *Wood and fiber science*, July 1992, 24(3), p.252-259, 22 refs.
Cutter, B.C., Chin, P.P.S.
Wood, Freezing, Composite materials, Thermal analysis, Thermal expansion, Freeze thaw tests, Damage, Mechanical properties, Water content, Cold weather performance, Temperature effects.

47-772
Light scattering by nonspherical ice grains: an application to noctilucent cloud particles.
Mishchenko, M.I., *Earth, Moon and planets*, June 1992, 57(3), p.203-211, 11 refs.
Cloud physics, Light scattering, Ice crystal optics, Particle size distribution, Polarization (waves), Surface properties.

47-773
Postfire shift from lichen-spruce to lichen-tundra vegetation at tree line.
Arsenault, D., et al. *Ecology*, June 1992, 73(3), p.1067-1081, Refs. p.1080-1081.
Payette, S.
Plant ecology, Forest lines, Forest fires, Environmental impact, Revegetation, Lichens, Snow cover effect, Forest canopy, Age determination, Tundra, Forest ecosystems.

47-774
Relationship between frost tolerance and sugar concentration of various bryophytes in summer and winter.
Rütten, D., et al. *Oecologia*, Aug. 1992, 91(2), p.260-265, 30 refs.
Santarius, K.A.
Mosses, Frost resistance, Cold stress, Cold tolerance, Photosynthesis, Plant physiology, Freeze thaw tests, Seasonal variations.

47-775
Enthalpy formulation of the conduction problem with phase changes.
Cesari, F., *Computers & structures*, Aug. 17, 1992, 44(5), p.983-987, 4 refs.
Liquid solid interfaces, Phase transformations, Stefan problem, Thermal conductivity, Enthalpy, Analysis (mathematics), Solidification.

47-776
Seasonal river runoff calculated from a global atmospheric model.
Kuhl, S.C., et al. *Water resources research*, Aug. 1992, 28(8), p.2029-2039, 24 refs.
Miller, J.R.
Runoff forecasting, Atmospheric physics, River basins, Climatic factors, Hydrologic cycle, Snowmelt, Precipitation (meteorology), Mathematical models, Seasonal variations, Global change.

47-777
Last glaciation and maximum glaciation in the Qinghai-Xizang (Tibet) Plateau: a controversy to M. Kuhle's ice sheet hypothesis.
Sni, Y.F., et al. *Zeitschrift für Geomorphologie*, Feb. 1992, Vol.84(Suppl), International Conference on Geomorphology: Geomorphology and Geoecology, 2nd, Frankfurt/Main, Germany, Sep. 3-9, 1989. Proceedings, Vol.7. Climatic geomorphology. Edited by H. Hagedorn and A. Rapp, p.19-35, 23 refs. For another version see 45-458.
Zheng, B.X., Li, S.J.
Mountain glaciers, Snow line, Ice sheets, Glaciation, Geomorphology, Climatic changes, Theories, Pleistocene, Quaternary deposits.

47-778
Eolian morphogenesis in a periglacial environment: closed depressions on the periphery of the Gulf of Lion (French Mediterranean). [Morphogenèse éolienne en ambiance périglaciaire: les dépressions fermées du pourtour du Golfe du Lion (France méditerranéenne)].
Ambert, P., et al. *Zeitschrift für Geomorphologie*, Feb. 1992, Vol.84(Suppl), International Conference on Geomorphology: Geomorphology and Geoecology, 2nd, Frankfurt/Main, Germany, Sep. 3-9, 1989. Proceedings, Vol.7. Climatic geomorphology. Edited by H. Hagedorn and A. Rapp, p.55-71, In French with English and German summaries. 47 refs.
Clauzon, G.
Plains, Periglacial processes, Geomorphology, Eolian soils, Wind erosion, Quaternary deposits, Sediment transport, Landscape development.

47-779
Detecting organic chemical contaminants by spectral-induced polarization method in glacial till environment.
Vanhala, H., et al. *Geophysics*, Aug. 1992, 57(8), p.1014-1017, 8 refs.
Soininen, H., Kukkonen, I.
Glacial deposits, Soil pollution, Hydrocarbons, Soil tests, Clay minerals, Detection, Spectra, Environmental tests, Quaternary deposits.

47-780
Seasonal temperature patterns in an arctic and two subarctic Alaskan (USA) headwater streams.
Irons, J.G., III, et al. *Hydrobiologia*, Aug. 7, 1992, 237(3), p.147-157, 54 refs.
Oswood, M.W.
Streams, Thermal regime, Water temperature, Limnology, Ecology, Seasonal variations, Temperature effects, Degree days.

47-781
Influence of snow viscosity on forced flexural-gravity waves in a basin with a density jump.
Bukatov, A.E., et al. *Soviet journal of physical oceanography*, 1992, 3(4), p.259-266, Translated from Morskoi gidrofizicheskiĭ zhurnal, 7 refs.
Solomakha, T.A.
Floating ice, Elastic waves, Ice water interface, Wave propagation, Internal friction, Viscosity, Snow cover effect, Damping, Analysis (mathematics).

47-782
Investigation of a mushroom-like flow in the shelf edge area of northern seas.
Voloshina, I.P., et al. *Soviet journal of physical oceanography*, 1992, 3(4), p.317-322, Translated from Morskoi gidrofizicheskiĭ zhurnal, 6 refs.
Sochnev, O.IA.
Ocean currents, Ice water interface, Sea ice distribution, Ice edge, Remote sensing, Ice cover effect, Spaceborne photography, Hydrography.

47-783
Temporal fluctuations in weather disasters: 1950-1989.
Changnon, S.A., et al. *Climatic change*, Nov. 1992, 22(3), p.191-208, 8 refs.
Changnon, J.M.
Snowstorms, Ice storms, Thunderstorms, Atmospheric disturbances, Climatic changes, Cost analysis, United States.

47-784
Computer-aided methods for the optimization of the mobility of single-unit and two-unit articulated tracked vehicles.
Wong, J.Y., *Journal of terramechanics*, July-Sep. 1992, 29(4/5), p.395-421, 17 refs.
Snow vehicles, Tracked vehicles, All terrain vehicles, Computerized simulation.

47-785
Glacier, river and sea ice blister observations.
Kovacs, A., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Aug. 1992, SR 92-22, 14p., ADA-256 301, 35 refs.
Sea ice, River ice, Glacier ice, Frost mounds, Water supply, Greenland—Jakobshavns Isbrae, Antarctica—Koettlitz Glacier, Canada—Yukon Territory—Firth River, United States—Alaska—Katakluruk River, United States—Alaska—Umiat, United States—Alaska—Kuparuk River.
Ice blister observations made by the author in Greenland, Alaska and Antarctica are discussed. Ice blisters up to 3 m high and tens of meters long were observed on rivers and glaciers as well as on a subsurface glacial pool. Ice blisters observed by other investigators are also discussed, as is ice blister morphology (solid, hollow or water-filled), the processes associated with their formation and their potential as a resource for potable water. (Auth.)

47-786
Surface water temperature changes in the high latitudes of the Southern Hemisphere over the last glacial- interglacial cycle.
Pichon, J.J., et al. *Paleoceanography*, June 1992, 7(3), p.289-318, Refs. p.316-318.
Ice cores, Algae, Paleoclimatology, Ocean environments, Air ice water interaction, Antarctica—Vostok Station.
A set of numerical equations is developed to estimate past sea surface temperatures (SST) from fossil antarctic diatoms. These equations take into account both the biogeographic distribution and experimentally derived silica dissolution. The data represent a revision and expansion of a floral data base used previously, and include samples resulting from progressive opal dissolution experiments. Factor analysis of 166 samples (124 Holocene core top and 42 artificial samples) resolved four factors. Three of these factors depend on the water mass distribution (one subantarctic and two antarctic assemblages); factor 4 corresponds to a "dissolution assemblage". Inclusion of this factor in the data analysis minimizes the effect of opal dissolution on the assemblages and gives accurate estimates of SST over a wide range of biosiliceous dissolution. The reconstructed SST records present strong analogies with the air temperature record over Antarctica at the Vostok site, derived from changes in the isotopic ratio of the ice. This similarity may be used to compare the oceanic isotope stratigraphy and the Vostok time scale derived from an ice flow model. The oceanic time scale, if taken at face value, would indicate that large changes in ice accumulation rates occurred between warm and cold periods. (Auth. mod.)

47-787
Environmental information from ice cores.
Delmas, R.J., *Reviews of geophysics*, Feb. 1992, 30(1), p.1-21, Refs. p.19-21.
Ice cores, Ice composition, Paleoclimatology, Atmospheric composition, Snow, Polar regions.
Information recorded in polar ice cores over the last several hundred millennia is invaluable to studies aimed at understanding the preindustrial environmental system and anticipating the future evolution of the atmosphere. An excellent understanding of the mechanisms of the ice record formation as well as a good assessment of the present polar atmospheric composition (trace gases, aerosol) are prerequisites to interpreting correctly the past variations of the measured parameters. This paper explains what and how atmospheric parameters are recorded. Ambient air samples are encapsulated and stored in the ice bubbled by relatively simple processes. The isotopic composition of the H2O (ice) lattice is a reliable paleothermometer. The data obtained from deep ice cores provide precise information on the ice age environmental conditions. When polar

temperatures were some 10 C lower than now, atmospheric CO2 and CH4 contents were factors of 2 and 4 lower, respectively, than at present. (Auth. mod.)

47-788

Diary of an arctic year.

Krasemann, S.J., North Vancouver, British Columbia, Whitecap Books Limited, 1991, 189p.

Arctic landscapes, Ecosystems, History.

47-789

Canada north of sixty.

Boden, J.F., ed, Toronto, McClelland and Stewart Inc., 1991, 336p.

Boden, E., ed.

Arctic landscapes, Ecosystems, History, Canada.

47-790

Effects of natural convection on ice formation inside a horizontal cylinder.

Chen, S.L., et al, *Experimental heat transfer*, Apr.-June 1992, 5(2), p.131-145, 8 refs.

Liang, S.S., Hong, J.T.

Ice formation, Solutions, Phase transformations, Convection, Heat transfer coefficient, Temperature effects, Ice water interface, Isotherms, Air conditioning, Density (mass/volume).

47-791

Effect of sealers on the freeze-thaw resistance of mortar.

Litvan, G.G., *Cement and concrete research*, Nov. 1992, 22(6), p.1141-1147, 1 ref.

Mortars, Concrete durability, Freeze thaw tests, Protective coatings, Frost resistance, Hygroscopicity, Sealing, Waterproofing.

47-792

Some results of a study of the physical characteristics of the glacial stratum on the slopes of the Klyuchevskoy volcano.

Salamatin, A.N., et al, *Volcanology and seismology*, Aug. 1992, 13(2), p.230-240, Translated from Vulkanologiia i seismologiia. 12 refs.

Murav'ev, I.A.D.

Volcanoes, Glacier mass balance, Glacier heat balance, Firn stratification, Geothermal thawing, Ice temperature, Boreholes, Temperature distribution, Mathematical models.

47-793

Heat balance characteristics during fine periods on the lower parts of the Franz Josef Glacier, South Westland, New Zealand.

Ishikawa, N., et al, *International journal of climatology*, May-June 1992, 12(4), p.397-410, 26 refs.

Owens, I.F., Sturman, A.P.

Glacier heat balance, Climatic factors, Ice air interface, Glacier surveys, Radiation balance, Glacier melting, Seasonal variations, Air temperature, Temperature effects, Correlation.

47-794

Ecological studies on the timberline of Mt. Fuji—3. Seasonal changes *in nitrogen content in leaves of* woody plants.

Sakio, H., et al, *Botanical magazine—Tokyo*, Mar. 1992, 105(1077), p.47-52, 13 refs.

Masuzawa, T.

Plants (botany), Plant tissues, Forest lines, Cold tolerance, Nutrient cycle, Plant ecology, Trees (plants), Temperature effects, Seasonal variations.

47-795

Cell shape and localisation of ice in leaves of overwintering wheat during frost stress in the field.

Pearce, R.S., et al, *Planta*, Oct. 1992, 188(3), p.324-331, 18 refs.

Ashworth, E.N.

Plant tissues, Scanning electron microscopy, Cold stress, Ice formation, Freeze drying, Frost action, Damage, Sampling, Acclimatization.

47-796

Slope runoff in the Transural steppe region of Bashkiria.

Mosienko, N.A., et al, *Soviet meteorology and hydrology*, 1991, No.2, p.77-80, Translated from Meteorologiia i gidrologiia. 10 refs.

Komissarov, A.V.

Steppes, Surface properties, Slope processes, Snowmelt, Precipitation (meteorology), Runoff, Flood forecasting, River basins, Agriculture, Seasonal variations.

47-797

***Preliminary* assessments of accuracy characteristics of the double-fenced precipitation gauge.**

Golubev, V.S., *Soviet meteorology and hydrology*, 1991, No.2, p.101-106, Translated from Meteorologiia i gidrologiia. 9 refs.

Precipitation (meteorology), Precipitation gages, Snow depth, Snow accumulation, Accuracy, Measurement, Water balance.

47-798

Ice nucleation in emulsified aqueous salt solutions: a differential scanning calorimetry study.

Ganguly, S., et al, *Colloids and surfaces*, Sep. 28, 1992, 66(2), p.105-111, 17 refs.

Adiseshaiah, K.S.

Colloids, Solutions, Ice formation, Heterogeneous nucleation, Homogeneous nucleation, Temperature measurement, Nucleation rate, Liquid cooling, Salt water, Ion density (concentration), Temperature control.

47-799

Elements of the material balance under conditions of *an alpine lichen heath of the* North Caucasus.

Makarov, M.I., *Moscow University soil science bulletin*, 1983, 38(4), p.58-61, Translated from Vestnik Moskovskogo Universiteta. Pochvovedenie. 8 refs.

Mountain soils, Precipitation (meteorology), Alpine landscapes, Snow composition, Chemical properties, Soil pollution, Ion diffusion, Lichens.

47-800

Ice edge contact and failure.

Daley, C., *Cold regions science and technology*, Sep. 1992, 21(1), p.1-23, 23 refs.

Ice mechanics, Ice breaking, Ice loads, Ice solid interface, Ice edge, Ice sheets, Dynamic loads, Cracking (fracturing), Mathematical models, Mechanical tests, Design criteria.

47-801

Two-dimensional extrusion of crushed ice. Part 1: experimental.

Sayed, M., et al, *Cold regions science and technology*, Sep. 1992, 21(1), p.25-36, 11 refs.

Frederking, R.M.W.

Ice solid interface, Internal friction, Ice breaking, Ice mechanics, Stresses, Rheology, Cracking (fracturing), Mechanical tests, Layers, Particle size distribution.

47-802

Two-dimensional extrusion of crushed ice. Part 2: analysis.

Savage, S.B., et al, *Cold regions science and technology*, Sep. 1992, 21(1), p.37-47, 7 refs.

Sayed, M., Frederking, R.M.W.

Ice mechanics, Internal friction, Ice solid interface, Rheology, Ice breaking, Stresses, Analysis (mathematics), Layers.

47-803

Electromagnetic emission (EME) from ice crack formation: preliminary observations.

Thiel, D.V., *Cold regions science and technology*, Sep. 1992, 21(1), p.49-60, 18 refs.

Ice breaking, Cracking (fracturing), Detection, Electrical measurement, Crack propagation, Electric charge, Electric fields, Ice strength, Polarity (charge separation).

47-804

***Stable isotope simulations using a regional* stable isotope model coupled to a zonally averaged global model.**

Fisher, D.A., *Cold regions science and technology*, Sep. 1992, 21(1), p.61-77, 46 refs.

Precipitation (meteorology), Climatology, Isotope analysis, Oxygen isotopes, Ice cores, Hydrologic cycle, Heavy water, Simulation, Surface temperature, Evaporation.

A global zonally averaged stable isotope model is reviewed, checked and used to give input to a regional model that uses precipitation along assumed vapor trajectories to predict (delta)O-18 and deuterium excess in Arctic Canada, NW Greenland, Central Greenland, East Antarctica, Victoria Land and on the Ross Ice Shelf. Where there is predominantly a single moisture trajectory, the model works well, but it does not fit the data in regions like Central Greenland (Crete) that would seem to have no predominant regional moisture path. Cloud supersaturation, seasonal precipitation and the temperature at which clouds shift from water droplets to ice crystals are emphasized. (Auth. mod.)

47-805

Preliminary study of the effect of fines on sanded-ice friction.

Blaisdell, G.L., et al, *Cold regions science and technology*, Sep. 1992, 21(1), MP 3151, p.79-90, 11 refs.

Borland, S.L.

Runways, Rubber ice friction, Skid resistance, Fines, Sands, Design criteria, Sliding, Temperature effects, Mechanical tests.

Small-scale laboratory tests were performed on sanded ice. Four standard sands, as specified by various regulatory agencies, were tested. Sliding friction was measured for a rubber-faced slider for each sand type at a temperature of -10 C on three prepared surfaces: bare ice, loose sanded ice and ice with sand frozen on. Friction coefficients for bare ice were found to be higher than those measured on loosely sanded ice and, in some cases, on ice with sand frozen on. Test results, presented as a performance ratio (ratio of coefficients for sanded ice to bare ice), allowed a distinct ranking of the sands' effectiveness. Performance ratios for frozen-on sand were significantly greater than for loose sand for a given sand type. The performance ratio showed a strong, linearly increasing trend as the percentage of a given fine grain size in the sand was increased. It was found that this line had a steeper slope for the percentage of material smaller than 0.177 mm as compared with that smaller than 0.297 mm. Also, there were greater increases in traction with increases in fines for frozen-on sand as compared with loosely sanded ice.

47-806

On the melt rate of drifting ice heated from below.

Omstedt, A., et al, *Cold regions science and technology*, Sep. 1992, 21(1), p.91-100, 29 refs.

Svensson, U.

Floating ice, Ice melting, Ice water interface, Surface roughness, Ice heat flux, Ice bottom surface, Mathematical models, Salinity, Drift.

47-807

Contribution to the Antarctic Expedition 1988-1989. First results. [Contribución a la Campaña Antártica 88/89. Primeros resultados].

Spain. Proyecto Español de Glaciologia Antártica, [Madrid], E.T.S.I. Minas: Universidad Politecnica de Madrid, [1989], 101p., In Spanish. Refs. passim. For individual papers see 47-808 through 47-816 or E-47234, F-47227 through F-47233 and G-47235.

DLC GB2597.C86

Expeditions, Low temperature research, Research projects, Glaciology.

This volume consists of 9 reports discussing preliminary results of investigations carried out at Juan Carlos I Station by members of the Spanish Antarctic Glaciological Project, based at the Universidad Politecnica de Madrid, during the Spanish Antarctic Expedition 1988-1989.

47-808

Record of the 1988-1989 expedition at the Spanish Juan Carlos I Station. [Memoria de la Campaña 1988/1989 en la Base Antártica Española Juan Carlos I].

Eraso, A., et al, Spain. Proyecto Español de Glaciología Antártica. Contribución a la Campaña Antártica 88/89. Primeros resultados. (Contribution to the Antarctic Expedition 1988-1989. First results), [Madrid], E.T.S.I. Minas: Universidad Politecnica de Madrid, [1989], p.3-22, In Spanish.

Antiguedad, I.

DLC GB2597.C86

Glacier surveys, Karst, Subglacial drainage, Antarctica—Juan Carlos I Station.

Glaciological and hydrological field activities carried out on the Caradora Glacier, which covers the Hurd Peninsula on which the Juan Carlos I Station is located and which is part of Livingston I., are summarized. The activities consisted mainly in the collection of ice samples for future isotope analysis, and ice measurements at 205 stations, over an area of 15 sq km, to determine the rate of subglacial drainage in the area. Difficulties encountered during the investigations described are outlined. Some recommendations for overcoming those difficulties in future studies on the Glacier are presented.

47-809

Correlation between discharge and hydrochemical *parameters in the river at* Juan Carlos I Station. [Correlación entre caudales drenados y parametros hidroquímicos en el río de la Base antártica Española Juan Carlos I (Isla Livingston, Shetland del Sur)].

Antiguedad, I., et al, Spain. Proyecto Español de Glaciología Antártica. Contribución a la Campaña Antártica 88/89. Primeros resultados. (Contribution to the Antarctic Expedition 1988-1989. First results), [Madrid], E.T.S.I. Minas: Universidad Politecnica de Madrid, [1989], p.24-31, In Spanish with English summary. 3 refs.

Eraso, A., Fernandez Rubio, R.

DLC GB2597.C86

Subglacial drainage, Glacial rivers, Glacier melting, Glacial hydrology, Meteorological factors, Antarctica—Juan Carlos I Station.

Using the data series available and the observations carried out in Feb. 1989 on the river near Juan Carlos I Station, the authors quantify the cryochemical effect defined by the inverse relationship between conductivity and discharge. These characteristics had been observed before, in the Arctic. On the basis of the hydrochemical data, the hydrogram is decomposed by identifying the provenance of the flows. (Auth. mod.)

47-810
Hydrogram characteristics as a function of meteorological data and elaboration of the discharge curve of the river at Juan Carlos I Station. [Características del hidrograma en función de los datos meteorológicos y elaboración de la curva de gastos del río de la Base Antártica Española (Isla Livingston, Shetland del Sur)].
Antiguedad, I., et al, Spain. Proyecto Español de Glaciología Antártica. Contribución a la Campaña Antártica 88/89. Primeros resultados. (Contribution to the Antarctic Expedition 1988-1989. First results), [Madrid], E.T.S.I. Minas: Universidad Politecnica de Madrid, [1989], p.32-40, In Spanish with English summary. 1 ref.
Eraso, A., Mangin, A., Fernandez Rubio, R.
DLC GB2597.C86
Subglacial drainage, Meteorological factors, Glacier melting, Glacial rivers, Glacial hydrology, Antarctica—Juan Carlos I Station.
The hydrogram characteristics of the river near Juan Carlos I Station, which drains the Cazadora Glacier, are analyzed. These data were obtained from a limnigraph operating in Feb. 1989, and by establishing the discharge curve calculated by watermill daily measurements. The hydrogram shapes are interpreted and the cause-effect relationship is determined between the glacier discharge and meteorological variables such as atmospheric temperature and pressure, precipitation, humidity, and solar radiation. Correlation and spectral analysis enable the authors to fix this relationship. (Auth. mod.)

47-811
Different water types found in the vicinity of Juan Carlos I Station. [Diferentes tipologías de aguas encontradas en la proximidad de la Base Antártica Española (Isla Livingston, Shetland del Sur)].
Antiguedad, I., et al, Spain. Proyecto Español de Glaciología Antártica. Contribución a la Campaña Antártica 88/89. Primeros resultados. (Contribution to the Antarctic Expedition 1988-1989. First results), [Madrid], E.T.S.I. Minas: Universidad Politecnica de Madrid, [1989], p.41-49, In Spanish with English summary. 4 refs.
Eraso, A., Fernandez Rubio, R.
DLC GB2597.C86
Subglacial drainage, Subsurface drainage, Meltwater, Glacial hydrology, Hydrogeochemistry, Antarctica—Juan Carlos I Station.
Variations of some physico-chemical parameters (conductivity, pH, temperature) are studied in a net of 15 water points of different origin (snowpath, permafrost, subsurface drainage, subglacial drainage) which were systematically analyzed, often on a daily basis. Spatial and temporal variations of these parameters, and complementary chemical analyses, allowed the authors to determine the different water families existing close to the Juan Carlos I Station. (Auth. mod.)

47-812
Vertical distribution of stable isotopes in the Cazadora Glacier near Juan Carlos I Station. [Distribución vertical de isotopos estables (deuterio y oxigeno-18) en el hielo del glaciar Cazadora junto a la Base Antártica Española Juan Carlos I, isla Livingston (Shetland del Sur)].
Eraso, A., et al, Spain. Proyecto Español de Glaciología Antártica. Contribución a la Campaña Antártica 88/89. Primeros resultados. (Contribution to the Antarctic Expedition 1988-1989. First results), [Madrid], E.T.S.I. Minas: Universidad Politecnica de Madrid, [1989], p.50-60, In Spanish with English summary. 1 ref.
DLC GB2597.C86
Ice composition, Paleoclimatology, Isotope analysis, Oxygen isotopes, Deuterium oxide ice, Glacier ice, Antarctica—Juan Carlos I Station.
The vertical distribution of oxygen 18 and deuterium is analyzed in 22 core barrel samples obtained from a 17.5 m thick sequence of ice located at the border of Cazadora Glacier near Juan Carlos I Station. Paleotemperatures and paleoclimate are determined by studying the concentration variations of both components. The r sults are similar to those obtained from data on the Argentine Is. in the files of the International Atomic Agency in Vienna. (Auth. mod.)

47-813
Vertical distribution of some oligo-elements in the Cazadora Glacier near the Juan Carlos I Station. [Distribución vertical de algunos oligoelementos presentes en el Glaciar Cazadora junto a la Base Antártica Española Juan Carlos I. Isla Livingston (Shetland del Sur)].
Eraso, A., et al, Spain. Proyecto Español de Glaciología Antártica. Contribución a la Campaña Antártica 88/89. Primeros resultados. (Contribution to the Antarctic Expedition 1988-1989. First results), [Madrid], E.T.S.I. Minas: Universidad Politecnica de Madrid, [1989], p.61-70, In Spanish with English summary. 5 refs.
DLC GB2597.C86
Ice composition, Glacier ice, Volcanic ash, Aerosols, Antarctica—Juan Carlos I Station.
The vertical distribution of 24 oligo-elements was determined in 22 ice samples from a 17.5 m thick sequence obtained at the border of Cazadora Glacier near the Juan Carlos I Station. The authors studied both the influence of the proximity of the marine environment, with its contribution of aerosols, and the intercalation of volcanic ash among the ice layers, which alteration could release some oligo-elements into the ice. (Auth. mod.)

47-814
Structural analysis of the Cazadora Glacier ice, directional anisotropy quantification and subglacial drainage prediction. [Analisis estructural del hielo del Glaciar Cazadora, cuantificación direccional de la anisotropía y predicción del drenaje subglaciar. Base Antártica Española Juan Carlos I, isla Livingston (Shetland del Sur)].
Eraso, A., et al, Spain. Proyecto Español de Glaciología Antártica. Contribución a la Campaña Antártica 88/89. Primeros resultados. (Contribution to the Antarctic Expedition 1988-1989. First results), [Madrid], E.T.S.I. Minas: Universidad Politecnica de Madrid, [1989], p.71-79, In Spanish with English summary. 13 refs.
Antiguedad, I., Taylor de Lima, M.
DLC GB2597.C86
Glacier ice, Anisotropy, Ice structure, Subglacial drainage, Water supply, Antarctica—Juan Carlos I Station.
The authors quantify, by ice-deformation analysis, the directional anisotropy of the glacier tongues Gaucho, Negro and Johnson of the Cazadora Glacier. The results, obtained by compared and global analysis, are used in the Direction Prediction Method of underground drainage to establish quantitatively the probability degree of each direction mode found. The end purpose of the study is to predict the subglacial drainage and provide a source of drinking water to nearby settlements. (Auth. mod.)

47-815
Mineralogic and microsonde analysis of volcanic ash in the vicinity of Juan Carlos I Station. [Analisis mineralógico y por microsonda de las cenizas volcánicas existentes junto a la Base Antártica Española Juan Carlos I. Isla Livingston, Shetland del Sur].
Eraso, A., et al, Spain. Proyecto Español de Glaciología Antártica. Contribución a la Campaña Antártica 88/89. Primeros resultados. (Contribution to the Antarctic Expedition 1988-1989. First results), [Madrid], E.T.S.I. Minas: Universidad Politecnica de Madrid, [1989], p.80-88, In Spanish with English summary. 6 refs.
DLC GB2597.C86
Subglacial drainage, Ice composition, Volcanic ash, Clay minerals, X ray diffraction, Antarctica—Juan Carlos I Station.
Results are presented of analyses of volcanic ash samples from 3 different sources: the underground drainage of the Cazadora Glacier, interlaid in the fossil beach levels where the Juan Carlos I Station is located, and lying openly on bare slopes. The degree was determined of the alteration of volcanic glasses, converted into clay minerals, by X ray diffraction, granulometry of thin sections, and electron microscopy. Analogies and differences between clay types are discussed. (Auth. mod.)

47-816
Plans for the construction of a dam in a fossil lagoon near the Juan Carlos I Station. [Anteproyecto de construcción de un azud en la albufera fósil del sexto nivel de playa existente junto a la Base Antártica Española Juan Carlos I. Isla Livingston (Shetland del Sur)].
Eraso, A., et al, Spain. Proyecto Español de Glaciología Antártica. Contribución a la Campaña Antártica 88/89. Primeros resultados. (Contribution to the Antarctic Expedition 1988-1989. First results), [Madrid], E.T.S.I. Minas: Universidad Politecnica de Madrid, [1989], p.89-101, In Spanish with English summary. 5 refs.
Sánchez de Toro Larios, A., Fernandez Rubio, R., Presa Santos, I.
DLC GB2597.C86
Dams, Cold weather construction, Water supply, Antarctica—Juan Carlos I Station.
A plan is described, based on a 1:500 scale topographic survey of the fossil lagoon above the 6th beach level where the Juan Carlos I Station is located, for the construction of a small dam of loose materials and the subsequent restoration of the lagoon to its natural conditions. It is estimated that the resulting reservoir could contain at least 15,000 cu m of water, the logistic advantages of which are pointed out, both to the nearby Station which could remain operative over winter, as well as to cargo operations in future expeditions. Estimates of the cost are also presented. (Auth. mod.)

47-817
Calorimetric study of pressure-amorphized cubic ice.
Johari, G.P., et al, *Journal of physical chemistry*, Feb. 22, 1990, 94(4), p.1212-1214, 23 refs.
Hallbrucker, A., Mayer, E.
Cubic ice, Amorphous ice, Ice crystal structure, High pressure ice, Ice thermal properties, Hydrogen bonds, Water structure, Solid phases.

47-818
Year-to-year variation of snow cover area in the Northern Hemisphere.
Iwasaki, T., *Meteorological Society of Japan. Journal*, Apr. 1991, 69(2), p.209-217, With Japanese summary. 22 refs.
Snow cover distribution, Snowfall, Long range forecasting, Snow air interface, Snow cover effect, Snow surveys, Atmospheric circulation, Meteorological data, Climatic factors, Statistical analysis.

47-819
Local and remote responses to excessive snow mass over Eurasia appearing in the northern spring and summer climate—a study with MRI-GCM.
Yasunari, T., et al, *Meteorological Society of Japan. Journal*, Aug. 1991, 69(4), p.473-487, With Japanese summary. 42 refs.
Kitoh, A., Tokioka, T.
Snow cover effect, Snowfall, Atmospheric circulation, Snow air interface, Snow cover distribution, Long range forecasting, Climatology, Mathematical models.

47-820
Bénard convection in binary mixtures with Soret effects and solidification.
Zimmermann, G., et al, *Journal of fluid mechanics*, May 1992, Vol.238, p.657-682, Refs. p.679-682.
Müller, U., Davis, S.H.
Solutions, Fluid mechanics, Ice formation, Solidification, Convection, Liquid solid interfaces, Phase transformations, Analysis (mathematics), Liquid phases, Temperature variations.

47-821
Angular variation of the infrared emissivity of ice and water surfaces.
Rees, W.G., et al, *International journal of remote sensing*, Oct. 1992, 13(15), p.2873-2886, 17 refs.
James, S.P.
Remote sensing, Sea ice, Ice detection, Radiometry, Infrared radiation, Radiance, Simulation, Orientation, Ice formation.

47-822
Observing precipitation through dual-polarization radar measurements.
Herzegh, P.H., et al, *American Meteorological Society. Bulletin*, Sep. 1992, 73(9), p.1365-1374, 50 refs.
Jameson, A.R.
Precipitation (meteorology), Remote sensing, Radar echoes, Ice crystal optics, Ice detection, Polarization (waves), Reflectivity, Snow pellets, Hail.

47-823
TAPS reroute meets schedule, beats cost estimate.
Newcomer, E.S., et al, *Oil & gas journal*, Sep. 14, 1992, 90(37), p.49-57.
McDevitt, P.G.
Petroleum industry, Underground pipelines, Pipe laying, Cold weather construction, Design criteria, Protection, Corrosion.

47-824
Alternative test for determining the frost resistance of bricks.
Arnott, M.R., et al, *Masonry Society journal*, Aug. 1990, 9(1), p.105, 3 refs.
Maurenbrecher, A.H.P.
Bricks, Frost resistance, Freeze thaw tests, Standards, Accuracy.

47-825
Thermogravitational convection of low temperature water in pipes with electric heating elements.
Agapkin, V.M., et al, *Power engineering*, 1991, 29(5), p.115-120, Translated from Izvestiia Akademii nauk SSSR. Energetika i transport. 2 refs.
Zubkov, P.T., IUgov, V.P.
Water pipelines, Pipeline heating, Pipeline freezing, Convection, Water temperature, Heat transfer, Analysis (mathematics), Electric heating.

47-826
Cool rain in a three-dimensional shallow-cloud model.
Takahashi, T., et al, *Meteorological Society of Japan. Journal*, June 1992, 70(3), p.739-748, With Japanese summary. 18 refs.
Asuma, Y.
Precipitation (meteorology), Cloud physics, Rain, Ice nuclei, Condensation nuclei, Ice crystal growth, Supercooling, Models, Wind factors.

47-827
Arctic ice shelves and ice islands: origin, growth and disintegration, physical characteristics, structural-stratigraphic variability, and dynamics.
Jeffries, M.O., *Reviews of geophysics*, Aug. 1992, 30(3), p.245-267, Refs. p.265-267.
Ice shelves, Ice islands, Sea ice distribution, Drift, Calving, Physical properties, Geophysical surveys, Air ice water interaction, Stability.

47-828
Advance and retreat of Cordilleran ice sheets in Washington, U.S.A.
Easterbrook, D.J., *Géographie physique et Quaternaire*, 1992, 46(1), p.51-68, With French and German summaries. Refs. p.66-68.
Pleistocene, Glaciation, Glacier oscillation, Ice sheets, Glacial geology, Quaternary deposits, Outwash, Age determination, Sediment transport.

47-829
Pleistocene montane glaciations in the Mackenzie Mountains, Northwest Territories.
Duk-Rodkin, A., et al, *Géographie physique et Quaternaire*, 1992, 46(1), p.69-83, With French and German summaries. 13 refs.
Hughes, O.L.
Pleistocene, Mountain glaciers, Glaciation, Glacial geology, Glacial deposits, Age determination, Landforms.

47-830
Paleoecology of an interglacial peat deposit, Nuyakuk, southwestern Alaska, U.S.A.
Elias, S.A., et al, *Géographie physique et Quaternaire*, 1992, 46(1), p.85-96, With French and German summaries. 42 refs.
Short, S.K.
Paleoecology, Peat, Palynology, Quaternary deposits, Soil analysis, Stratigraphy.

47-831
Paleoclimatic implications of new data on the origin of "greze" layering. [Données nouvelles sur l'origine du litage des grèzes: implications paléoclimatiques].
Bertran, P., et al, *Géographie physique et Quaternaire*, 1992, 46(1), p.97-112, In French with English and German summaries. 55 refs.
Paleoclimatology, Periglacial processes, Soil formation, Cryoturbation, Sediment transport, Snow cover effect, Slope processes, Soil texture.

47-832
Changes in tropospheric methane between 1841 and 1978 from a high accumulation-rate antarctic ice core.
Etheridge, D.M., et al, *Tellus*, Sep. 1992, 44B(4), p.282-294, Refs. p.292-294.
Pearman, G.I., Fraser, P.J.
Ice cores, Ice composition, Ice dating, Atmospheric composition, Antarctica—Law Dome.
To determine in detail how the concentration of tropospheric methane has changed from pre-industrial until recent times, an ice core with remarkably fine air-age resolution was investigated. The core, called DE08, contains air from as recent as 1978 with an age resolution of about 14 years. It was drilled from a region of Law Dome with extremely high snow-accumulation rate. The ice chronology was determined from the observed chemical and isotopic seasonal variations, verified against a volcanic horizon. The mean air-age was 35 years younger than the host ice except for air in summer ice layers, which was 37 years younger than the host ice. The extracted ice-core air was analyzed for methane using gas chromatography with flame-ionization detection. Methane concentrations in the DE08 record increased from 823 parts per billion by volume (ppbv, in dry air) in 1841 to 1481 ppbv in 1978. The DE08 record shows that methane growth rates have generally increased since the onset of the industrial revolution to a level of 14 ppbv/year (about 1% per year) by the 1970s. The exception was between about 1920-1945 when the growth rate stabilized at about 5 ppbv/year. (Auth. mod.)

47-833
Ratio of MSA to non-sea-salt sulphate in Antarctic Peninsula ice cores.
Mulvaney, R., et al, *Tellus*, Sep. 1992, 44B(4), p.295-303, 21 refs.
Ice cores, Ice composition, Atmospheric composition, Climatic factors, Antarctica—Antarctic Peninsula, Antarctica—Dolleman Island.
Methane sulphonic acid (MSA) in an ice core from Dolleman I. shows significantly high concentrations compared to values recorded in ice cores and in snowfall from elsewhere in Antarctica. MSA data from two other higher altitude Antarctic Peninsula ice cores, Dyer Plateau and Gomez Nunatak, show that the high concentrations measured at Dolleman I. are not representative of the Peninsula region as a whole. Exceptionally high concentrations observed at Dolleman I. may be related to its proximity to the biologically productive Weddell Sea, an important source of dimethyl sulphide (DMS), the precursor of MSA. The MSA data from this site are also unusual in that in deeper sections of this core they demonstrate a well-defined seasonal maximum in winter rather than in summer, and are out of phase with non sea-salt sulphate, another product of the decomposition of DMS. In contrast, in a near-surface section, MSA variations are in phase with non sea-salt sulphate, with a maximum concentration in the summer layer. A change in the season of deposition of MSA from winter to summer in the recent past is not considered likely. An alternative explanation is that there has been a relocation of the MSA from summer to winter layers during burial. (Auth. mod.)

47-834
1000 years of explosive volcanism recorded at the South Pole.
Delmas, R.J., et al, *Tellus*, Sep. 1992, 44B(4), p.335-350, Refs. p.349-350.
Kirchner, S., Palais, J.M., Pe'it, J.R.
Ice cores, Ice composition, Volcanic ash, Ice dating, Atmospheric composition, Antarctica—Amundsen-Scott Station.
Cataclysmic volcanic eruptions generally disturb the global atmosphere markedly for around 2 years. During that time, long-life volcanic products (mainly H_2SO_4), stored in the stratosphere gradually return to the troposphere. Antarctic snow may be subsequently contaminated and acid signals recorded. The recovery of these signals along antarctic ice cores provides a history of past volcanic events, most often of global, but sometimes of just regional, significance. Several physical and chemical techniques have been used to analyze a 1000-year ice core drilled near Amundsen-Scott Base. Acid and ultrafine ash deposits of volcanic origin have been carefully investigated. 23 major volcanic eruptions have been detected, dated and tentatively identified. The results have been compared with similar antarctic and Greenland records. The amount of volcanic sulfate deposited in antarctic snow, calculated and averaged over the last millennium, is, however, minor (13% of the total sulfate) in comparison with that of marine biogenic source. The 19th century was the period of the millennium most seriously disturbed by global explosive volcanic activity. The chlorine cycle, as recorded in antarctic ice, seems to be little affected even by such a large event as Tambora in 1815. (Auth.)

47-835
Seasonal input of heavy metals to antarctic snow.
Suttie, E.D., et al, *Tellus*, Sep. 1992, 44B(4), p.351-357, 21 refs.
Wolff, E.W.
Snow composition, Snow impurities, Marine atmospheres, Antarctica—Dolleman Island.
Cadmium, copper, lead and zinc concentrations have been measured on a sequence of snow blocks covering 2 years' accumulation at a site on the east coast of the Antarctic Peninsula. Careful collection and analysis techniques have ensured good data quality despite the very low concentrations, which averaged Cd 0.08 ng/kg, Cu 4 ng/kg, Pb 4 ng/kg, Zn 0.4 ng/kg. The elements show significant variations through the year. Pb has peaks in the autumn/winter period when both the crustal and marine aerosol are also at their maxima; despite a probable pollutant origin, Pb appears to be associated with natural aerosol in long range transport. No clear seasonal signal is observed for the other metals. At this site, the marine contribution to the concentrations of some metals may be significant. (Auth.)

47-836
Simulations of desert dust and sea-salt aerosols in Antarctica with a general circulation model of the atmosphere.
Genthon, C., *Tellus*, Sep. 1992, 44B(4), p.371-389, Refs. p.387-389.
Aerosols, Simulation, Paleoclimatology, Climate, Atmospheric composition, Snow composition, Dust, Salinity, Sea ice, Antarctica—Amundsen-Scott Station.
A coupled aerosol/climate model, elaborated on the basis of a general circulation model of the atmosphere, is used to study the features of desert dust and sea-salt aerosols in the antarctic region. Some of the observed seasonal characteristics of the two tracers are well simulated, and they are interpreted in terms of their relations with components of the atmospheric circulation. The model exhibits a strong influence of the boundary layer stability on the aerosols' vertical distributions near the surface. Observation at surface level may therefore be very misleading with respect to concentrations and seasonal variability higher in the atmosphere. An ice age experiment is run with the same aerosol/climate model, but fails to reproduce an expected large increase of dust and sea-salt concentrations in surface snow. The simulated enhancements of the production rates and atmospheric transport efficiency are weak. Changes in the distribution of the sources of dust, ignored in the experiment, could therefore have largely contributed to the last ice age dust increase. (Auth. mod.)

47-837
Time-trends in the pattern of ocean-atmosphere exchange in an ice core from the Weddell Sea sector of Antarctica.
Peel, D.A., et al, *Tellus*, Sep. 1992, 44B(4), p.430-442, Refs. p.441-442.
Mulvaney, R.
Ice cores, Sea ice distribution, Atmospheric composition, Air ice water interaction, Ice composition, Antarctica—Dolleman Island.
The east coast of the Antarctic Peninsula is strongly influenced by air masses that have traversed the Weddell Sea zone. A continuous record of annual-average values for delta O-18, delta D, Cl and non sea-salt sulphate ion in snowfall deposited since 1975 has been obtained on an ice core drilled on Dolleman I. Chemical changes along the ice core seem to be linked to changes in the concentration of the ice cover in the marginal ice zone. In the period since 1956, these variations appear to be coupled to the atmospheric circulation, as indexed by the atmospheric pressure gradient across the marginal ice zone. The largest anomaly in the 200-year sequence occurs in the period 1820-1880, during the final stages of the Little Ice Age. During the past century, there has been a marked decrease in deuterium excess of about 4 per mill. The implication is that there may have been significant weakening of the ice cover in this zone during the past century, despite satellite evidence which reveals no significant change in the position of the ice edge, at least since 1973. (Auth. mod.)

47-838
Lagrangian discrete parcel simulation of two dimensional river ice dynamics.
Chen, Y.C., Lulea, Sweden, University of Technology, 1992, 147p., Licentiate thesis. 70 refs.
River ice, Ice jams, Ice mechanics, Ice forecasting, Ice water interface, Ice cover effect, Ice models, River flow, Hydrodynamics, Mathematical models.

47-839
Tropical ice core paleoclimatic records, Quelccaya Ice Cap, Peru, A.D. 470 to 1984.
Thompson, L.G., et al, *Ohio State University. Byrd Polar Research Center. Miscellaneous publication*, 1992, No.321, 106p. + 5.25" floppy disk, 46 refs.
Mosley-Thompson, E.
Ice cores, Paleoclimatology, Isotope analysis, Peru.

47-840
Snow-meteorological yearbook of the Veneto Region mountains, 1988. [Annale nivometeorologico della montagna Veneta, anno 1988].
Cagnati, A., ed, Arabba, Italy, Regione del Veneto, Dipartimento Foreste, Centro Sperimentale Valanghe e Difesa Idrogeologica, 1989, 209p., In Italian.
Snow surveys, Snow depth, Snow temperature, Air temperature, Weather stations, Wind velocity, Humidity, Solar radiation, Albedo, Italy

47-841
Snow-meteorological yearbook of the Veneto Region mountains, 1989. [Annale nivometeorologico della montagna Veneta, anno 1989].
Cagnati, A., ed, Arabba, Italy, Regione del Veneto, Dipartimento Foreste, Centro Sperimentale Valanghe e Difesa Idrogeologica, 1990, 239p., In Italian.
Snow surveys, Snow depth, Snow temperature, Air temperature, Weather stations, Wind velocity, Humidity, Solar radiation, Albedo, Italy.

47-842
Snow-meteorological yearbook of the Veneto Region mountains, 1991. [Annale nivometeorologico della montagna Veneta, anno 1991].
Cagnati, A., ed, Arabba, Italy, Regione del Veneto, Dipartimento Foreste, Centro Sperimentale Valanghe e Difesa Idrogeologica, 1992, 247p., In Italian.
Snow surveys, Snow depth, Snow temperature, Air temperature, Weather stations, Wind velocity, Humidity, Solar radiation, Albedo, Italy.

47-843
[Hearing on monitoring the arctic and antarctic environments].
U.S. Congress. Senate. Committee on Commerce, Science, and Transportation. Subcommittee on Science, Technology, and Space. Washington, D.C., U.S. Government Printing Office, 1992, 119p.
Environmental protection, Polar regions.
The Hearing convened on May 13, 1991 and had as one of its major goals the comparison of the U.S. research effort in Antarctica and the Arctic. A second goal was to discover if the compromise protocol on antarctic minerals activities, negotiated in Madrid in 1991, accurately reflected the thoughts of the Congress on what those activities should be. A third goal was to gain information on the status of the ice cover with its annual and seasonal variations in both polar regions and to interpret the changes on a global basis.

47-844
Periglacial geomorphology; Proceedings.
Binghamton Symposium in Geomorphology, 22nd, Buffalo, NY, Sep. 1991. Chichester, England, John Wiley and Sons, 1992, 354p., Refs. passim. For individual papers see 47-845 through 47-858.
Dixon, J.C., ed, Abrahams, A.D., ed.
DLC GB642.B56 1991
Periglacial processes, Frost weathering, Mass movements (geology), Permafrost, Alpine landscapes, Ground ice, Active layer, Patterned ground, Frost mounds, Freeze thaw cycles, Sediment transport.

47-845
Periglacial geomorphology: what, where, when.
Thorn, C.E., Binghamton Symposium in Geomorphology, 22nd, Buffalo, NY, Sep. 1991. Proceedings. Periglacial geomorphology. Edited by J.C. Dixon and A.D. Abrahams, Chichester, England, John Wiley and Sons, 1992, p.1-30, Refs. p.25-30.
Periglacial processes, Geomorphology, Frost action, Ground ice, Permafrost, Thermokarst, Landscape development.

47-846
Origin of certain high-elevation local broad uplands in the central Appalachians south of the glacial border, U.S.A.—a paleoperiglacial hypothesis.
Clark, G.M., et al, Binghamton Symposium in Geomorphology, 22nd, Buffalo, NY, Sep. 1991. Proceedings. Periglacial geomorphology. Edited by J.C. Dixon and A.D. Abrahams, Chichester, England, John Wiley and Sons, 1992, p.31-61, 79 refs.
Hedges, J.
Alpine landscapes, Periglacial processes, Paleoclimatology, Geomorphology, Altiplanation, United States—Appalachian Mountains.

47-847
Spatial patterns of geochemical denudation in a Colorado alpine environment.
Caine, N., Binghamton Symposium in Geomorphology, 22nd, Buffalo, NY, Sep. 1991. Proceedings. Periglacial geomorphology. Edited by J.C. Dixon and A.D. Abrahams, Chichester, England, John Wiley and Sons, 1992, p.63-88, 55 refs.
Hydrogeochemistry, Nivation, Snow erosion, Snow cover effect, Snowmelt, Alpine landscapes, Weathering, Sediment transport, United States—Colorado.

47-848
Zonation of freeze-thaw temperatures at a glacier headwall, Dome Glacier, Canadian Rockies.
Gardner, J.S., Binghamton Symposium in Geomorphology, 22nd, Buffalo, NY, Sep. 1991. Proceedings. Periglacial geomorphology. Edited by J.C. Dixon and A.D. Abrahams, Chichester, England, John Wiley and Sons, 1992, p.89-102, 26 refs.
Cirque glaciers, Periglacial processes, Frost weathering, Freeze thaw cycles, Frozen rock temperature.

47-849
Mechanical weathering in the Antarctic: a maritime perspective.
Hall, K.J., Binghamton Symposium in Geomorphology, 22nd, Buffalo, NY, Sep. 1991. Proceedings. Periglacial geomorphology. Edited by J.C. Dixon and A.D. Abrahams, Chichester, England, John Wiley and Sons, 1992, p.103-123, 64 refs.
Periglacial processes, Frost weathering, Marine atmospheres, Freeze thaw cycles, Frozen rock temperature, Frozen rock strength, Antarctica—Signy Island.
Considerations of mechanical weathering in the Antarctic are usually limited to the continent and to the dry valleys in particular. However, the oft-unrecognized maritime antarctic differs climatically from the continent, particularly in terms of moisture availability, and consequently experiences a markedly different weathering regime. Data are presented on mechanical weathering processes, with special emphasis on freeze-thaw, from a maritime antarctic location. The interrelationship of the various weathering mechanisms is shown and the manner in which those factors controlling freeze-thaw can exert an influence on other processes is demonstrated. For the first time an attempt is made to integrate a combination of field and simulation data to deduce the actual freeze-thaw mechanism causing rock breakdown. It is shown that, compared to the continent, despite the potentially more dynamic maritime weathering environment, weathering rates are still slow. (Auth.)

47-850
Miniature sorted stripes in the Páramo de Piedras Blancas (Venezuelan Andes).
Pérez, F.L., Binghamton Symposium in Geomorphology, 22nd, Buffalo, NY, Sep. 1991. Proceedings. Periglacial geomorphology. Edited by J.C. Dixon and A.D. Abrahams, Chichester, England, John Wiley and Sons, 1992, p.125-157, 78 refs.
Periglacial processes, Patterned ground, Sorting, Ice needles, Freeze thaw cycles, Venezuela.

47-851
Model of water movement in rock glaciers and associated water characteristics.
Giardino, J.R., et al, Binghamton Symposium in Geomorphology, 22nd, Buffalo, NY, Sep. 1991. Proceedings. Periglacial geomorphology. Edited by J.C. Dixon and A.D. Abrahams, Chichester, England, John Wiley and Sons, 1992, p.159-184, 55 refs.
Vitek, J.D., DeMorett, J.L.
Rock glaciers, Glacial hydrology, Subglacial drainage, Periglacial processes, Water chemistry.

47-852
Snow-avalanche paths: conduits from the periglacial-alpine to the subalpine-depositional zone.
Butler, D.R., et al, Binghamton Symposium in Geomorphology, 22nd, Buffalo, NY, Sep. 1991. Proceedings. Periglacial geomorphology. Edited by J.C. Dixon and A.D. Abrahams, Chichester, England, John Wiley and Sons, 1992, p.185-202, 39 refs.
Malanson, G.P., Walsh, S.J.
Periglacial processes, Avalanche deposits, Avalanche tracks, Avalanche erosion, Sediment transport.

47-853
Long-term rates of contemporary solifluction in the Canadian Rocky Mountains.
Smith, D.J., Binghamton Symposium in Geomorphology, 22nd, Buffalo, NY, Sep. 1991. Proceedings. Periglacial geomorphology. Edited by J.C. Dixon and A.D. Abrahams, Chichester, England, John Wiley and Sons, 1992, p.203-221, 55 refs.
Periglacial processes, Solifluction, Mass movements (geology), Permafrost mass transfer, Sediment transport, Geomorphology, Slope processes, Canada—Rocky Mountains.

47-854
Factors influencing the distribution and initiation of active-layer detachment slides on Ellesmere Island, arctic Canada.
Lewkowicz, A.G., Binghamton Symposium in Geomorphology, 22nd, Buffalo, NY, Sep. 1991. Proceedings. Periglacial geomorphology. Edited by J.C. Dixon and A.D. Abrahams, Chichester, England, John Wiley and Sons, 1992, p.223-250, 33 refs.
Periglacial processes, Active layer, Landslides, Mass movements (geology), Sediment transport, Slope processes, Canada—Northwest Territories—Ellesmere Island.

47-855
Buoyancy forces induced by freeze-thaw in the active layer: implications for diapirism and soil circulation.
Hallet, B., et al, Binghamton Symposium in Geomorphology, 22nd, Buffalo, NY, Sep. 1991. Proceedings. Periglacial geomorphology. Edited by J.C. Dixon and A.D. Abrahams, Chichester, England, John Wiley and Sons, 1992, p.251-279, 50 refs.
Waddington, E.D.
Periglacial processes, Active layer, Thaw consolidation, Patterned ground, Sorting, Freeze thaw cycles, Ground thawing, Cryoturbation, Buoyancy, Mathematical models.

47-856
Formation of seasonal ice bodies.
Pollard, W.H., et al, Binghamton Symposium in Geomorphology, 22nd, Buffalo, NY, Sep. 1991. Proceedings. Periglacial geomorphology. Edited by J.C. Dixon and A.D. Abrahams, Chichester, England, John Wiley and Sons, 1992, p.281-304, 76 refs.
Van Everdingen, R.O.
Frost mounds, Naleds, Permafrost hydrology, Icing, Seasonal freeze thaw, Periglacial processes, Ground water, Ice (water storage).

47-857
Palsa-scale frost mounds.
Nelson, F.E., et al, Binghamton Symposium in Geomorphology, 22nd, Buffalo, NY, Sep. 1991. Proceedings. Periglacial geomorphology. Edited by J.C. Dixon and A.D. Abrahams, Chichester, England, John Wiley and Sons, 1992 p.305-325, 86 refs.
Hinkel, K.M., Outcalt, S.I.
Frost mounds, Permafrost hydrology, Periglacial processes, Terminology, Ground ice, Permafrost indicators.

47-858
Recent ground warming inferred from the temperature in permafrost near Mayo, Yukon Territory.
Burn, C.R., Binghamton Symposium in Geomorphology, 22nd, Buffalo, NY, Sep. 1991. Proceedings. Periglacial geomorphology. Edited by J.C. Dixon and A.D. Abrahams, Chichester, England, John Wiley and Sons, 1992, p.327-350, 44 refs.
Ground thawing, Permafrost thermal properties, Soil temperature, Permafrost thickness, Permafrost distribution, Permafrost forecasting, Ground ice, Climatic changes, Mathematical models, Canada—Yukon Territory.

47-859
Yukon Territory snow survey bulletin and water supply forecast, March 1, 1992.
Canada. Indian and Northern Affairs. Water Resources Division, Whitehorse, 1992, 27p.
Snow surveys, Runoff forecasting, Snow depth, Snow water equivalent, Stream flow, Canada—Yukon Territory.

47-860
Study in skid resistance on compacted snow and ice covered road surfaces.
Kaku, T., *Jidosha gijutsu (Society of Automotive Engineers of Japan. Journal)*, 1984, 38(5), p.600-606, In Japanese. 5 refs.
Road icing, Rubber snow friction, Skid resistance, Snow surface, Snow compaction, Tires, Traction, Mathematical models.

47-861
Cold weather compaction.
Brakey, B., *National Asphalt Pavement Association. Quality improvement publication*, 1992, QIP 118, 16p., 22 refs.
Cold weather construction, Paving, Pavements, Subgrade preparation, Bitumens, Compaction.

47-862
Comparison of analytical methods for determination of volatile organic compounds in soils.
Hewitt, A.D., et al, *Environmental science and technology*, 1992, 26(10), MP 3152, p.1932-1938, 29 refs.
Miyares, P.H., Leggett, D.C., Jenkins, T.F.
Soil pollution, Soil chemistry, Chemical analysis, Detection, Waste disposal, Environmental impact.
This study compares aqueous extraction headspace/gas chromatography and purge-and-trap gas chromatography/mass spectrometry (EPA SW-846, method 8240) for the determination of four volatile organic compounds (VOCs) in soil. Comparisons were performed on two fortified soils and two soils obtained from sites where hazardous waste had been spilled or disposed. In only two of the cases studied were significant differences consistently found: for the two most hydrophobic compounds in a high organic carbon soil, and for TCE in a field-contaminated soil that had previously shown slow aqueous VOC desorption. The findings strongly suggest that aqueous extraction/headspace GC using a portable instrument can be used to screen soils on site for VOCs, providing rapid same-day results, that will consistently identify the presence of these analytes and provide quantitative results which are generally not significantly different from slower and more expensive laboratory-based purge-and-trap analysis.

47-863
Freeze-thaw durability of air-entrained CSF concrete.
Sabir, B.B., et al, *Cement and concrete composites*, 1991, Vol.13, p.203-208, 5 refs.
Kouyiali, K.
Concrete durability, Concrete freezing, Frost resistance, Concrete admixtures, Freeze thaw tests, Air entrainment, Compressive properties.

47-864
Effect of inoculation on the biodegradation of weathered Prudhoe Bay crude oil.
Mueller, J.G., et al, *Journal of industrial microbiology*, 1992, Vol.10, p.95-102.
Resnick, S.M., Shelton, M.E., Pritchard, P.H.
Oil spills, Oil recovery, Crude oil, Degradation, Decomposition, Bacteria, Microbiology, United States—Alaska—Prince William Sound.

47-865
First ERS-1 SAR image acquired at Kiruna Salmijarvi, Spitsbergen (Norway).
ESA Public Relations Division, *International journal of remote sensing*, Sep. 20, 1992, 13(14), p.2515-2516.
Remote sensing, Spaceborne photography, Synthetic aperture radar, Sea ice, Ice detection, Radar photography.

47-866
Geomorphology of James Ross Island. [Geomorfología de la isla James Ross].
Strelin, J., et al, Geología de la isla James Ross (Geology of James Ross I.). Edited by C.A. Rinaldi, Buenos Aires, Dirección Nacional del Antártico, 1992, p.7-36, In Spanish with English summary. 25 refs.
Malagnino, E.C.
Glacier flow, Glacial erosion, Geomorphology, Glacial geology, Cryogenic structures, Antarctica—James Ross Island.
The main geomorphologic features of James Ross I. are the results of glacial processes and on this basis the island is divided into two sectors: one related to the Mount Haddington Ice Cap and the other to a more restricted glaciation. The first sector is characterized by a pattern of ice flow that moves radially from the Haddington and Dalinger ice domes. The James Ross I. glaciers are classified as of the subpolar type, with partial superficial thawing at high altitudes and partial basal thawing at low altitudes. During glacial and interglacial periods several marine terraces were formed as a consequence of glacieustatic and combined tectonic movements. A minimum of seven marine terraces were located at altitudes of 0.75-1 m; 2-3 m; 4-6 m; 10-14 m; 20-22 m; 30-40 m; and 100 m. Other flat surfaces that could have a similar origin were found at altitudes of 140-300 and 550-600 m. James Ross I. has been traditionally considered as consisting of a single Plio-Pleistocene volcanic cone. However, very Recent volcanic activity was also detected at the eastern margin of the island. This younger volcanic activity consists of three post-glacial maar craters that preserve the record of two superimposed volcanic activities. The initial vulcanism is of hydroclastic type and the latter is pyroclastic; the products of both volcanic activities are of olivine-basaltic composition. The study of the volcaniclastic sequence and of the younger deposits allowed for a summarized reconstruction of events. (Auth. mod.)

47-867
Minimum sampling for spectral analysis of nonstationary turbulence.
Treviño, G., et al, MP 3153, Symposium on Turbulence and Diffusion, 10th, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.289-292, 10 refs.
Andreas, E.L.
Atmospheric disturbances, Turbulence, Time factor, Statistical analysis, Mathematical models.

47-868
Air-ice drag coefficient in the Weddell Sea deduced from profile measurements.
Andreas, E.L., et al, MP 3154, Symposium on Turbulence and Diffusion, 10th, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.J5/109-J5/112, 12 refs.
Claffey, K.J.
Ice air interface, Drift, Wind pressure, Wind velocity, Ice surface, Ice cover effect, Surface roughness, Turbulent boundary layer, Statistical analysis, Antarctica—Weddell Sea.
The air-ice drag coefficient provides a convenient way to estimate the surface stress on sea ice from a measurement of the average wind speed at some reference height, in this case at 10 meters, multiplied by the root-mean-square sea ice surface roughness in centimeters. Air-ice drag coefficients were determined from wind speed profiles collected on Ice Station Weddell 1 which drifted through the western Weddell Sea on a multiyear ice floe from February to June 1992. The drag coefficients at 10 m ranged from .0013 to .0025 with an average of .0019. However, calculating the surface stress on an ice floe from the surface roughness and average drag coefficient value is an oversimplification because a 10 degree shift in wind direction may change the surface stress by a factor of two.

47-869
Glaciation of the Verkhoyansk-Kolyma region. [Oledenenie Verkhoiansko-Kolymskoĭ oblasti].
Koreisha, M.M., Moscow, Mezh. geof. komitet AN SSSR, 1991, 143p., In Russian with English summary and table of contents. Refs. p.130-141.
Glaciation, Naleds, Glacier surveys, Geocryology, Icing.

47-870
Volcanic aerosol and ozone depletion within the antarctic vortex during the austral spring of 1991.
Deshler, T., et al, *Geophysical research letters*, Sep. 23, 1992, 19(18), p.1819-1822, 16 refs.
Aerosols, Volcanoes, Ozone, Antarctica—McMurdo Station.
In the spring of 1991 the antarctic lower stratosphere was characterized by a layer of volcanic aerosol from the Cerro Hudson eruption. This aerosol layer was observed from McMurdo Station with both lidar and balloonborne particle counters beginning around Sep. 10. After Sep. 20 the aerosol was observed daily at between 9 and 13 km. In this layer homogeneous nucleation of new aerosol was observed with concentrations >6000/cu cm. Comparisons of scattering ratio calculated from measured particle size distributions agree best with the lidar measurements when a real index of refraction near 1.5 is used. In the past 5 years of measurements, ozone below 13 km has been relatively unchanged during the annual antarctic ozone depletion; however, in 1991 ozone below 13 km decreased at a rate of 4-8 ppb/day over 30 days. This change began shortly after the appearance of the volcanic aerosol, providing direct measurements correlating volcanic aerosol and ozone depletion. (Auth.)

47-871
Observations of correlated behavior of stratospheric ozone and aerosol at Thule during winter 1991-1992.
Di Sarra, A., *Geophysical research letters*, Sep. 23, 1992, 19(18), p.1823-1826, 20 refs.
Aerosols, Ozone, Greenland—Thule.

47-872
Antarctic ice sheets at risk?.
Sugden, D.E., *Nature*, Oct. 29, 1992, 29(6398), p.775-776, 8 refs.
Ice sheets, Ablation, Antarctica—East Antarctica.
Two opposing views are presented as possible consequences of global warming. Tending toward the instability of the antarctic ice sheet is the interpretation of deposits by deglaciation of leaves and pollen of the southern beech and marine diatoms, thought to have existed only in the Pliocene, in the Sirius Group of the Transantarctic Mountains. A recent observation of dating volcanic ash in a borehole in the Dry Valleys confirms an earlier dating and leads to a rendering of an Antarctica having several open seaways and basins during the Pliocene. Tending toward the stability of the ice sheet is other evidence. Recently (Sep/Oct 1992) presented laser fusion measurements of volcanic ash found in the Dry Valleys indicate the great age of the landscape. Ash falls up to 14 million years old are trapped in frost wedges. This close association of ash with cold desert conditions is explained by an unbroken line of cold desert features without water activity. Glacial landforms show the same pattern: there is no evidence of meltwater activity. Sea cores show no evidence of changes that would have accompanied a Pliocene collapse of the ice sheet. Ice sheets in cold, dry environments increase in size rather than decrease because a 5 C rise in temperature is sufficient to produce more snow but insufficient to melt the ice. An increase of 20-25 C would be necessary to remove the interior ice sheet.

47-873
Accumulation of suspended barite at mesopelagic depths and export production in the southern ocean.
Dehairs, F., et al, *Science*, Nov. 20, 1992, 258(5086), p.1332-1335, 33 refs.
Baeyens, W., Goeyens, L.
Minerals, Sea water, Sea ice, Water chemistry.
The relation between the accumulation of barite ($BaSO_4$) microcrystals in suspended matter from the mesopelagic depth region (100 to 600 m) and the type of production in the euphotic layer (new versus recycled) was studied for different southern ocean environments. Considerable subsurface barite accumulated in waters characterized by maintained new production and limited grazing pressure during the growth season. On the other hand, little if any barite accumulated in areas where relatively large amounts of photosynthetically fixed carbon were transferred to the microheterotrophic community and where recycled production became predominant. (Auth.)

47-874
Isotopic peculiarities of meteoric water in polar regions.
Wetzel, K., *Freiberger Forschungshefte. C*, 1990, Vol.442, Isotope und ihre Anwendung in den Geowissenschaften, in der Bergbausicherheit und im Umweltschutz: Vortrage des 4. Internationalen Isotopenkolloquiums 1988 in Freiberg, p.52-56, 9 refs.
DLC QE1.F73 Vol.442
Ground water, Hydrologic cycle, Isotope analysis, Geochemistry.
Knowledge of isotopic peculiarities of meteoric water in polar regions is a precondition of the use of *delta*D and *delta*O-18 records in polar ice for paleoclimatic research. Therefore the slope m and the intersect q of the meteoric water line (*delta*D = *delta*O-18 + q) have been studied in the typical climatic zones. As for the climatic zones of the Northern Hemisphere, the southern equatorial zone, and southern tropical zone and the southern equatorial zone, annual mean *delta*D and *delta*O-18 data of the IAEA/WMO precipitation network have been applied. According to antarctic data from Halley Station of this network, data published by various researchers have been investigated. The climatic zones have been selected such that they comprise at least 6 stations where precipitation has been sampled over a series of years. Results are summarized in a table. (Auth.)

47-875
Investigations of accumulation on the Filchner/-Ronne Ice Shelf (Antarctica) using isotopic stratigraphy. [Untersuchungen zur Akkumulation auf dem Filchner/Ronne-Schelfeis (Antarktis) unter Anwendung von Isotopenmethoden].
Moser, H., et al, *Freiberger Forschungshefte. C*, 1990, Vol.442, Isotope und ihre Anwendung in den Geowissenschaften, in der Bergbausicherheit und im Umweltschutz: Vortrage des 4. Internationalen Isotopenkolloquiums 1988 in Freiberg, p.57-71, In German with English summary. 15 refs.
Stichler, W., Graf, W., Reinwarth, O.
DLC QE1.F73 Vol.442
Ice shelves, Ice growth, Isotope analysis, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
The accumulation rates in the eastern part of the Ronne Ice Shelf as determined by isotopic stratigraphy (O-18) decrease from 21.3 at Filchner Station to 13.3 g/sq cm/a at measuring point 341, located 270 km up-stream of the ice edge. The O-18 content of the near-surface layers decreases in the same area from -25 to -29 per mill due to the isotopic continental effect. The O-18 profile of a 100 m ice core drilled in 1984 at point 340, 220 km from the ice edge, reveals 520 annual layers. The deduced accumulation rates in the catchment area of the ice core, using a simple ice- flow model, show variations which can be interpreted as variations of past accumulation rates. (Auth.)

47-876
Satellite observation of katabatic-wind propagation for great distances across the Ross Ice Shelf.
Bromwich, D.H., et al, *Monthly weather review*, Sep. 1992, 120(9), p.1940-1949, 23 refs.
Carrasco, J.F., Stearns, C.R.
Spaceborne photography, Radiometry, Ice shelves, Wind (meteorology), Atmospheric disturbances, Ice air interface, Turbulent boundary layer, Wind direction, Ice air interface, Glacier surfaces, Antarctica—Ross Ice Shelf.
Five winter months (Apr.-Aug. 1988) of thermal infrared satellite images were examined to investigate the occurrence of dark (warm) signatures across the Ross Ice Shelf. These features are inferred to be generated by katabatic winds that descend from southern Marie Byrd Land and then blow horizontally across the ice shelf. Significant mass is added to this airstream by katabatic winds blowing from the major glaciers that flow through the Transantarctic Mountains from East Antarctica. These negatively buoyant katabatic winds can reach the northwestern edge of the shelf, a horizontal propagation distance of up to 1000 km, 14% of the time. Where the airstream crosses from the ice shelf to the ice-covered Ross Sea, a prominent coastal polynya is formed. Because the downslope buoyancy force is near zero over the Ross Ice Shelf, the northwestward propagation of this katabatic air mass requires pressure gradient support. The study shows that the extended horizontal propagation of this atmospheric density current occurs in conjunction with the passage of synoptic cyclones over the southern Amundsen Sea. These cyclones can strengthen the pressure gradient in the interior of West Antarctica and make the pressure field favorable for northwestward movement of the katabatic winds from West Antarctica across the ice shelf in a geostrophic direction. The glacier winds from East Antarctica are further accelerated by the synoptic pressure gradient, usually undergo abrupt adjustment beyond the exit to the glacier valley, and merge into the mountain-parallel katabatic air mass. (Auth. mod.)

47-877
Great Lakes winter-weather 700-hPa PNA teleconnections.
Assel, R.A., *Monthly weather review*, Sep. 1992, 120(9), p.2156-2163, 19 refs.
Air temperature, Temperature variations, Atmospheric circulation, Lake ice, Atmospheric pressure, Snow accumulation, Lake effects, Climatic factors, Correlation, Seasonal variations.

47-878
Effect of temperature on the strength of adhesive joints.
Adams, R.D., et al, *International journal of adhesion and adhesives*, July 1992, 12(3), p.185-190, 9 refs.
Coppendale, J., Mallick, V., Al-Hamdan, H.
Joints (junctions), Strength, Polymers, Adhesion, Temperature effects, Thermal stresses, Design criteria, Construction materials.

47-879
Potential of common well casing materials to influence aqueous metal concentrations.
Hewitt, A.D., *Ground water monitoring review*, Spring 1992, MP 3155, p.131-136, 14 refs.
Soil pollution, Well casings, Water pollution, Ground water, Water chemistry, Chemical analysis, Environmental protection, Metals, Statistical analysis.
Static leaching and sorption laboratory studies were performed to assess the potential of polyvinyl chloride (PVC), polytetrafluoroethylene (PTFE), and two types of stainless steel (SS 304 and SS 316) well casing materials to influence metal concentrations in ground water solutions with low dissolved oxygen. Overall, PTFE was inert, whereas one or both stainless steels significantly altered the solution concentrations of Cd, Cr, Cu, Pb, Fe, and Ni. PVC was generally more reactive than PTFE, but did

not significantly alter the solution metal concentrations as often, or as greatly, as either of the stainless casings.

47-880
Predicted heights of buoyant convection above open leads in the winter arctic pack ice cover.
Serreze, M.C., et al, MP 3156, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.J3/45-J3/48, 18 refs.
Maslanik, J.A., Stone, R.S., Schnell, R.C., Kahl, J.D., Andreas, E.L.
Air ice water interaction, Ice openings, Polar atmospheres, Atmospheric circulation, Pack ice, Ice cover effect, Convection, Mathematical models.

47-881
Ice-pavement bond prevention: fundamental study.
Penn, L.S., et al, *U.S. Strategic Highway Research Program. Report*, 1992, SHRP-W/UFR-92-606, 102p., PB92-188184, 20 refs.
Myerson, A.
Road icing, Ice adhesion, Road Maintenance, Ice prevention, Ice removal, Ice solid interface.

47-882
Enhanced research program on the long-range climatic effects of increased atmospheric carbon dioxide—a continuation. Summary of research activities for 1990.
Washington, W.M., et al, Boulder, CO, National Center for Atmospheric Research, Jan. 1991, Var. p., DOE/ER/60995, Refs. passim.
Meehl, G.A.
Global warming, Air ice water interaction, Research projects, Carbon dioxide, Atmospheric composition.

47-883
Eastern-western arctic sea ice analysis: 1990.
U.S. Naval Polar Oceanography Center, Suitland, MD, [1991], n.p. ADA-250 238.
Ice surveys, Sea ice distribution, Ice cover thickness, Ice edge, Ice reporting, Maps.

47-884
Preliminary report on the observation of polar atmosphere and cryosphere by MOS-1 data received at Syowa Station.
Yamanouchi, T., et al, Proceedings on MOS-1 data evaluation. Edited by K. Maeda and S. Ogawa, Tokyo, National Space Development Agency of Japan (NASDA), Earth Observation Center, 1990, p.175-188, N92-23481, In Japanese with English summary. 12 refs.
Ice surveys, Sea ice distribution, Radiometry, Ice edge, Spaceborne photography, Data processing, Polar atmospheres, Cloud cover, Weather observations, Meteorological data, Antarctica—Showa Station.
The multipurpose satellite data receiving system (11 m antenna) has received data from the Marine Observation Satellite-1 (MOS-1) since Feb. 1989. The MOS-1 data have enabled the analysis of cloud liquid water content and water vapor amount, derivation of sea ice information and concentration, and monitoring of the ice sheet edge. Using images from the MOS-1 processed data, applicability of the data to the research subject is examined. Multispectral Electronic Self Scanning Radiometer (MESSR) imagery is applicable to the monitoring of the ice sheet edge. The Visible and Thermal Infrared Radiometer (VTIR) supplies important data to observe synoptic and large scale meteorology. However, the detection of clouds over snow and ice surfaces is difficult, especially in polar night. One of the main uses for the Microwave Scanning Radiometer (MSR) data is to survey the condition and distribution of the sea ice. However, the data are affected by the atmospheric liquid water and water vapor, and may result in large estimation errors of the sea ice concentration. It is difficult to derive the liquid water and water vapor concentration from these data over snow or ice covered surfaces. (Auth.)

47-885
Availability of MSR data for snow water estimation.
Suzuki, M., et al, Proceedings on MOS-1 data evaluation. Edited by K. Maeda and S. Ogawa, Tokyo, National Space Development Agency of Japan (NASDA), Earth Observation Center, 1990, p.189-196, N92-23482, In Japanese with English summary.
Sasaki, M., Fujino, K., Kawamura, T.
Snow surveys, Snow water equivalent, Snow depth, Radiometry, Spaceborne photography, Japan—Hokkaido.

47-886
Observation of lined-up cumulus rows under the winter monsoon situation using MOS-1 and radar data.
Koike, T., et al, Proceedings on MOS-1 data evaluation. Edited by K. Maeda and S. Ogawa, Tokyo, National Space Development Agency of Japan (NASDA), Earth Observation Center, 1990, p.197-203, N92-23483, In Japanese with English summary. 2 refs.
Ueda, H., Fujiyoshi, Y.
Snowstorms, Cloud cover, Weather observations, Spaceborne photography, Radiometry, Japan—Hokkaido.

47-887
Use of Marine Observation Satellite-1 in applied ocean science.
Pichel, W.G., et al, Proceedings on MOS-1 data evaluation. Edited by K. Maeda and S. Ogawa, Tokyo, National Space Development Agency of Japan (NASDA), Earth Observation Center, 1990, p.231-245, N92-23487, 19 refs.
Warner, R.A.
Ice surveys, Sea ice distribution, Spaceborne photography, Ice edge, Radiometry, Oceanographic surveys.

47-888
Implementation of a MMW FM-CW radar system for study of surface scattering from freshwater lake and river ice sheets.
Yankielun, N.E., et al, *U.S. Army Research Office. Report*, Dec. 1991, ARO-28962.2-GS-EQ, MP 3163, 20p., ADA-250 589, 1 ref.
Crane, R.K.
Ice surveys, Ice cover thickness, Ice surface, Lake ice, River ice, Ice electrical properties, Radio echo soundings, Radar, Scattering, Computer applications.

47-889
Natural cleaning processes of arctic waters and ice from petroleum hydrocarbons and the role of microorganisms in them: annual cycle of field observations. [Protsessy estestvennogo ochishcheniia arkticheskikh vod i l'dov ot neftianykh uglevodorodov i rol' v nikh mikroorganizmov: godovoĭ tsikl naturnykh nabliudeniĭ].
Il'inskiĭ, V.V., et al, *Moscow. Gosudarstvennyĭ okeanograficheskiĭ institut. Trudy*, 1992, Vol.203, p.91-101, In Russian. 7 refs.
Izmaĭlov, V.V.
Hydrocarbons, Ecology, Microbiology, Marine biology, Water pollution, Oil spills, Impurities.

47-890
Calculating the processes of condensation and coagulation growth of droplets and ice crystal aggregates in clouds and precipitation. [O raschete protsessov kondensatsionnogo i koaguliatsionnogo rosta sovokupnosti kapel i ledianykh kristallov v oblakakh i osadkakh],
Sergeev, B.N., *Moscow. Tsentral'naia aerologicheskaia observatoriia. Trudy*, 1991, Vol.178, p.85-96, In Russian with English summary. 7 refs.
Ice crystals, Cloud droplets, Condensation, Coagulation, Analysis (mathematics).

47-891
Conditions for the formation and forecasting of frontal and air mass icing in the Central Volga region. [Usloviia obrazovaniia i prognoz frontal'nogo i vnutrimassovogo gololeda v Srednem Povolzh'e],
Maksimovich, S.N., *Leningrad. Gidrometeorologicheskiĭ nauchno-issledovatel'skiĭ tsentr SSSR. Trudy*, 1992, Vol.315, p.10-13, In Russian. 2 refs.
Air masses, Glaze, Icing, Ice forecasting, Analysis (mathematics).

47-892
Synoptic conditions for the formation of avalanches and the possibility of forecasting them. [Sinoptícheskie usloviia obrazovaniia snezhnykh lavin i vozmozhnosti ikh prognoza],
Vinogradova, V.V., *Leningrad. Gidrometeorologicheskiĭ nauchno-issledovatel'skiĭ tsentr SSSR. Trudy*, 1992, Vol.315, p.45-49, In Russian. 10 refs.
Avalanche forecasting, Avalanche formation, Synoptic meteorology.

47-893
Mathematical modeling of ice drift in the example of the Caspian Sea. [Chislennoe modelirovanie dreĭfa l'da na primere Kaspiĭskogo moria],
Mikhal'chuk, A.V., *Leningrad. Gidrometeorologicheskiĭ nauchno-issledovatel'skiĭ tsentr SSSR. Trudy*, 1992, Vol.315, p.94-96, In Russian. 3 refs.
Mathematical models, Drift, Sea ice, USSR—Caspian Sea.

47-894
Calculating winter runoff from rivers in a cryolithozone based on the restoration of its hydrograph. [Raschet zimnego stoka rek kriolitozony na osnove vosstanovleniia ego gidrografa],
Kravchenko, V.V., et al, *Leningrad. Gosudarstvennyĭ gidrologicheskiĭ institut. Trudy*, 1991, Vol.355, p.41-60, In Russian. 12 refs.
Gizetdinov, A.M.
Runoff, Hydrography, River basins, Analysis (mathematics), River ice, Ice cover thickness.

47-895
Problems in calculating the minimal runoff from periodically freezing on drying-up rivers. [Problemy rascheta minimal'nogo stoka periodicheski peremerzaiushchikh (peresykhaiushchikh) rek],
Liubimov, G.A., et al, *Leningrad. Gosudarstvennyĭ gidrologicheskiĭ institut. Trudy*, 1991, Vol.355, p.61-71, In Russian. 7 refs.
Serkov, N.K.
Runoff, Rivers, Analysis (mathematics).

47-896
Mixed Markov model for multi-year fluctuations in minimal runoff from periodically freezing on drying-up rivers. [Smeshannaia markovskaia model' mnogoletnikh kolebaniĭ minimal'nogo stoka periodicheski peremerzaiushchikh (peresykhaiushchikh) rek],
Serkov, N.K., *Leningrad. Gosudarstvennyĭ gidrologicheskiĭ institut. Trudy*, 1991, Vol.355, p.72-76, In Russian. 6 refs.
Rivers, Runoff, Mathematical models.

47-897
Accumulation of water in freezing river beds. [Akkumuliatsiia vody v ruslakh peremerzaiushchikh rek],
Markov, M.L., *Leningrad. Gosudarstvennyĭ gidrologicheskiĭ institut. Trudy*, 1991, Vol.355, p.77-84, In Russian. 7 refs.
River basins, River ice, Ice cover thickness, Ground water, Naleds.

47-898
Calculating time characteristics of the period of winter runoff from rivers in the BAM zone. [Raschet vremennykh kharakteristik perioda zimnego stoka rek zony BAM],
Liubimov, G.A., *Leningrad. Gosudarstvennyĭ gidrologicheskiĭ institut. Trudy*, 1991, Vol.355, p.85-93, In Russian. 10 refs.
Runoff, Rivers, River ice.

47-899
Errors in measuring water discharge during hydrometric surveys of small and medium rivers in permafrost regions. [Pogreshnosti izmereniia raskhodov vody pri provedenii gidrometricheskikh s"emok na malykh i srednikh rekakh v raionakh mnogoletneĭ merzloty],
Kolotaev, V.N., et al, *Leningrad. Gosudarstvennyĭ gidrologicheskiĭ institut. Trudy*, 1991, Vol.355, p.147-158, In Russian. 11 refs.
Lifshits, F.A.
Accuracy, Rivers, Drainage, Statistical analysis, Analysis (mathematics).

47-900
Cold air outbreak near Spitsbergen in springtime—boundary-layer modification and cloud development.
Brümmer, B., et al, *Boundary-layer meteorology*, Oct. 1992, 61(1-2), p.13-46, 13 refs.
Rump, B., Kruspe, G.
Marine meteorology, Boundary layer, Atmospheric circulation, Air flow, Sea ice, Ice air interface, Cloud cover, Heat flux, Ice edge, Ice cover effect.

47-901
Changing sources of impurities to the Greenland ice sheet over the last 250 years.
Laj, P., et al, *Atmospheric environment*, Oct. 1992, 26A(14), p.2627-2640, 56 refs.
Palais, J.M., Sigurdsson, H.
Ice sheets, Snow impurities, Air pollution, Ice cores, Drill core analysis, Chemical properties, Ion density (concentration), Seasonal variations.

47-902
Dynamic simulation of phase changes in snowpacks and soils.
Grant, R.F., *Soil Science Society of America. Journal*, July-Aug. 1992, 56(4), p.1051-1062, 33 refs.
Snow cover stability, Soil water migration, Snowmelt, Surface energy, Snow air interface, Soil air interface, Freeze thaw cycles, Phase transformations, Simulation, Seasonal variations.

47-903
Xylem embolism in response to freeze-thaw cycles and water stress in ring-porous, diffuse-porous, and conifer species.
Sperry, J.S., et al. *Plant physiology.* Oct. 1992, 100(2), p.605-613, 23 refs.
Sullivan, J.E.M.
Trees (plants), Plant tissues, Freeze thaw tests, Damage, Bubbles, Cold tolerance, Stresses, Water transport.

47-904
Late Quaternary glaciation and deglaciation of the Bunger Hills, Antarctica.
Adamson, D.A., et al. *Antarctic science.* Dec. 1992, 4(4), p.435-446, Refs. p.445-446.
Colhoun, E.A.
Glaciation, Glacial deposits, Geomorphology, Ice sheets, Geochronology, Antarctica—Bunger Hills.
The Bunger Hills were covered by the Antarctic Ice Sheet during the last glaciation. During deglaciation the ice sheet margin collapsed into the marine inlets and the sea entered the oasis before 7.7 ka BP. Raised beaches occur widely below 8.5 m and indicate uplift at 1.4 m/ka during the Middle and Late Holocene. After the coastal inlets were formed, the Edisto Ice Tongue and Apfels Glacier still impinged on land margins in the west of the oasis. Two sets of marginal moraines were formed: the Older Edisto Moraines after 6.2 ka BP and the Younger Edisto Moraines during the last few centuries. The margins of the Antarctic Ice Sheet and Apfels Glacier in the south have maintained their present positions since at least 5.6 ka BP and probably 10 ka BP. (Auth.)

47-905
Short-offset seismic refraction results near Rothera Station, Antarctic Peninsula.
King, E.C., et al. *Antarctic science.* Dec. 1992, 4(4), p.479-480, 3 refs.
Jarvis, E.P.
Seismic velocity, Snow, Firn, Seismic refraction, Bedrock, Equipment, Antarctica—Rothera Point.
Details are presented of seismic velocities at a site near Rothera Point, Adelaide I. The snow/firn velocity structure was obtained using a 24-channel Bison 9000 seismograph, recording the outputs of geophones of 40 Hz natural frequency attached to 150 mm snow spikes. The refraction velocity of the underlying bedrock was measured using a 48-channel DFS V recorder and 10 Hz geophones. The records were obtained during trials of equipment and techniques which took place in the 1988-89 and 1990-91 seasons. The data will be of interest to other investigators studying firn structure around Antarctica, or considering crustal seismology in the Antarctic Peninsula region.

47-906
Ice crystal growth and lectins.
Rubinsky, B., et al. *Nature.* Nov. 12, 1992, 360(6400), p.113-114, 7 refs.
Coger, R., Ewart, K.V., Fletcher, G.L.
Ice crystal structure, Ice crystal growth, Chemistry, Venoms.

47-907
Possibility of an Arctic ozone hole in a doubled-CO2 climate.
Austin, J., et al. *Nature.* Nov. 19, 1992, 260(6401), p.221-225, 34 refs.
Butchart, N., Shine, K.P.
Ozone, Stratosphere, Atmospheric composition, Simulation, Clouds (meteorology).

47-908
Tenth annual EOSAEL/TWI Conference; Proceedings.
EOSAEL/TWI Conference, 10th, Las Cruces, NM, Nov 28-30, 1989, U.S. Army Atmospheric Sciences Laboratory, 1990, 713p., Refs. passim. For selected papers see 47-909 through 47-912.
Snowfall, Military operation, Mathematical models, Visibility, Ice crystal optics, Aircraft icing.

47-909
Assessment of the one-dimensional icing forecast model applied to stratiform clouds.
Tunick, A., et al. EOSAEL/TWI Conference, 10th, Las Cruces, NM, Nov. 28-30, 1989. Proceedings, U.S. Army Atmospheric Sciences Laboratory, 1990, p.57-64, 9 refs.
Rachele, H.
Aircraft icing, Mathematical models, Ice models, Unfrozen water content, Supercooled clouds, Cloud droplets.

47-910
Obscuration in snow and smoke.
Hutt, D.L., EOSAEL/TWI Conference, 10th, Las Cruces, NM, Nov. 28-30, 1989. Proceedings, U.S. Army Atmospheric Sciences Laboratory, 1990, p.101-110, 6 refs.
Scavenging, Snowfall, Mathematical models, Military operation, Time factor.

47-911
Regional CONUS snowfall intensity and inferred global patterns.
Ryerson, C.C., et al, MP 3157, EOSAEL/TWI Conference, 10th, Las Cruces, NM, Nov. 28-30, 1989. Proceedings, U.S. Army Atmospheric Sciences Laboratory, 1990, p.111-122, 10 refs.
Bates, R.E.
Snowfall, Military operation, Visibility, Snow water equivalent, Snowstorms.
Performance of battlefield millimeter-wave infrared and visible target acquisition systems during snowfall is a function, in part, of snowfall intensity. Snowfall intensity varies widely spatially and temporally within individual storms, as well as within regions. Regional snowfall intensity was computed and mapped from the National Weather Service (NWS) 6-hour synoptic reports to show general CONUS patterns. The percentage of annual snowfall events that are high in intensity is greatest in mountainous areas and along the East Coast. Intensities in most cases show no strong relationship to seasonal snow cover depth or persistence. Synoptic interpretation of two storms demonstrates one approach to mapping high intensity snowfall areas on a global scale from CONUS analogues. Supporting maps and statistics are presented in the paper.

47-912
Physical properties of suspended ice crystals with respect to optical effects.
Hogan, A.W., MP 3158, EOSAEL/TWI Conference, 10th, Las Cruces, NM, Nov. 28-30, 1989. Proceedings, U.S. Army Atmospheric Sciences Laboratory, 1990, p.123-132, 15 refs.
Ice crystal optics, Ice crystal size, Visibility, Physical properties.

47-913
Development of a thermal mechanical drill for sampling ice and rock from great depths.
Das, D.K., et al. *Tunnelling and underground space technology.* Oct. 1992, 7(4), p.377-382, With French summary, 7 refs.
Koci, B.R., Kelley, J.J.
Sampling, Ice coring drills, Thermal drills, Rock drilling, Design, Ice water interface.

47-914
Method of efficient ice cool energy storage using heat transfer of direct contact phase change between working medium and PCM in an enclosure.
Utaka, Y., et al. *JSME international journal.* Aug. 1989, 32(3), p.469-475, 3 refs.
Saito, A., Niimi, M., Nakata, N.
Cold storage, Refrigeration, Ice melting, Phase transformations, Heat transfer, Performance, Ice solid interface, Ice thermal properties.

47-915
Characteristics of the freezing heat transfer of layered air-water flow in a circular tube.
Fukusako, S., et al. *JSME international journal.* Feb. 1989, 32(1), p.91-97, 9 refs.
Takahashi, M., Sawaoka, M.
Water flow, Pipe flow, Phase transformations, Liquid solid interfaces, Freezing, Heat transfer, Laminar flow, Ice growth.

47-916
Heat of transport of water.
Takeyama, N., et al. *Physical Society of Japan. Journal.* Mar. 1991, 60(3), p.1134-1135, 12 refs.
Nakashima, K.
Water transport, Thermal diffusion, Heat capacity, Thermodynamics, Analysis (mathematics), Soil freezing.

47-917
Thermodynamical behaviour of liquid water near the triple point.
Kurioka, S., et al. *Physical Society of Japan. Journal.* Dec. 1991, 60(12), p.4181-4198, 23 refs.
Ikeda, K.
Water, Liquid phases, Thermodynamic properties, Thermal expansion, Temperature effects, Isotherms.

47-918
Scaling observed in glycerol-water and propylene glycol-water mixtures.
Abe, R., et al. *Physical Society of Japan. Journal.* Sep. 1991, 60(9), p.2835-2838, 4 refs.
Horioka, M., Sakumiya, I., Makino, T.
Solutions, Liquid cooling, Dispersions, Dielectric properties, Supercooling, Temperature effects, Low temperature research.

47-919
Many challenges ahead for exploration, development in Norwegian-Russian Arctic.
Johansen, B., *Offshore.* Oct. 1992, 52(10), p.31-32.
Petroleum industry, Natural gas, Offshore drilling, Exploration.

47-920
Designing production structures for the Russian Arctic. *Offshore.* Oct. 1992, 52(10), p.33,53, 1 ref.
Offshore drilling, Offshore structures, Ice loads, Design, Construction, Petroleum industry, Vibrations.

47-921
Ice forecasting model helps operators extend arctic exploration periods. *Offshore.* Oct. 1992, 52(10), p.34.
Sea ice, Ice forecasting, Computer applications, Sensor mapping, Ice conditions, Petroleum industry, Exploration.

47-922
Spillway design floods in Sweden: 1. New guidelines.
Bergström, S., et al. *Hydrological sciences journal.* Oct. 1992, 37(5), p.505-519, With French summary, 26 refs.
Harlin, J., Lindström, G.
Spillways, Snow hydrology, Dams, Flood forecasting, Standards, Design criteria, Snowmelt, Simulation, Electric power.

47-923
Spillway design floods in Sweden: 2. Applications and sensitivity analysis.
Lindström, G., et al. *Hydrological sciences journal.* Oct. 1992, 37(5), p.521-539, With French summary, 12 refs.
Harlin, J.
Spillways, Snow hydrology, Dams, Flood forecasting, Snowmelt, Design criteria, Accuracy, Water level, Simulation, Meteorological factors.

47-924
Electro-optical parameters of hydrogen-bonded water molecules.
IUkhnevich, G.V., et al. *Journal of molecular structure.* Oct. 15, 1992, Vol.272, p.211-234, 22 refs.
Sheliukhaev, B.P., Seifer, G.B., Tsoi, O.IU.
Water structure, Molecular structure, Hydrogen bonds, Ice spectroscopy, Vibration, Hygroscopic water, Spectra, Molecular energy levels.

47-925
Preprints.
International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992, Washington, D.C., National Research Council, Transportation Research Board, 1992, Var. p. (2 vols.), Refs. passim. For individual papers see 47-926 through 47-974.
Road icing, Road maintenance, Snow removal, Salting, Chemical ice prevention, Weather forecasting, Sanding, Ice detection, Environmental impact, Safety, Cost analysis.

47-926
Highway winter maintenance and cost efficiency.
Teppo, M.P.K., International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.1, Washington, D.C., National Research Council, Transportation Research Board, 1992, 8p.
Road icing, Road maintenance, Winter maintenance, Safety, Cost analysis, Finland.

47-927
Snow removal and ice control technology on Swiss highways.
Schlup, U., International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.1, Washington, D.C., National Research Council, Transportation Research Board, 1992, 8p.
Road maintenance, Snow removal, Road icing, Weather forecasting, Safety, Cost analysis, Switzerland.

47-928
Goals and methods of winter maintenance in Finland.
Katko, K., International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.1, Washington, D.C., National Research Council, Transportation Research Board, 1992, 7p.
Road maintenance, Snow removal, Road icing, Winter maintenance, Safety, Finland.

47-929
Proposal for new winter road maintenance strategy—MINSALT Project.
Axelson, L., International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.1, Washington, D.C., National Research Council, Transportation Research Board, 1992, 6p.
Road maintenance, Salting, Environmental protection, Chemical ice prevention, Road icing, Sweden.

47-930
Determining maintenance truck station network and snow plow routes in Finland.
Korhonen, P., et al, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.1, Washington, D.C., National Research Council, Transportation Research Board, 1992, 17p., 1 ref.
Teppo, M.P.K., Rahja, J., Lappalainen, H.
Road maintenance, Snow removal, Route surveys, Highway planning, Cost analysis, Finland.

47-931
Deicing of roads in Norway with brine.
Stotterud, R., et al, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.1, Washington, D.C., National Research Council, Transportation Research Board, 1992, 9p.
Reitan, K.M.
Road maintenance, Salting, Chemical ice prevention, Road icing, Brines, Norway.

47-932
SHRP H-208: development of anti-icing technology.
Blackburn, R.R., et al, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.1, Washington, D.C., National Research Council, Transportation Research Board, 1992, 23p.
McGrane, E.J., Bauer, K.M., Fleege, E.J.
Road maintenance, Salting, Chemical ice prevention, Sanding, Road icing, Research projects.

47-933
Quality, quantity and availability of West Virginia oil and gas well brines for highway deicing purposes.
Eck, R.W., et al, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.1, Washington, D.C., National Research Council, Transportation Research Board, 1992, 16p., 6 refs.
Sack, W.A.
Road maintenance, Salting, Chemical ice prevention, Road icing, Brines, Data processing, United States—West Virginia.

47-934
Anti-icing activities in Finland: field tests with liquid and prewetted chemicals.
Raukola, T.J., et al, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.1, Washington, D.C., National Research Council, Transportation Research Board, 1992, 11p.
Kuusela, R., Lappalainen, H., Piirainen, A.
Road maintenance, Salting, Chemical ice prevention, Road icing, Finland.

47-935
Experiments with corrosion inhibited deicers in Washington State.
Conrad, J.F., et al, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.1, Washington, D.C., National Research Council, Transportation Research Board, 1992, 11p.
Spaid, J.R., Jr., Bowers, D.
Road maintenance, Chemical ice prevention, Salting, Sanding, Road icing, Environmental impact, Cost analysis, United States—Washington.

47-936
Tradeoff analysis of non-environmental effects of alternative deicers: an Illinois case study.
Gingrich, C.D., et al, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.1, Washington, D.C., National Research Council, Transportation Research Board, 1992, 12p., 22 refs.
Thompson, S.R., Hauser, R.J., Eheart, J.W.
Road maintenance, Chemical ice prevention, Salting, Road icing, Corrosion, Cost analysis, Statistical analysis, United States—Illinois.

47-937
Trials of calcium magnesium acetate (CMA) deicer on highways in the Province of Ontario.
Manning, D.G., et al, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.1, Washington, D.C., National Research Council, Transportation Research Board, 1992, 18p., 12 refs.

Perchanok, M.S.
Road maintenance, Chemical ice prevention, Salting, Sanding, Road icing, Snowstorms, Standards, Canada—Ontario.

47-938
Thermally modified sand: an alternative for the treatment of icy roadways.
Gilfilian, R.E., International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.1, Washington, D.C., National Research Council, Transportation Research Board, 1992, 4p., 3 refs.
Road maintenance, Sanding, Salting, Road icing, Environmental impact, Cost analysis, Sands.

47-939
Braking traction on sanded ice at low slip rates.
Blaisdell, G.L., et al, MP 3159, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.1, Washington, D.C., National Research Council, Transportation Research Board, 1992, 28p., 7 refs.
Borland, S.L.
Road icing, Sanding, Traction, Rubber ice friction, Road maintenance, Sands, Environmental tests.
Ice traction enhancement on pavements using abrasives was evaluated in this study. The abrasives tested were five distinct gradations of sand built from a single host material. Four of the sands represented standard gradations as specified by the Federal Aviation Administration, the Society of Automotive Engineers, the American Society for Testing and Materials, and Transport Canada. Braking traction at a constant slip rate was measured with a full-size, self-contained instrumented vehicle. All tests were performed on an ice sheet located inside a large refrigerated room. Results showed that coarse sands perform best on cold ice surfaces and finer sands excel on warm ice. Good performance independent of ice temperature can be expected for sands with the bulk of their grains in the 1-2 mm diameter range. The authors also found that the concentration of a sand on ice very strongly influences the degree of traction enhancement as does the temperature of the sand grains when they are applied to the ice.

47-940
Methods and reasons for cutting usage of salt in Finland.
Kuusela, R., et al, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.1, Washington, D.C., National Research Council, Transportation Research Board, 1992, 7p.
Raukola, T.J., Lappalainen, H., Piirainen, A.
Road maintenance, Salting, Road icing, Environmental impact, Environmental protection, Cost analysis, Finland.

47-941
Environmental effects of alternative deicers: review and assessment method for CMA-BOD applied to an Illinois example case.
Eheart, J.W., et al, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.1, Washington, D.C., National Research Council, Transportation Research Board, 1992, 12p., 18 refs.
Chemical ice prevention, Salting, Water pollution, Road maintenance, Water chemistry, Environmental impact, Nutrient cycle, Microbiology, Streams, United States—Illinois.

47-942
Three-dimensional numerical simulation of snowdrift.
Kobayashi, T., et al, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.1, Washington, D.C., National Research Council, Transportation Research Board, 1992, 13p., 10 refs.
Uematsu, T., Kaneda, Y., Nakata, T.
Snowdrifts, Snow retention, Blowing snow, Wind factors, Snow fences, Topographic effects, Vegetation factors, Mathematical models.

47-943
Approach to the design of treatments to prevent snow drifting on highways.
Perchanok, M.S., et al, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.1, Washington, D.C., National Research Council, Transportation Research Board, 1992, 18p., 10 refs.

McGillivray, D.G., Smith, J.D.
Snowdrifts, Road maintenance, Snow retention, Blowing snow, Snow hedges, Highway planning, Computerized simulation.

47-944
Trapping efficiency of snow fences and implications for system design.
Tabler, R.D., et al, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.1, Washington, D.C., National Research Council, Transportation Research Board, 1992, 11p., 17 refs.
Jairell, R.L.
Road maintenance, Snow fences, Snow retention, Blowing snow, Snowdrifts, Snow removal, Cost analysis, Mathematical models.

47-945
Cost effective snow and ice control for the nineties.
Thornes, J.E., International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.1, Washington, D.C., National Research Council, Transportation Research Board, 1992, 16p., 7 refs.
Road maintenance, Road icing, Highway planning, Winter maintenance, Safety, Weather forecasting, Freezing indexes, Cost analysis, Data processing.

47-946
Application of SHRP's snow removal and ice control research.
Minsk, L.D., International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.1, Washington, D.C., National Research Council, Transportation Research Board, 1992, 6p.
Road maintenance, Road icing, Snow removal, Chemical ice prevention, Highway planning, Winter maintenance, Organizations, Research projects.

47-947
Conclusions of the European project COST 309, road weather conditions.
Nysten, E., International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.1, Washington, D.C., National Research Council, Transportation Research Board, 1992, 4p.
Road maintenance, Road icing, Weather forecasting, Highway planning, Winter maintenance, Research projects, International cooperation.

47-948
Abrasive air blast system for disbonding ice and snow from pavement.
Osborne, M.D., International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.2, Washington, D.C., National Research Council, Transportation Research Board, 1992, 12p., 5 refs.
Road maintenance, Road icing, Ice removal, Ice blasting, Ice cutting, Abrasion, Air flow, Sanding.

47-949
New ideas and equipment for winter maintenance in Finland.
Kuusela, R., et al, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.2, Washington, D.C., National Research Council, Transportation Research Board, 1992, 8p.
Raukola, T.J., Lappalainen, H., Piirainen, A.
Road maintenance, Snow removal, Salting, Sanding, Road icing, Winter maintenance, Finland.

47-950
Analytical model for two stage rotary snowplows.
Stevens, D.J., et al, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.2, Washington, D.C., National Research Council, Transportation Research Board, 1992, 12p., 13 refs.
Powers, K.B.
Road maintenance, Snow removal, Augers, Mathematical models.

47-951
Use of stress waves in removing ice from concrete.
Bruss, P.T., International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.2, Washington, D.C., National Research Council, Transportation Research Board, 1992, 9p., 4 refs.
Ice removal, Ice breaking, Concrete structures, Ice solid interface, Ice adhesion, Impact tests.

47-952
Spreader equipment for anti-icing.
Fleege, E.J., et al, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.2, Washington, D.C., National Research Council, Transportation Research Board, 1992, 14p.
Blackburn, R.R.
Road maintenance, Chemical ice prevention, Road icing, Equipment, Motor vehicles.

47-953
Field testing of new cutting edges for ice removal from pavements.
Nixon, W.A., et al, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.2, Washington, D.C., National Research Council, Transportation Research Board, 1992, 10p., 2 refs.
Frisbie, T.R., Chung, C.H.
Road maintenance, Ice removal, Ice cutting, Road icing, Equipment, Motor vehicles.

47-954
Development of pneumatic snow conveyance equipment.
Sumita, N., et al, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.2, Washington, D.C., National Research Council, Transportation Research Board, 1992, 10p., 4 refs.
Kondo, T., Sano, M., Ishimoto, K.
Road maintenance, Snow removal, Snow air interface, Equipment, Motor vehicles, Air flow.

47-955
Detection of weather induced road condition.
Fröhling, P.W., et al, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.2, Washington, D.C., National Research Council, Transportation Research Board, 1992, 10p., 11 refs.
Magerl, G., Pritzl, W.
Road icing, Ice detection, Radar, Road maintenance, Monitors.

47-956
Frensor—a new smart pavement sensor.
Katz, D.I., International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.2, Washington, D.C., National Research Council, Transportation Research Board, 1992, 7p.
Road icing, Ice detection, Frost forecasting, Road maintenance, Sensors, Soil temperature, Temperature measurement.

47-957
Estimating methods of anti-freezing effect on pavements mixed with deicing agent by dielectric pavement freezing detector.
Ninomiya, H., et al, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.2, Washington, D.C., National Research Council, Transportation Research Board, 1992, 9p., 2 refs.
Kawamura, K., Takeichi, K.
Road icing, Ice detection, Road maintenance, Chemical ice prevention, Frost forecasting, Soil temperature, Temperature measurement, Monitors.

47-958
Staff weather advisor: a person for all seasons (and many reasons).
Boselly, S.E., III, et al, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.2, Washington, D.C., National Research Council, Transportation Research Board, 1992, 3p.
Jonas, D.L.
Road icing, Weather forecasting, Road maintenance.

47-959
Traffic volume reductions due to winter storm conditions.
Hanbali, R.M., et al, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.2, Washington, D.C., National Research Council, Transportation Research Board, 1992, 11p., 2 refs.
Kuemmel, D.A.
Road icing, Snowstorms, Road maintenance, Safety, Highway planning.

47-960
Extension of the regions in Sweden where salt is not used—MINSALT Project.
Öberg, G., International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.2, Washington, D.C., National Research Council, Transportation Research Board, 1992, 7p., 3 refs.
Road maintenance, Salting, Environmental impact, Road icing, Sweden.

47-961
Accident analysis of ice control operations.
Kuemmel, D.A., et al, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.2, Washington, D.C., National Research Council, Transportation Research Board, 1992, 14p., 10 refs.
Hanbali, R.M.
Road icing, Road maintenance, Salting, Accidents, Safety, Highway planning, Cost analysis.

47-962
Law prohibiting use of studded tires in Japan, results of chemical deicing agents test and investigation on efficient operation of road heating facilities.
Konagai, N., et al, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.2, Washington, D.C., National Research Council, Transportation Research Board, 1992, 12p.
Asano, M., Horita, N., Miyamoto, S.
Road icing, Road maintenance, Chemical ice prevention, Legislation, Tires, Heating, Environmental protection, Japan.

47-963
Visibility reduced by snow in the wake of vehicles on highways.
Ishimoto, K., et al, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.2, Washington, D.C., National Research Council, Transportation Research Board, 1992, 15p., 5 refs.
Fukuzawa, Y., Takeuchi, M.
Blowing snow, Visibility, Road maintenance, Safety.

47-964
Road weather information systems: what are they and what can they do for you.
Boselly, S.E., III, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.2, Washington, D.C., National Research Council, Transportation Research Board, 1992, 8p., 2 refs.
Road icing, Weather forecasting, Road maintenance.

47-965
Open systems for ice prediction systems.
Lister, P.J., et al, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992 Preprints. Vol.2, Washington, D.C., National Research Council, Transportation Research Board, 1992, 7p., 5 refs.
McDonald, A.N., Goss, K.M.
Road icing, Ice forecasting, Road maintenance, Data transmission, Computer applications.

47-966
Road weather service system in Finland and savings in driving costs.
Pilli-Sihvola, Y., et al, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.2, Washington, D.C., National Research Council, Transportation Research Board, 1992, 12p.
Toivonen, K., Kantonen, J.
Road icing, Weather forecasting, Road maintenance, Safety, Cost analysis, Data transmission, Finland.

47-967
Results of a field test of six different commercial ice warning systems.
Scharsching, H., International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.2, Washington, D.C., National Research Council, Transportation Research Board, 1992, 16p., 2 refs.
Road icing, Ice detection, Road maintenance, Safety, Warning systems, Environmental tests.

47-968
Coastal influence on winter road surface temperatures in the County of Devon, United Kingdom.
McLean, P.J., et al, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.2, Washington, D.C., National Research Council, Transportation Research Board, 1992, 24p., 8 refs.
Wood, N.L.H.
Road icing, Weather forecasting, Road maintenance, Weather stations, Maritime meteorology, Soil temperature, United Kingdom.

47-969
Description of a local climatological model for improvement of winter road surveys.
Bogren, J., et al, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.2, Washington, D.C., National Research Council, Transportation Research Board, 1992, 10p., 5 refs.
Gustavsson, T.
Road icing, Weather forecasting, Road maintenance, Weather stations, Soil temperature, Safety, Sweden.

47-970
Removal of non-meteorological errors from ice prediction models by use of a statistical templet.
Astbury, A., International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.2, Washington, D.C., National Research Council, Transportation Research Board, 1992, 6p., 3 refs.
Road icing, Ice forecasting, Road maintenance, Statistical analysis.

47-971
Description and verification of a road ice prediction model.
Shao, J.M., et al, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.2, Washington, D.C., National Research Council, Transportation Research Board, 1992, 11p., 17 refs.
Lister, P.J., Thornes, J.E.
Road icing, Ice forecasting, Road maintenance, Statistical analysis, Mathematical models.

47-972
Detailed weather prediction system for snow and ice control.
Reiter, E.R., et al, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.2, Washington, D.C., National Research Council, Transportation Research Board, 1992, 12p., 2 refs.
Teixeira, L.
Road icing, Weather forecasting, Road maintenance, Snowstorms, Data transmission, Computer applications.

47-973
Prediction of road conditions by combined road layer-/atmospheric model in winter.
Voldborg, H., International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.2, Washington, D.C., National Research Council, Transportation Research Board, 1992, 9p., 11 refs.
Road icing, Weather forecasting, Road maintenance, Ice detection, Warning systems, Computer applications, Denmark.

47-974
Numerical forecasting of radiation fog.
Bergot, T., International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992. Preprints. Vol.2, Washington, D.C., National Research Council, Transportation Research Board, 1992, 16p., 20 refs.
Fog formation, Weather forecasting, Road maintenance, Soil air interface, Fog, Turbulent boundary layer, Diurnal variations, Mathematical models.

47-975
Laboratory test on construction of ice domes and their load-carrying capacity.
Hannuki, T., et al, *Antarctic record*, July 1992, 36(2), p.203-226, In Japanese with English summary, 18 refs.
Ishizawa, K., Futami, K., Tsukui, K.
Ice (construction material), Ice loads, Low temperature research, Ice models.
Ice domes will be used as a shelter of depot and laboratory space without heating systems which will be constructed on the ice field in the Arctic or Antarctica. Experiments on construction technique of ice domes and their load-carrying capacity were carried out in a low-temperature laboratory. It was confirmed that ice domes could be made by spraying water on a spherically inflated membrane form under the condition of holding a temperature below -18 C. The mechanical properties of artificial

ice made in the laboratory are examined by bending tests of simply supported ice beams so as to obtain a constitutive model of ice for numerical analysis. Load-carrying capacity and creep behavior of ice dome models were examined in the laboratory, and analytical models of ice structure for a numerical procedure of the design are discussed and compared with the tests. The suitability of an elastic-plastic model for the mechanical behavior of ice structures in a short term loading, and that of a Maxwell model for the long-term creep of ice structure, was confirmed. (Auth. mod.)

47-976
Crystallographic analyses of clathrate hydrates included in Vostok ice cores.
Hondoh, T., et al. *Antarctic record*, July 1992, 36(2), p.268-278, In Japanese with English summary, 6 refs.
Ice cores, Crystals, Structural analysis, Clathrates, Antarctica—Vostok Station.
The purpose and methods of crystallographic analyses of clathrate hydrates included in ice cores recovered at Vostok are briefly reviewed. The clathrate hydrate is a crystal composed of a cage structure formed by water molecules, and includes individual air molecules in the molecular cages. The crystallographic structure is described of the clathrate hydrate crystals found in deep ice cores determined by X-ray diffraction and Raman scattering measurements, and the formation process of the crystals in the ice sheet is discussed. Also discussed as a future prospect in core analysis is what new information and knowledge relating to climatic changes can be deduced from crystallographic analysis of the clathrate hydrates. (Auth.)

47-977
Canada-Russia geotechnical studies of permafrost; Bovanenkovo test site, Yamal Peninsula, Western Siberia.
Kurfurst, P.J., ed. *Canada. Geological survey. Open file*, 1992, No.2546, 402p., 3 refs.
Permafrost dating, Permafrost physics, Permafrost distribution, Boreholes, Drilling, Geophysical surveys, Geochemistry, Frozen ground temperature, USSR—Yamal Peninsula.

47-978
Characteristics of the operation of seepage tanks during winter. [Osobennosti ekspluatatsii infil'tratsionnykh basseĭnov v zimnĭĭ period].
Golovin, V.L., et al, Problemy gidrotekhniki i vodnogo khoziaĭstva na Dal'nem Vostoke; sbornik nauchnykh trudov (Problems in hydraulic engineering and water resources management in the Far East; collected scientific papers). Edited by V.G. Golovin, Moscow, VNIIGiM, 1988, p.136-143, in Russian. 6 refs.
Solomennik, S.F.
Seepage, Tanks (containers), Cold weather operation, Ice cover strength, Ice cover thickness, Analysis (mathematics).

47-979
Evaluating the effect of dust and gas exhaust on a city and its surrounding terrain. [Otsenka vozdeĭstviia pylegazovykh vybrosov na gorod i okruzhaiushchie ego landshafty].
Davydova, N.D., Ekologo-geokhimicheskie issledovaniia v raĭonakh intensivnogo tekhnogennogo vozdeĭstviia; sbornik nauchnykh statei (Ecological-geochemical studies in regions with intensive technical operations; collected scientific articles). Edited by E.K. Burenkov and N.F. Chelishchev, Moscow, IMGRE, 1990, p.65-74, In Russian. 5 refs.
Snow cover, Snow impurities, Water pollution, Snow water content, Environmental impact, Dust, Ecology, Gases.

47-980
Theoretical and methodological aspects of an eco-geochemical evaluation of large industrial regions in the arctic zone. [Teoreticheskie i metodicheskie aspekty ekogeokhimicheskoĭ otsenki krupnykh promraĭonov arkticheskoĭ zony].
Dodin, D.A., et al, Ekologo-geokhimicheskie issledovaniia v raĭonakh intensivnogo tekhnogennogo vozdeĭstviia; sbornik nauchnykh statei (Ecological-geochemical studies in regions with intensive technical operations; collected scientific articles). Edited by E.K. Burenkov and N.F. Chelishchev, Moscow, IMGRE, 1990, p.81-93, In Russian.
Sadikov, M.A., Tarnovetskiĭ, L.L.
Cold weather operation, Ecology, Environmental impact, Geochemistry.

47-981
(Mu)SR studies of ice, illustrating the positive muon as a magnetic resonance probe of structure and dynamics.
Cox, S.F.J., *Physica scripta*, 1992, Vol.T45, General Conference of the Condensed Matter Division, European Physical Society, Prague, Czechoslovakia, Apr. 6-9, 1992. Proceedings. Edited by V. Šmíd et al, p.292-296, 25 refs.
Probes, Ice physics, Magnetic resonance, Ice structure, Ice spectroscopy, Isotope analysis, Electric fields, Radioactivity, Particles.

47-982
Polynomial trend surface analysis applied to AVHRR images to improve definition of arctic leads.
Eppler, D.T., et al, *Remote sensing of environment*, June 1992, 40(2), p.197-218, 22 refs.
Full, W.E.
Sea ice, Polynyas, Remote sensing, Detection, Radiometry, Image processing, Radiance, Analysis (mathematics), Ice edge.

47-983
Thermal maturity and source-rock potential in northwestern Melville Island, arctic Canada.
Gentzis, T., et al, *Energy sources*, Oct.-Dec. 1992, 14(4), p.423-442, 31 refs.
Goodarzi, F.
Geophysical surveys, Rock drilling, Drill core analysis, Hydrocarbons, Exploration, Stratigraphy, Geologic structures, Geochemistry.

47-984
Characteristics and processing of seismic data collected on thick, floating ice: results from the Ross Ice Shelf, Antarctica.
Beaudoin, B.C., et al, *Geophysics*, Oct. 1992, 57(10), p.1359-1372, 39 refs.
Ten Brink, U.S., Stern, T.A.
Geophysical surveys, Seismic surveys, Seismic reflection, Sea ice, Ice cover effect, Data processing, Ice shelves, Ice water interface, Bottom topography, Antarctica—Ross Ice Shelf.
Coincident reflection and refraction data, collected in the austral summer of 1988/89, imaged the crust beneath the Ross Ice Shelf, Antarctica, which is a unique acquisition environment for seismic reflection profiling because of its thick floating ice cover. The ice shelf velocity structure is multilayered with a high velocity-gradient firn layer constituting the upper 50 to 100 m. This near surface firn layer influences the data character by amplifying and frequency modulating the incoming wavefield. In addition, the ice-water column introduces pervasive high energy seafloor, intra-ice, and intra-water multiples that have moveout velocities similar to the expected subseafloor primary velocities. Successful removal of these high energy multiples which relies on predictive deconvolution, inverse velocity stack filtering, and frequency filtering, reveals a faulted, sedimentary wedge which is truncated at or near the seafloor. Beneath this wedge the reflection character is diffractive to a two-way travel time of approx. 7.2 s. At this time, a prominent reflection is evident on the southeast end of the reflection profile. This reflection is interpreted as Moho, indicating that the crust is approx. 21 km thick beneath the profile. These results provide seismic evidence that the extensional features observed in the Ross Sea region of the Ross Embayment extend beneath the Ross Ice Shelf. (Auth. mod.)

47-985
Patterned ground formation and solar radiation ground heating.
McKay, G., *Royal Society of London. Proceedings A*, Aug. 8, 1992, 438(1903), p.249-263, 22 refs.
Soil mechanics, Solar radiation, Patterned ground, Convection, Periglacial processes, Analysis (mathematics), Radiation absorption, Heat flux.

47-986
Defining the boundaries of the Late-Glacial isotope episodes.
Broecker, W.S., *Quaternary research*, July 1992, 38(1), p.135-138, 35 refs.
Paleoclimatology, Climatic changes, Sediments, Age determination, Isotope analysis, Terminology, Stratigraphy.

47-987
Avalanche control.
United Nations. Food and Agriculture Organization, *FAO conservation guide*, 1985, No.5, 231p., Refs. p.213-231.
DLC TA714.A95 1985
Avalanche mechanics, Avalanche engineering, Safety, Countermeasures, Snow physics, Snow cover stability, Environmental impact.

47-988
Dielectric study of the structure of hyperquenched glassy water and its crystallized forms.
Johari, G.P., et al, *Journal of chemical physics*, Oct. 15, 1992, 97(8), p.5851-5855, 12 refs.
Hallbrucker, A., Mayer, E.
Ice physics, Liquid cooling, Water structure, Dielectric properties, Phase transformations, Cubic ice, Temperature effects, Hydrogen bonds.

47-989
Experimental study of the sublimation of water ice and the release of trapped gases.
Hudson, R.L., et al, *Icarus*, Dec. 1991, 94(2), p.326-332, 34 refs.
Donn, B.
Extraterrestrial ice, Ice sublimation, Simulation, Vapor transfer, Ice spectroscopy, Temperature effects, Cryogenics, Infrared spectroscopy, Ionization.

47-990
Sublimation and reformation of icy grains in the primitive solar nebula.
Lunine, J.I., et al, *Icarus*, Dec. 1991, 94(2), p.333-344, 43 refs.
Engel, S., Rizk, B., Horanyi, M.
Extraterrestrial ice, Atmospheric physics, Cosmic dust, Ice sublimation, Ice composition, Grain size, Condensation, Cryogenics, Solid phases.

47-991
Brine volcanism and the interior structures of asteroids and icy satellites.
Kargel, J.S., *Icarus*, Dec. 1991, 94(2), p.368-390, Refs. p.387-390.
Satellites (natural), Regolith, Extraterrestrial ice, Volcanoes, Geologic processes, Ice composition, Chemical composition, Frozen liquids, Viscosity.

47-992
Ground freezing to provide support for tunneling using vertical refrigeration pipes.
Sopko, J.A., Jr., et al, Rapid Excavation and Tunneling Conference, Seattle, WA, June 16-20, 1991. Proceedings. Edited by W.D. Wightman et al, Baltimore, Society for Mining, Metallurgy, and Exploration, 1991, p.267-272.
Budd, T.
DLC TA800.N66a 1991
Soil freezing, Supports, Artificial freezing, Refrigeration, Tunneling (excavation), Rock drilling, Pipe laying, Design.

47-993
Shaft construction by raise boring through artificially frozen ground.
Walsh, A.R., et al, Rapid Excavation and Tunneling Conference, Seattle, WA, June 16-20, 1991. Proceedings. Edited by W.D. Wightman et al, Baltimore, Society for Mining, Metallurgy, and Exploration, 1991, p.705-719, 2 refs. For another version see 46-2786.
Hart, D.E., Maishman, D.
DLC TA800.N66a 1991
Shaft sinking, Soil freezing, Artificial freezing, Boreholes, Mine shafts.

47-994
Ground freezing to control ground water and support deep storm sewer structural excavations.
Shuster, J.A., et al, Rapid Excavation and Tunneling Conference, Los Angeles, CA, June 11-14, 1989. Proceedings. Edited by R.A. Pond et al, Baltimore, Society for Mining, Metallurgy, and Exploration, 1989, p.149-155.
Sopko, J.A., Jr.
DLC TA800.N66a 1989
Soil freezing, Artificial freezing, Supports, Tunneling (excavation), Ground water, Design.

47-995
Synoptic-statistical method for surface air temperature forecasting for 12, 24, and 36 hours under heavy snowfalls over the European territory.
Petrichenko, I.A., et al, *Soviet meteorology and hydrology*, 1991, No.9, p.6-9, Translated from Meteorologiia i gidrologiia. 7 refs.
Bespalov, S.V.
Synoptic meteorology, Air temperature, Surface temperature, Forecasting, Snowfall, Analysis (mathematics), Statistical analysis, Meteorological data.

47-996
***Delta*N-15 of N2 in air trapped in polar ice: a tracer of gas transport in the firn and a possible constraint on ice age-gas age differences.**
Sowers, T., et al, *Journal of geophysical research*, Oct. 20, 1992, 97(D14), p.15,683-15,697, 39 refs.
Bender, M., Raynaud, D., Korotkevich, IU.S.
Ice sheets, Ice cores, Gas inclusions, Drill core analysis, Vapor diffusion, Age determination, Paleoclimatology, Firn stratification, Isotope analysis, Ice vapor interface.
In this paper data are presented on the *delta*N-15 of N2 in recently trapped air samples from 12 ice cores, along with numerous downcore samples from Byrd, Vostok, and Dome C. Bubble close-off depths for these cores (calculated from a densification model) ranged from 51 to 114 m below the surface. These data and the barometric equation are used to calculate the thickness of the diffusive air column, and it is found that it comprised 46 to 93% of the total firn thickness at the study sites. Paleo-close-off depths calculated from the densification model for glacial sections of Byrd, Vostok, and Dome C are 15-25 m deeper than close-off depths today. Diffusive column heights, calculated from *delta*N-15, varied in a more complex manner. The diffusive column height at Byrd appears to have decreased from 74 m during the last glacial period to 50 m during the Holocene. At Vostok and Dome C the diffusive column height calculated from N-15 increased from about 65 m during the last glacial period to about 80 m in the Holocene. Records of surface temperature and CO2 at Byrd and Vostok, along with their respective chronologies, are used to constrain the ice age-gas age difference throughout the section of the Vostok ice core corresponding to the last glacial termination. In principle, ice age-gas age difference values calculated from these data can be used to discriminate whether gas in the firn mixes to the bubble close-off depth or to a depth equivalent to th[illegible] column height. In practice, however, uncertain[illegible] chronology of Byrd and Vostok are too great to allow [illegible] between these two possibilities. One can only say [illegible] ne of the last termination, ice age-gas difference for V[illegible] between 3 and 10.5 kyr. Previous estimates fall within this range. (Auth. mod.)

47-997
Climatology of surface-based inversion in the North American Arctic.
Bradley, R.S., et al, *Journal of geophysical research*, Oct. 20, 1992, 97(D14), p.15,699-15,712, 9 refs.
Keimig, F.T., Diaz, H.F.
Climatology, Temperature inversions, Polar atmospheres, Air temperature, Surface temperature, Radio echo soundings, Periodic variations, Radiation balance.

47-998
Simulation of the last glacial cycle by a coupled, sectorially averaged climate-ice sheet model. 2. Response to insolation and CO2 variations.
Gallée, H., et al, *Journal of geophysical research*, Oct. 20, 1992, 97(D14), p.15,713-15,740, 97 refs.
Climatic changes, Paleoclimatology, Ice sheets, Carbon dioxide, Glacier oscillation, Insolation, Simulation, Periodic variations, Heat balance.

47-999
Interaction of HCl vapor with water-ice: implications for the stratosphere.
Abbatt, J.P.D., et al, *Journal of geophysical research*, Oct. 20, 1992, 97(D14), p.15,819-15,826, 31 refs.
Cloud physics, Scavenging, Ice vapor interface, Chemical properties, Solubility, Heterogeneous nucleation, Stratosphere, Simulation, Atmospheric attenuation.

47-1000
Collapse of peroxide-scavenging systems in apple flower-buds associated with freezing injury.
Kuroda, H., et al, *Plant and cell physiology*, Sep. 1992, 33(6), p.743-750, 22 refs.
Sagisaka, S., Chiba, K.
Plant physiology, Plant tissues, Freeze thaw cycles, Damage, Cold tolerance, Cold stress, Chemical analysis.

47-1001
Influence of frost heave on houses under construction in Merthyr Tydfil.
Statham, I., et al, *Ground engineering*, Mar. 1989, 22(2), p.31-33, 1 ref.
Arup, O.
Houses, Foundations, Frost heave, Damage, Soil freezing, Cracking (fracturing), Structural analysis.

47-1002
Climate and glacier change: the dilemma of the representative station.
Marcus, M.G., et al, *Zeitschrift für Geomorphologie*, Mar. 1992, Suppl.86, International Conference on Geomorphology: Geomorphology and Geoecology, 2nd, Frankfurt/Main, Germany, Aug. 30-Sep. 3, 1989. Proceedings, Vol.8. Glacial and polar geomorphology. Edited by G. Stäblein et al, p.1-14, With French summary. 48 refs.
Chambers, F.B., Brazel, A.J.
Glacier oscillation, Meteorological data, Climatic changes, Glacier mass balance, Weather stations, Ice air interface, Microclimatology, Accuracy, Geomorphology.

47-1003
Summer energy balance on West Gulkana Glacier, Alaska, and linkages to a temporal synoptic index.
Brazel, A.J., et al, *Zeitschrift für Geomorphologie*, Mar. 1992, Suppl.86, International Conference on Geomorphology: Geomorphology and Geoecology, 2nd, Frankfurt/Main, Germany, Aug. 30-Sep. 3, 1989. Proceedings, Vol.8. Glacial and polar geomorphology. Edited by G. Stäblein et al, p.15-34, 27 refs.
Chambers, F.B., Kalkstein, L.S.
Glacier ablation, Glacier heat balance, Microclimatology, Ice air interface, Surface energy, Glacier surveys, Glacial meteorology, Ice heat flux, Statistical analysis.

47-1004
Report on the Franz Josef Glacier.
Brazier, V., et al, *Zeitschrift für Geomorphologie*, Mar. 1992, Suppl.86, International Conference on Geomorphology: Geomorphology and Geoecology, 2nd, Frankfurt/Main, Germany, Aug. 30-Sep. 3, 1989. Proceedings, Vol.8. Glacial and polar geomorphology. Edited by G. Stäblein et al, p.35-49, 17 refs.
Owens, I.F., Soons, J.M., Sturman, A.P.
Geomorphology, Glacier surveys, Glacier oscillation, Glacier mass balance, Firn.

47-1005
Glaciers and glacial geomorphology in China.
Shi, Y.F., *Zeitschrift für Geomorphologie*, Mar. 1992, Suppl.86, International Conference on Geomorphology: Geomorphology and Geoecology, 2nd, Frankfurt/Main, Germany, Aug. 30-Sep. 3, 1989. Proceedings, Vol.8. Glacial and polar geomorphology. Edited by G. Stäblein et al, p.51-63, Refs. p.61-63.
Geomorphology, Glaciation, Glacier surveys, Classifications, Pleistocene.

47-1006
Geomorphology and climate of the cool oxygen isotope stage 3 in comparison with the cold stages 2 and 4 in the Netherlands.
Vandenberghe, J., *Zeitschrift für Geomorphologie*, Mar. 1992, Suppl.86, International Conference on Geomorphology: Geomorphology and Geoecology, 2nd, Frankfurt/Main, Germany, Aug. 30-Sep. 3, 1989. Proceedings, Vol.8. Glacial and polar geomorphology. Edited by G. Stäblein et al, p.65-75, With French summary. 43 refs.
Geomorphology, Periglacial processes, Paleoclimatology, Geocryology, Isotope analysis, Stratigraphy, Correlation.

47-1007
Cenozoic sedimentary processes on the antarctic continental margin and the record from deep drilling.
Hambrey, M.J., et al, *Zeitschrift für Geomorphologie*, Mar. 1992, Suppl.86, International Conference on Geomorphology: Geomorphology and Geoecology, 2nd, Frankfurt/Main, Germany, Aug. 30-Sep. 3, 1989. Proceedings, Vol.8. Glacial and polar geomorphology. Edited by G. Stäblein et al, p.77-103, With French summary. Refs. p.100-103.
Barrett, P.J., Ehrmann, W.U., Larsen, B.
Glacial deposits, Marine deposits, Bottom sediment, Offshore drilling, Sediment transport, Drill core analysis, Glacier oscillation, Marine geology, Antarctica—Ross Sea.
Recent drilling on the antarctic continental shelf, combined with seismic surveys, has yielded not only a long-term record of glacial processes, but also evidence concerning the mode of build-up of the continental shelf under the influence of a major ice sheet. The CIROS-1 drill site in McMurdo Sound penetrated 702 m of glacigenic sediment dating back to earliest Oligocene time (c. 36 Ma). The lower part of this sequence illustrates the interaction of deposition from floating ice, sediment gravity flows and background muddy marine sedimentation derived from a subglacial source. The upper part is flat-lying and characterized by fluvial basal till and shallow glaciomarine facies. The core only spans Oligocene to Early Miocene time, since most of the younger sedimentary record was stripped off when the Ross Ice Shelf advanced to the edge of the continental shelf during Pliocene to Quaternary time. The younger part of the record, however, which was recovered at the drill-site, located in the inner part of Ferrar Fjord landwards of CIROS-1, shows a complex interaction of ice derived from the Ross Sea direction due to expansion of the West Antarctic Ice Sheet, and local ice from the Transantarctic Mountains. Another area drilled was Prydz Bay, seaward of the Lambert Glacier-Amery Ice Shelf. A series of five holes was drilled between the inner continental shelf and the continental slope. The recovered sequence comprises a lower composite sequence of sediments interpreted principally as waterlain till, deposited close to the grounding line as the glacier became decoupled from the bed at the continental shelf break. The sequence further shows evidence of loading events which are inferred to represent glacial advances across the shelf. (Auth. mod.)

47-1008
Further evidence for a glacial maximum in Antarctica during the Late Neogene.
Höfle, H.C., et al, *Zeitschrift für Geomorphologie*, Mar. 1992, Suppl.86, International Conference on Geomorphology: Geomorphology and Geoecology, 2nd, Frankfurt/Main, Germany, Aug. 30-Sep. 3, 1989. Proceedings, Vol.8. Glacial and polar geomorphology. Edited by G. Stäblein et al, p.125-137, With French summary. 15 refs.
Glacial geology, Nunataks, Glacier flow, Geomorphology, Glacier oscillation, Antarctica—Shackleton Range.
Glaciogeological and glaciological observations during the West German GANOVEX IV expedition to North Victoria land (1984/85) yield evidence for at least one glacial maximum during the Upper Neogene. Equivalent observations were made during a West German Expedition to the Shackleton Range at the end of Filchner Ice Shelf (Geisha 1986/87). Glacial deposits, ice-polished rock surfaces, striae, crescentic gouges and "roches moutonées" indicate a former ice stream from the S or SW that moved across the Shackleton Range. Based on exposed bedrock characteristics and elevation of once-glaciated terrain above the current ice level in the Shackleton Range and in North Victoria Land, it is estimated that the minimum additional ice thickness of the regional ice sheets must have been more than 1,000 m. Isotope analysis of ice-free rock surfaces suggests that the last glacial maximum ended during the lower Pliocene. (Auth. mod.)

47-1009
Investigations of present and former periglacial, nival and glacial features in central Helan Shan (Inner Mongolia/Peoples Rep. of China).
Hofmann, J., *Zeitschrift für Geomorphologie*, Mar. 1992, Suppl.86, International Conference on Geomorphology: Geomorphology and Geoecology, 2nd, Frankfurt/Main, Germany, Aug. 30-Sep. 3, 1989. Proceedings, Vol.8. Glacial and polar geomorphology. Edited by G. Stäblein et al, p.139-154, With German and French summaries. 22 refs.
Geomorphology, Periglacial processes, Geocryology, Paleoclimatology, Glaciation, Mountains.

47-1010
Self-organization of glacial landforms.
Mazo, V.L., *Zeitschrift für Geomorphologie*, Mar. 1992, Suppl.86, International Conference on Geomorphology: Geomorphology and Geoecology, 2nd, Frankfurt/Main, Germany, Aug. 30-Sep. 3, 1989. Proceedings, Vol.8. Glacial and polar geomorphology. Edited by G. Stäblein et al, p.155-160, 18 refs.
Landforms, Glacial geology, Glacial erosion, Valleys, Geologic processes, Ice solid interface, Glacier beds.

47-1011
Arctic push moraines, a case study of the Thompson Glacier moraine, Axel Heiberg Island, N.W.T., Canada.
Lehmann, R., *Zeitschrift für Geomorphologie*, Mar. 1992, Suppl.86, International Conference on Geomorphology: Geomorphology and Geoecology, 2nd, Frankfurt/Main, Germany, Aug. 30-Sep. 3, 1989. Proceedings, Vol.8. Glacial and polar geomorphology. Edited by G. Stäblein et al, p.161-171, With French and German summaries. 14 refs.
Geomorphology, Glacier flow, Ice push, Moraines, Permafrost mass transfer, Glacial geology, Sediment transport, Frozen ground mechanics.

47-1012
Nature and geomorphological relationships of earth hummocks (thufa) in Iceland.
Gerrard, J., *Zeitschrift für Geomorphologie*, Mar. 1992, Suppl.86, International Conference on Geomorphology: Geomorphology and Geoecology, 2nd, Frankfurt/Main, Germany, Aug. 30-Sep. 3, 1989. Proceedings, Vol.8. Glacial and polar geomorphology. Edited by G. Stäblein et al, p.173-182, 14 refs.
Geomorphology, Landforms, Hummocks, Periglacial processes, Soil patterns, Slope processes, Frost action.

47-1013
Advances in ice technology; proceedings of the 3rd international conference.
International Conference on Ice Technology, 3rd, Cambridge, MA, Aug. 11-13, 1992, Southampton, England, Computational Mechanics Publications, 1992, 365p., Refs. passim. For individual papers see 47-1014 through 47-1046.
Murthy, T.K.S., ed, Sackinger, W.M., ed, Wadhams, P., ed.
Sea ice, Ice crystals, Ice creep, Ice cover strength, Ice cover thickness, Ice models, Ice loads, Ice floes, Ice jams, Ice solid interface, Ice forecasting, Ship icing, Ice (construction material), Stress strain diagrams, Mathematical models.

47-1014
Assessment of the mathematical modelling of the creep of ice and frozen soils.
Azizi, F., International Conference on Ice Technology, 3rd, Cambridge, MA, Aug. 11-13, 1992. Proceedings. Edited by T.K.S. Murthy, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1992, p.3-14, 16 refs.
Ice creep, Soil creep, Mathematical models, Frozen ground mechanics, Stress strain diagrams.

47-1015
On computer simulation of motion of broken ice.
Vinogradov, O., International Conference on Ice Technology, 3rd, Cambridge, MA, Aug. 11-13, 1992. Proceedings. Edited by T.K.S. Murthy, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1992, p.15-24, 17 refs.
Computerized simulation, Ice breakup, River ice, Ice jams, Mathematical models.

47-1016
Numerical simulation of river ice dynamics.
Wasantha Lal, A.M., et al, International Conference on Ice Technology, 3rd, Cambridge, MA, Aug. 11-13, 1992. Proceedings. Edited by T.K.S. Murthy, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1992, p.25-36, 15 refs.
Shen, H.T.
River ice, Mathematical models, Ice cover thickness, Ice jams.

47-1017
Landing and parking a C5 Galaxy on sea ice: McMurdo Station, Antarctica.
Barthelemy, J.L., International Conference on Ice Technology, 3rd, Cambridge, MA, Aug. 11-13, 1992. Proceedings. Edited by T.K.S. Murthy, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1992, p.37-49, 10 refs.
Sea ice, Aircraft landing areas, Ice runways, Computer programs, Ice (construction material), Antarctica—McMurdo Station.
The Naval Civil Engineering Laboratory was tasked in 1989 to verify the feasibility of using a C5 Galaxy, the world's largest cargo aircraft, to boost the United States Antarctic Program during its yearly resupply effort. The finite-element computer program VISICE was employed to develop landing and parking curves for the annual sea-ice runway located each season near McMurdo Station. As a result of that effort, a fully-loaded C5B made an unprecedented safe landing and takeoff in Oct. 1989. (Auth.)

47-1018
Topside icing probabilities for naval combatants in the Bering Sea.
Thomas, W.L., III, International Conference on Ice Technology, 3rd, Cambridge, MA, Aug. 11-13, 1992. Proceedings. Edited by T.K.S. Murthy, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1992, p.51-63, 10 refs.
Ship icing, Ice accretion, Sea spray, Ice forecasting, Military operation, Bering Sea.

47-1019
Ice plates as laminated composite structures.
Vinogradov, A.M., International Conference on Ice Technology, 3rd, Cambridge, MA, Aug. 11-13, 1992. Proceedings. Edited by T.K.S. Murthy, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1992, p.65-75, 27 refs.
Ice floes, Ice cover strength, Ice cover thickness, Ice creep, Bearing strength, Ice (construction material), Analysis (mathematics), Time factor, Temperature effects.

47-1020
Study of ice borehole closure by finite element method.
Li, F., et al, International Conference on Ice Technology, 3rd, Cambridge, MA, Aug. 11-13, 1992. Proceedings. Edited by T.K.S. Murthy, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1992, p.77-89, 10 refs.
Koci, B.R., Kelley, J.J.
Boreholes, Drilling, Mathematical models, Ice models, Greenland, Antarctica—Byrd Station.
Ice borehole closure may affect an ice drilling operation when the closure rate reaches some critical level. It is essential to estimate the closure rate of ice boreholes for ice drilling program planning. To estimate ice borehole closure under complex ice and boundary conditions, a finite element model was developed. The ice in this study was treated as a nonlinear, visco-incompressible fluid. Glen's ice flow power law was employed. A direct iteration method was used. Verification studies using Nye's formula show that the model gives accurate results in closure rate, strain rate and stresses with errors at the 4th digit in strain rate. Tests with field measurements from Byrd Station and Dye 3 (Greenland) show that the power law exponent should be considered as a variable of ice effective stresses to get more accurate results. An empirical relation between the exponent and effective stress was obtained with field measurements. Nye's formula is effective under ordinary ice conditions. (Auth. mod.)

47-1021
Boundary element analysis of macrocracking of ice in a large test basin.
Marcellus, R.W., et al, International Conference on Ice Technology, 3rd, Cambridge, MA, Aug. 11-13, 1992. Proceedings. Edited by T.K.S. Murthy, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1992, p.91-104, 14 refs.
Prodanovic, A., Croasdale, K.R.
Ice cracks, Cracking (fracturing), Crack propagation, Ice cover strength, Ice models, Ice loads, Shear stress, Analysis (mathematics).

47-1022
Computational modeling of antarctic lake ice.
Lindner, B.L., et al, International Conference on Ice Technology, 3rd, Cambridge, MA, Aug. 11-13, 1992. Proceedings. Edited by T.K.S. Murthy, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1992, p.105-116, 31 refs.
McKay, C.P., Clow, G.D., Wharton, R.A., Jr.
Lake ice, Ice models, Ice cover thickness, Ice air interface, Computerized simulation, Climatic changes, Carbon dioxide, Antarctica—Hoare, Lake.
Ice thickness is measured at 6 perennially-frozen freshwater lakes in the dry valleys of Antarctica. A steady thinning of the ice has occurred over the last 15 years, by as much as a factor of 2. Is this thinning related to climatic changes in CO2, O3 or cloud abundance? A computer model of atmospheric radiative transfer was constructed and will be coupled with a computer model of lake ice physics to study the ice-atmosphere link. (Auth.)

47-1023
Arctic marine R&D program.
Peirce, T.H., International Conference on Ice Technology, 3rd, Cambridge, MA, Aug. 11-13, 1992. Proceedings. Edited by T.K.S. Murthy, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1992, p.119-133.
Icebreakers, Design, Design criteria, Research projects.

47-1024
Nonsimultaneous failure and local pressure of ice in ice/vertical structure interaction.
Takeuchi, T., et al, International Conference on Ice Technology, 3rd, Cambridge, MA, Aug. 11-13, 1992. Proceedings. Edited by T.K.S. Murthy, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1992, p.135-145, 10 refs.
Ice solid interface, Ice loads, Lake ice, Ice cover strength, Ice pressure.

47-1025
Estimate of sea ice freezing.
Mizuno, Y., et al, International Conference on Ice Technology, 3rd, Cambridge, MA, Aug. 11-13, 1992. Proceedings. Edited by T.K.S. Murthy, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1992, p.147-154, 6 refs.
Hirasawa, M., Umezawa, N., Tokikawa, K.
Sea ice, Sea water freezing, Water temperature, Ice forecasting.

47-1026
Determination of compressive strength, flexural strength and static elastic modulus of sea ice by sonic method.
Takahashi, Y., et al, International Conference on Ice Technology, 3rd, Cambridge, MA, Aug. 11-13, 1992. Proceedings. Edited by T.K.S. Murthy, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1992, p.155-168, 8 refs.
Sea ice, Ice elasticity, Ice strength, Compressive properties, Flexural strength, Measuring instruments.

47-1027
Full-scale trials on hull resistance and bow ice load in level ice on board the cutter M.S. *Uisko*.
Kivimaa, S., International Conference on Ice Technology, 3rd, Cambridge, MA, Aug. 11-13, 1992. Proceedings. Edited by T.K.S. Murthy, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1992, p.169-180, 6 refs.
Ships, Ice loads, Ice solid interface.

47-1028
Determination of creep damage parameters for polycrystalline ice.
Mahrenholtz, O., et al, International Conference on Ice Technology, 3rd, Cambridge, MA, Aug. 11-13, 1992. Proceedings. Edited by T.K.S. Murthy, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1992, p.181-192, 19 refs.
Wu, Z.
Ice crystals, Ice creep, Tensile properties, Analysis (mathematics).

47-1029
Three-dimensional viscoplastic flow model of polycrystalline ice.
Fish, A.M., MP 3160, International Conference on Ice Technology, 3rd, Cambridge, MA, Aug. 11-13, 1992. Proceedings. Edited by T.K.S. Murthy, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1992, p.193-207, 22 refs.
Ice crystals, Ice creep, Ice models, Ice strength, Ice mechanics, Rheology, Mathematical models.
A three-dimensional constitutive equation has been developed for viscoplastic flow (secondary creep) of polycrystalline ice. The stress dependency of the minimum creep shear strain rate is described by a flow equation that includes a yield criterion of ice. The latter is selected either in the form of an extended (parabolic) von Mises-Drucker-Prager or an extended (parabolic) Mohr-Coulomb rupture model in which the ice strength is characterized by three parameters: the cohesion, the friction angle on the octahedral plane, and the ice melting pressure, i.e. the magnitude of the hydrostatic stress at which the ice strength reaches a maximum.

47-1030
Stress and time effects on the creep rate of polycrystalline ice.
Kuo, S.S., International Conference on Ice Technology, 3rd, Cambridge, MA, Aug. 11-13, 1992. Proceedings. Edited by T.K.S. Murthy, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1992, p.209-224, 8 refs.
Ice crystals, Ice creep, Ice mechanics, Ice deformation, Time factor, Stress strain diagrams, Analysis (mathematics).

47-1031
Minerals Management Service regulation of floating drilling unit operations in the Beaufort and Chukchi Outer Continental Shelf.
Kuranel, R.Y., et al, International Conference on Ice Technology, 3rd, Cambridge, MA, Aug. 11-13, 1992. Proceedings. Edited by T.K.S. Murthy, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1992, p.227-241, 14 refs.
Regg, J.B.
Offshore drilling, Cold weather operation, Environmental protection.

47-1032
Research on hovercraft and suction bow icebreakers.
Hinchey, M.J., et al, International Conference on Ice Technology, 3rd, Cambridge, MA, Aug. 11-13, 1992. Proceedings. Edited by T.K.S. Murthy, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1992, p.243-251, 10 refs.
Colbourne, D.B.
Icebreakers, Air cushion vehicles, Design.

47-1033
Effect of naturally-occurring ice thickness variations in reducing global loads on offshore structures.
Sackinger, W.M., et al, International Conference on Ice Technology, 3rd, Cambridge, MA, Aug. 11-13, 1992. Proceedings. Edited by T.K.S. Murthy, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1992, p.253-265, 4 refs.
Lu, M.
Ice floes, Sea ice, Ice solid interface, Ice loads, Pack ice, Ice cover thickness.

47-1034
On ice-coupled waves: a comparison of data and theory.
Squire, V.A., et al, International Conference on Ice Technology, 3rd, Cambridge, MA, Aug. 11-13, 1992. Proceedings. Edited by T.K.S. Murthy, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1992, p.269-280, 13 refs.
Fox, C.
Ice water interface, Wave propagation, Ocean waves, Sea ice, Ice models, Mathematical models, Attenuation, Theories.

47-1035
Probabilistic approach to the problem of ice floe collision under wave action in the Marginal Ice Zone.
Gao, L., et al, International Conference on Ice Technology, 3rd, Cambridge, MA, Aug. 11-13, 1992. Proceedings. Edited by T.K.S. Murthy, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1992, p.281-291, 7 refs.
Clark, J.I.
Ice floes, Ice water interface, Analysis (mathematics), Ice mechanics.

47-1036
Large amplitude sea/ice coupling.
Fox, C., International Conference on Ice Technology, 3rd, Cambridge, MA, Aug. 11-13, 1992. Proceedings. Edited by T.K.S. Murthy, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1992, p.293-304, 14 refs.
Sea ice, Ice water interface, Ocean waves, Ice models, Mathematical models, Ice cover, Wave propagation, Ice breakup, Boundary value problems, Ice edge.

47-1037
Ship operations in ice: practical speed considerations.
Parnell, G.Q., International Conference on Ice Technology, 3rd, Cambridge, MA, Aug. 11-13, 1992. Proceedings. Edited by T.K.S. Murthy, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1992, p.307-312, 8 refs.
Ice navigation, Ships, Damage.

47-1038
Forecasting sea ice clearing in the Labrador Sea.
Newell, J.P., International Conference on Ice Technology, 3rd, Cambridge, MA, Aug. 11-13, 1992. Proceedings. Edited by T.K.S. Murthy, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1992, p.313-323, 9 refs.
Sea ice, Ice cover, Ice forecasting, Atmospheric pressure, Labrador Sea.

47-1039
Trend analysis of the Barents Sea ice cover.
Vefsnmo, S., et al, International Conference on Ice Technology, 3rd, Cambridge, MA, Aug. 11-13, 1992. Proceedings. Edited by T.K.S. Murthy, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1992, p.325-335, 7 refs.
Lövas, S.M., Mathiesen, M., Kjelaas, A.G.
Sea ice, Ice edge, Ice cover, Analysis (mathematics), Barents Sea.

47-1040
Airborne video as satellite imagery ground truthing.
Johannessen, B.O., et al, International Conference on Ice Technology, 3rd, Cambridge, MA, Aug. 11-13, 1992. Proceedings. Edited by T.K.S. Murthy, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1992, p.337-349, 4 refs.
Lövas, S.M.
Synthetic aperture radar, Airborne radar, Remote sensing, Spaceborne photography, Spacecraft, Airborne equipment, Measurement, Ice surveys, Imaging

47-1041
Extending the shipping season in the Canadian Arctic and prospects for the future.
Sneyd, A.R., et al, International Conference on Ice Technology, 3rd, Cambridge, MA, Aug. 11-13, 1992. Proceedings. Edited by T.K.S. Murthy, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1992, p.351-365, 22 refs.
Luce, M.P.
Ice navigation, Ships, Marine transportation.

47-1042
Results of calculating the parameters for theoretical models of ice jams according to data on hydrometric changes. [Rezul'taty rascheta parametrov teoreticheskikh modelei zatorov l'da po dannym gidrometricheskikh izmerenii].
Buzin, V.A., *Leningrad. Gosudarstvennyi gidrologicheskii institut. Trudy*, 1991, Vol.354, p.3-11, In Russian. 12 refs.
Ice jams, River ice, Mathematical models.

47-1043
Calculating the maximum water levels in areas of backwater curves in designing the Khingan reservoir on the Amur River. [Raschet maksimal'nykh zatornykh urovnei vody na uchastke vyklinivaniia krivykh podpora pri proektirovanii Khinganskogo vodokhranilishcha na r. Amure].
Bolotnikov, G.I., *Leningrad. Gosudarstvennyi gidrologicheskii institut. Trudy*, 1991, Vol.354, p.12-16, In Russian. 5 refs.
Reservoirs, Design criteria, Water level, Ice jams, River ice, Analysis (mathematics), USSR—Amur River.

47-1044
Space-time variability in ice jams on the Amur and Lena rivers. [Prostranstvenno-vremennaia izmenchivost' zatornykh iavlenii na Amure i Lene].
Shanochkin, S.V., et al, *Leningrad. Gosudarstvennyi gidrologicheskii institut. Trudy*, 1991, Vol.354, p.17-23, In Russian. 3 refs.
Buzin, V.A.
Ice jams, River ice, Variations, USSR—Amur River, USSR—Lena River.

47-1045
Determining parameters of ice jams and accumulation of bottom ice based on field studies of the Amgun' River. [K opredeleniiu parametrov zazhorov i skoplenii donnogo l'da po materialam naturnykh issledovanii na r.Amguni].
Kiselev, A.A., et al, *Leningrad. Gosudarstvennyi gidrologicheskii institut. Trudy*, 1991, Vol.354, p.24-29, In Russian. 4 refs.
Filippov, A.M.
Bottom ice, Ice jams, River ice, Analysis (mathematics), USSR—Amgun' River.

47-1046
Laboratory studies of hydraulic resistance to ice jams. [Laboratornye issledovaniia gidravlicheskikh soprotivlenii zazhornykh skoplenii].
Kiselev, A.A., *Leningrad. Gosudarstvennyi gidrologicheskii institut. Trudy*, 1991, Vol.354, p.30-37, In Russian. 5 refs.
Ice jams, River ice, Hydraulics, Laboratory techniques.

47-1047
Field studies of the freezing processes of the Amgun' River. [Naturnye issledovaniia protsessov zamerzaniia r.Amguni].
Bolotnikov, G.I., et al, *Leningrad. Gosudarstvennyi gidrologicheskii institut. Trudy*, 1991, Vol.354, p.38-46, In Russian. 1 ref.
Kiselev, A.A.
Ice jams, River ice, Freezeup, Analysis (mathematics), USSR—Amgun' River.

47-1048
Problem of variations in the amount of slush ice in river beds during an icebound period. [K voprosu ob izmeneniiakh zashugovannosti rusel rek v period ledostava].
Alekseenko, R.IA., *Leningrad. Gosudarstvennyi gidrologicheskii institut. Trudy*, 1991, Vol.354, p.47-53, In Russian. 7 refs.
River ice, Slush, Icebound rivers.

47-1049
Controlling river runoff with artificial glaciers. [Regulirovanie stoka rek iskusstvennymi lednikami].
Faiko, L.I., et al, *Leningrad. Gosudarstvennyi gidrologicheskii institut. Trudy*, 1991, Vol.354, p.54-59, In Russian. 6 refs.
Ilarov, N.A.
River ice, Runoff, Glaciers, Artificial ice.

47-1050
Effect of an aerodynamic impact load on ice cover. [Vozdeistvie udarnoi aerodinamicheskoi nagruzki na ledianoi pokrov].
Filippov, A.M., *Leningrad. Gosudarstvennyi gidrologicheskii institut. Trudy*, 1991, Vol.354, p.60-68, In Russian. 8 refs.
River ice, Ice cover strength, Impact strength, Loads (forces), Analysis (mathematics).

47-1051
Estimating changes in dates for the initial phases of icing in relation to climatic changes. [Otsenka izmenenii srokov osnovnykh faz ledovogo rezhima v sviazi s izmeneniem klimata].
Shanochkin, S.V., *Leningrad. Gosudarstvennyi gidrologicheskii institut. Trudy*, 1991, Vol.354, p.69-74, In Russian. 3 refs.
Ice conditions, Climatic factors, River ice, Freezeup, Ice forecasting.

47-1052
On the mathematical description of glaciated valley cross sections.
Harbor, J.M., et al, *Earth surface processes and landforms*, Aug. 1992, 17(5), p.477-485, 24 refs.
Wheeler, D.A.
Glaciation, Glacial erosion, Valleys, Geomorphology, Landforms, Mathematical models, Profiles.

47-1053
Interannual variations in tundra methane emission: a 4-year time series at fixed sites.
Whalen, S.C., et al, *Global biogeochemical cycles*, June 1992, 6(2), p.139-159, 61 refs.
Reeburgh, W.S.
Tundra, Wetlands, Soil air interface, Natural gas, Atmospheric composition, Global change, Soil chemistry, Periodic variations, Decomposition.

47-1054
Observations of heterogeneous nucleation of water vapor on a cold substrate.
Shinagawa, H., et al, *Journal of chemical engineering of Japan*, Aug. 1992, 25(4), p.448-450, 3 refs.
Okuyama, K., Kawamura, Y.
Ice formation, Heterogeneous nucleation, Liquid solid interfaces, Supersaturation, Water vapor, Substrates, Metals, Temperature effects.

47-1055
Analysis of cool storage for air conditioning.
Chen, S.L., et al, *International journal of energy research*, Aug. 1992, 16(6), p.553-563, 4 refs.
Air conditioning, Cold storage, Performance, Ice formation, Heat transfer, Analysis (mathematics), Phase transformations, Porous materials.

47-1056
Study on dynamical structure in water and heavy water by low-frequency Raman spectroscopy.
Mizoguchi, K., et al, *Journal of chemical physics*, Aug. 1, 1992, 97(3), p.1961-1968, 23 refs.
Hori, Y., Tominaga, Y.
Water structure, Heavy water, Supercooling, Spectroscopy, Scattering, Spectra, Temperature effects, Low frequencies, Molecular energy levels.

47-1057
Durability of MSW fly-ash concrete.
Triano, J.R., et al, *Journal of materials in civil engineering*, Nov. 1992, 4(4), p.369-384, 15 refs.
Frantz, G.C.
Concrete aggregates, Concrete durability, Freeze thaw tests, Mechanical tests, Waste disposal, Physical properties.

47-1058
Toward the improvement of aircraft-icing forecasts for the continental United States.
Schultz, P., et al, *Weather and forecasting*, Sep. 1992, 7(3), p.491-500, 17 refs.
Politovich, M.K.
Aircraft icing, Ice forecasting, Ice detection, Meteorological data, Classifications, Accuracy.

47-1059
Temperature forecast biases associated with snow cover in the Northeast.
Wojcik, G.S., et al, *Weather and forecasting*, Sep. 1992, 7(3), p.501-506, 19 refs.
Wilks, D.S.
Weather forecasting, Air temperature, Snow cover effect, Accuracy, Human factors, Meteorological factors, Snow air interface.

47-1060
Polar Ocean Profiler: new generation sensor platform.
May, C.W., et al, *Sea technology*, Sep. 1992, 37(9), p.73-81, 5 refs.
Morison, J.H., Backes, J.L.
Oceanography, Hydrography, Measuring instruments, Floating structures, Performance, Air ice water interaction, Design.

47-1061
Contour mapping of Arctic basin ice draft and roughness parameters.
Bourke, R.H., et al, *Journal of geophysical research*, Nov. 15, 1992, 97(C11), p.17,715-17,728, 31 refs.
McLaren, A.S.
Sea ice, Topographic surveys, Ice cover thickness, Ice bottom surface, Topographic features, Subglacial observations, Radio echo sounding, Surface roughness, Seasonal variations.

47-1062
Sea ice melting and floe geometry in a simple ice-ocean model.
Steele, M., *Journal of geophysical research*, Nov. 15, 1992, 97(C11), p.17,729-17,738, 23 refs.
Sea ice distribution, Ice melting, Ice water interface, Heat flux, Ice floes, Surface properties, Mathematical models.

47-1063
Large-scale thermal bending fracture of sea ice plates.
Bažant, Z.P., *Journal of geophysical research*, Nov. 15, 1992, 97(C11), p.17,739-17,751, 47 refs.
Sea ice, Ice temperature, Ice mechanics, Cracking (fracturing), Thermal stresses, Ice deformation, Crack propagation, Ice elasticity, Analysis (mathematics), Temperature gradients.

47-1064
Effect of severe storms on the ice cover of the northern Tatarskiy Strait.
Martin, S., et al, *Journal of geophysical research*, Nov. 15, 1992, 97(C11), p.17,753-17,764, 23 refs.
Munoz, E., Drucker, R.
Sea ice, Oceanography, Sea water, Water transport, Storms, Ice formation, Heat flux, Wind factors, Salinity, Air ice water interaction.

47-1065
Distribution of aluminium in the Greenland Sea and its relationship to ventilation processes.
Measures, C.I., et al, *Journal of geophysical research*, Nov. 15, 1992, 97(C11), p.17,787-17,800, 43 refs.
Edmond, J.M.
Sea water, Impurities, Brines, Ice formation, Sea ice, Advection, Water transport, Metals, Sampling.

47-1066
Ecology of recently-deglaciated terrain: a geoecological approach to glacier forelands and primary succession.
Matthews, J.A., Cambridge, UK, Cambridge University Press, 1992, 386p., Refs. p.327-367. Cambridge studies in ecology.
Ecology, Glacial deposits, Glaciation, Glacial geology, Geocryology, Frost heave, Periglacial processes, Landscape development, Soil formation, Plant ecology, Glacial erosion, Solifluction, Nivation.

47-1067
Proceedings of the 1991 Battlefield Atmospherics Conference.
Battlefield Atmospherics Conference, El Paso, TX, Dec. 3-6, 1991, White Sands, Atmospherics Sciences Laboratory, U.S. Army Laboratory Command, 1992, 646p., Refs. passim. For selected papers see 47-1068 through 47-1070.
Military operation, Snow cover effect, Imaging, Remote sensing, Dispersions.

47-1068
Thermal reversal tactical decision aid evaluation.
Berrick, S.W., et al, Battlefield Atmospherics Conference, El Paso, TX, Dec. 3-6, 1991. Proceedings, White Sands, NM, Atmospheric Sciences Laboratory, U.S. Army Laboratory Command, 1992, p.75-83, 7 refs.
Gillespie, P.S.
Military operation, Imaging, Mathematical models, Temperature effects, Thermal radiation, Snow cover effect.

47-1069
Source strength terms for winter dispersion models.
Hogan, A.W., et al, MP 3161, Battlefield Atmospherics Conference, El Paso, TX, Dec. 3-6, 1991. Proceedings, White Sands, NM, Atmospheric Sciences Laboratory, U.S. Army Laboratory Command, 1992, p.149-155, 4 refs.
Leggett, D.C.
Military operation, Dispersions, Snow cover effect, Snow air interface, Snow surface temperature, Air temperature, Models.
It is now frequently necessary to prepare an estimate of atmospheric dispersion of aerosols, vapors, and gases before beginning Engineer operations. Several dispersion models prepared by the DOD/DOE/NOAA community have been examined for application in data-sparse winter settings. The combustion rate terms, or thermodynamic properties of gases, used to estimate the contaminant input to the atmosphere from uncontrolled sources acquire an additional degree of complexity over snow-covered ground. Multiple inversions may limit the applicability of even nearby soundings of atmospheric structure to wind field analysis. Some analyses of organic vapor permeation in snow cover, coincident with nearby atmospheric structure observations, are presented as a preliminary approach to over-snow dispersion modelling.

47-1070
Rapid Deployment Imagery Terminal (RDIT) using DMSP special sensor data.
Harris, T.L., et al, Battlefield Atmospherics Conference, El Paso, TX, Dec. 3-6, 1991. Proceedings, White Sands, NM, Atmospheric Sciences Laboratory, U.S. Army Laboratory Command, 1992, p.202-211.
Jensen, J.A.
Military operation, Remote sensing, Imaging, Spacecraft, Sensors, Portable equipment, Electronic equipment, Ice detection, Snow cover.

47-1071
Chemical mechanisms behind ozone depletion.
Folkins, I., et al, *Chemistry and industry*, Apr. 20, 1992, No.8, p.294-297, 13 refs.
Brasseur, G.
Ozone, Atmospheric composition, Polar regions.
The use of chlorofluorocarbons has diminished stratospheric ozone by 3% over the last 10 yr. The ozone layer is created as oxygen molecules absorb ultraviolet energy from the sun at altitudes of 15-40 km. The reaction is reversible, however, and lower energy levels of ultraviolet energy can cause the breakdown of the ozone molecule into an oxygen molecule and a free oxygen atom. The ozone breakdown can also cause chemical combination with other elements present in the stratosphere, such as nitrogen, hydrogen, and chlorine. A variety of chemical reactions involved in the breakdown of the ozone molecule are described, as are the consequences of a transparent atmosphere. Of principal concern is the effect of UV-B radiation on humans, crop yield, and phytoplankton.

47-1072
Is the antarctic ice sheet growing.
Jacobs, S.S., *Nature*, Nov. 5, 1992, 360(6399), p.29-33, 58 refs.
Ice sheets, Mass balance, Sea ice, Sea level.
A common public perception is that global warming will accelerate the melting of polar ice sheets, causing sea level to rise. A common scientific position is that the volume of grounded antarctic ice is slowly growing, and will damp future sea-level rise. At present, studies supporting recent shrinkage or growth depend on limited measurements that are subject to high temporal and regional variability, and it is too early to say how the antarctic ice sheet will behave in a warmer world. (Auth.)

47-1073
Ice capade for science.
Holden, C., ed, *Science*, July 3, 1992, 257(5066), p.26.
Research projects, Drift stations, Antarctica—Weddell Sea.
This progress report tells of a joint US-Russian venture which began in Feb. 1992 on an ice station drifting in the Weddell Sea. Data gathered thus far suggest a necessary reassessment of how the region fits into the global climate system. An unexpected finding is that the continental slope off the Antarctic Peninsula is about 62 miles farther west than previously thought, a change that will affect extant models of ocean circulation. (See 46-1932/A-45460).

47-1074
Marginal Ice Zone oceanographic variability and its effects on acoustic propagation.
Meredith, R.W., et al, Workshop on Ocean Variability and Acoustic Propagation, La Spezia, Italy, June 4-8, 1990. Proceedings. Ocean variability and acoustic propagation. Edited by J. Potter et al, Dordrecht, Netherlands, Kluwer Academic Publishers, 1991, p.87-101, 5 refs.
Jackson, P.M.
DLC QC244.O34 1991
Sea ice distribution, Underwater acoustics, Sound transmission, Ice cover effect, Ice edge, Velocity measurement, Statistical analysis, Wave propagation.

47-1075
Treatments of incoherent scattering for the parabolic equation and astral propagation models.
Dozier, L.B., et al, Workshop on Ocean Variability and Acoustic Propagation, La Spezia, Italy, June 4-8, 1990. Proceedings. Ocean variability and acoustic propagation. Edited by J. Potter et al, Dordrecht, Netherlands, Kluwer Academic Publishers, 1991, p.265-281, 11 refs.
Hanna, J.S., Pearson, C.R.
DLC QC244.O34 1991
Sea ice, Underwater acoustics, Ice acoustics, Wave propagation, Scattering, Ice bottom surface, Mathematical models, Attenuation.

47-1076
Proceedings.
Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991, *Annals of glaciology*, 1992, Vol.16, 239p., Refs. passim. For individual papers see 47-1077 through 47-1117.
Hooke, R.L., ed.
Mountain glaciers, Glaciology, Glacier mass balance, Glacier oscillation, Glacier flow, Snow hydrology, Glacial hydrology, Ice air interface, Climatic factors, Lake bursts, Ice mechanics, Meetings, Avalanche forecasting.

47-1077
Glacioclimatological features in the Tanggula mountains, China.
Ding, Y.J., et al, *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.1-6, 8 refs.
Li, Z.Q., Liu, S.Y., Yu, X.Z.
Mountain glaciers, Glacier mass balance, Climatic factors, Glacier oscillation, Glacier formation, Glaciology.

47-1078
Outline of avalanches in the Tien Shan mountains.
Hu, R.J., et al, *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.7-10, 4 refs.
Ma, H., Wang, G.
Mountains, Snow cover stability, Avalanches, Periodic variations.

47-1079
Relation between recent glacier variations and climate in the Tien Shan mountains, central Asia.
Liu, C.H., et al, *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.11-16, 6 refs.
Han, T.D.
Mountain glaciers, Glacier oscillation, Climatic changes, Glacier mass balance, Correlation, Glacier surveys.

47-1080
Characteristics of the distribution of glaciers in China.
Wang, Z.T., et al, *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.17-20, 1 ref.
Yang, H.I.
Glacier surveys, Distribution, Ice volume, Correlation.

47-1081
Trends and features of climatic changes in the past 5000 years recorded by the Dunde ice core.
Yao, T.D., et al. *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.21-24, 10 refs.
Thompson, L.G.
Ice sheets, Ice cores, Ice dating, Paleoclimatology, Climatic changes, Isotope analysis, Air temperature, Drill core analysis.

47-1082
Sources and spatial variation of the chemical composition of snow in the Tien Shan, China.
Williams, M.W., et al. *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.25-32, 25 refs.
Tonnessen, K.A., Melack, J.M., Yang, D.Q.
Snow surveys, Snow composition, Chemical composition, Sampling, Dust, Wind factors, Glacier surfaces.

47-1083
Flood generation and destruction of "Drift" Glacier by the 1989-90 eruption of Redoubt Volcano, Alaska.
Trabant, D.C., et al. *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.33-38, 8 refs.
Meyer, D.F.
Glacier melting, Volcanoes, Mass flow, Flooding, Sediment transport, Ice deterioration.

47-1084
Movement mechanisms of Ürümqi Glacier No.1, Tien Shan mountains, China.
Huang, M.H., *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.39-44, 17 refs.
Mountain glaciers, Glacier flow, [illegible]ormation, Glacier beds, Ice solid interface, Subglac[illegible]bservations, Sliding.

47-1085
Anthropogenic sulfate and Asian dust signals in snow from Tien Shan, northwest China.
Wake, C.P., et al. *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.45-52, 20 refs.
Glacier surfaces, Snow impurities, Air pollution, Dust, Sampling, Origin, Chemical composition, Accuracy.

47-1086
Avalanche videos.
Dennis, A., *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.53-54, 4 refs.
Avalanches, Recording, Photography, Safety.

47-1087
Experimental study of the water and heat balance in the source of the Ürümqi River in the Tien Shan mountains.
Kang, E.S., et al. *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.55-66, 19 refs.
Mountain glaciers, Glacier mass balance, Glacier heat balance, Water balance, Glacier ablation, Runoff, Water supply, Precipitation (meteorology).

47-1088
Some glacio-micrometeorological features on the north side of Mount Qogir (K2), Karakoram mountains.
Ding, Y.J., *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.67-72, 2 refs.
Glacial meteorology, Mountain glaciers, Meteorological factors, Glacier surveys, Ice air interface, Altitude, Meteorological data.

47-1089
Energy balance of a snow cover and simulation of snowmelt in the western Tien Shan mountains, China.
Ma, H., et al, *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.73-78, 5 refs.
Liu, Z.C., Liu, Y.F.
Snowmelt, Mountains, Snow heat flux, Surface energy, Heat balance, Runoff forecasting, Mathematical models, Microclimatology.

47-1090
Glacial and lake fluctuations in the area of the west Kunlun mountains during the last 45,000 years.
Li, S.J., et al, *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.79-84, 16 refs.
Shi, Y.F.
Paleoclimatology, Glacier oscillation, Mountain glaciers, Age determination, Glacial deposits, Lacustrine deposits, Glacial lakes, Climatic changes.

47-1091
Jökulhlaups in the Kunmalike River, southern Tien Shan mountains, China.
Liu, J.S., *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.85-88, 6 refs.
Lake bursts, Glacial hydrology, Glacial lakes, Ice dams, Subglacial drainage, Flow measurement, Flood forecasting.

47-1092
Predictions of changes of glacier mass balance in the Nepal Himalaya and Tibetan Plateau: a case study of air temperature increase for three glaciers.
Ageta, Y., et al, *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.89-94, 12 refs.
Kadota, T.
Mountain glaciers, Glacier mass balance, Air temperature, Temperature variations, Glacier ablation, Ice air interface, Periodic variations, Global warming.

47-1093
Jökulhlaups in Iceland: prediction, characteristics and simulation.
Björnsson, H., *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.95-106, 38 refs.
Lake bursts, Glacial hydrology, Subglacial drainage, Glacial lakes, Flood forecasting, Hydrography, Simulation.

47-1094
Influence of humidity on the ablation of continental-type glaciers.
Ohno, H., et al, *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.107-114, 27 refs.
Ohata, T., Higuchi, K.
Glacier ablation, Ice sheets, Ice air interface, Humidity, Glacier heat balance, Glacial meteorology, Temperature effects, Analysis (mathematics), Evaporation.

47-1095
Evaluation of scale-dependent effects of atmosphere-glacier interactions on heat supply to glaciers.
Ohata, T., *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.115-122, 20 refs.
Glacial meteorology, Glacier heat balance, Ice air interface, Glacier oscillation, Ice heat flux, Heat transfer, Climatic changes, Radiation absorption, Wind factors.

47-1096
Basal deformation of Ürümqi Glacier No.1, Tien Shan mountains, China.
Jing, X.P., et al, *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.123-126, 10 refs.
Huang, M.H., Chen, J.M., Jin, M.X.
Glacier beds, Glacier flow, Basal sliding, Ice solid interface, Shear strain, Ice tunnels, Deformation.

47-1097
Dramatic retreat of Mount Kenya's glaciers between 1963 and 1987: greenhouse forcing.
Hastenrath, S., et al, *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.127-133, 14 refs.
Kruss, P.D.
Glacier oscillation, Mountain glaciers, Glacier ablation, Glacier surveys, Humidity, Climatic changes, Global warming, Periodic variations.

47-1098
***Simultaneous monitoring of mass balance fluctuations* of and runoff from Tien Shan glaciers.**
Diurgerov, M.B., et al, *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.134, 2 refs.
Mountain glaciers, Glacier surveys, Glacier mass balance, Simulation, Periodic variations.

47-1099
Investigation of glacier bursts of the Yarkant River in Xinjiang, China.
Zhang, X.S., *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.135-139, 8 refs.
Lake bursts, Glacial hydrology, Subglacial drainage, Glacial lakes, Flooding, Glacier oscillation, Periodic variations, Global warming.

47-1100
Avalanches in the Tien Shan mountains, China.
Wei, W.S., *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.140, 1 ref.
Mountains, Avalanches, Periodic variations.

47-1101
Study of glacier meltwater resources in China.
Yang, Z.N., et al, *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.141-145, 19 refs.
Hu, X.G.
Glacier melting, Glacial hydrology, Ice (water storage), Meltwater, Glacier surveys, Limnology, Water supply.

47-1102
Outline of avalanches in the southeastern Tibet Plateau, China.
Wang, Y.L., et al, *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.146-150, 8 refs.
Huang, M.H.
Avalanches, Distribution, Climatic factors, Topographic effects.

47-1103
Terminus of Hubbard Glacier, Alaska.
Krimmel, R.M., et al, *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.151-157, 5 refs.
Trabant, D.C.
Glacier flow, Glacial hydrology, Glacier tongues, Photographic techniques, Photointerpretation, Velocity measurement, Periodic variations, Ice water interface.

47-1104
Reactions *of a calving glacier to large changes in* water level.
Laumann, T., et al, *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.158-162, 14 refs.
Wold, B.
Glacial hydrology, Glacier oscillation, Calving, Ice water interface, Water level, Lake water, Simulation, Periodic variations.

47-1105
Recent fluctuations of glaciers in the Gongga mountains.
Su, Z., et al. *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.163-167, 5 refs.
Liu, S.Y., Wang, N.L., Shi, A.P.
Mountain glaciers, Glacier oscillation, Glacier surveys, Moraines, Topographic effects, Soil analysis.

47-1106
Identification of glaciers with surge characteristics on the Tibetan Plateau.
Zhang, W.J., *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.168-172, 7 refs.
Glacier oscillation, Glacier surges, Glacier flow, Mountain glaciers, Geomorphology, Glacier surveys.

47-1107
Can the mass balance of the entire glacier area of the Tien Shan be estimated.
Diurgerov, M.B., et al, *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.173-179, 22 refs.
Glacier mass balance, Mountain glaciers, Glaciation, Glacier surveys, Altitude, River basins, Analysis (mathematics), Runoff forecasting.

47-1108
Glacier lake outburst flood disasters in China.
Ding, Y.J., et al, *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.180-184, 9 refs.
Liu, J.S.
Lake bursts, Glacial lakes, Glacial hydrology, Flooding, Moraines, Ice dams, History.

47-1109
Temperature regime studies and mathematical calculations for dry snow covers in the western Tien Shan mountains, China.
Ma, H., et al, *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.185-189, 5 refs.
Liu, Z.C., Yang, Z.
Snow temperature, Snow cover, Thermal regime, Temperature variations, Snow air interface, Mathematical models, Temperature gradients.

47-1110
Application of nonlinear colour enhancement on transparencies for interpretation of glacier surface characteristics.
Cao, M.S., et al, *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.190-192, 5 refs.
Mi, D.S., Pu, Y.B., Liu, J.H.
Glacier surfaces, Classifications, Spaceborne photography, Image processing, Surface structure, Glacier surveys.

47-1111
Satellite snow-cover monitoring for the prediction of snowmelt runoff in the upper reaches of the Yellow River, China.
Zeng, Q.Z., et al, *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.193-197, 6 refs.
Snow cover distribution, Spaceborne photography, Runoff forecasting, Snowmelt, River basins, Altitude, Accuracy.

47-1112
Differences in mass-balance calculations resulting from alternative sampling and estimation techniques on Glacier No.1, Tien Shan, China.
Elder, K., et al, *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.198-206, 12 refs.
Glacier mass balance, Glacier surveys, Sampling, Snow depth, Accuracy, Snow water equivalent.

47-1113
Progress and prospect for research on mountain glaciers in China.
Xie, Z.C., *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.207-211, 17 refs.
Mountain glaciers, Research projects, Glacier surveys, Glaciology.

47-1114
Industrial influence on glacial processes in mountains of circumpolar regions.
Grebenets, V.I., et al, *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.212-214, 3 refs.
Fedoseev, D.B.
Arctic landscapes, Snow impurities, Landscape development, Cold weather construction, Environmental impact, Topographic effects, Erosion.

47-1115
Use of microwave radiometer data for characterizing snow storage in western China.
Chang, A.T.C., et al, *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.215-219, 9 refs.
Snow cover distribution, Snow surveys, Water storage, Remote sensing, Radiometry, Scattering, Snow water equivalent, Accuracy, Microwaves.

47-1116
Influence of local factors on the distribution of snow resources in northern Tien Shan.
Severskiĭ, S.I., et al, *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.220-224, 4 refs.
Severskiĭ, I.V.
Snow cover distribution, Snow depth, Snow surveys, Slope orientation, Vegetation factors, Water storage, Topographic effects, Accuracy.

47-1117
Factors delaying spring runoff in the upper Ürümqi River basin, China.
Kattelmann, R., et al, *Annals of glaciology*, 1992, Vol.16, Symposium on Mountain Glaciology Relating to Human Activity, Lanzhou, China, Aug. 26-30, 1991. Proceedings. Edited by R.L. Hooke et al, p.225-230, 23 refs.
Yang, D.Q.
Snow hydrology, Snowmelt, Runoff, Water retention, Stream flow, Regelation, Watersheds.

47-1118
Radical polymerization of N,N-dimethyl-N-decylacetylmethacryloylethylammonium bromide in frozen aqueous solutions.
Egorov, V.V., et al, *Polymer science USSR*, Feb. 1992, 34(2), p.95-97, Translated from Vysokomolekuliarne soedineniia. 7 refs.
Leizerovich, V.S., Sergeev, B.M.
Polymers, Cryogenics, Ultraviolet radiation, Frozen liquids, Phase transformations, Chemical analysis, Molecular structure, Temperature effects.

47-1119
Vertical retrieval of solar and infrared irradiances in the stratiform regions of EMEX cloud clusters.
Churchill, D.D., *Journal of applied meteorology*, Nov. 1992, 31(11), p.1229-1247, 42 refs.
Cloud physics, Radiant heating, Radiance, Ice crystal optics, Solar radiation, Infrared radiation, Heat balance, Radar echoes, Remote sensing.

47-1120
Subvisual-thin cirrus lidar dataset for satellite verification and climatological research.
Sassen, K., et al, *Journal of applied meteorology*, Nov. 1992, 31(11), p.1275-1285, 22 refs.
Cho, B.S.
Cloud physics, Data processing, Lidar, Ice crystal optics, Scattering, Radiance, Detection, Remote sensing, Climatology.

47-1121
Uncertainty in a path-averaged measurement of the friction velocity u*.
Andreas, E.L., *Journal of applied meteorology*, Nov. 1992, 31(11), MP 3165, p.1312-1321, 39 refs.
Turbulent boundary layer, Turbulent flow, Turbulent diffusion, Atmospheric physics, Surface energy, Heat flux, Scintillation, Analysis (mathematics), Measurement.
Several electro-optical methods exist for measuring a path-averaged value of the inner scale of turbulence. By virtue of Monin-Obukhov similarity, in the atmospheric surface layer such measurements are related to the friction velocity or to the surface stress. Because the inner scale of turbulence is a path-averaged quantity, so, too is the friction velocity. Here the question of how precisely friction velocity can be measured is investigated by combining these inner-scale measurements with two-wavelength scintillation measurements that yield the sensible and latent heat fluxes, and thereby facilitate stability corrections. The analysis suggests that current path-averaging instruments can generally measure friction velocity to +- 20-30%.

47-1122
Snowmelt and heat balance in snow-covered forested areas.
Yamazaki, T., et al, *Journal of applied meteorology*, Nov. 1992, 31(11), p.1322-1327, 5 refs.
Kondo, J.
Forest canopy, Snow air interface, Snow cover effect, Snowmelt, Heat balance, Radiation absorption, Mathematical models, Solar radiation.

47-1123
Doppler radar wind and reflectivity signatures with overrunning and freezing-rain episodes: preliminary results.
Prater, E.T., et al, *Journal of applied meteorology*, Nov. 1992, 31(11), p.1350-1358, 13 refs.
Borho, A.A.
Rain, Freezing, Atmospheric physics, Radar echoes, Detection, Boundary layer, Aircraft icing, Wind factors.

47-1124
Effect of arctic ice cover on the monthly temperature and precipitation in China.
Chen, Y.S., et al, *Acta meteorological sinica*, 1992, 6(3), p.275-286, 9 refs.
Chen, L.X.
Sea ice, Climatology, Ice cover effect, Precipitation (meteorology), Air temperature, Ice air interface, Periodic variations, Climatic factors.

47-1125
Experimental examination of growing and newly submerged sea ice including acoustic probing of the skeletal layer.
Williams, K.L., et al, *Acoustical Society of America. Journal*, Oct. 1992, 92(4)Pt.1, p.2075-2092, 23 refs.
Garrison, G.R., Mourad, P.D.
Sea ice, Ice acoustics, Underwater acoustics, Ice bottom surface, Sound waves, Scattering, Porosity, Thermal diffusion, Ice water interface.

47-1126
Temperature and suction profiles beneath highway pavements: computed and measured.
Pufahl, D.E., et al, *Transportation research record*, 1991, No.1307, p.268-276, 7 refs.
Lytton, R.L.
DLC TE7.H5
Pavement bases, Temperature variations, Stability, Frost penetration, Seepage, Water pressure, Design criteria, Climatic factors, Computerized simulation, Profiles.

47-1127
Measuring negative pore water pressures in a freezing environment.
Fredlund, D.G., et al, *Transportation research record*, 1991, No.1307, p.291-299, 15 refs.
Gan, J.K., Rahardjo, H.
DLC TE7.H5
Soil freezing, Soil water migration, Water pressure, Thermal conductivity, Measurement, Sensors, Soil physics, Unfrozen water content.

47-1128
Field testing of a model for water flow and heat transport in variably saturated, variably frozen soil.
Xu, X., et al, *Transportation research record*, 1991, No.1307, p.300-308, 34 refs.
Nieber, J.L., Baker, J.M., Newcomb, D.E.
DLC TE7.H5
Soil freezing, Soil tests, Thaw depth, Freeze thaw cycles, Frozen ground thermodynamics, Pavements, Analysis (mathematics), Soil profiles.

47-1129
Effect of a geotextile on water migration and frost heave in a large-scale test basin.
Shoop, S.A., et al, *Transportation research record*, 1991, No.1307, MP 3164, p.309-318, 15 refs.
Henry, K.S.
DLC TE7.H5
Soil freezing, Soil tests, Geotextiles, Soil water migration, Frost heave, Frozen ground mechanics, Water table, Countermeasures, Capillarity.
The objective of this study was to examine the effect of a needle-punched polyester geotextile on moisture migration and frost heave during freezing and thawing in a large test basin. Nonwoven polypropylene geotextiles have proved effective in reducing frost heave in laboratory tests. In this case, a needle-punched polyester geotextile separator was monitored for its influence on frost heave and soil moisture tension for four freeze-thaw cycles in a large test basin. Results from freezing tests in the test basin without a water table and with a water table present 12.7 cm below the fabric suggest that use of the fabric results in greater frost heave. When the water table was above the fabric, the fabric had no influence on frost heave or water distribution in the soil. Laboratory tests indicate that the separator had no effect on frost heave. Tensiometer data in the test basin indicate that lateral transmission of water through the fabric may have occurred, so transmission of water from thawed soil to freezing soil may have contributed to increased frost heave. It is concluded that if a geotextile is used in frost-susceptible soil, proper drainage and the correct fabric type must be used to prevent increased frost heave.

47-1130
Construction of a geogrid- and geocomposite-faced soil-nailed slope reinforcement project in eastern Canada.
Alston, C., *Transportation research record*, 1991, No.1330, p.87-95, 9 refs.
DLC TE7.H5
Slope protection, Anchors, Soil stabilization, Geotextiles, Construction materials, Freeze thaw cycles, Design, Frost action.

47-1131
Comparison of four aggregates using the Washington hydraulic fracture test.
Janssen, D.J., et al, *Transportation research record*, 1991, No.1301, p.57-67, 30 refs.
Almond, D.K.
DLC TE7.H5
Concrete aggregates, Freeze thaw tests, Saturation, Concrete durability, High pressure tests, Cracking (fracturing), Simulation, Design criteria.

47-1132
Laboratory tests for predicting coarse aggregate performance in Ontario.
Senior, S.A., et al, *Transportation research record*, 1991, No.1301, p.97-106, 12 refs.
Rogers, C.A.
DLC TE7.H5
Concrete aggregates, Frost resistance, Mechanical tests, Freeze thaw tests, Weathering, Concrete durability, Accuracy.

47-1133
Proceedings of the 37th Annual Conference.
Annual Conference of Canadian Technical Asphalt Association, 37th, Victoria, BC, 1992, *Canadian Technical Asphalt Association. Proceedings*, Nov. 1992, Vol.37, 307p. + appends., Refs. passim. For selected papers see 47-1134 through 47-1139.
Thompson, E., ed.
Pavements, Subgrades, Bituminous concretes, Frost penetration, Low temperature research, Low temperature tests, Cracking (fracturing).

47-1134
Evaluation of frost action mitigation procedures for highly frost-susceptible soils.
MacKay, M.H., et al, *Canadian Technical Asphalt Association. Proceedings*, Nov. 1992, Vol.37, p.91-109, 6 refs.
Hein, D.K., Emery, J.J.
Frost action, Frost heave, Damage, Frost protection, Frost penetration, Pavements, Roads, Subgrades, Construction.

47-1135
Performance of asphalt concrete airport pavements during thaw weakening periods: a field study.
Janoo, V.C., et al, *Canadian Technical Asphalt Association. Proceedings*, Nov. 1992, Vol.37, MP 3166, p.167-183, 14 refs.
Berg, R.L., Tomita, H.
Thaw weakening, Loads (forces), Freeze thaw cycles, Pavements, Subgrades, Bituminous concretes, Airports, Thaw depth, Frost penetration, Analysis (mathematics).
Many airport pavement structures are subjected to freezing in the winter and thawing in the spring. In winter, the load-carrying capacity of the pavement increases dramatically due to freezing of the pavement structure. In spring, the pavement structure thaws and can become saturated with water from the melting ice lenses, thus reducing the strength of the base, subbase and/or subgrade. The U.S. Army Cold Regions Research and Engineering Laboratory (USACRREL) conducted Falling Weight Deflectometer (FWD) measurements for the Federal Aviation Administration (FAA) at several airports in Wisconsin. One was Wittman Field in Oshkosh, where the pavement surface was mainly asphalt concrete. In addition to FWD measurements, surface and subsurface pavement temperatures were measured at selective sites. The objective of the study was to determine the change in the load-bearing capacity of airport pavement structures in a seasonal frost area during thaw-weakening periods, using the FWD and methods developed at CRREL from test results obtained in the Frost Effects Research Facility (FERF). This paper gives a general description of the airport pavement structures and summarizes the results of the analysis of the FWD measurements from Wittman Airfield, Oshkosh.

47-1136
Statistical analysis of low temperature thermal stress restrained specimen test results.
Jung, D.H., et al, *Canadian Technical Asphalt Association. Proceedings*, Nov. 1992, Vol.37, p.200-223, 17 refs.
Vinson, T.S.
Cracking (fracturing), Thermal stresses, Statistical analysis, Bituminous concretes, Pavements, Low temperature research, Low temperature tests, Concrete aggregates, Models.

47-1137
Evaluation of polymer-modified asphalts in Ontario.
Joseph, P., et al, *Canadian Technical Asphalt Association. Proceedings*, Nov. 1992, Vol.37, p.243-269, 12 refs.
Dickson, J.H., Kennepohl, G.
Bitumens, Cold weather performance, Polymers, Low temperature tests, Roads, Pavements, Fracturing.

47-1138
Concepts and procedures for evaluation/design of materials and flexible pavements.
Ruth, B.E., et al, *Canadian Technical Asphalt Association. Proceedings*, Nov. 1992, Vol.37, p.270-288, 13 refs.
Murphy, K.
Cracking (fracturing), Pavements, Low temperature research, Design criteria, Subgrade soils.

47-1139
Low temperature cracking experiment at USACRREL Frost Effects Research Facility.
Kanerva, H.K., et al, *Canadian Technical Asphalt Association. Proceedings*, Nov. 1992, Vol.37, MP 3167, p.289-307.
Vinson, T.S., Brickman, A.M., Janoo, V.C.
Low temperature research, Low temperature tests, Cracking (fracturing), Pavements, Bituminous concretes, Cements, Thermocouples.
Under Strategic Highway Research Program Contract A-003A, several field test roads related the Thermal Stress Restrained Specimen Test (TSRST) laboratory fracture temperature to the cracking temperature and crack frequency in the field. However, observing the moment of cracking and temperature for the field test sections is very difficult. In addition, variations in microclimate, restraint conditions, pavement structure and subgrade complicate an interpretation of observations in the field. For these reasons, a low temperature cracking experiment was conducted at USACRREL Frost Effects Research Facility (FERF) in summer 1991. The test program consisted of two phases. In Phase I the influence of the pavement geometry and slab thickness on low temperature cracking was investigated. Phase II focused on the low-temperature performance of different asphalt cements. In this phase, four sections were constructed. Each section contained a different asphalt cement. Temperatures at the bottom and top of the insulation, in the middle of the base course and at the bottom and surface of the pavement were recorded monotonically, using cooling panels placed directly on the surface of the pavement. Cracking temperatures for a total of 17 cracks were recorded.

47-1140
Iceberg/seabed interaction events observed during the DIGS experiment.
Lever, J.H., et al, *Journal of offshore mechanics and arctic engineering*, Feb. 1991, Vol.113, MP 3168, p.74-87, 33 refs. For another version see 43-2629.
Bass, D.W., Lewis, C.F.M., Klein, K., Diemand, D., Dyke, M.
Icebergs, Ice scoring, Drift, Grounded ice, Bottom topography, Ocean bottom, Subsurface investigations, Labrador Sea.
The Dynamics of Iceberg Grounding and Scouring (DIGS) experiment was conducted in the Labrador Sea during Aug. 1985. The objectives of the experiment were to obtain full-scale data sets documenting iceberg/seabed interactions, and to obtain by direct observation new information regarding the processes of iceberg scour formation and degradation. Utilizing a vessel and a helicopter, measurements were made of icebergs' above and below-water shapes, plus local winds, waves, currents and tides. Special self-contained motion monitoring packages were deployed by helicopter on icebergs thought to be good grounding candidates. Seabed observations were made directly using the submersible Pisces IV, and extensive side-scan sonar data were collected. This paper describes two dynamic iceberg/seabed interaction events documented during DIGS: the roll-pitting behavior of the 1.2 million-ton domed iceberg "Bertha," and the split grounding behavior of the 7.7 million-ton tabular iceberg "Gladys." This latter event is particularly interesting due to its very energetic nature, and the fact that it represents the only full-scale observation of any iceberg impact with sufficient documentation to yield estimates of the interaction forces. Subsequent to the experiment, the recorded above and below-water shapes were used to obtain hydrostatic stability maps for these icebergs. A time stepping procedure was also developed to re-create these two dynamic events, and comparisons between the observed and simulated motions are provided.

47-1141
Hydroelastic stability of marine risers.
Rzentkowski, G., et al, MP 3169, Marine Dynamics Conference, St. John's, Newfoundland, 1991, [1991], p.31-41, 37 refs.
Hinchey, M.J., Lever, J.H.
Offshore structures, Pipelines, Damping, Hydrodynamics, Dynamic loads, Ocean currents, Ocean waves, Water pressure, Stability, Mathematical models.
This paper presents an overview of hydroelastic stability concepts for multi-pipe marine risers. Marine risers extending over large depths are exposed to a variety of hydrodynamic loads arising from wave and current actions. These loads may induce two types of oscillations: (i) an overall riser motion due to waves, and (ii) relative pipe motions due to waves and current. Relative pipe motions can be generated by asymmetric vortex shedding, in a process known as Strouhal periodicity, and by the turbulence in the stream set-up by flow separation and wake formation behind upstream pipes. They may also be generated by hydroelastic phenomena. Here, the elastic array can extract energy from the flow leading to violent self-excited oscillations. Since these mechanisms can exist simultaneously, the state of riser motion is rather complex, and it may be stable in one respect and unstable in another. In the present paper, the authors investigate the question of hydroelastic stability from various points of view, depending on the source of excitation and its physical properties, by considering a particularly simple non-linear oscillator. Implications for riser design are also outlined and discussed.

47-1142
Effects of temperature on an ISL-PVDF shock sensor between + 20 C and -40 C.
Solie, D.J., et al, MP 3170, American Physical Society Topical Conference, 7th, Williamsburg, VA, June 17-20, 1991. Shock compression of condensed matter—1991. Edited by S.C. Schmidt, R.D. Dick, J.W. Forbes, and D.G. Tasker, Amsterdam, Elsevier Science Publishers, 1992, p.891-892, 4 refs.
Johnson, J.B., Dutta, P.K., Kalafut, J.
Shock waves, Strain measuring instruments, Snow compression, Temperature effects.
Temperature calibration tests were done on a Metravib ISL-PVDF shock sensor using a Hopkinson bar from + 20 C to -40 C at three pressure levels: 22 MPa, 38 MPa and 48 MPa. Nearly a 50% decrease in peak signal amplitude at all three pressure levels was observed for a shock sensor temperature decrease from + 20 C to -40 C. The data were well described using a linear fit. The average sensor output decreased (relative to 20 C) -0.72% +/- 0.10%/deg C down to -40 C.

47-1143
Shock wave studies of snow.
Johnson, J.B., et al, MP 3171, American Physical Society Topical Conference, 7th, Williamsburg, VA, June 17-20, 1991. Shock compression of condensed matter—1991. Edited by S.C. Schmidt, R.D. Dick, J.W. Forbes, and D.G. Tasker, Amsterdam, Elsevier Science Publishers, 1992, p.107-110, 10 refs.
Brown, J.A., Gaffney, E.S., Blaisdell, G.L., Sturm, M., Barrett, S.A.
Shock waves, Snow compression, Snow deformation, Wave propagation, Snow density, Snow temperature.
Shock-wave studies of snow have been conducted at stress levels of up to 40 MPa. Analysis of embedded gauges and shock-reverberation techniques were used to determine shock pressure-density data for snow with initial densities ranging from 100 kg/cu m to 520 kg/cu m and temperature ranging from -2 C to -23 C. Shock velocities ranged from about 170 m/s for low density snow to about 280 m/s for high density snow. At constant density and impact velocity, but varying temperature, there was little variation in shock velocity. This indicates that the internal energy and any temperature dependent strength of ice bonds do not measurably affect shock propagation in snow over the temperature and pressure range of these tests. The results also indicate that snow is a highly rate-sensitive material.

47-1144
Simulating multidimensional snow temperature response to a buried object under changing meteorological conditions.
Albert, M.R., et al, MP 3172, Winter annual meeting, Anaheim, CA, Nov. 8-13, 1992, New York, American Society of Mechanical Engineers, 1992, 7p., 4 refs.
McGilvary, W.R.
Snow surface temperature, Infrared photography, Detection, Subsurface investigations, Snow thermal properties, Snow cover effect, Mathematical models.
A multidimensional finite element model is used to conduct preliminary numerical investigations of the effect of a buried

cylinder on snow surface temperatures. The effects of two cylinder materials (aluminum and phenolic) and two snow types are investigated under varied meteorological influences. For the cases investigated, the variability of snow surface temperatures resulted from the ability of the buried object to conduct heat at different rates than the snow and from the ability of the object to retain heat differently than snow. These effects are sufficient to cause a significant thermal contrast at the snow surface. The thermal characteristics of the snow play a large part in the heat balance, and thus the metamorphosis of the snowpack characteristics may control thermal imagery results from objects buried under the snow. The snow surface temperature variability from this investigation is in excess of one centigrade degree, a sufficient amount to be of importance in infrared imagery.

47-1145
Physical variation of water vapor, and the relation with carbon dioxide.
Egan, W.G., et al, *Geophysical research letters*, Dec. 1991, 18(12), MP 3173, p.2245-2248, 30 refs.
Hogan, A.W., Zhu, H.
Polar atmospheres, Atmospheric composition, Water vapor, Carbon dioxide, Atmospheric circulation, Marine atmospheres, Air ice water interaction, Air masses, Humidity, Seasonal variations.
Analysis of the long-term NOAA carbon dioxide flask sample records to examine the exchange among the continental antarctic air mass and other air masses shows a meteorological variation of carbon dioxide concentration. There is an inverse relation between the seasonal variation of carbon dioxide concentration and water vapor at all stations examined. Well established diffusion coefficients indicate an interaction of water and carbon dioxide vapor on the molecular scale. Laboratory experiments using a Fourier transform spectrometer show carbon dioxide to be removed from an airstream in proportion to water vapor precipitated. The authors propose that interaction of carbon dioxide and water vapor in the atmosphere provides temporary sinks that can influence the balance of the carbon dioxide budget.

47-1146
Development of a component-based scaling system for ship-ice model tests.
Colbourne, D.B., et al, *Journal of ship research*, Mar. 1992, 36(1), MP 3174, p.77-87, 20 refs.
Lever, J.H.
Icebreakers, Ice breaking, Metal ice friction, Ice solid interface, Ice pressure, Ice navigation, Environmental tests, Mathematical models.
This paper presents the development and verification of a method for conducting and scaling ice resistance model tests based on division of the total resistance into three components. It is shown that each of these components is subjected to a separate scaling law. A comprehensive literature review traces development of the concept of independent components in icebreaking resistance and covers development of nondimensional scaling parameters. A system of analysis and presentation is developed based on nondimensional parameters unique to each of the identified components. A set of experiments was carried out on a highly simplified hull form model to verify the proposed experimental procedure. Data from these experiments demonstrate the excellent data collapse which can be achieved using the developed nondimensional presentation.

47-1147
Synopsis of research conducted under the 1991/1992 northern contaminants program.
Murray, J.L., ed, *Northern Affairs Canada. Environmental studies*, 1992, No.68, 213p., From a workshop in support of the technical and science managers committees on Northern Ecosystems and Native Diets, Ottawa, Mar. 24-25, 1992. Refs. passim.
Shearer, R.G., ed.
Polar atmospheres, Air pollution, Water pollution, Atmospheric circulation, Snow impurities, Environmental impact, Ecosystems, Marine biology, Health, Research projects, Canada.

47-1148
Proceedings.
ASHRAE/DOE/BTECC Conference [on the] Thermal Performance of the Exterior Envelopes of Buildings, 5th, Clearwater Beach, FL, Dec. 7-10, 1992, Atlanta, GA, American Society of Heating, Refrigerating and Air-Conditioning Engineers, 1992, 756p., Refs. passim. For selected papers see 47-1149 through 47-1166.
Thermal insulation, Walls, Weatherproofing, Cold weather performance, Ventilation, Houses, Residential buildings.

47-1149
Gas-filled panels: a thermally improved building insulation.
Griffith, B.T., et al, ASHRAE/DOE/BTECC Conference [on the] Thermal Performance of the Exterior Envelopes of Buildings, 5th, Clearwater Beach, FL, Dec. 7-10, 1992. Proceedings, Atlanta, GA, American Society of Heating, Refrigerating and Air-Conditioning Engineers, 1992, p.96-102, 13 refs.
Arasteh, D.
Thermal insulation, Buildings, Refrigeration, Cellular plastics, Construction materials, Weatherproofing, Panels.

47-1150
Performance of an attic radiant barrier for a simulated Minnesota winter.
Chen, H., et al, ASHRAE/DOE/BTECC Conference [on the] Thermal Performance of the Exterior Envelopes of Buildings, 5th, Clearwater Beach, FL, Dec. 7-10, 1992. Proceedings, Atlanta, GA, American Society of Heating, Refrigerating and Air-Conditioning Engineers, 1992, p.114-122, 7 refs.
Larson, T., Erickson, R.W.
Roofs, Vapor barriers, Thermal insulation, Cold weather performance, Frost protection, Heat loss, Ventilation, Weatherproofing.

47-1151
Experimental long-term performance of some thermal foundation systems.
Goldberg, L.F., et al, ASHRAE/DOE/BTECC Conference [on the] Thermal Performance of the Exterior Envelopes of Buildings, 5th, Clearwater Beach, FL, Dec. 7-10, 1992. Proceedings, Atlanta, GA, American Society of Heating, Refrigerating and Air-Conditioning Engineers, 1992, p.127-136, 3 refs.
Luke, K.W.
Foundations, Thermal insulation, Cold weather performance, Modular construction, Heating, Frost protection, Heat loss, Dehumidification, Weatherproofing.

47-1152
Comparison of energy performance of commonly used insulation configurations for slab-on-grade floors.
Krarti, M., ASHRAE/DOE/BTECC Conference [on the] Thermal Performance of the Exterior Envelopes of Buildings, 5th, Clearwater Beach, FL, Dec. 7-10, 1992. Proceedings, Atlanta, GA, American Society of Heating, Refrigerating and Air-Conditioning Engineers, 1992, p.137-146, 9 refs.
Foundations, Thermal insulation, Floors, Cold weather performance, Frost protection, Heat loss, Weatherproofing.

47-1153
Assessment of apparent soil thermal conductivity.
Sterling, R.L., ASHRAE/DOE/BTECC Conference [on the] Thermal Performance of the Exterior Envelopes of Buildings, 5th, Clearwater Beach, FL, Dec. 7-10, 1992. Proceedings, Atlanta, GA, American Society of Heating, Refrigerating and Air-Conditioning Engineers, 1992, p.147-157, 15 refs.
Foundations, Soil temperature, Thermal conductivity, Soil classification, Soil surveys, Soil water, Thermal insulation, Cost analysis, Data processing.

47-1154
Soil thermal conductivity: effects of saturation and dry density.
Fricke, B.A., et al, ASHRAE/DOE/BTECC Conference [on the] Thermal Performance of the Exterior Envelopes of Buildings, 5th, Clearwater Beach, FL, Dec. 7-10, 1992. Proceedings, Atlanta, GA, American Society of Heating, Refrigerating and Air-Conditioning Engineers, 1992, p.158-165, 17 refs.
Misra, A., Becker, B.R., Stewart, W.E., Jr.
Frozen ground thermodynamics, Thermal conductivity, Soil classification, Soil temperature, Soil water, Soil texture, Saturation, Mathematical models.

47-1155
Thermal properties of wood and wood products.
Goss, W.P., et al, ASHRAE/DOE/BTECC Conference [on the] Thermal Performance of the Exterior Envelopes of Buildings, 5th, Clearwater Beach, FL, Dec. 7-10, 1992. Proceedings, Atlanta, GA, American Society of Heating, Refrigerating and Air-Conditioning Engineers, 1992, p.193-203, 31 refs.
Miller, R.G.
Wood, Thermal conductivity, Walls, Thermal insulation, Construction materials, Manuals, Mathematical models.

47-1156
Convergence criterion in measuring building R-values.
Flanders, S.N., MP 3175, ASHRAE/DOE/BTECC Conference [on the] Thermal Performance of the Exterior Envelopes of Buildings, 5th, Clearwater Beach, FL, Dec. 7-10, 1992. Proceedings, Atlanta, GA, American Society of Heating, Refrigerating and Air-Conditioning Engineers, 1992, p.204-209, 11 refs.
Walls, Thermal insulation, Frost resistance, Construction materials, Cold weather tests, Cold weather performance, Thermal stresses, Heat flux, Weatherproofing, Building codes, Mathematical models.
ASTM C 1155, Standard Practice for Determining Thermal Resistance of Building Envelope Components from In-Situ Data, requires that a calculation of R-value converge on a steady value within criterion bounds. Some field experience suggests that this criterion is often easily met. Some theoretical studies suggest that the criterion may be blind to certain temperature-change conditions. In this paper, long-term field data are converted into synthetic pure wave forms and employed in a computational model. The convergence criterion is tested for several delay periods to determine the worst case for that set of frequencies. The investigation highlighted the effect on R-value calculations of low-frequency temperature inputs, representing periodicities of up to 500 hours. The mathematical simulations allow discrimination between conditions that cause lack of convergence and those that represent a long-term change in R-value. While the convergence strategy suggested in C 1155 is adequate, a more sophisticated algorithm would increase the reliability of the test. The automated data collection process would include periodic Fourier transforms of the hourly data that have been collected, perform a power spectrum analysis, and select the most stringent delay period for performing the convergence test.

47-1157
Impact of hygrothermal gradients on juvenile wood.
Larson, T., et al, ASHRAE/DOE/BTECC Conference [on the] Thermal Performance of the Exterior Envelopes of Buildings, 5th, Clearwater Beach, FL, Dec. 7-10, 1992. Proceedings, Atlanta, GA, American Society of Heating, Refrigerating and Air-Conditioning Engineers, 1992, p.210-218, 14 refs.
Erickson, R.W.
Wood, Frost resistance, Walls, Thermal insulation, Construction materials.

47-1158
Thermal performance of a residential dynamic wall.
Morrison, I.D., et al, ASHRAE/DOE/BTECC Conference [on the] Thermal Performance of the Exterior Envelopes of Buildings, 5th, Clearwater Beach, FL, Dec. 7-10, 1992. Proceedings, Atlanta, GA, American Society of Heating, Refrigerating and Air-Conditioning Engineers, 1992, p.229-234, 21 refs.
Karagiozis, A.N., Kumaran, M.K.
Walls, Thermal insulation, Houses, Residential buildings, Weatherproofing, Ventilation.

47-1159
Application of the transfer function approach in the thermal analysis of dynamic wall structures.
Virtanen, M., et al, ASHRAE/DOE/BTECC Conference [on the] Thermal Performance of the Exterior Envelopes of Buildings, 5th, Clearwater Beach, FL, Dec. 7-10, 1992. Proceedings, Atlanta, GA, American Society of Heating, Refrigerating and Air-Conditioning Engineers, 1992, p.240-251, 4 refs.
Heimonen, I., Kohonen, R.
Walls, Thermal insulation, Heat transfer, Houses, Residential buildings, Ventilation, Heat balance, Thermal analysis, Mathematical models.

47-1160
Performance of wood-based siding in energy-efficient homes located in cold climates.
Kroll, R.E., et al, ASHRAE/DOE/BTECC Conference [on the] Thermal Performance of the Exterior Envelopes of Buildings, 5th, Clearwater Beach, FL, Dec. 7-10, 1992. Proceedings, Atlanta, GA, American Society of Heating, Refrigerating and Air-Conditioning Engineers, 1992, p.260-267, 8 refs.
Au, K.C., Gertjejansen, R.O.
Walls, Thermal insulation, Wood, Houses, Frost resistance, Weatherproofing, Cold weather tests.

47-1161
Analysis of moisture accumulation in a wood-frame wall subjected to winter climate.
Burch, D.M., et al, ASHRAE/DOE/BTECC Conference [on the] Thermal Performance of the Exterior Envelopes of Buildings, 5th, Clearwater Beach, FL, Dec. 7-10, 1992. Proceedings, Atlanta, GA, American Society of Heating, Refrigerating and Air-Conditioning Engineers, 1992, p.467-479, 17 refs.
Thomas, W.C.
Walls, Thermal insulation, Moisture transfer, Wood, Weatherproofing, Cold weather performance, Mathematical models.

47-1162
Air exfiltration and moisture accumulation in residential wall cavities.
Ojanen, T., et al, ASHRAE/DOE/BTECC Conference [on the] Thermal Performance of the Exterior Envelopes of Buildings, 5th, Clearwater Beach, FL, Dec. 7-10, 1992. Proceedings, Atlanta, GA, American Society of Heating, Refrigerating and Air-Conditioning Engineers, 1992, p.491-500, 5 refs.
Kumaran, M.K.
Walls, Thermal insulation, Moisture transfer, Residential buildings, Vapor barriers, Weatherproofing, Cold weather performance, Mathematical models.

47-1163
Moisture control in a ventilated attic.
Samuelson, I., ASHRAE/DOE/BTECC Conference [on the] Thermal Performance of the Exterior Envelopes of Buildings, 5th, Clearwater Beach, FL, Dec. 7-10, 1992. Proceedings, Atlanta, GA, American Society of Heating, Refrigerating and Air-Conditioning Engineers, 1992, p.512-516.
Roofs, Thermal insulation, Ventilation, Weatherproofing.

47-1164
Power demand and energy savings through air leakage control in high-rise residential buildings in cold climates.
Parekh, A., ASHRAE/DOE/BTECC Conference [on the] Thermal Performance of the Exterior Envelopes of Buildings, 5th, Clearwater Beach, FL, Dec. 7-10, 1992. Proceedings, Atlanta, GA, American Society of Heating, Refrigerating and Air-Conditioning Engineers, 1992, p.632-642, 13 refs.
Residential buildings, Air leakage, Ventilation, Cold weather performance, Vapor barriers, Weatherproofing.

47-1165
Creating effective air barriers: materials and techniques.
Rousseau, J., ASHRAE/DOE/BTECC Conference [on the] Thermal Performance of the Exterior Envelopes of Buildings, 5th, Clearwater Beach, FL, Dec. 7-10, 1992. Proceedings, Atlanta, GA, American Society of Heating, Refrigerating and Air-Conditioning Engineers, 1992, p.646-651, 7 refs.
Walls, Thermal insulation, Vapor barriers, Houses, Residential buildings, Air leakage, Weatherproofing.

47-1166
Airtightness standards for residential buildings in Japan.
Yoshino, H., ASHRAE/DOE/BTECC Conference [on the] Thermal Performance of the Exterior Envelopes of Buildings, 5th, Clearwater Beach, FL, Dec. 7-10, 1992. Proceedings, Atlanta, GA, American Society of Heating, Refrigerating and Air-Conditioning Engineers, 1992, p.718-724, 38 refs.
Walls, Thermal insulation, Air leakage, Houses, Residential buildings, Weatherproofing, Building codes.

47-1167
Performance predictions for a passive infrared intrusion detection system.
Lacombe, J., MP 3176, 33rd annual meeting, Orlando, FL, July 19-22, 1992. Proceedings, Northbrook, IL, Institute of Nuclear Materials Management, 1992, p.133-140, 6 refs.
Infrared reconnaissance, Warning systems, Detection, Sensors, Infrared equipment, Radiometry, Statistical analysis, Mathematical models.
A study was conducted to assess the capabilities of an exterior passive infrared (PIR) intrusion detection sensor. The study involved a series of field tests and the development of a sensor performance model. This paper describes the model and presents examples of model output. System sensitivity to changes in target and background surface temperatures, target size, target range, and target speed are shown. The PIR model should prove useful as an aid in determining the proper configuration of such sensors within a fixed-facility or tactical surveillance application.

47-1168
Effects of seasonal variation in the thermal background scene on the detection capability of passive infrared intrusion detection systems.
Peck, L., MP 3177, 33rd annual meeting, Orlando, FL, July 19-22, 1992. Proceedings, Northbrook, IL, Institute of Nuclear Materials Management, 1992, p.141-144, 3 refs.
Infrared reconnaissance, Warning systems, Detection, Sensors, Infrared equipment, Snow cover effect, Seasonal variations.
The interaction of a passive infrared intrusion detection system (IDS) with its environment has been studied by continuously monitoring a voltage indicative of the sensor's proximity-to-alarm status to determine its behavior as the thermal background scene changes diurnally and seasonally. Alarm voltages caused by the detection of a low-threat human intruder have also been recorded occasionally. Concurrently, site characterization data such as solar illumination, air and soil surface temperature and wind speed have been recorded for correlation with the recorded system voltages. This approach identifies situations when the background scene dynamics render the detection capability of this type of IDS unreliable, either by masking the presence of an intruder or by causing frequent nonintruder alarms. In conjunction with a performance model for a specific passive infrared IDS, such as described by J. Lacombe, an understanding of the environment-dependent variation in thermal background scene permits security personnel to set appropriate alarm criteria for the IDS on a daily or seasonal basis, as required.

47-1169
Real time system for flood forecasting of an ice dam outburst.
Fernández, P., et al, International Conference on River Flood Hydraulics, Wallingford, England, Sep. 17-20, 1990. Edited by W.R. White, Wallingford, United Kingdom, Hydraulics Research Limited, 1990, p.85-91, 16 refs.
DLC GB1399.I574 1990
Glacial lakes, Lake bursts, Ice dams, River flow, Flood forecasting, Glacier surges, Hydraulics.

47-1170
Composition and distribution of saturated and aromatic hydrocarbons in nearshore sediments, river sediments, and coastal peat of the Alaskan Beaufort Sea: implications for detecting anthropogenic hydrocarbon inputs.
Steinhauer, M.S., et al, *Marine environmental research*, 1992, 33(4), p.223-253, 20 refs.
Boehm, P.D.
Oceanographic surveys, Environmental impact, Marine deposits, Bottom sediment, Soil pollution, Hydrocarbons, Geochemistry, Chemical analysis, Origin.

47-1171
Analysis of the Beaufort-Mackenzie Basin, Canada: burial, thermal and hydrocarbon histories.
Tang, J., et al, *Marine and petroleum geology*, Oct. 1992, 9(5), p.510-525, 32 refs.
Lerche, I.
Marine geology, Hydrocarbons, Exploration, Geologic structures, Tectonics, Thermal analysis, Stratigraphy, Petroleum industry.

47-1172
Spectroscopic studies of model polar stratospheric cloud films.
Tolbert, M.A., et al, *Spectrochimica acta*, Sep. 1992, 48A(9), p.1303-1313, 17 refs.
Koehler, B.G., Middlebrook, A.M.
Cloud physics, Simulation, Infrared spectroscopy, Heterogeneous nucleation, Water films, Ice sublimation, Spectra, Chemical properties, Ozone.

47-1173
Two polar lows affecting Denmark.
Rasmussen, E.A., et al, *Weather*, Sep. 1992, 47(9), p.326-338, 10 refs.
Aakjaer, P.D.
Air masses, Fronts (meteorology), Atmospheric disturbances, Cloud cover, Air flow, Classifications, Spaceborne photography, Weather forecasting, Atmospheric pressure.

47-1174
Alamosa's amazing anomalies.
Doesken, N.J., *Weatherwise*, Oct.-Nov. 1992, 45(5), p.19-22.
Air temperature, Records (extremes), Winter, Snow cover effect, Deserts, Periodic variations, Topographic effects.

47-1175
Friction against ice and snow.
Balakin, V.A., et al, *Soviet journal of friction and wear*, 1991, 12(3), p.132-143, Translated from Trenie i iznos, 40 refs.
Pereverzeva, O.V.
Metal snow friction, Metal ice friction, Sliding, Ice solid interface, Ice melting, Thermal conductivity, Analysis (mathematics), Mechanical tests.

47-1176
Atmospheric general circulation/mixed layer ocean model for climate studies and long-term weather forecasting.
Meleshko, V.P., et al, *Soviet meteorology and hydrology*, 1991, No.5, p.1-9, Translated from Meteorologiia i gidrologiia, 37 refs.
Air ice water interaction, Atmospheric circulation, Long range forecasting, Snow cover effect, Radiation balance, Mathematical models, Climatic changes.

47-1177
Deposition of sulfur and nitrogen compounds over the USSR.
Vasilenko, V.N., et al, *Soviet meteorology and hydrology*, 1991, No.5, p.19-24, Translated from Meteorologiia i gidrologiia, 6 refs.
Air pollution, Snowfall, Snow impurities, Distribution, Snow surveys, Maps, Scavenging, Chemical properties, Sampling.

47-1178
Results of investigating the middle atmosphere at antarctic station Molodezhnaya.
Ivanova, I.N., et al, *Soviet meteorology and hydrology*, 1991, No.5, p.30-34, Translated from Meteorologiia i gidrologiia, 9 refs.
Polar atmospheres, Air temperature, Atmospheric composition, Cooling, Ozone, Periodic variations, Antarctica—Molodezhnaya Station.
This paper analyzes data on air temperature and wind obtained at Molodezhnaya Station in 1969-1988 and on Heiss I. in 1964-1988. It was found that during these periods virtually the entire middle atmosphere had been cooled. Differences in the behavior of amplitudes and phases of semiannual, annual and 11-year variations are apparently caused by more intensive dynamic processes in the Northern as against the Southern Hemisphere. An analysis is made of the relative variations in total ozone and air temperature, and of the absolute values of wind components observed at Molodezhnaya in 1987-1988. The absence of the spring ozone minimum in 1988 in contrast to 1987, and the difference in the mean vertical wind speed apparently resulted from an intensification of dynamic processes over the Antarctic in 1988. (Auth. mod.)

47-1179
Variations of sea ice area and thickness in the southern ocean due to climate warming.
Baĭkova, I.M., *Soviet meteorology and hydrology*, 1991, No.5, p.41-45, Translated from Meteorologiia i gidrologiia, 18 refs.
Sea ice distribution, Air temperature, Ice cover thickness, Ice air interface, Radiation balance, Global warming, Climatic changes, Seasonal variations.
Variations in the monthly mean thickness and area of sea ice cover in the antarctic region of the southern ocean due to climate warming are determined at the points of a geographic grid, with 1-5 deg latitudinal and 5 deg longitudinal steps. The layer of growing sea ice in the cold season is determined by Zubov's method; that of melting ice in summer months by the method of Budyko. The calculations are made using Strokina's data on radiation balance at the ocean surface. The monthly mean patterns of the ice cover area are presented for modern conditions and also account for a possible 3 C increase in planetary mean air temperature. The analysis is also compared to other studies. (Auth. mod.)

47-1180
Evolution of atmospheric circulation over the North Atlantic in the period of hydrological front displacement.
Semenov, M.V., et al, *Soviet meteorology and hydrology*, 1991, No.5, p.85-89, Translated from Meteorologiia i gidrologiia, 4 refs.
Pereskokov, A.I.
Marine atmospheres, Atmospheric circulation, Fronts (meteorology), Atmospheric disturbances, Subpolar regions, Boundary layer, Atmospheric pressure.

47-1181
Black carbon concentration in a Greenland Dye-3 ice core.
Chýlek, P., et al, *Geophysical research letters*, Oct. 2, 1992, 19(19), p.1951-1953, 18 refs.
Johnson, B., Wu, H.
Ice cores, Ice composition, Greenland.

47-1182
Radiation balance of ridge-tillage with modeling strategies for slope and aspect in the subarctic.
Sharratt, B.S., et al, *Soil Science Society of America. Journal*, Sep.-Oct. 1992, 56(5), p.1379-1384, 16 refs.
Schwarzer, M.J., Campbell, G.S., Papendick, R.I.
Subarctic landscapes, Agriculture, Soil tests, Soil temperature, Radiation absorption, Radiation balance, Slope orientation, Solar radiation, Topographic effects, Temperature control.

47-1183
Topography and soil acidity in an arctic landscape.
Valentine, D.W., et al, *Soil Science Society of America. Journal*, Sep.-Oct. 1992, 56(5), p.1553-1559, 25 refs.
Binkley, D.
Arctic landscapes, Soil analysis, Soil chemistry, Landscape types, Topographic effects, Chemical properties, Ion diffusion, Ecosystems.

47-1184
Seasonal soil loss and erodibility variation on a Miamian silt loam soil.
Bajracharya, R.M., et al. *Soil Science Society of America. Journal.* Sep.-Oct. 1992. 56(5). p.1560-1565. 25 refs.
Lal, R.
Loams, Soil erosion, Seasonal freeze thaw, Soil tests, Seasonal variations, Runoff, Soil conservation, Seepage.

47-1185
Rockslide and debris flow from Mount Cayley, B.C., in June 1984.
Cruden, D.M., et al. *Canadian geotechnical journal.* Aug. 1992. 29(4). p.614-626. With French summary. 41 refs.
Lu, Z.Y.
Landslides, Mass flow, Rock mechanics, Snow cover effect, Damage, Ice dams, Topographic effects.

47-1186
New computerized approach to estimating the thermal properties of unfrozen soils.
Tarnawski, V.R., et al. *Canadian geotechnical journal.* Aug. 1992. 29(4). p.714-720. With French summary. 14 refs.
Wagner, B.
Soil temperature, Thermal conductivity, Thermal properties, Computerized simulation, Forecasting, Computer programs, Soil water migration, Soil composition.

47-1187
Root cold hardiness and native distribution of subalpine conifers.
Coleman, M.D., et al. *Canadian journal of forest research.* July 1992. 22(7). p.932-938. With French summary. 32 refs.
Hinckley, T.M., McNaughton, G., Smit, B.A.
Roots, Plant tissues, Cold tolerance, Cold weather tests, Trees (plants), Forestry, Temperature effects.

47-1188
Effects of summer frosts and subsequent shade on foliage gas exchange in peatland tamarack and black spruce.
Dang, Q.L., et al. *Canadian journal of forest research.* July 1992. 22(7). p.973-979. With French summary. 26 refs.
Lieffers, V.J., Rothwell, R.L.
Trees (plants), Plant physiology, Frost, Cold weather tests, Light effects, Photosynthesis, Simulation, Temperature effects.

47-1189
Surface melting of the (0001) face of TIP4P ice.
Kroes, G.J., *Surface science.* Sep. 15, 1992. 275(3). p.365-382. 52 refs.
Ice physics, Ice melting, Ice surface, Ice water interface, Self diffusion, Molecular energy levels, Hydrogen bonds, Temperature effects, Simulation.

47-1190
Mechanical properties of undisturbed Tone River gravel obtained by *in situ* freezing method.
Goto, S., et al. *Soils and foundations.* Sep. 1992. 32(3). p.15-25. 9 refs.
Suzuki, Y., Nishio, S., Oh-Oka, H.
Soil tests, Artificial freezing, Alluvium, Soil freezing, Laboratory techniques, Soil strength, Mechanical properties, Shear strength.

47-1191
Angular width of the coherent back-scatter opposition effect: an application to icy outer planet satellites.
Mishchenko, M.I., *Astrophysics and space science.* Aug. 1992. 194(2). p.327-333. 25 refs.
Extraterrestrial ice, Satellites (natural), Regolith, Light scattering, Backscattering, Ice optics, Ice cover effect, Remote sensing, Analysis (mathematics).

47-1192
Turbulent structure of wind flow over ice-covered sea surface.
Naito, G., et al. *Journal of wind engineering and industrial aerodynamics.* Oct. 1992. Vol.41. International Conference on Wind Engineering, 8th, Ontario, Canada, July 8-12, 1991. Proceedings. Edited by A.G. Davenport et al. p.283-294. 9 refs.
Sasaki, Y., Nakamura, H.
Sea ice, Turbulent flow, Ice air interface, Wind velocity, Shear stress, Ice cover effect, Turbulent boundary layer, Drift.

47-1193
Galloping instability of ice coated poles.
Durgin, F.H., et al. *Journal of wind engineering and industrial aerodynamics.* Oct. 1992. Vol.41. International Conference on Wind Engineering, 8th, Ontario, Canada, July 8-12, 1991. Proceedings. Edited by A.G. Davenport et al. p.675-686. 7 refs.
Palmer, D.A., White, R.W.
Pipes (tubes), Wind factors, Ice cover effect, Ice air interface, Stability, Oscillations, Wind tunnels, Analysis (mathematics), Design criteria, Power line icing.

47-1194
Mapping Alaska's North Slope with aerial photography.
Harrison, B.V., *Wetlands.* Sep. 1981. p.179-182. 10 refs.
Aerial surveys, Terrain identification, Soil mapping, Infrared mapping, Tundra, Wetlands, Permafrost surveys, United States—Alaska—North Slope.

47-1195
Bromoform in the Nansen Basin in the Arctic Ocean.
Krysell, M., *Marine chemistry.* Apr. 1991. 33(1/2). p.187-197. 27 refs.
Water chemistry, Polar atmospheres, Air water interactions, Algae, Marine biology, Sea water, Ozone.

47-1196
Hydrological principles of the Bavarian Alps. [Wasserwirtschaftliche Grundlagen im bayerischen Alpenraum].
Pfündl, D., *Wasser und Boden.* Aug. 1989. 41(8). p.450-453. In German with English summary. 8 refs.
Water balance, River flow, Alpine landscapes, Forest land, Water reserves, Germany—Alps.

47-1197
Avalanche protection in the Bavarian Alps. [Lawinenschutz in den bayerischen Alpen].
Göttle, A., *Wasser und Boden.* Aug. 1989. 41(8). p.458-462 (p.463 missing). In German.
Avalanche engineering, Snowsheds, Germany—Alps.

47-1198
Rehabilitation of avalanche protection forests. [Die Sanierung von Lawinenschutzwäldern].
Konetschny, H., et al. *Wasser und Boden.* Aug. 1989. 41(8). p.482-486. In German with English summary. 8 refs.
Zenke, B.
Avalanche erosion, Protective vegetation, Forest strips, Snow stabilization, Revegetation, Land reclamation.

47-1199
Non cosine response of optics in the evaluation of bi-hemispherical reflectance of antarctic surfaces.
Zibordi, G., et al. Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992. p.149-157. 11 refs.
Meloni, P.
Albedo, Ice surface, Snow surface, Reflectivity, Solar radiation, Atmospheric density, Antarctica—Victoria Land.
Bi-hemispherical reflectance of earth's surfaces is an important parameter in climatology because of its role in the energy exchange between atmosphere and biosphere. Experimental values of bi-hemispherical reflectance can be obtained by irradiance measurements performed with 2 pi steradian radiometers, provided that the non-cosine response of optics, which could strongly affect the retrieved bi-hemispherical reflectance as a function of the sun zenith, is accounted for in data analysis. By simulating irradiance measurable with a 2 pi steradian non-cosine collector radiometer, accounting for the angular transmission function of optics and sky radiance non- isotropy, theoretical factors have been computed to correct the bi-hemispherical reflectance obtained from irradiance measurements. The description of the correction methodology and retrieved bi-hemispherical reflectance of representative Victoria Land surfaces are given. (Auth.)

47-1200
Interaction of gravity driven flows at Nansen Ice Sheet.
Mastrantonio, G., et al. Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992. p.159-166. 13 refs.
Ocone, R., Argentini, S., Fiocco, G.
Ice sheets, Ice surface, Wind (meteorology), Topographic effects, Antarctica—Nansen Ice Sheet.
During the 1988-89 summer expedition, a three-axis Doppler sodar system was deployed on the Nansen Ice Sheet, a large flat area at the confluence of the Reeves and Priestley glaciers, and ran continuously for about 45 days. The observations show a larger degree of variability in comparison with those recorded during the previous year at the base site. The direction of arrival and the structure of the wind profile reflect the orientation of the axes of the two glaciers and the merging of the two air currents. Some statistical analyses of the collected data are presented, together with examples of the wind field observed. Episodes of the interaction between flows coming from the two glaciers are also discussed. (Auth.)

47-1201
New lidar systems: the DIAL, first calibration campaign at OHP; the automatic backscattering system, state of the art.
Castagnoli, F., et al. Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992. p.185-203. 7 refs.
Ozone, Lidar, Meteorological instruments.
A detailed description of the IROE and SA-CNRS lidar for tropospheric and stratospheric ozone measurements, assembled in June 1990, is presented. The various subsystems, the reliability of the lasers and the acquisition electronics were tested, and the results are discussed. Also described is the automatic backscattering lidar.

47-1202
O3 and NO2 absorption cross section measurements by multipath spectrophotometer.
Bonasoni, P., et al. Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992. p.205-211. 7 refs.
Evangelisti, F., Giovanelli, G.
Ozone, Data processing, Atmospheric composition, Stratosphere.
The measurements of the absolute absorption cross sections of O3 and NO2 in the wavelength ranges 295.0-345.0 nm and 400.0-460.0 nm respectively, were measured in laboratory at room temperature. They were taken by a spectrophotometer with variable multipath cell. This paper discusses the instrumental setup and the processing procedures employed in measuring the O3 and NO2 differential absorption cross sections. The resulting values were subsequently fed into the computing programs of the O3 and NO2 vertical column amounts that were measured by DOAS (Differential Optical Absorption Spectrometer, called "GASCOD") during the last two Italian scientific expeditions to Antarctica, 1988-1990. (Auth. mod.)

47-1203
Energy-balance and surface layer measurements in Antarctica.
Georgiadis, T., et al. Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992. p.213-218. 11 refs.
Giovanelli, G., Bonasoni, P.
Surface temperature, Low temperature research, Heat flux, Weather stations.
This paper reviews studies of the physical behavior of the atmospheric surface layer of Antarctica and the energy balance related to the turbulent fluxes of scalar quantities as calculated by the Monin-Obukhov similarity theory. A broad range of analytical results are examined, along with the instruments used in formulating for future national expeditions in Antarctica a new Energy Balance Remote Station. This is designed to provide for iced over and ice-free areas a complete set of micrometeorological data capable of assessing all the terms of the energy balance equation. (Auth.)

47-1204
International efforts in the study of stratospheric ozone depletion: a 1990 status report.
Kurylo, M.J., Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992. p.221-226. 11 refs.
Research projects, Ozone, Stratosphere.
A review is presented of research projects, organizations and instruments involved in studying stratospheric ozone changes both in Antarctica and in the Arctic. It is pointed out that in large part, this research has been motivated by the desire to understand the response of stratospheric ozone to the atmospheric emission of trace gases from both natural and anthropogenic sources, and thereby to predict the possibility and scope of future ozone perturbations.

47-1205
Ozone absorption and Rayleigh scattering features in sun-photometric measurements taken at ultraviolet wavelengths.
Tomasi, C., et al. Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992. p.227-245. 27 refs.
Vitale, V., Gasperoni, L., Marani, S.
Ozone, Solar radiation, Aerosols, Mathematical models, Data processing, Antarctica—Terra Nova Bay Station.
The solar ultraviolet radiation measurements taken at the Terra Nova Bay Station in both 1988 and 1989 with the sun photometer, model UVISIR, were examined by separately calculating the various attenuation effects produced by atmospheric gases, Rayleigh scattering and aerosol particles. The sun photometric output voltages were first corrected for the sky-diffuse radiance errors and then for the extinction effects produced by nitrogen dioxide, sulphur dioxide and airborne aerosol particles so as to determine the output signals attenuated by Rayleigh scattering and ozone absorption only. On the basis of results obtained, an empirical method is proposed for measuring the short-time changes in vertical atmospheric content of ozone using the sun photometric measurements routinely taken within one of the ultraviolet wavelength intervals. (Auth. mod.)

47-1206
Ice clouds in the antarctic stratosphere: evidence for water removal.
Di Girolamo, P., et al, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.271-275, 10 refs.
Clouds (meteorology), Stratosphere, Water vapor.
Clouds form in the antarctic stratosphere during the winter season when the temperature drops below approximately 200K. Clouds composed of nitric acid hydrates (Type I) appear at temperatures a few degrees above the water ice point. Water ice clouds (Type II) start forming as soon as saturation conditions are reached. Lidar echoes obtained at South Pole have been studied and a criterion for distinguishing Type II from Type I clouds based on the sensitivity of backscattering to temperature has been applied. Water vapor vertical profiles in the presence of clouds have been inferred, and evidence for the water vapor removal by the clouds is discussed. (Auth.)

47-1207
Use of the Brewer spectrophotometer in measurements of total O3, SO2, NO2, UVB and for Umkehr profiling.
Anav, A., et al, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.277-284, 3 refs.
Ciattaglia, L., Guerrini, A., Valenti, C.
Ozone, Measurement, Atmospheric composition, Air pollution, Antarctica—Scott Base, Antarctica—Showa Station.
The use of the Brewer spectrophotometer in Antarctica and in Rome is discussed. Measurements taken at Scott Base show evidence of an ozone hole during the period of Sep.-Oct. every year. Contemporary data, also taken at other sites in Antarctica, confirm values as low as 130-150 D.U. The results of a new program made by A.E.S. (Canada) based on an inversion technique (Umkehr) are shown for Rome and some vertical profiles of ozone are reported. Some data for total SO2 and ozone are examined with the aim to interpret the characteristics of the air pollution due to urban sources. (Auth.)

47-1208
Stratospheric GCM for polar ozone studies: a progress report.
Pitari, G., et al, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.285-316, 31 refs.
Palermi, S., Visconti, G.
Ozone, Mathematical models, Stratosphere.
A progress report is given on the upgrading of a general circulation model of the stratosphere in view of its use for polar ozone studies. Particular emphasis is given to the explicit and detailed parameterization of diabatic processes in the lower stratosphere, in substitution of a simple thermal relaxation law that was present in the original version of the model. Problems connected with spatial truncation and ozone transport are also taken into account. As a result a much better simulation of the stratospheric dynamics is obtained (for example, the closure of the upper stratospheric jet) as well as a noticeable improvement in ozone transport. Finally, a first experiment of polar ozone depletion through heterogeneous processes has been made using a simple parameterization of these chemical reactions. (Auth.)

47-1209
Antarctic temperature perturbation due to the QBO and the secular ozone trend.
Pitari, G., et al, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.317-329, 28 refs.
Visconti, G., Verdecchia, M., Mancini, E.
Ozone, Mathematical models, Air temperature, Numerical models, Polar regions.
A study of the temperature perturbation associated with ozone depletion in the antarctic region was made with a two-dimensional model of the stratosphere and troposphere. The thermodynamic equation is solved using a diabatic forcing which includes the difference of the radiative heating due to ozone absorption of solar radiation with respect to a reference unperturbed case. The same approach has been used to evaluate the high-latitude temperature oscillation introduced by the QBO of the equatorial zonal winds. A significant feedback of ozone on stratospheric temperatures is shown which could have important consequences in the frequency of occurrence for both type 1 and type 2 polar stratospheric clouds. (Auth.)

47-1210
Role of sulfate aerosols in the stratospheric ozone climatology.
Pitari, G., Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.331-347, Refs. p.346-347.
Models, Ozone, Stratosphere, Aerosols, Atmospheric composition.
A 2D model has been used to study the effects of sulfate aerosols on stratospheric ozone. The authors have included in their study background and volcanic aerosols, using different scenarios. The model includes a complete chemical code for both homogeneous and heterogeneous reactions; the basic temperature field is prescribed, while the perturbation introduced by the presence of volcanic aerosols is explicitly predicted. A *delta*-Eddington approximation is used to evaluate the photodissociation rates with aerosols present. It is shown that the partition inside ClOy and NOy families is a key point to assess the potential O3 destruction induced by the presence of sulfate aerosols. Increase of total chlorine in the stratosphere causes a well-known ozone depletion by itself, but the effects could be highly enhanced in the presence of a large amount of volcanic dust, which can also produce different equilibria in the NOy and ClOy reservoirs. (Auth.)

47-1211
Soils of alpine mountains.
Legros, J.P., Weathering, soils & paleosols. Edited by I.P. Martini and W. Chesworth, Developments in Earth Surface Processes. No.2, Amsterdam, Netherlands, Elsevier Science Publishers, 1992, p.155-181, Refs. p.176-181.
DLC QE570.W43 1991
Alpine landscapes, Soil classification, Mountain soils, Weathering, Soil formation, Climatic factors, Vegetation patterns, Soil science, Altitude.

47-1212
Soils of cold climate regions.
Campbell, I.B., et al, Weathering, soils & paleosols. Edited by I.P. Martini and W. Chesworth, Developments in Earth Surface Processes. No.2, Amsterdam, Netherlands, Elsevier Science Publishers, 1992, p.183-201, 30 refs.
Claridge, G.G.C.
DLC QE570.W43 1991
Soil formation, Permafrost weathering, Cryogenic soils, Periglacial processes, Soil composition, Cryoturbation, Chemical properties.
The world's coldest climates are found in the north and south polar lands and within these regions temperature has the greatest influence on weathering and soil development. The arctic and antarctic regions are frigid because they receive little solar radiation owing to their high latitude. In the atmosphere, low humidity and precipitation are a consequence of the cold while significant amounts of fluid water are present in the soils only for short periods during warm months. Thus, water is largely unavailable for weathering and translocation of the weathering products. With increasing latitude, chemical weathering, which is the dominant weathering process in tropical and temperate regions, declines in importance, while physical processes become much more important in soil formation. The soils of cold climate regions differ therefore in many ways from those of temperate regions of the earth. This paper examines processes of weathering and soil formation in such cold regions. (Auth. mod.)

47-1213
I kill avalanches.
Atwater, M.M., *Avalanche review*, Nov. 1992, 11(1), p.4-5.
Avalanche triggering, Rescue operations.

47-1214
Effects of impulse waves on storage reservoirs. [Auswirkungen von Schwallwellen auf Stauanlagen].
Müller, D., et al, *Wasser, Energie, Luft*, 1992, 84(5/6), p.96-100, In German with English summary. 9 refs.
Huber, A.
Reservoirs, Avalanche engineering, Avalanches, Shock waves, Ice loads.

47-1215
ANARE first aid manual (5th ed.).
Gormly, P., Kingston, Tasmania, Australian Antarctic Division, Sep. 1992, 82p.
Cold weather survival, Rescue operations, Health, Safety, Cold exposure, Manuals.
This pocket size manual is designed as a ready reference to be carried on the person. First aid instructions are provided for both general medical emergencies and particularly cold-related emergencies such as hypothermia and frostbite. General emergencies include cardiopulmonary resuscitation, bleeding, shock, fractures, dislocations, sprains, head injuries, wounds, dehydration, and burns. An index of medical supplies and drugs is also included.

47-1216
MINSALT. An experiment with unsalted road in Västerbottens county. [MINSALT. Försök med osaltad väg i Västerbottens län].
Öberg, G., et al, *Sweden. Statens väg- och trafikinstitut. VTI meddelande*, 1991, No.636, 69p. + appends., In Swedish with English summary. 14 refs.
Gregersen, N.P.
Road maintenance, Road icing, Salting, Environmental impact, Cost analysis, Sweden.

47-1217
Effects of studded tyres: consequences of amended regulations. [Effekter av dubbdäck: konsekvenser avändrade bestämmelser].
Carlsson, A., et al, *Sweden. Statens väg- och trafikinstitut. VTI meddelande*, 1992, No.674, 53p. + appends., In Swedish with English summary. 26 refs.
Nordström, O., Perby, H.
Road maintenance, Road icing, Tires, Legislation, Safety, Environmental impact, Cost analysis, Sweden.

47-1218
Scientific cruise report of the 1991 Arctic Expedition ARK VIII/2 of RV *Polarstern* (EPOS II: Study of the European Arctic Shelf, "SEAS," of the European Science Foundation). [Wissenschaftlicher Fahrtbericht über die Arktis-Expedition ARK VIII/2 von 1991 mit FS *Polarstern*].
Rachor, E., ed, *Berichte zur Polarforschung*, 1992, No.115, 150p., 19 refs.
Hydrography, Sea ice, Marine biology, Plankton, Sediments.

47-1219
Postembryonic development of *Paralabidocera antarctica* (I.C. Thompson) (Copepoda, Calanoida) from the fast ice near Syowa Station, Antarctica.
Tanimura, A., *Hydrobiologia*, Oct. 7, 1992, 245(2), p.109-128, 18 refs.
Marine biology, Sea ice, Ice cores, Antarctica—Lützow-Holm Bay, Antarctica—Showa Station.
Six nauplius and five copepodid stages as well as adults of *Paralabidocera antarctica* (I.C. Thompson, 1898) (Copepoda: Calanoida) are described based on specimens obtained from fast ice and collected by a plankton net near Showa Station. The adult male and female are redescribed in detail. Nauplius stages of *P. antarctica* are very similar to the previously described *Acartia* species. Sexual dimorphism becomes apparent from copepodid IV onwards in the morphology of antennule and leg 5. The copepodid stages of this species retain certain characteristics not only of Acartiidae but also of Pontellidae and Parapontellidae. (Auth.)

47-1220
Paradox lost and paradox found.
Kasting, J.F., *Nature*, Feb. 20, 1992, 355(6362), p.676-677, 12 refs.
Atmospheric composition, Carbon dioxide, Paleoclimatology.
The author points out and discusses this reversal in scientific thought: reduced solar luminosity in the past, once perceived as a problem, has been recast as a solution; meanwhile, increased atmospheric CO2, once seen as solution, is now viewed as a problem. How this will eventually work out depends on whether a CO2 paleobarometer method proves able to produce self-consistent reproducible results.

47-1221
Expedition ARKTIS VIII/1 of RV *Polarstern* in 1991. [Die Expedition ARKTIS VIII/1 mit FS *Polarstern* 1991].
Kattner, G., ed, *Berichte zur Polarforschung*, 1992, No.113, 75p., In German and English.
Expeditions, Sea ice, Marine biology, Plankton.

47-1222
Determination of the phase interface of the aggregate state of water in soil.
Kitaev, V.V., *Soviet engineering geology*, 1991, No.3, p.84-92, Translated from Inzhenernaia geologiia. 8 refs.
Mathematical models, Frozen ground thermodynamics, Freeze thaw cycles, Soil water, Phase transformations.

47-1223
Aerosol optical characteristics of the arctic atmosphere.
Sakunov, G.G., et al, *Soviet meteorology and hydrology*, 1990, No.2, p.53-58, Translated from Meteorologiia i gidrologiia. 11 refs.
Timerev, A.A., Barteneva, O.D.
Aerosols, Temperature inversions, Atmospheric composition, Optical properties.

47-1224
Revised estimate of pollutant reserve in the snow cover.
Fedoseev, N.F., et al, *Soviet meteorology and hydrology*, 1990, No.2, p.59-63, Translated from Meteorologiia i gidrologiia. 6 refs.
Fedoseeva, V.I., Makarov, V.N.
Snow impurities, Snow cover, Snow depth, Snow air interface, Snow composition, Analysis (mathematics).

47-1225
Evaluation of ice compression.
Kuznetsov, I.M., et al, *Soviet meteorology and hydrology*, 1990, No.2, p.72-76, Translated from Meteorologiia i gidrologiia. 11 refs.
Kolesov, S.A.
Ice cover strength, Sea ice, Compressive properties, Ice navigation, Ice pressure, Analysis (mathematics).

47-1226
Variability of area of ice cover in Far East seas.
Petrova, V.A., et al, *Soviet meteorology and hydrology*, 1990, No.2, p.77-81, Translated from Meteorologiia i gidrologiia. 9 refs.
Saltanova, T.V., Trofimov, M.IU.
Ice cover, Sea ice distribution, Okhotsk Sea, Bering Sea, USSR—Tatar Strait.

47-1227
Influence of convection and currents on bottom melting of ice during spring heating of a body of water.
Blokhina, N.S., *Soviet meteorology and hydrology*, 1990, No.2, p.82-87, Translated from Meteorologiia i gidrologiia. 17 refs.
Hydrodynamics, Mathematical models, Ice water interface, Ice cover, Convection, Ice melting, Water temperature.

47-1228
Modeling the spatial distribution of the snow cover based on informative cartographic analysis.
Shutov, V.A., *Soviet meteorology and hydrology*, 1990, No.2, p.88-94, Translated from Meteorologiia i gidrologiia. 11 refs.
Snow cover distribution, Mathematical models, Mapping.

47-1229
Inverse relationship between the Earth's thermal regime and variation of the snow-ice cover upon climate warming and cooling.
Baĭkova, I.M., *Soviet meteorology and hydrology*, 1990, No.6, p.21-27, Translated from Meteorologiia i gidrologiia. 20 refs.
Thermal regime, Global change, Global warming, Analysis (mathematics), Albedo, Air temperature, Carbon dioxide, Climatic changes, Snow cover, Ice cover, Pleistocene.

47-1230
Analysis of the estimates of mean climatological rate of the bottom and deep water renewal in the Greenland Sea.
Popov, A.V., *Soviet meteorology and hydrology*, 1991, No.2, p.94-97, Translated from Meteorologiia i gidrologiia. 13 refs.
Mass balance, Sea water, Ocean bottom, Greenland Sea, Norwegian Sea.

47-1231
Analytical model of the dynamics of an arctic eddy lens.
Zharnitskiĭ, E.V., *Oceanology*, Apr. 1990, 30(5), p.544-548, Translated from Okeanologiia. 14 refs.
Mathematical models, Ocean currents.

47-1232
Three-dimensional acoustic waveguide in the Labrador Sea.
Bogdanov, K.T., et al, *Oceanology*, Apr. 1990, 30(5), p.563-565, Translated from Okeanologiia. 6 refs.
Artem'ev, O.V.
Underwater acoustics, Ocean currents, Sound waves, Wave propagation, Labrador Sea.

47-1233
Effect of low temperature on dynamic tensile strength of rocks.
Dutta, P.K., et al, MP 3178, International Symposium on Mining in the Arctic, 2nd, Fairbanks, AK, July 19-22, 1992. Proceedings. Edited by S. Bandopadhyay and M.G. Nelson, Rotterdam, A.A. Balkema, 1992, p.61-69, 16 refs.
Kim, K.S.
Rock mechanics, Frozen rock strength, Rock drilling, Low temperature tests, Dynamic loads, Strain tests, Tensile properties, Temperature effects.
This paper discusses the stress-strain behavior, fracture strength, influence of low temperature, and energy absorption in the dynamic fracturing of a limestone and a granitic rock. Experiments were conducted with a special low-temperature split-Hopkinson pressure bar in the tensile strain rate regime of 80-100 strains/s. The tensile strength was determined by diametral compression of disc samples (Brazilian method) at -40 C and 24 C. Diametral strains to failure were monitored by high-speed digital oscilloscope to observe deformations at microsecond intervals. These data then were compared with the results from room and low-temperature quasi-static tests.

47-1234
Frozen archives. [Les glaces racontent].
Denmark. Ministry of Education and Research, Copenhagen, 1992, 37p., In French and English. Catalog of an exhibition.
Ice cores, Paleoclimatology, Ice sheets, Research projects, Education, Greenland.

47-1235
White phosphorus poisoning of waterfowl in an Alaskan salt marsh.
Racine, C.H., et al, *Journal of wildlife diseases*, 1992, 28(4), MP 3179, p.669-673.
Walsh, M.E., Roebuck, B.D., Collins, C.M., Calkins, D., Reitsma, L., Buchli, P., Goldfarb, G.
Wetlands, Soil pollution, Water pollution, Environmental impact, Explosives, Military facilities, Animals, United States—Alaska.
The cause of the yearly death of an estimated 1,000 to 2,000 migrating dabbling ducks (*Anas* spp.) and 10 to 50 swans (*Cygnus buccinator* and *C. columbianus*) has remained a mystery for the last ten years in Eagle River Flats (ERF), a 1,000 ha estuarine salt marsh near Anchorage, AK, used for artillery training by the U.S. Army. The authors have gathered evidence that the cause of this mortality is the highly toxic, incendiary munition white phosphorus (P4). The symptoms of poisoning observed in wild ducks included lethargy, repeated drinking, and head shaking and rolling. Death was preceded by convulsions. Farm-reared mallards dosed with white phosphorus showed nearly identical behavioral symptoms to those of wild ducks that became sick in ERF. White phosphorus does not occur in nature, but was found in both the sediments where dabbling ducks and swans feed and in the gizzards of all carcasses collected in ERF. It is hypothesized that feeding waterfowl are ingesting small particles of the highly toxic incendiary munition P4 stored in the bottom anoxic sediments of shallow salt marsh ponds.

47-1236
Chemical potential of a layer of water adsorbed on a solid surface.
Takagi, S., *Journal of colloid and interface science*, Oct. 1992, 153(2), MP 3180, p.521-528, 16 refs.
Water films, Liquid solid interfaces, Adsorption, Ice water interface, Thermodynamics, Surface energy, Enthalpy, Wettability, Mathematical models.
The author presents the equilibrium thermodynamics of a layer of water adsorbed on a wettable solid. It seems reasonable to express the adsorption potential with the integration of the van der Waals potential of the power -6 over a given domain of the solid material. First the theory is developed for a layer of water adsorbed on an ice sphere. The theory is then extended to a layer of water adsorbed on a wettable solid of any shape. The chemical potential inside the adsorption layer includes the pressure of water, i.e., the disjoining pressure introduced by Derjaguin. The vapor-water interface, if it exists, can be located by solving the differential equation that the formula of the chemical potential valid on the interface produces when the water pressure is equated to the capillary pressure expressed in terms of the curvature of the surface. The constant that defines the van der Waals potential can be expressed with the material constants if the water is overlaid by the vapor. The importance of the disjoining pressure for causing a flow of adsorbed water is recognized. The theory applies to any liquid that wets a solid surface.

47-1237
Ice impacts on flow along the Missouri River.
Wuebben, J.L., et al, MP 3181, IAHR Symposium on Ice, 11th, Banff, Alberta, June 15-19, 1992. Proceedings. Vol.3, 1992, 10p., 4 refs.
Daly, S.F., White, K.D., Tatinclaux, J.C., Zufelt, J.E.
River ice, Ice jams, River flow, Flow control, Ice cover effect, Dams, Reservoirs, Water reserves, United States—Missouri River.
In recent years, drought conditions in the Missouri River basin have required more accurate control of releases at Gavins Point Dam, the furthermost downstream flow control structure on the river, in order to meet competing water needs for irrigation and recreation upstream and for navigation and municipal and industrial water supply downstream. In winter, ice accumulations can seriously affect flow distribution along the river. This paper summarizes a study of such ice effects. It proposes methods to determine minimum flow releases at Gavins Point Dam to meet downstream water supply without unduly depleting upstream reservoirs.

47-1238
Israel River ice control structure.
Axelson, K.D., MP 3182, Annual conference, 15th, Denver, CO, June 10-14, 1991. Proceedings, Madison, WI, Association of State Floodplain Managers, 1991, p.349-352, 4 refs.
River ice, Ice jams, Ice control, Frazil ice, Flood control, United States—New Hampshire.

47-1239
Ice jam flood frequency analysis techniques.
Zufelt, J.E., et al, MP 3183, Annual conference, 15th, Denver, CO, June 10-14, 1991. Proceedings, Madison, WI, Association of State Floodplain Managers, 1991, p.353-356, 2 refs.
Wuebben, J.L.
River ice, Ice jams, Flood forecasting.

47-1240
Observation and measurement of ice movement and sediment transport on the St. Marys River during early opening of navigation 15-31 March 1992.
Zabilansky, L.J., et al, MP 3184, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, 1992, 76p., 10 refs.
Frankenstein, G.E., Tuthill, A.M.
River ice, Ice navigation, Shore erosion, Sediment transport, Banks (waterways), Channel stabilization, Docks, Locks (waterways), United States—Michigan—St. Marys River.

47-1241
Is the extent of glaciation limited by marine gas-hydrates.
Paull, C.K., et al, *Geophysical research letters*, Mar. 1991, 18(3), p.432-434, 32 refs.
Ussler, W., III, Dillon, W.P.
Glaciation, Atmospheric composition, Global warming, Paleoclimatology, Glacier oscillation, Air ice water interaction, Hydrates, Marine deposits, Bottom sediment, Marine atmospheres.

47-1242
Wind-chill—it's sensational.
Dixon, J.C., *Weather*, May 1991, 46(5), p.141-144, 9 refs.
Wind chill, Weather observations, Cold exposure.

47-1243
International law and the Antarctic Treaty System.
Watts, A., Cambridge, England, Grotius Publications Limited, 1992, 469p., Refs. p.451-460.
International cooperation, Environmental protection, Natural resources, Exploration, Legislation, Antarctica.

47-1244
Ice jam flood assessment—Yukon River at Dawson.
Gerard, R., et al, Whitehorse, Indian and Northern Affairs Canada, Mar. 1992, 145p., 18 refs.
Jasek, M., Hicks, F.
River ice, Ice jams, Flood forecasting, Water level, Ice scoring, Ice breakup, Ice cover effect, Banks (waterways), Channel stabilization, Computerized simulation, Canada—Yukon Territory—Dawson City.

47-1245
Karginsky sea terraces in northern West Siberia and the problem of the Sartan glaciation. [Karginskie morskie terrasy na severe Zapadnoĭ Sibiri i problema Sartanskogo oledeneniia].
Avdalovich, S.A., et al, *Akademiia nauk SSSR. Izvestiia. Seriia geograficheskaia*, Jan.-Feb. 1984, No.1, p.89-100, In Russian. 8 refs.
Bidzhiev, R.A.
Terraces, Paleoclimatology, Glacial deposits, Glaciation, USSR—Siberia.

47-1246
New reports theorizing on the periglacial zone and historical geocryology. [Novye obobshchaiushchie svodki po perigliatsialu i istoricheskoĭ geokriologii].
Velichko, A.A., et al, *Akademiia nauk SSSR. Izvestiia. Seriia geograficheskaia*, Mar.-Apr. 1984, No.2, p.113-119, In Russian.
Nechaev, V.P.
Periglacial processes, Geocryology, Theories.

47-1247
Evaluating the nival-glacial climate of mountains to be used for recreation. [Otsenka nival'no-gliatsial'nogo klimata gor dlia rekreatsii].
Suprunenko, IU.P., *Akademiia nauk SSSR. Izvestiia. Seriia geograficheskaia*, July-Aug. 1984, No.4, p.34-41, In Russian. 20 refs.
Wind chill, Nival relief, Climatology, Air temperature, Mountains.

47-1248
Problems in studying geographical regularities in the characteristics of snow cover hardness. [Voprosy issledovaniia geograficheskikh zakonomernosteĭ kharakteristik prochnosti snezhnogo pokrova].
Samoĭlov, R.S., et al, *Akademiia nauk SSSR. Izvestiia. Seriia geograficheskaia*, July-Aug. 1984, No.4, p.86-90, In Russian. 19 refs.
Ushakov, A.I., Khodakov, V.G.
Snow cover, Snow hardness, Snow strength.

47-1249
Reconstruction of the development of vegetation in the high-latitude Arctic. [Rekonstruktsiia razvitiia rastitel'nosti v vysokoshirotnoĭ Arktike].
Serebriannyĭ, L.R., et al, *Akademiia nauk SSSR. Izvestiia. Seriia geograficheskaia*, Nov.-Dec. 1984, No.6, p.75-84, In Russian. 15 refs.
Vegetation patterns, Paleobotany.

47-1250
Global changes in the environment as "mirrored" in an ice core. [Global'nye izmeneniia prirody v "zerkale" ledianogo kerna].
Kotliakov, V.M., *Priroda*, July 1992, No.7, p.59-68, In Russian.
Global change, Climatic changes, Ice cores, Environmental impact, Aerosols, Air temperature.
Ice cores extracted at Vostok Station are analyzed. The discussion includes age and temperature of the ice, atmospheric precipitation, aerosols, and anthropogenic impact on atmospheric composition.

47-1251
Oscillations of mountain glaciers in post-glacial time. [Kolebaniia gornykh lednikov v poslelednikovoe vremia],
Solomina, O.N., *Priroda*, May 1992, No.5, p.56-65, In Russian.
Mountain glaciers, Glacier oscillation, Glacier surveys.

47-1252
Geological map of the Arctic. [Geologicheskaia karta Arktiki],
Shlezinger, A.E., *Priroda*, Sep. 1991, No.9, p.52-53, In Russian. 1 ref.
Geological maps.

47-1253
Global warming and future agroclimatic resources of the Russian Plain. [Global'noe poteplenie i budushchie agroklimaticheskie resursy Russkoĭ ravniny],
Sirotenko, O.D., et al, *Priroda*, Mar. 1991, No.3, p.83-88, In Russian. 3 refs.
Velichko, A.A., Dolgiĭ-Trach, V.A., Klimanov, V.A.
Global change, Global warming, Climatic changes, Agriculture.

47-1254
Assuring durability of reinforced concrete structures during construction under winter conditions. [Obespechenie dolgovechnosti zhelezobetonnykh konstruktsiĭ v protsesse vozvedeniia v zimnikh usloviiakh],
Cherniavskiĭ, V.L., *Promyshlennoe stroitel'stvo*, Sep. 1990, No.9, p.19, In Russian. 3 refs.
Reinforced concretes, Cold weather construction, Concrete structures.

47-1255
Mechanism of mass transfer and chemogenic deformation of frozen ground during its interaction with saline solutions. [Mekhanizm massoperenosa i khemogennogo deformirovaniia merzlykh porod pri vzaimodeĭstvii ikh s rastvorami soleĭ],
Lebedenko, IU.P., *Moscow. Universitet. Vestnik. Seriia 4: Geologiia*, July-Aug. 1990, No.4, p.55-66, In Russian. 12 refs.
Frozen ground mechanics, Frozen ground physics, Mass transfer, Deformation, Saline soils.

47-1256
Antarctic total ozone change correlated to the stratosphere wind and temperature during the polar night.
Xiong, K., et al, *Antarctic research (Chinese edition)*, June 1992, 4(2), p.45-50, In Chinese with English summary. 10 refs.
Hu, R.M., Shi, G.Y.
Ozone, Stratosphere, Air temperature, Wind (meteorology), Antarctica—Showa Station.
Analysis of total amount of ozone variation, and its relation to the wind speed temperature and the rate of temperature change at 50 hPa height over Showa Station during the polar night in 1987, is made by using the total amount of ozone and upper air data at Showa Station from 1982 to 1987. It is found that there is a good coherence between total amount of ozone and the wind speed at 50 hPa height during the polar night. According to the principle of thermal wind, the authors calculated the thermal advection during the polar night in 1987. A good coherence between total amount of ozone and the thermal advection at 50 hPa height was found, also that the temperature variation was caused by thermal advection. It is suggested that stratospheric ozone does not have a significant air heating function. (Auth. mod.)

47-1257
Grounding of the *Bahia Paraiso*: microbial ecology of the 1989 antarctic oil spill.
Karl, D.M., *Microbial ecology*, 1992, 24(1), p.77-89, 21 refs.
Ocean environments, Oil spills, Water pollution, Hydrocarbons, Degradation, Microbiology, Ecology, Environmental impact, Temperature effects, Marine biology, Bottom sediment, Antarctica—Arthur Harbor.
This report represents the evaluation by a group of scientists who investigated the effects of the *Bahia Paraiso* oil spill near Arthur Harbor. Microbial hydrocarbon oxidation potential (CO_2-14 evolved from C-14 labeled hexadecane) was detected throughout both the oil-impacted and control regions. Hexadecane was mineralized at extremely low rates (0.13-1.21 pmol/g sediment dry weight/day); microbiological turnover time exceeded 2 years. The acute effects of DFA (measured over exposure periods of 3-7 days) on the metabolic activities of sedimentary microorganisms appear to be negligible even at seawater saturation concentrations of DFA. Long-term exposure (120 days) to varying concentrations of DFA resulted in significant decreases (>90%) in total ATP, but had either no effect or a slight stimulatory effect on metabolic activity and production. In contrast to planktonic microbial communities, increasing incubation temperatures of between 0 and 30 C had a positive effect on rates of metabolism and production of sedimentary assemblages. These results may influence the overall weathering rates of hydrocarbons deposited in the intertidal and supratidal regions of Arthur Harbor and other polar regions. (Auth. mod.)

47-1258
Skeletal modeling of ice leads.
Banfield, J., *IEEE transactions on geoscience and remote sensing*, Sep. 1992, 30(5), p.918-923, 17 refs.
Sea ice, Polynyas, Spaceborne photography, Synthetic aperture radar, Detection, Image processing, Data processing, Classifications, Mathematical models.

47-1259
Inversion of snow parameters from passive microwave remote sensing measurements by a neural network trained with a multiple scattering model.
Tsang, L., et al, *IEEE transactions on geoscience and remote sensing*, Sep. 1992, 30(5), p.1015-1024, 28 refs.
For another version see 46-4261.
Snow cover, Surface temperature, Remote sensing, Radiometry, Surface properties, Scattering, Snow optics, Analysis (mathematics), Data processing, Radiation.
The inversion of snow parameters from passive microwave remote sensing measurements is performed with a neural network trained with a dense media multiple scattering model. The basic idea is to use the input-output pairs generated by the scattering model to train the neural network. Once the neural network is trained, it can invert snow parameters speedily from the measurements. This paper describes the simultaneous inversion of three parameters: mean-grain size of ice particles in snow, snow density, and snow temperature from five brightness temperatures. It is shown that the neural network gives good results for the inversion of parameters from the simulated data, for which the absolute percentage errors for mean-grain size of ice particles and snow density are less than 10% and the absolute error for snow temperature is less than 3 K. The neural network with the trained weighting coefficients of the three-parameter model is used to invert the SSMI data over the antarctic region. The algorithm inverts 30,000 sets of 5-channel brightness temperatures of Antarctica in only 10 cpu min on a VAX 3500 workstation. Validity of the inversion results is discussed in view of the limited number of parameters used and the much more complicated real-life situation in Antarctica. (Auth. mod.)

47-1260
HF bi-phase shift keying radar: application to ice sounding in western Alps and Spitsbergen glaciers.
Nicollin, F., et al, *IEEE transactions on geoscience and remote sensing*, Sep. 1992, 30(5), p.1025-1033, 11 refs.
Glacier thickness, Remote sensing, Glacier surveys, Radar echoes, Sounding, Performance, Ice solid interface, Subsurface investigations, Data processing.

47-1261
Ranging performance of satellite laser altimeters.
Gardner, C.S., *IEEE transactions on geoscience and remote sensing*, Sep. 1992, 30(5), p.1061-1072, 14 refs.
Topographic surveys, Remote sensing, Spacecraft, Lasers, Height finding, Performance, Ice sheets, Analysis (mathematics).

47-1262
Thickness profiling of freshwater ice using a millimeter-wave FM-CW radar.
Yankielun, N.E., et al, *IEEE transactions on geoscience and remote sensing*, Sep. 1992, 30(5), MP 3185, p.1094-1100, 13 refs.
Arcone, S.A., Crane, R.K.
Lake ice, River ice, Ice cover thickness, Ice surveys, Airborne radar, Radar echoes, Performance, Profiles, Scattering, Design.
A prototype broadband millimeter wave (26.5 to 40 GHz) FM-CW radar employing digital signal processing techniques has been developed for profiling the thickness of freshwater ice. The radar was tested at elevations of up to 7 m above ice surfaces and at speeds up to 40 km/h both from a surface vehicle and a helicopter. The thickness of pond and river ice sheets between 3 and 35 cm thick with and without fresh snow cover and minimal surface roughness showed direct correlation with borehole thickness measurements. Losses due to volume scattering by imbedded air bubbles did not significantly affect system capability to discern the air/ice and ice/water scattering boundaries.

47-1263
Winter Icing and Storms Project (WISP).
Rasmussen, R., et al, *American Meteorological Society. Bulletin*, July 1992, 73(7), p.951-974, Refs. p.972-974.
Aircraft icing, Research projects, Storms, Supercooling, Ice forecasting, Atmospheric physics, Cloud droplets, Meteorological data, Aerial surveys.

47-1264
Protection of membrane integrity in *Medicago sativa* L. by glycinebetaine against the effects of freezing.
Zhao, Y., et al, *Journal of plant physiology*, Oct. 1992, 140(5), p.541-543, 18 refs.
Aspinall, D., Paleg, L.G.
Plant tissues, Plant physiology, Freezing, Protection, Cold tolerance, Temperature effects, Temperature control, Cold weather tests, Solutions.

47-1265
Sticking of HCl and ClOH to ice: a computational study.
Kroes, G.J., et al, *Journal of physical chemistry*, 1992, 96(17), p.7079-7088, 60 refs.
Clary, D.C.
Stratosphere, Ice vapor interface, Adsorption, Cloud physics, Surface energy, Scavenging, Mathematical models, Chemical properties, Molecular energy levels, Ozone.

47-1266
Evolution of dissolved and particulate matter during the ice-covered period in a deep, high-mountain lake.
Catalan, J., *Canadian journal of fisheries and aquatic sciences*, May 1992, 49(5), p.945-955, With French summary. 57 refs.
Limnology, Lake water, Suspended sediments, Ecology, Decomposition, Nutrient cycle, Ice cover effect, Subglacial observations, Light effects.

47-1267
Response of a subarctic lake chain to reduced sewage loading.
Choulik, O., et al, *Canadian journal of fisheries and aquatic sciences*, June 1992, 49(6), p.1236-1245, With French summary. 36 refs.
Moore, T.R.
Limnology, Lake water, Sewage disposal, Water pollution, Water chemistry, Ice cover effect, Snowmelt, Environmental impact, Ecosystems.

47-1268
Temperature-precipitation relationships for Canadian stations.
Isaac, G.A., et al, *Journal of climate*, Aug. 1992, 5(8), p.822-830, 14 refs.
Stuart, R.A.
Air temperature, Climatology, Precipitation (meteorology), Correlation, Climatic changes, Meteorological data, Weather stations, Long range forecasting.

47-1269
Canadian Climate Centre second-generation general circulation model and its equilibrium climate.
McFarlane, N.A., et al, *Journal of climate*, Oct. 1992, 5(10), p.1013-1044, 45 refs.
Boer, G.J., Blanchet, J.P., Lazare, M.
Climatology, Atmospheric circulation, Air temperature, Climatic factors, Ice cover effect, Mathematical models, Climatic changes, Periodic variations.
The Canadian Climate Centre second generation general circulation model is described. Important features of the new version include an interactive cloudiness parameterization, improved solar and terrestrial radiative heating calculations, a more sophisticated treatment of land surface processes, and a simple ocean mixed-layer model with a thermodynamic sea ice component. Results from a ten-year climate simulation made with the new model are presented and compared with observed climatology. The comparison is made for the Dec.-Feb. and June-Aug. periods. The model reproduces the observed climatology in a generally successful manner. Included are simulated snow volume and sea ice thickness variations on and surrounding Antarctica. (Auth. mod.)

47-1270
Greenhouse gas-induced climate change simulated with the CCC second-generation general circulation model.
Boer, G.J., et al, *Journal of climate*, Oct. 1992, 5(10), p.1045-1077, 39 refs.
McFarlane, N.A., Lazare, M.
Climatology, Climatic changes, Air temperature, Carbon dioxide, Global warming, Sea ice distribution, Ice cover effect, Temperature effects, Climatic factors, Simulation.
The Canadian Climate Centre second-generation atmospheric general circulation model coupled to a mixed-layer ocean incorporating thermodynamic sea ice is used to simulate the equilibrium climate response to a doubling of CO_2. The results of the simulation indicate a global annual warming of 3.5 C with enhanced warming found over land and at higher latitudes. Precipitation and evaporation rates increase by about 4%, and cloud cover decreases by 2.2%. Soil moisture decreases over continental Northern Hemisphere land areas in summer. The frozen component of soil moisture decreases and the liquid component increases in association with the increase of temperature at higher latitudes. The simulated accumulation rate of permanent snow cover decreases markedly over Greenland and increases slightly over Antarctica. Seasonal snow and sea ice boundaries retreat, but local decreases in planetary albedo are counteracted by tropical increases, so there is little change in the global average. Large-scale patterns of change are found in mean sea level pressure accompanied by a general decrease in short-term variability. (Auth. mod.)

47-1271
Large-scale patterns and variability of snowmelt and parameterized surface albedo in the Arctic Basin.
Robinson, D.A., et al. *Journal of climate*, Oct. 1992, 5(10), p.1109-1119, 64 refs.
Snow cover distribution, Spaceborne photography, Sea ice, Snowmelt, Albedo, Snow cover effect, Climatic factors, Image processing, Seasonal variations.

47-1272
Tracing upper waters of the Nansen Basin in the Arctic Ocean.
Anderson, L.G., et al. *Deep-sea research*, 1992, 39(2A)Suppl., p.S425-S433, 19 refs.
Jones, E.P.
Sea water, Ocean currents, Hydrography, Water chemistry, Water transport, Oceanography, Chemical analysis, Distribution.

47-1273
Halocarbon ratio and tritium/He-3 dating of water masses in the Nansen Basin, Arctic Ocean.
Wallace, D.W.R., et al. *Deep-sea research*, 1992, 39(2A)Suppl., p.S435-S458, 39 refs.
Schlosser, P., Krysell, M., Bönisch, G.
Sea water, Ocean currents, Water transport, Hydrography, Water chemistry, Isotope analysis, Radioactive age determination, Fallout, Oceanography.

47-1274
Internal waves and mixing in the Arctic Ocean.
D'Asaro, E.A., et al. *Deep-sea research*, 1992, 39(2A)Suppl., p.S459-S484, 58 refs.
Morison, J.H.
Ocean currents, Wave propagation, Hydrography, Ice cover effect, Heat transfer, Shear rate, Oceanography, Topographic effects, Profiles.

47-1275
Distribution of dominant copepods in the Nansen Basin, Arctic Ocean, in summer.
Hirche, H.J., et al. *Deep-sea research*, 1992, 39(2A)Suppl., p.S485-S505, 48 refs.
Mumm, N.
Oceanography, Marine biology, Hydrography, Plankton, Distribution, Ocean currents, Ecosystems, Biomass.

47-1276
Recent distribution of planktonic foraminifera in the Nansen Basin, Arctic Ocean.
Carstens, J., et al. *Deep-sea research*, 1992, 39(2A)Suppl., p.S507-S524, 36 refs.
Wefer, G.
Hydrography, Marine biology, Ocean currents, Plankton, Distribution, Ice cover effect, Survival, Oceanography, Ecosystems.

47-1277
Diatom assemblages in arctic sea ice—indicator for ice drift pathways.
Abelmann, A., *Deep-sea research*, 1992, 39(2A)Suppl., p.S525-S538, Refs. p.S535-S538.
Sea ice, Sedimentation, Ice rafting, Marine biology, Plankton, Ice composition, Drift, Distribution, Ice surface, Sampling, Oceanography.

47-1278
Origin of sediment pellets from the arctic seafloor: sea ice or icebergs?.
Goldschmidt, P.M., et al. *Deep-sea research*, 1992, 39(2A)Suppl., p.S539-S565, Refs. p.S562-S565.
Pfirman, S.L., Wollenburg, I., Henrich, R.
Ocean bottom, Icebergs, Bottom sediment, Glacier ice, Sea ice, Drill core analysis, Origin, Soil composition, Oceanography.

47-1279
Combined high-resolution magnetostratigraphy and nannofossil biostratigraphy for late Quaternary Arctic Ocean sediments.
Nowaczyk, N.R., et al. *Deep-sea research*, 1992, 39(2A)Suppl., p.S567-S601, Refs. p.S598-S601.
Baumann, M.
Ocean bottom, Magnetic surveys, Bottom sediment, Quaternary deposits, Stratigraphy, Ocean currents, Sedimentation, Age determination, Geomagnetism.

47-1280
Feasibility and limits of cold preconditioning prior to depositing. [Die Möglichkeiten und Grenzen der kalten Vorbehandlung von Abfällen vor der Ablagerung].
Wiemer, K., et al. *Wasser und Boden*, May 1992, 44(5), p.280,283-284, In German with English summary. 2 refs.
Kern, M.
Cold storage, Waste treatment.

47-1281
GLOBEC: Southern Ocean Program; GLOBEC Workshop on Southern Ocean Marine Animal Populations and Climate Change.
U.S. Global Change Research Program, *Global Ocean Ecosystems Dynamics. GLOBEC report*, Nov. 1991, No.5, 150p., Refs. passim.
Sea ice, Ice temperature, Marine biology, Oceanography, Models.
From May 9-11, 1991 a workshop entitled "GLOBEC Marine Animal Populations and Climate Change in the Southern Ocean" was held at Scripps Institution of Oceanography. This workshop was one in a series convened as part of the Global Ocean Ecosystems Dynamics (GLOBEC) initiative, which has as its general objective the understanding of processes relating to and controlling variability in marine populations. This report provides the results of the Southern Ocean Workshop. An executive summary summarizes the scientific issues addressed at the workshop and the major recommendations from the working groups. This is followed by a more detailed summary of the rationale, objectives and scientific questions set forth at the workshop. Discussions of the international aspects of a GLOBEC Southern Ocean initiative, field program logistics and data management needs are given in sections 4 to 6, respectively. The synopsis of the meeting is followed by a series of overview papers from the plenary presentations that provide general background on many aspects of the physics and biology of the antarctic system. The reports of the working groups are given in Section 7 in their unabridged form to provide details of the discussions at the workshop from which recommendations were obtained. Finally, a glossary and list of meeting attendees are provided as appendices.

47-1282
Glacial-interglacial evolution of greenhouse gases as inferred from ice core analysis: a review of recent results.
Raynaud, D., et al. *Quaternary science reviews*, June 1992, 11(4), p.381-386, 27 refs.
Ice cores, Gas inclusions, Climatic changes.
Ice core analysis provides the most direct evidence of changes in some major greenhouse gases (CO_2, CH_4 and N_2O) over the climatic cycle covering approximately the last 150,000 years. A remarkable overall correlation is observed between the CO_2 or CH_4 record and the climatic changes in the high latitudes of the Southern Hemisphere, with lowest greenhouse gas concentrations found under full glacial conditions. In terms of phase relationship, CO_2 and CH_4 are roughly in phase with the climatic signal during the deglaciation periods; when entering the glaciation, CH_4 appears to decrease in phase with the antarctic cooling, but CO_2 lags strikingly behind. The CH_4 record exhibits a marked signal which is most likely associated with the abrupt cooling of the Younger Dryas. Existing differences between CO_2 and CH_4 records in comparison with climate reflect differences in sources which are mainly oceanic in the case of CO_2 and continental in the case of CH_4. For N_2O only few data are available, suggesting that the N_2O concentrations may also have been lower during the Last Glacial Maximum than during the Holocene. Greenhouse gases are likely to have played an important climatic role in amplifying, together with continental ice, the initial orbital forcing of the glacial- interglacial climatic changes. (Auth.)

47-1283
Seasonal variations of ozone trends.
Entzian, G., et al. *Advances in space research*, 1990, 10(10), Workshops VI, VII, and Symposium 6 of the COSPAR Twenty-seventh Plenary Meeting, Proceedings, p.(10)265-(10)268, 14 refs.
Grasnick, K.H., Taubenheim, J.
DLC QB495.A38
Ozone, Seasonal variations.

47-1284
Quo vadimus re the springtime antarctic ozone depletion?.
Rycroft, M.J., *Advances in space research*, 1990, 10(10), Workshops VI, VII, and Symposium 6 of the COSPAR Twenty-seventh Plenary Meeting. Proceedings, p.(10)275-(10)277, 11 refs.
DLC QB495.A38
Ozone, Research projects, Antarctica.

47-1285
Report of Operation Deep Freeze 85, 1984-1985.
U.S. Naval Support Force Antarctica, 1985, Var. p.
Research projects, Expeditions, Logistics, Organizations, Antarctica.
The support to the National Science Foundation in conjunction with the U.S. Antarctic Research Program, provided by the U.S. Naval Support Force Antarctica from Aug. 1984 to Mar. 1985 as Operation Deep Freeze 85, is described. Included in the logistic support of scientific research were the fundamental life support requirements of food, shelter, water, heat and medical services to McMurdo residents and the logistic resupply of McMurdo, Amundsen-Scott, Byrd and Palmer Stations plus support of Scott Base, the nearby New Zealand camp. An aerial mapping project was again undertaken with the U.S. Geological Survey. A chronological summary of significant events and a list of participating organizations are also provided.

47-1286
Discussion of "Minimization of frazil-ice production by river flow regulation".
Ferrick, M.G., *Journal of hydraulic engineering*, Oct. 1991, 117(10), MP 3186, p.1406-1409, 3 refs.
For paper being discussed see 44-120.
River ice, Frazil ice, Ice control, Flow control, River flow, Ice formation, Ice growth.

47-1287
Discussion of "Minimization of frazil-ice production by river flow regulation".
Calkins, D.J., *Journal of hydraulic engineering*, Oct. 1991, 117(10), MP 3187, p.1402-1405, 8 refs. For paper being discussed see 44-120.
River ice, Frazil ice, Ice control, Flow control, River flow, Ice formation, Ice growth.

47-1288
Snow, hydrology and forests in high alpine areas.
Bergman, H., ed, *International Association of Hydrological Sciences. IAHS publication*, 1991, No.205, 250p., Refs. passim. Proceedings of a symposium held during the 20th General Assembly of the International Union of Geodesy and Geophysics, Vienna, Aug. 11-24, 1991. For individual papers see 47-1289 through 47-1312.
Snowmelt, Runoff forecasting, Snow surveys, Snow cover distribution, Alpine landscapes, River basins, Stream flow, Snow water equivalent, Snow hydrology, Mountain glaciers, Forest land.

47-1289
Modelling of the snow-water equivalent in the mountain environment.
Braun, L.N., *International Association of Hydrological Sciences. IAHS publication*, 1991, No.205, Snow, hydrology and forests in high alpine areas. Edited by H. Bergman, et al, p.3-17, 67 refs. Presented at the Vienna Symposium, Aug. 1991.
Snow water equivalent, Snowmelt, Runoff forecasting, Snow surveys, Snow hydrology, Alpine landscapes, Forest land, Models.

47-1290
Effects of forests near the timberline on avalanche formation.
Gubler, H., et al. *International Association of Hydrological Sciences. IAHS publication*, 1991, No.205, Snow, hydrology and forests in high alpine areas. Edited by H. Bergman, et al, p.19-38, 17 refs. Presented at the Vienna Symposium, Aug. 1991.
Rychetnik, J.
Avalanche formation, Forest lines, Snow cover stability, Vegetation factors, Snow retention, Forest land, Forest strips, Protective vegetation.

47-1291
Snow cover variation in the Alps using NOAA-AVHRR data.
Baumgartner, M.F., et al. *International Association of Hydrological Sciences. IAHS publication*, 1991, No.205, Snow, hydrology and forests in high alpine areas. Edited by H. Bergman, et al, p.41-50, 16 refs. Presented at the Vienna Symposium, Aug. 1991.
Schönenberger, A., Stalder, U.
Snow surveys, Snow cover distribution, Snowmelt, Runoff forecasting, Spaceborne photography, Radiometry, Alpine landscapes, Switzerland.

47-1292
Spatially distributed snowmelt model for application in alpine terrain.
Blöschl, G., et al. *International Association of Hydrological Sciences. IAHS publication*, 1991, No.205, Snow, hydrology and forests in high alpine areas. Edited by H. Bergman, et al, p.51-60, 27 refs. Presented at the Vienna Symposium, Aug. 1991.
Kirnbauer, R., Gutknecht, D.
Snow cover distribution, Snowmelt, Runoff forecasting, Snow surveys, Snow hydrology, Alpine landscapes, Models, Austria.

47-1293
Scale dependent albedo variations and runoff from a glacierized alpine basin.
Brugman, M.M., *International Association of Hydrological Sciences. IAHS publication*, 1991, No.205, Snow, hydrology and forests in high alpine areas. Edited by H. Bergman, et al, p.61-71, 8 refs. Presented at the Vienna Symposium, Aug. 1991.
Glacial hydrology, Glacier mass balance, Meltwater, Runoff forecasting, Mountain glaciers, Glacier ablation, Snow cover effect, Albedo, Canada—British Columbia—Sentinel Glacier.

47-1294
Use of microwave radiometry for characterizing snow storage in large river basins.
Chang, A.T.C., et al, *International Association of Hydrological Sciences. IAHS publication*, 1991, No.205, Snow, hydrology and forests in high alpine areas. Edited by H. Bergman, et al, p.73-80, 15 refs. Presented at the Vienna Symposium, Aug. 1991.
Foster, J.L., Rango, A., Josberger, E.G.
Snow surveys, Snow cover distribution, Snowmelt, Runoff forecasting, Snow water equivalent, Snow hydrology, River basins, Spaceborne photography, Radiometry.

47-1295
Use of microwave radiometry for monitoring the alpine environment.
Keshari, A.K., et al, *International Association of Hydrological Sciences. IAHS publication*, 1991, No.205, Snow, hydrology and forests in high alpine areas. Edited by H. Bergman, et al, p.81-89, 12 refs. Presented at the Vienna Symposium, Aug. 1991.
Singh, R.P.
Snow surveys, Snow depth, Snow density, Snow air interface, Snow hydrology, Runoff forecasting, Radiometry, Mathematical models.

47-1296
Analysis of snow cover patterns as derived from oblique aerial photographs.
Kirnbauer, R., et al, *International Association of Hydrological Sciences. IAHS publication*, 1991, No.205, Snow, hydrology and forests in high alpine areas. Edited by H. Bergman, et al, p.91-99, 17 refs. Presented at the Vienna Symposium, Aug. 1991.
Blöschl, G., Waldhäusl, P., Hochstöger, F.
Snow surveys, Snow cover distribution, Snowmelt, Alpine landscapes, Aerial surveys, Oblique photography, Slopes.

47-1297
Satellite snow cover mapping and snowmelt runoff modelling in Beas basin.
Kumar, V.S., et al, *International Association of Hydrological Sciences. IAHS publication*, 1991, No.205, Snow, hydrology and forests in high alpine areas. Edited by H. Bergman, et al, p.101-109, 8 refs. Presented at the Vienna Symposium, Aug. 1991.
Haefner, H., Seidel, K.
Snow surveys, Snow cover distribution, Snowmelt, Runoff forecasting, Alpine landscapes, River basins, Spaceborne photography, Himalaya Mountains.

47-1298
Indirect evaluation of snow reserves in mountain basins.
Martinec, J., et al, *International Association of Hydrological Sciences. IAHS publication*, 1991, No.205, Snow, hydrology and forests in high alpine areas. Edited by H. Bergman, et al, p.111-119, 6 refs. Presented at the Vienna Symposium, Aug. 1991.
Rango, A.
Snow surveys, Snow cover distribution, Snowmelt, Runoff forecasting, Alpine landscapes, River basins, Snow water equivalent, Snow hydrology, Spaceborne photography, Mathematical models.

47-1299
Areal modelling of snow water equivalent based on remote sensing techniques.
Martinec, J., et al, *International Association of Hydrological Sciences. IAHS publication*, 1991, No.205, Snow, hydrology and forests in high alpine areas. Edited by H. Bergman, et al, p.121-129, 4 refs. Presented at the Vienna Symposium, Aug. 1991.
Seidel, K., Burkart, U., Baumann, R.
Snow surveys, Snow cover distribution, Snowmelt, Runoff forecasting, Alpine landscapes, River basins, Snow water equivalent, Snow hydrology, Spaceborne photography.

47-1300
Transport and sublimation of snow in wind-scoured alpine terrain.
Pomeroy, J.W., *International Association of Hydrological Sciences. IAHS publication*, 1991, No.205, Snow, hydrology and forests in high alpine areas. Edited by H. Bergman, et al, p.131-140, 22 refs. Presented at the Vienna Symposium, Aug. 1991.
Blowing snow, Snow evaporation, Snow air interface, Snow cover distribution, Snow erosion, Alpine landscapes, Wind factors, Mathematical models.

47-1301
Physically based approach to modelling distributed snowmelt in a small alpine catchment.
Ranzi, R., et al, *International Association of Hydrological Sciences. IAHS publication*, 1991, No.205, Snow, hydrology and forests in high alpine areas. Edited by H. Bergman, et al, p.141-150, 20 refs. Presented at the Vienna Symposium, Aug. 1991.
Rosso, R.
Snowmelt, Snow heat flux, Runoff forecasting, Radiation balance, Solar radiation, Albedo, Alpine landscapes, Mathematical models.

47-1302
Mountain snowpack observations by microwave satellite.
Wankiewicz, A., *International Association of Hydrological Sciences. IAHS publication*, 1991, No.205, Snow, hydrology and forests in high alpine areas. Edited by H. Bergman, et al, p.151-160, 6 refs. Presented at the Vienna Symposium, Aug. 1991.
Snow surveys, Snowmelt, Runoff forecasting, Snow water equivalent, Alpine landscapes, Spaceborne photography, Radiometry, Statistical analysis.

47-1303
Satellite snow cover monitoring and snowmelt runoff prediction in the high alpine area of northwestern China.
Chen, X.Z., et al, *International Association of Hydrological Sciences. IAHS publication*, 1991, No.205, Snow, hydrology and forests in high alpine areas. Edited by H. Bergman, et al, p.161-168, 5 refs. Presented at the Vienna Symposium, Aug. 1991.
Zeng, Q.Z., Lan, Y.C.
Snow surveys, Snow cover distribution, Snowmelt, Runoff forecasting, Alpine landscapes, River basins, Spaceborne photography, Mathematical models, China.

47-1304
Physical properties of snow cover and estimation of snowmelt runoff in a small watershed in high alpine Tianshan.
Yang, D.Q., et al, *International Association of Hydrological Sciences. IAHS publication*, 1991, No.205, Snow, hydrology and forests in high alpine areas. Edited by H. Bergman, et al, p.169-177, 6 refs. Presented at the Vienna Symposium, Aug. 1991.
Zhang, Y.S., Zhang, Z.Z., Elder, K Kattelmann, R.
Snow surveys, Snow cover distribution, Snowmelt, Runoff forecasting, Snow temperature, Snow density, Snow depth, Alpine landscapes, River basins, China—Tian Shan.

47-1305
Estimation of streamflow change by global warming in a glacier-covered high mountain area of the Nepal Himalaya.
Fukushima, Y., et al, *International Association of Hydrological Sciences. IAHS publication*, 1991, No.205, Snow, hydrology and forests in high alpine areas. Edited by H. Bergman, et al, p.181-188, 8 refs. Presented at the Vienna Symposium, Aug. 1991.
Watanabe, O., Higuchi, K.
Snowmelt, Runoff forecasting, Glacier melting, Stream flow, Mountain glaciers, Global warming, Climatic factors, Flood forecasting, Mathematical models, Nepal.

47-1306
Relationship between runoff and meteorological factors and its simulation in a Tianshan glacierized basin.
Kang, E.S., *International Association of Hydrological Sciences. IAHS publication*, 1991, No.205, Snow, hydrology and forests in high alpine areas. Edited by H. Bergman, et al, p.189-202, 8 refs. Presented at the Vienna Symposium, Aug. 1991.
Meltwater, Runoff forecasting, Subglacial drainage, Glacial rivers, Mountain glaciers, Snowmelt, Meteorological factors, Statistical analysis, China—Tian Shan.

47-1307
Peak flows from snowmelt runoff in the Sierra Nevada, USA.
Kattelmann, R., *International Association of Hydrological Sciences. IAHS publication*, 1991, No.205, Snow, hydrology and forests in high alpine areas. Edited by H. Bergman, et al, p.203-211, 28 refs. Presented at the Vienna Symposium, Aug. 1991.
Snowmelt, Runoff forecasting, Floods, Stream flow, Alpine landscapes, River basins, Global warming, Forest land, Vegetation factors, United States—California—Sierra Nevada.

47-1308
Snowmelt runoff forecasting: case study of Karadj reservoir, Iran.
Mashayekhi, T., et al, *International Association of Hydrological Sciences. IAHS publication*, 1991, No.205, Snow, hydrology and forests in high alpine areas. Edited by H. Bergman, et al, p.213-220, 2 refs. Presented at the Vienna Symposium, Aug. 1991.
Mahjoub, M.
Snowmelt, Runoff forecasting, Stream flow, River flow, Reservoirs, Statistical analysis, Iran.

47-1309
Performance of a simple degree-day estimate of snow accumulation to an alpine watershed.
Sommerfeld, R.A., et al, *International Association of Hydrological Sciences. IAHS publication*, 1991, No.205, Snow, hydrology and forests in high alpine areas. Edited by H. Bergman, et al, p.221-228, 10 refs. Presented at the Vienna Symposium, Aug. 1991.
Musselman, R.C., Wooldridge, G.L., Conrad, M.A.
Snow surveys, Snowmelt, Runoff forecasting, Watersheds, Snow accumulation, Degree days, Alpine landscapes, United States—Colorado.

47-1310
Characteristics of hydrological processes in a small high mountain basin.
Yang, Z.N., et al, *International Association of Hydrological Sciences. IAHS publication*, 1991, No.205, Snow, hydrology and forests in high alpine areas. Edited by H. Bergman, et al, p.229-236, 4 refs. Presented at the Vienna Symposium, Aug. 1991.
Yang, Z.H., Wang, Q.
Snowmelt, Runoff forecasting, Stream flow, Alpine landscapes, River basins, Active layer, Permafrost hydrology, China.

47-1311
Hydrological interactions in the Mistaya basin, Alberta, Canada.
Young, G.J., *International Association of Hydrological Sciences. IAHS publication*, 1991, No.205, Snow, hydrology and forests in high alpine areas. Edited by H. Bergman, et al, p.237-244, 21 refs. Presented at the Vienna Symposium, Aug. 1991.
Meltwater, Runoff forecasting, Subglacial drainage, Stream flow, Glacial rivers, Mountain glaciers, Glacier oscillation, Canada—Alberta.

47-1312
Analysis of the relationship between lakes' melting regimes and stream runoff.
Zhang, S.Y., et al, *International Association of Hydrological Sciences. IAHS publication*, 1991, No.205, Snow, hydrology and forests in high alpine areas. Edited by H. Bergman, et al, p.245-250, Presented at the Vienna Symposium, Aug. 1991.
Xie, Z.C.
Snowmelt, Lake ice, Runoff forecasting, Stream flow, Ice melting, Alpine landscapes, River basins, Spaceborne photography, China.

47-1313
Ice transport and jamming in river bends.
Bjedov, G., Potsdam, Clarkson University, 1992, 94p., University Microfilms order No.DA9222808, Ph.D. thesis. 60 refs.
River ice, Ice jams, River flow, Ice water interface, Ice cover effect, Frazil ice, Drift, Banks (waterways), Boundary value problems, Mathematical models.

47-1314
Study of ice-covered bend flow.
Tsai, W.F., MP 3188, Iowa City, University of Iowa, 1991, 207p., University Microfilms order No.-DA9217216, Ph.D. thesis. 83 refs.
Icebound rivers, River flow, Ice cover effect, Sediment transport, River ice, Ice water interface, Suspended sediments, Alluvium, Channels (waterways), Mathematical models.

47-1315
Surface and airborne infrared detection of sea ice hazards.
Worsfold, R.D., St. John's, Memorial University of Newfoundland, 1981, 119p., M.Eng. thesis. 38 refs.
Ice detection, Ice reporting, Infrared reconnaissance, Ice floes, Icebergs, Infrared photography, Radar tracking, Radiometry, Mathematical models.

47-1316
Evaluation of recycled asphalt pavements in cold climates.
Mushule, N.K.M., Calgary, Alberta, University, 1990, 123p., M.S. thesis. 52 refs.
Road maintenance, Pavements, Frost resistance, Road icing, Cold weather performance, Bitumens, Mathematical models.

47-1317
Fracture analysis of ice forces on offshore structures.
Ayoub, A.S., Calgary, Alberta, University, 1989, 99p., M.S. thesis. 23 refs.
Ice loads, Ice solid interface, Ice cracks, Ice cover strength, Offshore structures, Ice deformation, Ice breaking, Cracking (fracturing), Crack propagation, Mathematical models.

47-1318
Mountain rescue by the Customs Service. [Il Soccorso Alpino della Guardia di Finanza]
Moretti, B., *Neve e valanghe*, July 1992, No.16, p.16-23, In Italian with English summary.
Avalanches, Rescue operations, Cold weather survival, Safety, Accidents, Italy.

47-1319
New perspectives on the survival chances of a person buried in an avalanche. [Le quattro fasi del seppellimento da valanga]
Brugger, H., et al, *Neve e valanghe*, July 1992, No.16, p.24-31, In Italian with English summary. 10 refs.
Falk, M.
Avalanches, Rescue operations, Cold weather survival, Safety, Accidents, Italy.

47-1320
Snow is their profession—the French "Pisteurs-Secouristes". [La neve é il loro mestiere—I "Pisteurs-Secouristes" Francesi]
Escudero, H., et al, *Neve e valanghe*, July 1992, No.16, p.32-39, In Italian with English summary. 2 refs.
Lambert, R.
Avalanches, Rescue operations, Cold weather survival, Safety, Accidents, France.

47-1321
Avalanche studies in Italy. [Lo studio delle valanghe in Italia]
Peretti, G., *Neve e valanghe*, July 1992, No.16, p.40-47, In Italian with English summary.
Avalanches, Research projects, Organizations, Cost analysis, Italy.

47-1322
1992: Catastrophic avalanches in Turkey. [1992: Valanghe catastrofiche in Turchia]
Gürer, I., *Neve e valanghe*, July 1992, No.16, p.56-61, In Italian with English summary. 3 refs.
Avalanches, Snowstorms, Accidents, Turkey.

47-1323
Nonsteady channel flow of ice as a modified second-order fluid with power-law viscosity.
Man, C.S., *Archive for rational mechanics and analysis*, 1992, Vol.119, p.35-57, 29 refs.
Glacier flow, Ice creep, Glacier ice, Glacier friction, Ice pressure, Ice models, Unsteady flow, Viscous flow, Boundary value problems, Mathematical models.

47-1324
Bank recession—causes, measurement techniques, rates, and predictions, Lake Sakakawea, North Dakota.
Reid, J.R., *U.S. Army Corps of Engineers. Omaha District. Missouri River Division. MRD sediment series*, Sep. 1992, No.38, 67p., 55 refs.
Banks (waterways), Shore erosion, Frost action, Frost penetration, Beaches, Alluvium, Sediment transport, Mass movements (geology), United States—North Dakota.

47-1325
Activities of the Alaska District, Water Resources Division, U.S. Geological Survey, 1992.
Snyder, E.F., ed, *U.S. Geological Survey. Open-file report*, 1992, No.92-479, 21p., Refs. passim.
Research projects, Water reserves, Hydrology, Ground water, Surface waters, Water pollution, Flood forecasting, Glacier surveys, Organizations, United States—Alaska.

47-1326
Influence of physical and biological processes on the concentration of O2 and CO2 in the ice-covered Weddell Sea in the spring of 1988.
Bouquegneau, J.M., et al, *Polar biology*, Sep. 1992, 12(2), p.163-170, 32 refs.
Gieskes, W.W.C., Kraay, G.W., Larsson, A.M.
Ice cover effect, Biomass, Photosynthesis, Water chemistry, Antarctica—Weddell Sea.
In Oct. and Nov. 1988, measurements of oxygen and total dissolved inorganic carbon (TCO2) concentrations were made in the northwestern Weddell Sea to the south and north of the marginal ice edge, in order to estimate the relative importance, regarding their variations, of both biological (photosynthesis and respiration) and physical (transport of O2 and CO2 by turbulent movements and by intrusion from the atmosphere) processes. In the ice-covered region, both respiration and upwelling determined the O2 and TCO2 variations, whilst in the open water just north of the marginal ice edge, photosynthetic activity was the most important factor controlling O2 and TCO2 levels. These findings underline the importance of the activity of the pelagic ecosystem in determining the concentration of O2 and CO2 not only in the ice-free but also in the ice-covered antarctic ocean. (Auth.)

47-1327
Marine bacterioplankton at the Weddell Sea ice edge, distribution of psychrophilic and psychrotrophic populations.
Delille, D., *Polar biology*, Sep. 1992, 12(2), p.205-210, Refs. p.209-210.
Sea ice, Bacteria, Ice cover effect, Sea water, Antarctica—Weddell Sea.
In the eastern Weddell Sea on several transects, from ice-covered through ice melt to open-ocean stations, total and heterotrophic bacteria were estimated to document an enhanced bacteriological biomass expected near the ice edge. The highest numbers of bacteria were found in melted ice cores. All quantitatively studied bacterial parameters were lower under the ice than in the ice samples, but there were no clear vertical gradients in the water column. In the studied spring situation, sea ice occurrence seems to play only a minor role in the general distribution of the seawater bacterioplankton. The bacterial community structure was investigated by carrying out 29 morphological and biochemical tests on 118 isolated strains. The bacterial communities inhabiting antarctic pack ice differ from those found in underlying seawater. Although non-fermentative Gram-negative rods were always dominant in seawater, *Vibrio* sp. represented more than 25% of the strains isolated from some ice samples. The results clearly indicated that a large majority of the bacteria isolated from seawater must be considered psychrotrophic, but that truly psychrophilic strains occur in melted ice and brine samples. (Auth. mod.)

47-1328
Phytoplankton distribution in relation to sea ice, hydrography and nutrients in the northwestern Weddell Sea in early spring 1988 during EPOS.
Bianchi, F., et al, *Polar biology*, Sep. 1992, 12(2), p.225-235, Refs. p.234-235.
Biomass, Ice cover effect, Sea water, Algae, Antarctica—Weddell Sea.
Phytoplankton biomass and distribution of major phytoplankton groups were investigated in relation to sea ice conditions, hydrography and nutrients along three north-south transects in the northwestern Weddell Sea in early spring 1988. Three different zones along the transect could be distinguished: the open water zone, the marginal ice zone, and the closed pack-ice zone. Nutrient concentrations increased towards the south, showing winter values under the closed pack-ice. Centric diatoms such as *Thalassiosira gravida* and *Chaetoceros neglectum* forming large colonies dominated the phytoplankton assemblage in terms of biomass in open water together with large, long chain forming, pennate diatoms, whereas small pennate diatoms such as *Nitzschia* spp. and nanoflagellates prevailed in ice covered areas. Fairly low concentrations of phytoplankton cells were encountered at the southernmost stations and many empty diatom frustules were found in the samples. The enhanced phytoplankton biomass in the Weddell-Scotia Confluence area is achieved through sea ice melting in the frontal zone of two different water masses, the Weddell and the Scotia Sea surface waters. (Auth. mod.)

47-1329
On processes determining the vertical stability of surface waters in the marginal ice zone of the northwestern Weddell Sea and their relationship with phytoplankton bloom development.
Veth, C., et al, *Polar biology*, Sep. 1992, 12(2), p.237-243, 23 refs.
Lancelot, C., Ober, S.
Ice cover effect, Meltwater, Plankton, Ice edge, Sea ice distribution, Antarctica—Weddell Sea.
Ice edge-related phytoplankton blooms following the retreating sea-ice in the marginal ice zone are frequently observed phenomena. Such blooms are generally short-lived and are followed by a strong decrease in the chlorophyll concentration towards the open ocean, generally explained by the degradation of the vertical stability. Solar heating and ice melting, which control the stability of the surface water of the northwestern Weddell Sea during sea-ice retreat in spring, were analyzed in order to relate the spatial features of the phytoplankton ice-edge bloom in 1988 to the density field. Solar heating has little effect on the density of seawater in ice-covered areas because the thermal expansion coefficient is very low near to the freezing temperature. Outside the marginal ice zone, the temperature effect on stratification increases and the combined contribution of melting and heating on buoyancy input to the surface layer is roughly constant. As a consequence, the low phytoplankton stocks in the open ocean adjacent to the marginal ice zone, after an initial bloom peak following the retreating ice in spring, are not necessarily caused by deep turbulent mixing, in contrast to what is often assumed. (Auth.)

47-1330
Nitrogen uptake in the Weddell Sea during late winter and spring.
Kristiansen, S., et al, *Polar biology*, Sep. 1992, 12(2), p.245-251, Refs. p.250-251.
Syvertsen, E.E., Farbrot, T.
Sea ice, Ice cover effect, Biomass, Algae, Water chemistry, Antarctica—Weddell Sea.
Uptake rates of ammonium, nitrate and urea were measured during the EPOS leg 1 cruise to the Weddell Sea in Oct.-Nov. 1988 using the isotope N-15. Nitrate was the most important nitrogen source both for ice algae (f-ratio equal to or greater than 0.88) and for phytoplankton in the water column (f-ratio equal to or greater than 0.85). Indications of a gradual decrease in % new production with time were found in the outer marginal ice zone. Nitrogen uptake rates in ice algae from the sub-ice assemblages were light-limited at *in situ* irradiances. Significant regeneration of ammonium was found in ice algal samples only. (Auth.)

47-1331
Organic carbon in the upper layer and its sedimentation during the ice-retreat period in the Scotia-Weddell Sea, 1988.
Cadée, G.C., *Polar biology*, Sep. 1992, 12(2), p.253-259, Refs. p.258-259.
Sea ice, Biomass, Water chemistry, Suspended sediments, Ice cover effect, Antarctica—Weddell Sea, Scotia Sea.
The maximum of particulate organic carbon (POC) in the surface layer (200-400 micrograms/l) followed the retreating ice from end Nov. to end Dec. In the upper 150 m dissolved organic carbon (DOC) amounted to 10-20 times the POC content. Free floating sediment traps at 150 m showed a daily sedimentation of 0.6-11.6% of the standing stock of POC, 0.1-2.6% of the chlorophyll-*a* and 5-190% of the gross primary production. Maximum sedimentation occurred during grazing of a krill swarm, indicating the important role of krill swarms in the downward flux. Also at most other stations krill faecal strings formed a large part of the downward flux.

47-1332
Respiratory electron transport activity of microplankton in the Weddell Sea during early spring: influence of the ice cover and the ice edge.
Martínez, R., et al, *Polar biology*, Sep. 1992, 12(2), p.275-282, Refs. p.281-282.
Estrada, M.
Plankton, Photosynthesis, Ice cover effect, Antarctica—Weddell Sea.
During early spring the microplankton electron transport system (ETS) activity increased with time and in the pack ice-open water direction. The temporal trend was more obvious than the spatial one. ETS activity ranged from 0.01 to 1.25 ml O2/cu m/h under the ice and from 0.1 to 1.6 ml O2/cu m/h in the open water at the ice edge. ETS/Chl *a* ratios showed the importance of microheterotrophs under the ice, versus a greater phytoplankton dominance in the ice edge-open water zone. The carbon-specific activity reached a maximum (0.43/day) in the innermost zone of the CPI where bacteria dominated. Respiratory activity under the ice is important in producing the oxygen deficit observed, due to the negative balance between photosynthesis and respiration. The ETS activity was at the lower range of that found in the region in summer, and is comparable to that measured in other oligotrophic stratified systems in ocean areas. (Auth. mod.)

47-1333
Effects of antarctic sea ice biota on seeding as studied in aquarium experiments.
Kuosa, H., et al, *Polar biology*, Sep. 1992, 12(3-4), p.333-339, 30 refs.
Norrman, B., Kivi, K., Brandini, F.
Algae, Microbiology, Cryobiology, Sea ice, Antarctica—Weddell Sea.
The potential seeding impact of sea ice microbial communities was studied during late austral winter-early spring 1988 in the Weddell Sea. Experiments were performed in seawater aquariums with natural seawater and seawater enriched with crushed ice. Algal, protozoan and bacterial cell numbers were followed, as well as nutrients and DOC levels. The results showed a potential seeding effect of sea ice communities to the water column. However, the type of ice communities differed greatly from each other and the effect of such seeding will be patchy. Seeding of seawater by ice rich in algae, flagellates and/or particulate organic carbon led to the development of communities dominated either by diatoms or bacteria. (Auth.)

47-1334
Ecology of sea ice biota. 1. Habitat, terminology, and methodology.
Horner, R., et al, *Polar biology*, Sep. 1992, 12(3-4), MP 3189, p.417-427, Refs. p.424-427.
Ackley, S.F., Dieckmann, G.S., Gulliksen, B., Hoshiai, T., Legendre, L., Melnikov, I.A., Reeburgh, W.S., Spindler, M., Sullivan, C.W.
Sea ice, Ecology, Cryobiology.
Polar regions are covered by extensive sea ice that is inhabited by a variety of plants and animals. The environments where the organisms live vary depending on the structure and age of the ice. Many terms have been used to describe the habitats and the organisms. The authors here characterize the habitats and communities and suggest some standard terms for them. They also suggest routine sampling methods and reporting units for measurements of biological and chemical variables. (Auth.)

47-1335
Ecology of sea ice biota. 2. Global significance.
Legendre, L., et al, *Polar biology*, Sep. 1992, 12(3-4), MP 3190, p.429-444, Refs. p.441-444.
Ackley, S.F., Dieckmann, G.S., Gulliksen, B., Horner, R., Hoshiai, T., Melnikov, I.A., Reeburgh, W.S., Spindler, M., Sullivan, C.W.
Sea ice, Ice cover effect, Cryobiology, Ecology, Algae, Water chemistry, Polar regions.
Sea ice not only determines the ecology of ice biota, but also influences the pelagic systems under the ice cover and at ice edges. In this paper, new estimates of arctic and antarctic production of biogenic carbon are derived, and differences as well as similarities between the two oceans are examined. In ice-covered seas, high algal concentrations (blooms) occur in association with several types of conditions. Blooms often lead to high sedimentation of intact cells and faecal pellets. A fraction of the carbon fixed by microalgae that grow in sea ice or in relation to it is exported out of the production zone. This includes particulate material sinking out of the euphotic zone, and also material passed on to the food web. Pathways through which ice algal [illegible]tion does reach various components of the pelagic and benthic food webs, and through them such top predators as marine mammals and birds, are discussed. Processes that favor the production and accumulation of biogenic carbon as well as its export to deep waters and sequestration are discussed, together with those that influence mineralization in the upper ice-covered ocean. (Auth. mod.)

47-1336
Stratospheric sudden cooling after solar proton event over Syowa Station, Antarctica.
Kodama, M., et al, *Journal of geomagnetism and geoelectricity*, 1992, 44(5), p.361-366, 14 refs.
Kohno, T., Kanzawa, H.
Ozone, Stratosphere, Solar activity, Air temperature, Antarctica—Showa Station.
Forty-three solar proton events (SPEs) with energies of greater than 30 MeV, whose time-integrated proton flux throughout an event is above 10,000,000/sq cm, are selected from 4 solar cycles of 1956 to 1990, and their influence on the lower stratospheric temperature was investigated by using radiosonde data from Showa Station. It is shown that 64% of the 33 SPEs in which the radiosonde data were available are followed by a sudden cooling of -2.4 C on average at 20-30 km altitude. Also 69% of the 13 SPEs recorded proton flux above 100,000,000/sq cm, giving a mean value of -3.5 C. Fifteen events accompanied with the GLE (Ground Level Enhancement, with the order of GeV protons) exhibit significant coolings, while two do not. (Auth.)

47-1337
Photosynthetic capacity in microalgae associated with antarctic pack ice.
Lizotte, M.P., et al, *Polar biology*, Oct. 1992, 12(5), p.497-502, 35 refs.
Sullivan, C.W.
Sea ice, Algae, Biomass, Scotia Sea, Antarctica—Weddell Sea.
Previous studies of primary production in antarctic seas have concluded that microalgae associated with sea ice make only a minor contribution to the carbon budget; however, production estimates for sea ice algae have been based almost exclusively on microalgae from nearshore fast ice. The authors measured biomass and rates of photosynthesis (at saturating irradiances) in microalgae collected from offshore pack ice during 4 cruises to the Weddell-Scotia Sea and the region west of the Antarctic Peninsula. Chlorophyll *a* concentrations in pack ice (0.089 to 260 micrograms/l) were as high as reported from fast ice. The photosynthetic capacities are approximately an order of magnitude greater than previously reported for fast ice microalgae, but are similar to rates reported for antarctic phytoplankton. Because pack ice constitutes more than 90% of the ice cover in antarctic seas, and indigenous microalgae have a higher photosynthetic capacity than previously realized, the authors raise the question: has the importance of sea ice algae to primary production in the southern ocean been underestimated? (Auth. mod.)

47-1338
Differential absorption lidar detection of ozone in the troposphere and lower stratosphere.
Browell, E.V., Optoelectronics for environmental sciences, edited by S. Martellucci and A.N. Chester, New York, Plenum Press, 1991, p.77-89, Proceedings of the 14th Course of International School of Quantum Electronics. 21 refs.
Measuring instruments, Ozone, Stratosphere, Troposphere.
The DIAL technique for deriving ozone profiles from lidar measurements is discussed. The NASA airborne DIAL system is described as an example of an advanced field system, and results are presented for studies of: a) photochemically produced ozone in the summertime over the eastern United States and in biomass burning plumes during the dry season over the Amazon Basin of Brazil; b) vertical ozone transport from the mixed layer into the free troposphere via cloud dynamics and from the stratosphere into the troposphere via tropopause fold events; and, c) ozone depletion in the ozone hole over Antarctica. The airborne DIAL measurements discussed in this paper demonstrate the advanced capability of lidar for conducting ozone investigations throughout the troposphere and lower stratosphere under widely different atmospheric conditions. (Auth.)

47-1339
Vapor pressures of solid hydrates of nitric acid: implications for polar stratospheric clouds.
Worsnop, D.R., et al, *Science*, Jan. 1, 1993, 259(5091), p.71-74, Numerous refs.
Fox, L.E., Zahniser, M.S., Wofsy, S.C.
Clouds (meteorology), Stratosphere, Ozone, Atmospheric composition.
Thermodynamic data are presented for hydrates of nitric acid: HNO3 - H2O, HNO3 - 2H2O, HNO3 - 3H2O, and a higher hydrate. Laboratory data indicate that nucleation and persistence of metastable HNO3 - 2H2O may be favored in polar stratospheric clouds over the slightly more stable HNO3 - 3H2O. Atmospheric observations indicate that some polar stratospheric clouds may be composed of HNO3 - 2H2O and HNO3 - 3H2O. Vapor transfer from HNO3 - 2H2O to HNO3 - 3H2O cloud may be a key step in the sedimentation of HNO3, which plays an important role in the depletion of polar ozone. The mechanism proposed here would help explain observed denitrification in both polar regions, and may contribute to the associated north-south asymmetry in the severity of O3 loss. (Auth.)

47-1340
Kinetic coefficient of friction measurements of EG-/AD/S ice on filled Imron paint.
Bell, J., et al, *National Research Council Canada. Institute for Marine Dynamics. Laboratory memorandum*, Nov. 1991, LM-1991-26, 33p. + appends., 2 refs.
Newbury, S.
Protective coatings, Ice friction, Ice prevention, Artificial ice.

47-1341
Proposed standard method for conduct and analysis of ice resistance model tests.
Spencer, D.S., et al, *National Research Council Canada. Institute for Marine Dynamics. Laboratory memorandum*, Feb. 1992, LM-1992-01, 10p., 3 refs.
Jones, S.J., Colbourne, D.B.
Ice navigation, Ice breaking, Ice solid interface, Metal ice friction, Artificial ice, Laboratory techniques, Test chambers, Environmental tests, Mathematical models.

47-1342
Field dropweight ice impact test system at the Institute for Marine Dynamics.
Chin, S.N., *National Research Council Canada. Institute for Marine Dynamics. Laboratory memorandum*, Oct. 1991, LM-1991-11, 9p. + appends., 5 refs.
Ice cover strength, Ice solid interface, Impact tests, Test equipment.

47-1343
Modelling techniques for icebreaking hull forms.
Newbury, S., *National Research Council Canada. Institute for Marine Dynamics. Laboratory memorandum*, Aug. 1991, LM-1991-10, 18p. + appends., 14 refs.
Icebreakers, Ice solid interface, Metal ice friction, Ice navigation, Ice breaking, Ice loads, Test chambers, Environmental tests, Mathematical models.

47-1344
Risk analysis for ice failure in ice-structure interaction.
Parsons, B.L., *National Research Council Canada. Institute for Marine Dynamics. Laboratory report*, May 1990, LR-1990-08, 15p., 36 refs.
Ice cover strength, Ice solid interface, Ice cracks, Ice breaking, Ice deformation, Ice loads, Crack propagation, Brittleness, Statistical analysis, Mathematical models.

47-1345
R-class icebreakers: a bibliography.
Tillotson, J., *National Research Council Canada. Institute for Marine Dynamics. Laboratory memorandum*, Mar. 1990, LM-1990-05, 7p., 55 refs.
Icebreakers, Bibliographies.

47-1346
Some thermal and mechanical properties of flooded ice.
Lozowski, E.P., et al, *National Research Council Canada. Institute for Marine Dynamics. Laboratory memorandum*, Sep. 1990, LM-1990-01, 96p., 12 refs.
Jones, S.J.
Ice growth, Ice heat flux, Ice cover strength, Artificial freezing, Ice (construction material), Ice thermal properties, Flooding, Ice water interface, Mathematical models.

47-1347
Some exploratory tests on circular and sidewall air cushion icebreaker bows.
Hinchey, M.J., et al, *National Research Council Canada. Institute for Marine Dynamics. Laboratory report*, June 1990, LR-1990-12, 60p., 13 refs.
Mak, L.M., Colbourne, D.B.
Icebreakers, Ice breaking, Ice solid interface, Metal ice friction, Ice navigation, Ice cover strength, Ice loads, Test chambers, Environmental tests, Mathematical models.

47-1348
CD model ice—preliminary observations on the effect of density on tank testing.
Spencer, D.S., *National Research Council Canada. Institute for Marine Dynamics. Institute report*, June 1992, IR-1992-11, 7p., 12 refs. Presented at the American Tank Towing Conference, 23rd, New Orleans, June 1992.
Artificial ice, Ice solid interface, Metal ice friction, Ice density, Propellers, Ice navigation, Test chambers, Environmental tests.

47-1349
Repeatability of resistance experiments in ice with a 1:20 scale model of the Canadian R-class icebreaker.
Newbury, S., *National Research Council Canada. Institute for Marine Dynamics. Institute report*, Apr. 1992, IR-1992-10, 7p., 6 refs. Presented at the American Tank Towing Conference, 23rd, New Orleans, June 1992.
Icebreakers, Ice solid interface, Metal ice friction, Ice navigation, Test chambers, Environmental tests.

47-1350
Constricted hydrodynamic flow due to proximate ice blockage over a blade profile in two dimensions.
Shih, L.Y., et al, *National Research Council Canada. Institute for Marine Dynamics. Institute report*, Sep. 1992, IR-1992-20, 6p., 4 refs. Presented at the International Symposium on Propeller and Cavitation, 2nd, Hangzhou, China, Sep. 1-4, 1992.
Zheng, Y.
Ice solid interface, Metal ice friction, Propellers, Ice navigation, Cavitation, Hydrodynamics, Turbulent flow, Test chambers, Environmental tests, Mathematical models.

47-1351
Research on "Ice/Propeller Interaction": JRPA No.6 sub-tasks 5.1.1 and 5.1.2.
Cowper, D.N.B., *National Research Council Canada. Institute for Marine Dynamics. Contractor report*, July 1992, CR-1992-07, 87p., Refs. p.80-87.
Ice solid interface, Metal ice friction, Propellers, Ice loads, Ice navigation, Icebreakers, Environmental tests, Cavitation, Hydrodynamics, Mathematical models.

47-1352
JRPA No.6 propeller/ice interaction: development of model test program.
R.P. Browne Marine Consultants Limited, *National Research Council Canada. Institute for Marine Dynamics. Contractor report*, June 1992, CR-1992-08, 17p. + appends., 22 refs.
Ice solid interface, Metal ice friction, Propellers, Ice loads, Ice navigation, Icebreakers, Environmental tests.

47-1353
Three point loading of freshwater ice beams.
Williams, J.L., *National Research Council Canada. Institute for Marine Dynamics. Laboratory memorandum*, June 1990, LM-1990-13, 44p., 6 refs.
Artificial ice, Ice loads, Ice strength, Ice deformation, Flexural strength, Strain tests, Mathematical models.

47-1354
Mathematical model to describe hinge crack failure of a sheet ice reinforced ridge beam.
Lau, M., *National Research Council Canada. Institute for Marine Dynamics. Contractor report*, Aug 1991, CR-1991-10, 16p. + appends., 5 refs.
Ice cover strength, Ice loads, Ice cracks, Pressure ridges, Ice solid interface, Ice deformation, Ice pressure, Ice models, Flexural strength, Strain tests, Mathematical models.

47-1355
Model test investigation of level and multi-year ridge ice forces on downward breaking conical structures.
Lau, M., *National Research Council Canada. Institute for Marine Dynamics. Contractor report*, Mar. 1990, CR-1990-08, 2 vols., Vol.1: Main report, Vol.2: Appendices. 13 refs.
Ice cover strength, Ice loads, Ice solid interface, Pressure ridges, Ice breaking, Ice friction, Ice models, Flexural strength, Strain tests, Mathematical models.

47-1356
Study of the friction of ice—phase II.
Molgaard, J., *National Research Council Canada. Institute for Marine Dynamics. Contractor report.* June 1990, CR-1990-12, 4p. + append., For paper included as appendix, "Evidence for pressure melting and heat generation by viscous flow of liquid in indentation and impact experiments on ice" by R.E. Gagnon and J. Molgaard, see 46-1741.
Ice friction, Ice pressure, Regelation.

47-1357
Computation of ship/pack ice interaction with wave effect.
Wang, S.L., et al, *National Research Council Canada. Institute for Marine Dynamics. Contractor report.* May 1990, CR-1990-10, 36p., 9 refs.
Hsiung, C.C.
Ice solid interface, Metal ice friction, Ice navigation, Pack ice, Ice loads, Ocean waves, Computer programs, Mathematical models.

47-1358
Report on the investigation of lateral ice pressure techniques in model ice at the Institute for Marine Dynamics.
Hardiman, K.C., *National Research Council Canada. Institute for Marine Dynamics. Contractor report.* June 1992, CR-1992-04, n.p., 13 refs.
Ice solid interface, Metal ice friction, Ice navigation, Ice pressure, Ice models, Artificial ice, Laboratory techniques, Test chambers, Environmental tests, Mathematical models.

47-1359
Thrust deduction and propulsive coefficients of icebreaking vessels.
Drodge, R.M., et al, *National Research Council Canada. Institute for Marine Dynamics. Contractor report.* Apr. 1992, CR-1992-05, 20p. + appends., 15 refs.
Paterson, R.B.
Icebreakers, Ice solid interface, Metal ice friction, Ice navigation, Ice breaking, Ice loads, Propellers, Mathematical models.

47-1360
Modelling of the ice failure processes in ship-ice interaction.
McKenna, R.F., et al, *National Research Council Canada. Institute for Marine Dynamics. Contractor report.* Aug. 1991, CR-1991-11, 156p., 42 refs.
Ice solid interface, Metal ice friction, Ice navigation, Ice loads, Ice pressure, Ice cover strength, Ice breaking, Ice deformation, Flexural strength, Strain tests, Mathematical models.

47-1361
Using the air containing stream for channel ice clearance.
Hsiung, C.C., et al, *National Research Council Canada. Institute for Marine Dynamics. Contractor report.* Jan. 1992, CR-1992-02, 94p., 8 refs.
Wang, S.L.
Ice navigation, Bubbling, Ice control, Channels (waterways), Bubbles, Turbulent flow, Cavitation, Propellers, Computerized simulation, Computer programs, Mathematical models.

47-1362
Full-scale ice breaker trials: CCGS *Sir John Franklin*, Indian Arm/Little Burnt Bay 1991.
Williams, F.M., et al, *National Research Council Canada. Institute for Marine Dynamics. Test report.* July 1991, TR-1991-03, 13p.+ appends., 13 refs.
Icebreakers, Ice navigation, Ice solid interface, Metal ice friction, Ice loads, Cold weather tests.

47-1363
Full scale deflection of ice by an icebreaker.
Gagnon, R.E., et al, *National Research Council Canada. Institute for Marine Dynamics. Laboratory memorandum.* Dec. 1991, LM-1991-29, 4p. + appends.
Spencer, D.S.
Icebreakers, Ice navigation, Ice breaking, Ice solid interface.

47-1364
Continued study of the frictional and cohesive-like behaviour of floating model ice rubble.
Case, P.C., *National Research Council Canada. Institute for Marine Dynamics. Laboratory memorandum.* Dec. 1991, LM-1991-27, 24p. + appends., 11 refs.
Ice friction, Ice adhesion, Ice cover strength, Ice deformation, Floating ice, Ice loads, Internal friction, Shear strength.

47-1365
First-year sea ice forces on a mobile arctic caisson in the Beaufort Sea.
Frederking, R.M.W., et al, *National Research Council Canada. Institute for Marine Dynamics. Institute report.* Feb. 1991, IR-1991-04, 3p., 6 refs. Reprinted from Hansa, Vol.127, No.22, 1990, p.1575-1577.
Timco, G.W., Jones, S.J., Neth, V.
Ice loads, Ice pressure, Ice solid interface, Caissons.

47-1366
Vertical and inclined edge-indentation of freshwater ice sheets.
Finn, D.W., *National Research Council Canada. Institute for Marine Dynamics. Laboratory memorandum.* Sep. 1991, LM-1991-18, 97p., M.E. thesis for the Memorial University of Newfoundland, St. John's. 48 refs.
Ice cover strength, Ice loads, Ice pressure, Ice solid interface, Ice breaking, Ice deformation, Ice cracks, Strain tests, Environmental tests, Test chambers, Mathematical models.

47-1367
Properties of EG/AD/S doped ice at the IMD ice tank.
Melville Shipping Limited, *National Research Council Canada. Institute for Marine Dynamics. Contractor report.* Apr. 1990, CR-1990-05, 31p., 7 refs.
Artificial ice, Doped ice, Ice cover strength, Ice loads, Ice models, Strain tests, Environmental tests, Test chambers.

47-1368
Design and implementation of an in-situ ice compression tester.
Keiley, P., *National Research Council Canada. Institute for Marine Dynamics. Laboratory memorandum.* Dec. 1991, LM-1991-28, 20p. + appends., 5 refs.
Ice cover strength, Ice pressure, Ice loads, Compressive properties, Strain tests, Test equipment, Test chambers, Mathematical models.

47-1369
Surface flaw density from three-point bend tests on ice beams.
Lal, M., *National Research Council Canada. Institute for Marine Dynamics. Contractor report.* Apr. 1991, CR-1991-04, 91p., 8 refs.
Ice strength, Ice cracks, Ice breaking, Ice deformation, Ice loads, Crack propagation, Flexural strength, Strain tests, Computer programs, Statistical analysis, Mathematical models.

47-1370
Simulating marine icing conditions in the refrigerated marine icing wind tunnel.
Lozowski, E.P., et al, *National Research Council Canada. Institute for Marine Dynamics. Contractor report.* Apr. 1991, CR-1991-05, 85p. + appends., 21 refs. Includes a 3.5" high density disk.
Zakrzewski, W.P.
Ship icing, Ice accretion, Ice forecasting, Sea spray, Icing rate, Superstructures, Wind tunnels, Computerized simulation, Computer programs, Mathematical models.

47-1371
Clearing of ice fragments in continuous-mode icebreaking.
Hsiung, C.C., et al, *National Research Council Canada. Institute for Marine Dynamics. Contractor report.* Apr. 1991, CR-1991-06, 102p., 10 refs.
Wang, S.L.
Ice solid interface, Metal ice friction, Icebreakers, Ice breaking, Ice navigation, Ice water interface, Drift, Water flow, Computerized simulation, Computer programs, Mathematical models.

47-1372
1:8 R-class model ice tests: resistance and captive experiments.
Carroll, W.J., *National Research Council Canada. Institute for Marine Dynamics. Contractor report.* Aug. 1990, CR-1990-19, 11p. + appends., 11 refs.
Ice solid interface, Metal ice friction, Icebreakers, Ice breaking, Ice navigation, Ice loads, Test chambers, Environmental tests, Mathematical models.

47-1373
Report on resistance tests of model *Polarstern* in the ice tank.
NORDCO Limited, *National Research Council Canada. Institute for Marine Dynamics. Contractor report.* Feb. 1990, CR-1990-02, 8p. + appends.
Ice solid interface, Metal ice friction, Icebreakers, Ice navigation, Ice loads, Test chambers, Environmental tests, Mathematical models.

47-1374
2-D simulation of rigid body motion in mush ice.
NORDCO Limited, *National Research Council Canada. Institute for Marine Dynamics. Contractor report.* Mar. 1990, CR-1990-03, 32p. + appends., 6 refs.
Ice solid interface, Metal ice friction, Ice navigation, Ice loads, Slush, Ships, Computerized simulation, Computer programs, Mathematical models.

47-1375
Impacts of summer warming on the energy and water balance of wetland tundra.
Rouse, W.R., et al, *Climatic change.* Dec. 1992, 22(4), p.305-326, 29 refs.
Carlson, D.W., Weick, E.J.
Tundra, Wetlands, Permafrost transformation, Water balance, Climatic changes, Global warming, Surface energy, Simulation, Subarctic landscapes, Temperature effects, Evapotranspiration.

47-1376
Passive acoustic emission for quantitative evaluation of freeze thaw and alkali aggregate reaction in concretes.
Taylor, M.A., Sessions sponsored by the Engineering Mechanics Division of the American Society of Civil Engineers, San Antonio, TX, Apr. 13-15, 1992. Proceedings. Nondestructive testing of concrete elements and structures. Edited by F. Ansari et al, New York, American Society of Civil Engineers, 1992, p.1-12, Proceedings held in conjunction with 1992 Structures Congress.
DLC TA440.S87 1992
Concrete freezing, Structural analysis, Concrete aggregates, Acoustic measurement, Freeze thaw cycles, Damage, Structural changes, Air entrainment, Concrete strength.

47-1377
Brillouin and Raman scattering from liquid water.
Nardone, M., et al, *Journal of molecular structure.* July 1992, Vol.270, p.287-299, 19 refs.
Ricci, M.A., Benassi, P.
Water structure, Molecular structure, Supercooling, Low temperature research, Light scattering, Spectra, Spectroscopy, Simulation, Very low frequencies.

47-1378
Plant-dependent CH4 emission in a subarctic Canadian fen.
Whiting, G.J., et al, *Global biogeochemical cycles.* Sep. 1992, 6(3), p.225-231, 50 refs.
Chanton, J.P.
Wetlands, Vapor transfer, Subarctic landscapes, Soil air interface, Atmospheric composition, Vegetation factors, Natural gas, Photosynthesis, Biomass.

47-1379
Physics-based models of snow.
Morris, E.M., NATO Advanced Science Institutes, Series C. Mathematical and Physical Sciences, Vol.345, NATO Advanced Study Institute on Recent Advances in the Modeling of Hydrologic Systems, Sintra, Portugal, July 10-23, 1988. Proceedings. Edited by D.S. Bowles et al, Dordrecht, Netherlands, Kluwer Academic Publishers, 1991, p.85-112, 58 refs.
DLC GB656.2.M33 N38 1991
Snow physics, Snow hydrology, Snowmelt, Snow air interface, Snow impurities, Mathematical models, Runoff forecasting, Meteorological factors.

47-1380
Physically based snowcover model.
Vehviläinen, B., NATO Advanced Science Institutes, Series C. Mathematical and Physical Sciences, Vol.345, NATO Advanced Study Institute on Recent Advances in the Modeling of Hydrologic Systems, Sintra, Portugal, July 10-23, 1988. Proceedings. Edited by D.S. Bowles et al, Dordrecht, Netherlands, Kluwer Academic Publishers, 1991, p.113-135, 26 refs.
DLC GB656.2.M33 N38 1991
Snow cover stability, Snow accumulation, Snowmelt, Snow hydrology, Heat balance, Snow air interface, Runoff forecasting, Mathematical models, Mass balance.

47-1381
Recent advances and future implications of remote sensing for hydrologic modeling.
Engman, E.T., et al, NATO Advanced Science Institutes, Series C. Mathematical and Physical Sciences. Vol.345, NATO Advanced Study Institute on Recent Advances in the Modeling of Hydrologic Systems, Sintra, Portugal, July 10-23, 1988. Proceedings. Edited by D.S. Bowles et al, Dordrecht, Netherlands, Kluwer Academic Publishers, 1991, p.471-495, Refs. p.491-495.
Gurney, R.J.
DLC GB656.2.M33 N38 1991
Remote sensing, Hydrologic cycle, Snowmelt, Precipitation (meteorology), Simulation, Runoff forecasting.

47-1382
Problems of runoff modeling which are particular to the area or climate being modeled.
Dawdy, D.R., NATO Advanced Science Institutes, Series C. Mathematical and Physical Sciences. Vol.345, NATO Advanced Study Institute on Recent Advances in the Modeling of Hydrologic Systems, Sintra, Portugal, July 10-23, 1988. Proceedings. Edited by D.S. Bowles et al, Dordrecht, Netherlands, Kluwer Academic Publishers, 1991, p.541-547, 15 refs.
DLC GB656.2.M33 N38 1991
Runoff forecasting, Snowmelt, Snow hydrology, Simulation, Hydrologic cycle, Climatic factors, Accuracy, Topographic effects.

47-1383
Premelting of ice in exfoliated graphite; a neutron diffraction study.
Gay, J.M., et al, *Journal of crystal growth*, Nov. 1992, 125(1-2), p.33-41, 34 refs.
Suzanne, J., Dash, J.G., Fu, H.Y.
Ice crystal growth, Ice physics, Ice crystal structure, Ice melting, Ice solid interface, Deuterium oxide ice, Neutron diffraction, Epitaxy, Spectra, Temperature effects, Orientation.

47-1384
Study of ablation variations on the tongue of Hintereisferner, Austrian Alps.
Van de Wal, R.S.W., et al, *Journal of glaciology*, 1992, 38(130), p.319-324, 8 refs.
Oerlemans, J., Van der Hage, J.C.
Glacier tongues, Glacier ablation, Albedo, Glacier surveys, Topographic effects, Snow air interface, Air flow, Altitude, Glaciology, Periodic variations.

47-1385
Ice-core dating and chemistry by direct-current electrical conductivity.
Taylor, K., et al, *Journal of glaciology*, 1992, 38(130), p.325-332, 12 refs.
Ice dating, Temperature effects, Ice electrical properties, Ice cores, Ice sheets, Electrical measurement, Stratigraphy, Chemical properties, Measuring instruments, Accuracy, Glaciology.

47-1386
Observations of the water-vein system in polycrystalline ice.
Mader, H.M., *Journal of glaciology*, 1992, 38(130), p.333-347, 30 refs.
Ice crystal structure, Ice water interface, Ice veins, Anisotropy, Permeability, Ice microstructure, Physical properties, Ice optics, Measurement.

47-1387
Intra-seasonal changes in deformation profiles revealed by borehole studies, Storglaciären, Sweden.
Hooke, R.L., et al, *Journal of glaciology*, 1992, 38(130), p.348-358, 23 refs.
Pohjola, V.A., Jansson, P., Kohler, J.
Glacier surveys, Boreholes, Glacier flow, Ice deformation, Ice solid interface, Glacier beds, Interfacial tension, Subsurface drainage, Seasonal variations, Profiles.

47-1388
Thermal behaviour of the water-vein system in polycrystalline ice.
Mader, H.M., *Journal of glaciology*, 1992, 38(130), p.359-374, 19 refs.
Ice crystal structure, Ice microstructure, Ice veins, Ice water interface, Thermal diffusion, Phase transformations, Water transport, Ice thermal properties, Temperature effects, Temperature measurement.

47-1389
Melting of ice shelves and the mass balance of Antarctica.
Jacobs, S.S., et al, *Journal of glaciology*, 1992, 38(130), p.375-387, Refs. p.384-387.
Hellmer, H.H., Doake, C.S.M., Jenkins, A., Frolich, R.M.
Ice sheets, Ice shelves, Glacier mass balance, Sea level, Glacier melting, Ice water interface, Calving, Runoff, Icebergs, Simulation.
This paper presents a calculation of the present ice budget for Antarctica from measurements of accumulation minus iceberg calving, run-off and in situ melting beneath the floating ice shelves. The resulting negative mass balance of 469 Gt/yr differs substantially from other recent estimates, but some components are subject to high temporal variability and budget uncertainties of 20-50%. Annual accumulation from an earlier review is adjusted to include the Antarctic Peninsula for a total of 2144 Gt/yr. An iceberg production rate of 2016 Gt/yr is obtained from the volume of large icebergs calculated from satellite images since 1978, and from the results of an international iceberg census project. Ice-shelf melting of 544 Gt/yr is derived from physical and geochemical observations of meltwater outflow, glaciological field studies and modeling of the sub-ice ocean circulation. The highest melt rates occur near ice fronts and deep within sub-ice cavities. Run-off from the ice-sheet surface and from beneath the grounded ice is taken to be 53 Gt/yr. Less than half of the negative mass balance need come from the grounded ice to account for the unattributed 0.45 mm/yr in the Intergovernmental Panel on Climate Change "best estimate" of the recent global sea-level rise. (Auth. mod.)

47-1390
Tools for examining subglacial bed deformation.
Blake, E., et al, *Journal of glaciology*, 1992, 38(130), p.388-396, 6 refs.
Clarke, G.K.C., Gérin, M.C.
Glacier beds, Glacier flow, Ice solid interface, Deformation, Strain tests, Strain measuring instruments, Rheology, Subglacial observations, Design, Glaciology.

47-1391
Climate at the equilibrium line of glaciers.
Ohmura, A., et al, *Journal of glaciology*, 1992, 38(130), p.397-411, Refs. p.408-411.
Kasser, P., Funk, M.
Glacier oscillation, Glacier surveys, Glacier mass balance, Climatic changes, Altitude, Radiation balance, Precipitation (meteorology), Statistical analysis, Long range forecasting.

47-1392
Determination of a flow center on an ice cap.
Van der Veen, C.J., et al, *Journal of glaciology*, 1992, 38(130), p.412-416, 14 refs.
Whillans, I.M.
Ice sheets, Glacier surveys, Glacier flow, Topographic features, Glacier surfaces, Strain tests, Boreholes, Basal sliding, Glacier friction.

47-1393
International sharing of polar information resources.
Polar Libraries Colloquy, 14th, Columbus, OH, May 3-7, 1992, *Ohio State University. Byrd Polar Research Center. BPRC report*, 1992, No.4, 371p., Refs. passim. For selected papers see 47-1394 through 47-1410 or A-47516 through A-47519, A-47521, A-47522 and B-47520.
Lay, L.B., ed, Everett, L.T., ed.
Bibliographies, Data processing, International cooperation, Research projects, Organizations, Education, Cost analysis.
This is a collection of 44 papers, 7 of which are pertinent to Antarctica, presented at the 14th Polar Libraries Colloquy held in Columbus, Ohio, on May 3-7, 1992. One of the goals of the Colloquy was to share information on current international initiatives which aid in the bibliographic control of polar literature. The Arctic and Antarctic Regions CD-ROM and the modernization of the Cold Regions Bibliography Project and the Antarctic Bibliography are examined in great detail.

47-1394
Implementation of a U.S. polar bibliographic information system.
McCarthy, P., et al, *Ohio State University. Byrd Polar Research Center. BPRC report*, 1992, No.4, Polar Libraries Colloquy, 14th, Columbus, OH, May 3-7, 1992. Proceedings. Edited by L.B. Lay and L.T. Everett. International sharing of polar information resources, p.29-40, 2 refs.
Andrews, M.
Bibliographies, Data processing, Organizations, Cost analysis.

47-1395
Analysis of the content of the PolarPac database using the WLN collection analysis service.
West, S.M., *Ohio State University. Byrd Polar Research Center. BPRC report*, 1992, No.4, Polar Libraries Colloquy, 14th, Columbus, OH, May 3-7, 1992. Proceedings. Edited by L.B. Lay and L.T. Everett. International sharing of polar information resources, p.41-55, 7 refs.
Bibliographies, Data processing, Organizations.

47-1396
Contrasts in coverage: an examination of the polar bibliographic data bases on the NISC Arctic and Antarctic Regions CD-ROM.
Mills, W., *Ohio State University. Byrd Polar Research Center. BPRC report*, 1992, No.4, Polar Libraries Colloquy, 14th, Columbus, OH, May 3-7, 1992. Proceedings. Edited by L.B. Lay and L.T. Everett. International sharing of polar information resources, p.56-78.
Bibliographies, Data processing, Organizations.
With the launch of the NISC Arctic and Antarctic Regions CD-ROM, the polar community has been confronted with an apparent profusion of polar bibliographic databases. This paper compares and contrasts geographic and subject coverage of the various databases, suggesting that when examined in detail, they are considerably less alike than a more cursory inspection might suggest. (Auth.)

47-1397
Modernization of the Cold Regions bibliographies at the Library of Congress.
Hibben, S.G., *Ohio State University. Byrd Polar Research Center. BPRC report*, 1992, No.4, Polar Libraries Colloquy, 14th, Columbus, OH, May 3-7, 1992. Proceedings. Edited by L.B. Lay and L.T. Everett. International sharing of polar information resources, p.81-87.
Bibliographies, Data processing, Organizations, Cost analysis.
After a recent review of the Cold Regions bibliography production, the National Science Foundation (NSF) and Cold Regions Research and Engineering Laboratory (CRREL) sponsors have approved a plan for modernizing the process. The plan calls for updated hardware and software, an independent host computer, and real-time access for users. A new software system has been designed and ordered, and an interim upgrading of the citation input method is being adopted. The overall modernization plan is scheduled to be completed by 1994. (Auth.)

47-1398
Building a Canadian Polar Information System.
Minion, R., et al, *Ohio State University. Byrd Polar Research Center. BPRC report*, 1992, No.4, Polar Libraries Colloquy, 14th, Columbus, OH, May 3-7, 1992. Proceedings. Edited by L.B. Lay and L.T. Everett. International sharing of polar information resources, p.88-94, 14 refs.
Goodwin, R.
Bibliographies, Data processing, Organizations, Cost analysis, Canada.

47-1399
BIBSYS as a polar literature database.
Sveum, T., *Ohio State University. Byrd Polar Research Center. BPRC report*, 1992, No.4, Polar Libraries Colloquy, 14th, Columbus, OH, May 3-7, 1992. Proceedings. Edited by L.B. Lay and L.T. Everett. International sharing of polar information resources, p.95-101, 7 refs.
Bibliographies, Data processing, Organizations, Education, Norway.

47-1400
Cold climate related studies in Finland and in the Kola area in Russia: a new product—bibliography and database.
Saarinen, H., et al, *Ohio State University. Byrd Polar Research Center. BPRC report*, 1992, No.4, Polar Libraries Colloquy, 14th, Columbus, OH, May 3-7, 1992. Proceedings. Edited by L.B. Lay and L.T. Everett. International sharing of polar information resources, p.102-107.
Kurppa, L.
Bibliographies, Data processing, International cooperation, Research projects, Organizations, Finland—Lapland, USSR—Kola Peninsula.

47-1401
Contract indexing of industry and government gray literature at ASTIS.
Goodwin, R., *Ohio State University. Byrd Polar Research Center. BPRC report*, 1992, No.4, Polar Libraries Colloquy, 14th, Columbus, OH, May 3-7, 1992. Proceedings. Edited by L.B. Lay and L.T. Everett. International sharing of polar information resources, p.112-118, 4 refs.
Bibliographies, Data processing, Organizations, Cost analysis, Canada.

47-1402
Permafrost information and data management activities of the National Snow and Ice Data Center.
Brennan, A.M., et al, *Ohio State University. Byrd Polar Research Center. BPRC report*, 1992, No.4, Polar Libraries Colloquy, 14th, Columbus, OH, May 3-7, 1992. Proceedings. Edited by L.B. Lay and L.T. Everett. International sharing of polar information resources, p.119-124, 6 refs.
Hanson, C.S.
Bibliographies, Data processing, Permafrost, Organizations, Research projects.

47-1403
WLN and PolarPac.
Miller, R.F., *Ohio State University. Byrd Polar Research Center. BPRC report*, 1992, No.4, Polar Libraries Colloquy, 14th, Columbus, OH, May 3-7, 1992. Proceedings. Edited by L.B. Lay and L.T. Everett. International sharing of polar information resources, p.130-133.
Bibliographies, Data processing, Organizations.

47-1404
Polar archival records: a modest proposal.
Cronenwett, P.N., *Ohio State University. Byrd Polar Research Center. BPRC report*, 1992, No.4, Polar Libraries Colloquy, 14th, Columbus, OH, May 3-7, 1992. Proceedings. Edited by L.B. Lay and L.T. Everett. International sharing of polar information resources, p.195-207, Refs. passim.
Bibliographies, Data processing, Organizations, Research projects, International cooperation.

47-1405
Contribution of SCAR to antarctic research.
Walton, D.W.H., *Ohio State University. Byrd Polar Research Center. BPRC report*, 1992, No.4, Polar Libraries Colloquy, 14th, Columbus, OH, May 3-7, 1992. Proceedings. Edited by L.B. Lay and L.T. Everett. International sharing of polar information resources, p.217-228, 39 refs.
Bibliographies, Data processing, Research projects, Organizations, Antarctica.
A brief history of the origins of the Scientific Committee for Antarctic Research (SCAR) and its remit is followed by an examination of the range of publications produced. The literature is divided into four groups—serials, symposia, reports or monographs, and others. The place of each in current antarctic scientific information is examined. Inadequacies in the existing framework for public circulation of SCAR information are discussed. A list of SCAR publications is provided. (Auth.)

47-1406
Environmental management in Antarctica: a guide to the literature resources.
Meadows, J., *Ohio State University. Byrd Polar Research Center. BPRC report*, 1992, No.4, Polar Libraries Colloquy, 14th, Columbus, OH, May 3-7, 1992. Proceedings. Edited by L.B. Lay and L.T. Everett. International sharing of polar information resources, p.229-241, 58 refs.
Bibliographies, Data processing, Environmental protection, International cooperation, Organizations, Antarctica.
The drafting of the Environmental Protocol to the Antarctic Treaty punctuated a growing body of scholarly research and official recommendation. This paper is intended to help the information professional identify and acquire information on environmental management in Antarctica. It is not comprehensive, but offers instead a selection of sources. (Auth.)

47-1407
NSF's role in polar information.
Guthridge, G.G., *Ohio State University. Byrd Polar Research Center. BPRC report*, 1992, No.4, Polar Libraries Colloquy, 14th, Columbus, OH, May 3-7, 1992. Proceedings. Edited by L.B. Lay and L.T. Everett. International sharing of polar information resources, p.243-249.
Bibliographies, Data processing, Organizations, Cost analysis, Research projects, Antarctica.
As manager of the U.S. Antarctic Program, since 1960 the National Science Foundation (NSF) has served as clearinghouse and source of antarctic information in governmental and nongovernmental organizations. In 1978 the Antarctic Conservation Act added information and education assignments. NSF's arctic information assignment began in 1968 with its tasking to chair the Interagency Arctic Research Coordinating Committee; that committee was abolished in 1978. After 1984 NSF was assigned to head the Interagency Arctic Research Policy Committee, which also has information tasks. To help meet these assignments the Foundation publishes two journals and additional special reports devoted to arctic and antarctic research; supports translations, a monograph series, and bibliographies; and produces publications and audio-visual products to meet needs of specialists and the broader public. Each year it handles approximately 4,000 inquiries about polar regions. It awards grants and contracts to U.S. institutions for projects to develop or improve polar information. (Auth.)

47-1408
I suppose you haven't got this, but—some thoughts on building up a glaciological collection.
Macqueen, A.D., *Ohio State University. Byrd Polar Research Center. BPRC report*, 1992, No.4, Polar Libraries Colloquy, 14th, Columbus, OH, May 3-7, 1992. Proceedings. Edited by L.B. Lay and L.T. Everett. International sharing of polar information resources, p.307-316, Refs. p.312-315.
Bibliographies, Research projects, Education, Glaciology.

47-1409
Information acquisition and use by antarctic scientists: a study conducted at the British Antarctic Survey.
Phillips, C., *Ohio State University. Byrd Polar Research Center. BPRC report*, 1992, No.4, Polar Libraries Colloquy, 14th, Columbus, OH, May 3-7, 1992. Proceedings. Edited by L.B. Lay and L.T. Everett. International sharing of polar information resources, p.317-324, 1 ref.
Bibliographies, Data processing, Organizations, Research projects, Antarctica.
A survey of British Antarctic Survey scientists was conducted to assess the relative importance to them of various information sources—e.g. BAS and other libraries, current awareness journals, the Arctic and Antarctic Regions CD-ROM, on-line searches, and personal communications from other scientists. Also investigated, by means of a citation study, was the relative importance of antarctic and non-antarctic literature in antarctic research. The implications of the findings for library service provision to antarctic scientists are discussed. (Auth.)

47-1410
Information resources of the northern regions of Russia: status and availability problems.
Vinogradov, A., *Ohio State University. Byrd Polar Research Center. BPRC report*, 1992, No.4, Polar Libraries Colloquy, 14th, Columbus, OH, May 3-7, 1992. Proceedings. Edited by L.B. Lay and L.T. Everett. International sharing of polar information resources, p.325-329.
Bibliographies, International cooperation, Organizations, Research projects, History, USSR.

47-1411
Current state and prospects for the development of new technology for cold climate regions. [Sostoianie i perspektivy sozdaniia novoĭ tekhniki dlia raĭonov kholodnogo klimata].
Prutovykh, V.P., et al, *Stroitel'nye i dorozhnye mashiny*, Aug. 1990, No.8, p.2-3, In Russian.
Makushkin, D.O.
Cold weather construction, Cold weather operation.

47-1412
Equipment for drilling boreholes in rocky and coarse-grained ground. [Oborudovanie dlia bureniia skvazhin v skal'nykh i krupnoskeletnykh gruntakh].
Goĭkhman, IA.A., et al, *Stroitel'nye i dorozhnye mashiny*, Aug. 1990, No.8, p.3-5, In Russian.
Borehole instruments, Rock drilling, Drilling, Permafrost.

47-1413
Working tools and special equipment for trenching excavators designed for frozen ground. [Rabochie organy i spetsial'noe oborudovanie k transheĭnym ekskavatoram dlia razrabotki merzlykh gruntov].
Sokolov, L.K., et al, *Stroitel'nye i dorozhnye mashiny*, Aug. 1990, No.8, p.17-19, In Russian.
Danilov, A.K., Dashevskiĭ, A.G.
Equipment, Excavation, Trenching, Permafrost.

47-1414
Snow-compacting equipment for constructing winter roads and airfields. [Snegouplotniaiushchie mashiny dlia stroitel'stva zimnikh dorog i aerodromov].
Rongonen, V.E., *Stroitel'nye i dorozhnye mashiny*, Aug. 1990, No.8, p.22-23, In Russian. 2 refs.
Snow compaction, Snow (construction material), Snow roads, Construction equipment, Cold weather construction, Aircraft landing areas.

47-1415
Evaluating the technical level of snowplows. [Otsenka tekhnicheskogo urovnia snegoochistiteleĭ].
Shtaĭn, A.I., et al, *Stroitel'nye i dorozhnye mashiny*, Aug. 1990, No.8, p.23-24, In Russian. 1 ref.
Rongonen, V.E.
Snow removal, Performance, Equipment.

47-1416
Improving the norms for construction, road-making and mining equipment of the "KhL" type. [O povyshenii trebovaniĭ k stroitel'noĭ, dorozhnoĭ i gornoĭ tekhnike ispolneniia "KhL"].
Karelov, V.A., et al, *Stroitel'nye i dorozhnye mashiny*, Aug. 1990, No.8, p.24-25, In Russian.
Alekseev, V.I., Marchenko, S.IU.
Cold weather construction, Cold weather operation, Engineering, Construction equipment.

47-1417
Modern means of improving the microclimate of cabs and preparing construction and road-making machines for starting at low temperatures. [Sovremennye sredstva uluchsheniia mikroklimata kabin i podgotovki SDM k pusku pri nizkikh temperaturakh].
Alekseev, V.I., et al, *Stroitel'nye i dorozhnye mashiny*, Aug. 1990, No.8, p.25-26, In Russian.
Karepov, V.A.
Construction equipment, Microclimatology, Cold weather operation, Electric heating.

47-1418
Electric cab heater for construction and road-making machines. [Elektricheskiĭ otopitel' kabin SDM].
Khaĭnatskiĭ, G.F., et al, *Stroitel'nye i dorozhnye mashiny*, Aug. 1990, No.8, p.26-27, In Russian.
Veĭkum, K.O.
Electric heating, Construction equipment, Machinery.

47-1419
Bench testing of joints in machinery—the basis for competitive engineering. [Stendovye ispytaniia uzlov mashin—osnova sozdaniia konkurentosposobnoĭ tekhniki].
Mikheenko, V.V., *Stroitel'nye i dorozhnye mashiny*, Aug. 1990, No.8, p.27-29, In Russian.
Machinery, Cold weather tests, Mechanical tests, Joints (junctions).

47-1420
Accelerated heating of a hydraulic system in subzero ambient temperatures. [Uskorennyĭ progrev gidrosistemy pri otritsatel'nykh temperaturakh okruzhaiushcheĭ sredy].
Gulin, S.D., et al, *Stroitel'nye i dorozhnye mashiny*, Aug. 1990, No.8, p.6, In Russian. 2 refs.
Sorokin, A.A.
Hydraulic structures, Heating, Cold weather operation.

47-1421
Arctic environment: past, present and future.
Woo, M.K., ed, Hamilton, Ontario, McMaster University, 1992, 164p., Proceedings of a symposium held at McMaster University, Nov. 14-15, 1991. Refs. passim. For selected papers see 47-1422 through 47-1432.
Gregor, D.J., ed.
Polar atmospheres, Global warming, Air pollution, Permafrost distribution, Paleoclimatology.

47-1422
No great change: a commentary on 50 years of watching arctic science.
Hare, F.K., Arctic environment: past, present and future, Hamilton, Ontario, McMaster University, 1992, p.7-16, 13 refs.
Research projec: Polar atmospheres, Ecology, Arctic landscapes, Environmental impact, International cooperation.

47-1423
Arctic climate in the future.
Etkin, D., et al, Arctic environment: past, present and future, Hamilton, Ontario, McMaster University, 1992, p.17-34, 8 refs.
Agnew, T.
Polar atmospheres, Global warming.

47-1424
Ice and snow in the Arctic and global change.
Adams, P., Arctic environment: past, present and future, Hamilton, Ontario, McMaster University, 1992, p.35-44, 7 refs.
Polar atmospheres, Global warming, Snow cover effect, Air ice water interaction.

47-1425
Snow, sea ice and climate: a study of scales.
LeDrew, E.F., et al, Arctic environment: past, present and future, Hamilton, Ontario, McMaster University, 1992, p.45-59, 16 refs.
Barber, D.G.
Polar atmospheres, Air ice water interaction, Snow cover effect, Snow air interface, Snow ice interface, Global warming.

47-1426
Past climate changes as deduced from Canadian ice cores.
Koerner, R.M., Arctic environment: past, present and future, Hamilton, Ontario, McMaster University, 1992, p.61-70, 14 refs.
Polar atmospheres, Paleoclimatology, Ice cores, Air pollution, Global warming.

47-1427
Natural and anthropogenic influences on the chemical composition of the arctic troposphere.
Barrie, L.A., Arctic environment: past, present and future, Hamilton, Ontario, McMaster University, 1992, p.71-77, 18 refs.
Polar atmospheres, Atmospheric composition, Air pollution, Ozone.

47-1428
Organic micropollutants in arctic snow and firn.
Gregor, D.J., Arctic environment: past, present and future, Hamilton, Ontario, McMaster University, 1992, p.79-90, 24 refs.
Polar atmospheres, Air pollution, Snow impurities, Scavenging, Snow composition, Snowmelt, Firn.

47-1429
Climatic change and the permafrost landscape.
Lewkowicz, A.G., Arctic environment: past, present and future, Hamilton, Ontario, McMaster University, 1992, p.91-104, 28 refs.
Permafrost distribution, Soil air interface, Ground thawing, Permafrost heat transfer, Active layer, Thermokarst, Climatic changes.

47-1430
Arctic streamflow.
Woo, M.K., Arctic environment: past, present and future, Hamilton, Ontario, McMaster University, 1992, p.105-111, 13 refs.
Stream flow, Polar atmospheres, Permafrost beneath rivers, Snowmelt, Ice cover effect, Icebound rivers, Global warming.

47-1431
Ecology and palaeocology of the northern treeline.
MacDonald, G.M., et al, Arctic environment: past, present and future, Hamilton, Ontario, McMaster University, 1992, p.113-120, 19 refs.
Gajewski, K.
Forest lines, Paleoecology, Paleobotany, Forest tundra, Paleoclimatology, Permafrost distribution, Polar atmospheres, Global warming.

47 1432
Climate change and its effects on Canadian arctic plant communities.
Edlund, S.A., Arctic environment: past, present and future, Hamilton, Ontario, McMaster University, 1992, p.121-137, 22 refs.
Plant ecology, Vegetation patterns, Global warming, Polar atmospheres, Biogeography, Acclimatization, Phenology.

47-1433
Radiocarbon date list VII: Baffin Island, N.W.T., Canada.
Kaufman, D.S., ed, *Colorado. University. Institute of Arctic and Alpine Research. Occasional paper*, 1992, No.48, 82p., 41 refs.
Williams, K.M., ed.
Bottom sediment, Marine deposits, Paleoclimatology, Soil dating, Geochronology, Radioactive age determination, Quaternary deposits, Ocean bottom, Lacustrine deposits, Drill core analysis, Canada—Northwest Territories—Baffin Island.

47-1434
Field and laboratory studies of patterned ground in a Colorado alpine region.
Benedict, J.B., *Colorado. University. Institute of Arctic and Alpine Research. Occasional paper*, 1992, No.49, 38p., 25 refs.
Patterned ground, Solifluction, Periglacial processes, Sorting, Alpine landscapes, Alpine tundra, Permafrost indicators, United States—Colorado—Front Range.

47-1435
Sediment facies and bottomwater current on the continental slope in the northwestern Weddell Sea.
[Sedimentfazies und Bodenwasserstrom am Kontinentalhang des nordwestlichen Weddellmeeres].
Brehme, I., *Berichte zur Polarforschung*, 1992, No.110, 127p., In German with English summary. Refs. p.74-83.
Bottom sediment, Ocean currents, Paleoclimatology, Quaternary deposits, Marine deposits, Ocean bottom, Stratigraphy, Drill core analysis, Antarctica—Weddell Sea, South Orkney Islands.

47-1436
Late Quaternary sedimentation at the continental margin of the southeastern Weddell Sea, Antarctica.
[Spätquartäre Sedimentation am Kontinentalrand des südöstlichen Weddellmeeres, Antarktis].
Weber, M., *Berichte zur Polarforschung*, 1992, No.109, 165p., In German with English summary. Refs. p.113-123.
Bottom sediment, Quaternary deposits, Paleoclimatology, Marine deposits, Ocean bottom, Ocean currents, Stratigraphy, Antarctica—Weddell Sea.

47-1437
Anomalous focal mechanisms: tension faults studied with seismological and geodetical means on the Ekström Ice Shelf north of the Georg-von-Neumayer Station, Antarctica. [Dehnungsbeben an einer Störungszone im Ekström-Schelfeis nördlich der Georg-von-Neumayer Station, Antarktis. Eine Untersuchung mit seismologischen und geodätischen Methoden].
Nixdorf, U., *Berichte zur Polarforschung*, 1992, No.108, 101p., In German with English summary. Refs. p.94-101.
Ice shelves, Icequakes, Ice deformation, Geodetic surveys, Seismology, Mathematical models, Antarctica—Ekström Ice Shelf, Antarctica—Georg von Neumayer Station.

47-1438
Characteristics of the modern environmental geochemistry and natural environmental evolution in the region of antarctic Great Wall Station.
Zhao, J.L., Beijing, Science Press, 1991, 178p., In Chinese with abridged English version. Refs. p.100-106.
Geochemistry, Paleoclimatology, Geochemical cycles, Weathering, Lake water, Water chemistry, Lacustrine deposits, Bottom sediment, Soil chemistry, Antarctica—Great Wall Station.
The geochemistry in the region of the Great Wall Station on the Fildes Peninsula of King George Island is described. Variations in the chemical element content of the rock, soil, atmospheric aerosol, lake water, and lake bottom sediment, particularly the Ca content in the sediment of West Lake over the last 16,000 years, are indicators of the variations in temperature and precipitation over the same period. Comparative studies with southern Chile may indicate shifts in the Antarctic Convergence and comparative studies with China may indicate a relationship with north-south shifts in the climate zones of eastern China, glacier activity in the western mountains of China, and sea level rise and fall in eastern China. It is suggested that geochemical variation at the Great Wall Station be monitored as a possible indicator of global change.

47-1439
Photosynthetic dinoflagellates and their cysts characteristic of the land-fast ice.
Stoecker, D.K., et al, *Antarctic Journal of the United States*, 1991, 26(5), p.143-144, 8 refs.
Buck, K.R., Putt, M.
Microbiology, Cryobiology, Fast ice, Antarctica—McMurdo Sound.
During late austral spring and early summer of 1990-1991, the authors sampled the brine from the upper 50 cm of the approximately 175 cm of annual ice in McMurdo Sound, using previously described techniques. Sampling locations were distributed throughout McMurdo Sound; 12 were on the east side and 7 on the west side of McMurdo Sound. At all locations, athecate photosynthetic dinoflagellates and/or their cysts were observed, which together accounted for 82% in Dec. and 54% in Jan. 1991 of the autotrophic biomass in the brine. The most common dinoflagellate was a small (approximately 6x10 micron) photosynthetic gymnodinoid species. The dinoflagellate cysts observed in land-fast ice are morphologically indistinguishable from the cysts observed in pack-ice. The data demonstrate that the photosynthetic dinoflagellates found in the upper land-fast ice at McMurdo are part of an actively growing assemblage and, in fact, are a characteristic component of the brine during the austral spring.

47-1440
Sharp cone testing of creep properties of frozen sand.
Ladanyi, B., et al, *Canadian geotechnical journal*, Oct. 1992, 29(5), p.757-764, With French summary., 13 refs.
Sgaoula, J.
Penetration tests, Frozen ground strength, Soil creep, Rheology, Boreholes, Sands, Analysis (mathematics).

47-1441
Snowpack characteristics associated with avalanche accidents.
Jamieson, J.B., et al, *Canadian geotechnical journal*, Oct. 1992, 29(5), p.862-866, With French summary. 12 refs.
Johnston, C.D.
Avalanche forecasting, Avalanche triggering, Accidents, Snow cover stability, Snow cover structure, Human factors, Accuracy, Microstructure.

47-1442
Classification of snow cover and precipitation using SSM/I measurements: case studies.
Fiore, J.V., Jr., et al, *International journal of remote sensing*, Nov. 20, 1992, 13(17), p.3349-3361, 16 refs.
For another version see 46-1194.
Grody, N.C.
Remote sensing, Data processing, Radiometry, Snow cover, Precipitation (meteorology), Classifications, Geophysical surveys, Microwaves, Brightness, Correlation.

47-1443
Multisource evidential classification of surface cover and frozen ground.
Peddle, D.R., et al, *International journal of remote sensing*, Nov. 20, 1992, 13(17), p.3375-3380, 12 refs.
Franklin, S.E.
Remote sensing, Permafrost surveys, Soil mapping, Image processing, Data processing, Classifications, Surface properties, Computer programs, Discontinuous permafrost.

47-1444
Arctic Boundary Layer Expedition (ABLE 3A): July-August 1988.
Harriss, R.C., et al, *Journal of geophysical research*, Oct. 30, 1992, 97(D15), p.16,383-16,394, 52 refs.
Atmospheric composition, Air pollution, Research projects, Boundary layer, Geophysical surveys, Soil air interface, Ozone, Ecosystems, Chemical properties.

47-1445
Meteorological overview of the Arctic Boundary Layer Expedition (ABLE 3A) flight series.
Shipham, M.C., et al, *Journal of geophysical research*, Oct. 30, 1992, 97(D15), p.16,395-16,419, 26 refs.
Bachmeier, A.S., Cahoon, D.R., Jr., Browell, E.V.
Aerial surveys, Atmospheric circulation, Atmospheric composition, Synoptic meteorology, Air pollution, Haze, Aerosols, Boundary layer, Wind direction.

47-1446
Summertime photochemistry of the troposphere at high northern latitudes.
Jacob, D.J., et al, *Journal of geophysical research*, Oct. 30, 1992, 97(D15), p.16,421-16,431, 48 refs.
Atmospheric composition, Photochemical reactions, Aerial surveys, Ozone, Air pollution, Periodic variations, Atmospheric density, Chemical properties.

47-1447
Large-scale variability of ozone and aerosols in the summertime arctic and sub-arctic troposphere.
Browell, E.V., et al, *Journal of geophysical research*, Oct. 30, 1992, 97(D15), p.16,433-16,450, 55 refs.
Polar atmospheres, Boundary layer, Atmospheric composition, Air pollution, Ozone, Aerosols, Distribution, Aerial surveys, Chemical composition.

47-1448
Tropospheric ozone and aerosol observations: the Alaskan Arctic.
Gregory, G.L., et al, *Journal of geophysical research*, Oct. 30, 1992, 97(D15), p.16,451-16,471, 37 refs.
Polar atmospheres, Atmospheric composition, Air pollution, Ozone, Aerosols, Air masses, Sampling, Chemical composition, Particle size distribution.

47-1449
Deposition of ozone to tundra.
Jacob, D.J., et al, *Journal of geophysical research*, Oct. 30, 1992, 97(D15), p.16,473-16,479, 34 refs.
Atmospheric composition, Tundra, Soil air interface, Turbulent exchange, Ozone, Photochemical reactions, Boundary layer, Air pollution, Wind factors.

47-1450
Summertime tropospheric observations related to NxOy distributions and partitioning over Alaska: Arctic Boundary Layer Expedition 3A.
Sandholm, S.T., et al, *Journal of geophysical research*, Oct. 30, 1992, 97(D15), p.16,481-16,509, 77 refs.
Atmospheric composition, Chemical properties, Air masses, Air pollution, Photochemical reactions, Distribution, Ozone, Correlation.

47-1451
Atmospheric measurements of peroxyacetyl nitrate and other organic nitrates at high latitudes: possible sources and sinks.
Singh, H.B., et al, *Journal of geophysical research*, Oct. 30, 1992, 97(D15), p.16,511-16,522, 45 refs.
Atmospheric composition, Chemical properties, Sampling, Boundary layer, Air pollution, Aerosols, Origin, Ozone.

47-1452
Relationship of peroxyacetyl nitrate to active and total odd nitrogen at northern high latitudes: influence of reservoir species NOx and O3.
Singh, H.B., et al, *Journal of geophysical research*, Oct. 30, 1992, 97(D15), p.16,523-16,530, 32 refs.
Atmospheric composition, Air pollution, Chemical properties, Sampling, Boundary layer, Aerial surveys, Chemical analysis.

47-1453
Soluble species in the arctic summer troposphere: acidic gases, aerosols, and precipitation.
Talbot, R.W., et al, *Journal of geophysical research*, Oct. 30, 1992, 97(D15), p.16,531-16,543, 61 refs.
Vijgen, A.S., Harriss, R.C.
Atmospheric composition, Solubility, Air pollution, Aerosols, Precipitation (meteorology), Sampling, Ice cover effect, Chemical properties, Aerial surveys, Boundary layer.

47-1454
Measurements of NOx and NOy concentrations and fluxes over arctic tundra.
Bakwin, P.S., et al, *Journal of geophysical research*, Oct. 30, 1992, 97(D15), p.16,545-16,557, 58 refs.
Wofsy, S.C., Fan, S.M., Fitzjarrald, D.R.
Atmospheric composition, Tundra, Soil air interface, Air pollution, Turbulent exchange, Ecosystems, Sampling, Chemical properties, Boundary layer.

47-1455
Summertime measurements of selected nonmethane hydrocarbons in the Arctic and subarctic during the 1988 Arctic Boundary Layer Expedition (ABLE 3A).
Blake, D.R., et al, *Journal of geophysical research*, Oct. 30, 1992, 97(D15), p.16,559-16,588, 55 refs.
Atmospheric composition, Hydrocarbons, Air pollution, Chemical composition, Sampling, Distribution, Boundary layer, Aerial surveys, Fires, Ozone.

47-1456
Carbon monoxide and methane in the North American arctic and subarctic troposphere: July-August 1988.
Harriss, R.C., et al, *Journal of geophysical research*, Oct. 30, 1992, 97(D15), p.16,589-16,599, 33 refs.
Atmospheric composition, Boundary layer, Hydrocarbons, Air pollution, Haze, Wetlands, Soil air interface, Chemical properties, Tundra, Aerial surveys.

47-1457
Airborne flux measurements of trace species in an arctic boundary layer.
Ritter, J.A., et al, *Journal of geophysical research*, Oct. 30, 1992, 97(D15), p.16,601-16,625, 64 refs.
Atmospheric composition, Boundary layer, Wetlands, Turbulent exchange, Air pollution, Tundra, Ozone, Aerial surveys, Chemical composition.

47-1458
Micrometeorological measurements of CH4 and CO2 exchange between the atmosphere and subarctic tundra.
Fan, S.M., et al, *Journal of geophysical research*, Oct. 30, 1992, 97(D15), p.16,627-16,643, 53 refs.
Atmospheric composition, Sampling, Soil air interface, Tundra, Natural gas, Boundary layer, Turbulent exchange, Subarctic landscapes, Climatic factors, Vegetation factors, Carbon dioxide.

47-1459
Methane emissions from tundra environments in the Yukon-Kuskokwim Delta, Alaska.
Bartlett, K.B., et al, *Journal of geophysical research*, Oct. 30, 1992, 97(D15), p.16,645-16,660, 41 refs.
Atmospheric composition, Tundra, Soil air interface, Natural gas, Wetlands, Vapor diffusion, Climatic changes, Sampling, Boundary layer, Vegetation factors.

47-1460
Methane emissions from Alaska arctic tundra: an assessment of local spatial variability.
Morrissey, L.A., et al, *Journal of geophysical research*, Oct. 30, 1992, 97(D15), p.16,661-16,670, 46 refs.
Livingston, G.P.
Atmospheric composition, Tundra, Wetlands, Soil air interface, Natural gas, Vapor diffusion, Ecosystems, Arctic landscapes, Boundary layer, Vegetation factors.

47-1461
Biosphere/atmosphere CO2 exchange in tundra ecosystems: community characteristics and relationships with multispectral surface reflectance.
Whiting, G.J., et al, *Journal of geophysical research*, Oct. 30, 1992, 97(D15), p.16,671-16,680, 28 refs.
Atmospheric composition, Tundra, Soil air interface, Ecosystems, Turbulent exchange, Carbon dioxide, Remote sensing, Vegetation factors, Climatic factors, Radiometry.

47-1462
Methane transport mechanisms and isotopic fractionation in emergent macrophytes of an Alaskan tundra lake.
Chanton, J.P., et al, *Journal of geophysical research*, Oct. 30, 1992, 97(D15), p.16,681-16,688, 60 refs.
Atmospheric composition, Limnology, Natural gas, Vegetation factors, Tundra, Vapor diffusion, Isotope analysis, Boundary layer, Plant physiology, Carbon isotopes.

47-1463
Carbon and hydrogen isotopic characterization of methane from wetlands and lakes of the Yukon-Kuskokwim Delta, western Alaska.
Martens, C.S., et al, *Journal of geophysical research*, Oct. 30, 1992, 97(D15), p.16,689-16,701, 50 refs.
Kelley, C.A., Chanton, J.P.
Atmospheric composition, Wetlands, Natural gas, Lakes, Air water interactions, Vapor diffusion, Ecosystems, Isotope analysis, Carbon isotopes, Boundary layer.

47-1464
Emissions of biogenic sulfur gases from Alaskan tundra.
Hines, M.E., et al, *Journal of geophysical research*, Oct. 30, 1992, 97(D15), p.16,703-16,707, 31 refs.
Morrison, M.C.
Atmospheric composition, Wetlands, Tundra, Gases, Soil air interface, Vapor diffusion, Geochemistry, Boundary layer, Sampling.

47-1465
Beryllium 7 and Lead 210 in the western hemisphere arctic atmosphere: observations from three recent aircraft-based sampling programs.
Dibb, J.E., et al, *Journal of geophysical research*, Oct. 30, 1992, 97(D15), p.16,709-16,715, 48 refs.
Talbot, R.W., Gregory, G.L.
Atmospheric composition, Aerial surveys, Sampling, Polar atmospheres, Turbulent exchange, Radioactive isotopes, Aerosols, Boundary layer, Isotope analysis.

47-1466
Turbulent transports over tundra.
Fitzjarrald, D.R., et al, *Journal of geophysical research*, Oct. 30, 1992, 97(D15), p.16,717-16,729, 28 refs.
Moore, K.E.
Atmospheric composition, Tundra, Soil air interface, Turbulent exchange, Heat balance, Vapor transfer, Sampling, Boundary layer, Surface energy.

47-1467
Atmospheric chemistry in the Arctic and subarctic: influence of natural fires, industrial emissions, and stratospheric inputs.
Wofsy, S.C., et al, *Journal of geophysical research*, Oct. 30, 1992, 97(D15), p.16,731-16,746, 47 refs.
Atmospheric composition, Chemical composition, Haze, Air pollution, Aerial surveys, Forest fires, Boundary layer, Layers, Environmental impact.

47-1468
Temperature evolution and vapour pressure build-up in porous ices.
Kömle, N.I., et al, *Planetary and space science*, Oct. 1992, 40(10), p.1311-1323, 16 refs.
Extraterrestrial ice, Ice composition, Simulation, Ice temperature, Ice solid interface, Vapor pressure, Vapor transfer, Ice sublimation, Porosity, Thermodynamics, Permeability, Analysis (mathematics).

47-1469
Chlorophyll *a* biomass and growth of sea-ice microalgae along a salinity gradient (southeastern Hudson Bay, Canadian Arctic).
Legendre, L., et al, *Polar biology*, Sep. 1992, 12(3-4), p.445-453, 31 refs.
Martineau, M.J., Therriault, J.C., Demers, S.
Sea ice, Biomass, Chlorophylls, Ice water interface, Marine biology, Salinity, Ice cover effect, Ocean currents, Growth.

47-1470
Bio-optical variability across the Arctic Front.
Trees, C.C., et al, *Polar biology*, Sep. 1992, 12(3-4), p.455-461, 24 refs.
Aiken, J., Hirche, H.J., Groom, S.B.
Ocean currents, Surface waters, Biomass, Optical properties, Chlorophylls, Surface temperature, Atmospheric composition, Radiometry, Temperature effects.

47-1471
Errors in net radiometry: comparison and evaluation of six radiometer designs.
Halldin, S., et al, *Journal of atmospheric and oceanic technology*, Dec. 1992, 9(6), p.762-783, Refs. p.762-783.
Lindroth, A.
Radiometry, Remote sensing, Meteorology, Design, Performance, Snow cover effect, Accuracy, Temperature effects, Climatic factors.

47-1472
Obtaining smooth hydrographic profiles from a buoy deployed in sea ice.
Steele, M., et al, *Journal of atmospheric and oceanic technology*, Dec. 1992, 9(6), p.812-826, 14 refs.
Morison, J.H.
Sea ice, Ice cover effect, Hydrography, Measuring instruments, Design, Drift stations, Accuracy, Analysis (mathematics), Profiles.

47-1473
Acoustical measurement of current and vorticity beneath ice.
Menemenlis, D., et al, *Journal of atmospheric and oceanic technology*, Dec. 1992, 9(6), p.827-849, 21 refs.
Farmer, D.M.
Ocean currents, Hydrography, Ice cover effect, Ice water interface, Acoustic measurement, Underwater acoustics, Turbulent flow, Accuracy, Analysis (mathematics), Data processing.

47-1474
Saturated gravity wave spectrum in the polar summer lower thermosphere observed by foil chaff during campaign "Sodium 88".
Wu, Y.F., et al, *Journal of the atmospheric sciences*, Oct. 1, 1992, 49(19), p.1781-1789, 32 refs.
Widdel, H.U.
Polar atmospheres, Atmospheric circulation, Gravity, Spectra, Atmospheric physics, Shear flow, Profiles, Radar echoes, Wave propagation.

47-1475
Short-pulse radar detection of groundwater in the Sagavanirktok River floodplain in early spring.
Arcone, S.A., et al, *Water resources research*, Nov. 1992, 28(11), MP 3191, p.2925-2936, 37 refs.
Chacho, E.F., Jr., Delaney, A.J.
Floodplains, Taliks, Frost mounds, Ground water, Detection, Radar echoes, Alimentation, Water supply, Aerial surveys, Profiles.
Short-pulse radar operating in the UHF band was used to search for unfrozen water beneath ice blisters and within the gravels of the Sagavanirktok River floodplain near Prudhoe Bay, AK. The investigations were carried out in early Apr. 1991, when daily mean air temperatures still were below -20 C. The radar pulse spectrum was centered near 400 MHz and the radar time range was set to cover about 10 m depth. The flat snow-covered surface allowed good antenna-ground coupling, and the ice and gravels provided a low-loss propagation medium that allowed details of the gravel structure to be seen in the data. Grids of several traverses were profiled at three sites, all within an area of about 0.5 sq km. Unfrozen water was inferred from the strength and polarization of the radar reflections. One site contained a large icing blister beneath which an extensive reservoir was mapped and seen to extend several tens of meters beyond the mound. Data from two other sites indicated taliks 5-7 m deep near a frozen mound and within the gravels. It is concluded that taliks exist in the floodplain throughout the winter and are a probable source for the numerous icing mounds seen along most arctic rivers east of Prudhoe Bay.

47-1476
Climate and energy exchange at the snow surface in the alpine region of the Sierra Nevada. 1. Meteorological measurements and monitoring.
Marks, D., et al, *Water resources research*, Nov. 1992, 28(11), MP 3192, p.3029-3042, 42 refs.
Dozier, J., Davis, R.E.
Alpine landscapes, Snow surface, Snow heat flux, Snowmelt, Snow air interface, Meteorological factors, Heat balance, Watersheds, Periodic variations, Climatology.
A detailed evaluation of climate conditions in a small alpine watershed is presented for the 1986 water year. Measurements of snowfall, meteorological and snow cover conditions, and snow cover ablation are used to characterize the climate at four locations in the watershed during that snow season. Data from these locations are then combined into two representative sites for the watershed. The data are integrated into a continuous hourly time series of solar and thermal radiation, air, snow and soil temperature, humidity, and wind at the sites for an entire snow season. While problems were encountered monitoring air and snow surface temperature, humidity, and wind because of the extreme conditions which are likely to occur in an alpine environment, radiation is easily monitored, and the estimated uncertainty of all measured parameters was acceptably low. This effort was required to develop a high quality time series of integrated climate data to evaluate the components of the energy balance of the snow cover during both deposition and ablation conditions.

47-1477
Climate and energy exchange at the snow surface in the alpine region of the Sierra Nevada. 2. Snow cover energy balance.
Marks, D., et al. *Water resources research*, Nov. 1992, 28(11), p.3043-3054, 30 refs.
Dozier, J.
Alpine landscapes, Snow cover stability, Snow heat flux, Heat balance, Snow air interface, Insolation, Climatic factors, Metamorphism (snow), Watersheds.

47-1478
Cosmogenic nuclides in ice sheets.
Lal, D., et al. *Radiocarbon*, 1992, 34(2), International Radiocarbon Conference, 14th, Tucson, AZ, May, 1991. Proceedings. Workshop on paleoastrophysics and natural variations of cosmogenic isotopes. Edited by A. Long et al, p.227-233, 36 refs.
Jull, A.J.T.
Ice sheets, Ice cores, Radioactive isotopes, Isotope analysis, Ice composition, Radioactive age determination, Climatic change, Ice dating, Periodic variations.
This paper examines the nature of the twofold record of cosmogenic nuclides in ice sheets, of nuclei produced in the atmosphere, and of nuclei produced *in situ* due to interactions of cosmic-ray particles with oxygen nuclei in ice. It is shown that a wealth of geophysical information, in principle, can be derived from a suitable combination of nuclides in ice deposited at different latitudes, including temporal changes in the cosmic-ray flux, in the geomagnetic field and in climate. The rate of deposition of cosmogenic atmospheric nuclei in ice depends on the global cosmic-ray flux and a host of climatic factors. The global cosmic-ray flux, in turn, depends on the level of solar activity, and of the geomagnetic dipole field. Thus, the task of deconvolution of the record of cosmogenic nuclides can be facilitated by considering the recently discovered record of *in situ* produced cosmogenic C-14, whose production rate at high latitudes is independent of the geomagnetic dipole field. A brief review of work done to date and new prospects for deciphering geophysical records using ice sheets is also presented. (Auth. mod.)

47-1479
Anomalous 11-year *delta*C-14 cycle at high latitudes?.
Damon, P.E., et al. *Radiocarbon*, 1992, 34(2), International Radiocarbon Conference, 14th, Tucson, AZ, May, 1991. Proceedings. Workshop on paleoastrophysics and natural variations of cosmogenic isotopes. Edited by A. Long et al, p.235-238, 13 refs.
Burr, G., Cain, W.J., Donahue, D.J.
Polar atmospheres, Solar activity, Plant tissues, Radioactive age determination, Carbon isotopes, Atmospheric composition, Carbon dioxide, Frozen ground chemistry, Periodic variations, Seasonal freeze thaw.

47-1480
Supernova shock ensemble model using Vostok Be-10 radioactivity.
Sonett, C.P., *Radiocarbon*, 1992, 34(2), International Radiocarbon Conference, 14th, Tucson, AZ, May, 1991. Proceedings. Workshop on paleoastrophysics and natural variations of cosmogenic isotopes. Edited by A. Long et al, p.239-245, 37 refs.
Ice cores, Drill core analysis, Radioactive isotopes, Gamma irradiation, Isotope analysis, Radioactive age determination, Ice composition, Periodic variations, Geochemistry, Antarctica—Vostok Station.
Analysis of the Vostok ice-core record of Be-10 suggests that the sharply resolved increases in Be-10 at 35 ka and 60 ka are due to cosmic-ray (CR) increases. As an alternate to long-term solar modulation or strong decreases in the Earth's magnetic field, supernova (SN) forcing is qualitatively consistent with the generation of a forward-reverse shock ensemble from a spherical blast wave of age very approximately at 75 ka. Confirmation would be the first geochemical detection of supernova forcing of spallogenic and perhaps cosmogenic isotope production in the atmosphere. One contemporary model requires the solar system to be immersed in the 'bubble' of the earlier post-SN evolution, possibly affecting estimates of heliospheric boundary distance. However, more recent analysis of Camp Century ice core data discloses only the 35 ka Be-10 peak. This recent result compounds the difficulty of constructing a completely consistent model for the source of the Vostok spikes. This paper is written in the spirit of suggesting only one of possibly several different models, even within the subclass of SN models. (Auth. mod.)

47-1481
Winter injury to Subalpine red spruce: influence of prior vigor and effects on subsequent growth.
Peart, D.R., et al. *Canadian journal of forest research*, June 1992, 22(6), p.888-892, With French summary. 13 refs.
Poage, N.J., Jones, M.B.
Trees (plants), Cold stress, Cold weather survival, Damage, Growth, Cold tolerance, Temperature effects.

47-1482
Recent dynamics of jack pine at its northern distribution limit in northern Quebec.
Desponts, M., et al. *Canadian journal of botany*, June 1992, 70(6), p.1157-1167, With French summary. 46 refs.
Payette, S.
Trees (plants), Forest lines, Subarctic landscapes, Forest tundra, Growth, Forest fires, Revegetation, Environmental impact, Vegetation patterns.

47-1483
Characterization and comparison of macrofungal communities in an *Alnus tenuifolia* and an *Alnus crispa* forest in Alaska.
Brunner, I., et al. *Canadian journal of botany*, June 1992, 70(6), p.1247-1258, With French summary. 58 refs.
Brunner, F., Laursen, G.A.
Phenology, Subarctic landscapes, Fungi, Vegetation patterns, Forest ecosystems, Site surveys, Distribution.

47-1484
Snow-meteorological yearbook of the Veneto mountain region, 1985-1986-1987. [Annale nivometeorologico della montagna Veneta, anni 1985-1986-1987].
Cagnati, A., ed, Arabba, Italy, Regione del Veneto, Dipartimento Foreste, Centro Sperimentale Valanghe e Difesa Idrogeologica, [1988], 249p., In Italian.
Snow surveys, Snow depth, Air temperature, Humidity, Wind velocity, Solar radiation, Albedo, Weather stations, Italy.

47-1485
Alaska's mineral industry, 1991.
Bundtzen, T.K., et al. *Alaska. Division of Geological and Geophysical Surveys. Special report*, 1992, No.46, 89p., 31 refs.
Swainbank, R.C., Wood, J.E., Clough, A.H.
Exploration, Minerals, Mining, Natural resources, Economic development, Cost analysis, United States—Alaska.

47-1486
Ground-water resources of the Palmer area, Alaska.
LaSage, D.M., *Alaska. Department of Natural Resources. Division of Geological and Geophysical Surveys. Report of investigations*, Nov. 1992, No.92-3, 39p. + 1 sheet, 22 refs.
Ground water, Water reserves, Wells, Well logging, Water chemistry, United States—Alaska—Palmer.

47-1487
Recharge area evaluation for Moonlight Springs, Nome, Alaska.
Munter, J.A., et al. *Alaska. Department of Natural Resources. Division of Geological and Geophysical Surveys. Report of investigations*, July 1992, No.92-2, 69p. + 2 sheets, 16 refs.
Maurer, M.A., Inghram, M.G., Petrik, W.A.
Ground water, Springs (water), Water reserves, Water chemistry, Subsurface drainage, Snowmelt, Runoff, United States—Alaska—Nome.

47-1488
Geochemistry of Haines-Klukwan-Porcupine area, southeastern Alaska.
Gilbert, W.G., et al. *Alaska. Department of Natural Resources. Division of Geological and Geophysical Surveys. Report of investigations*, Dec. 1991, No.91-5, 75p. + 2 sheets, 20 refs.
Still, J.C., Burns, L.E., Weir, K.R., Redman, E.C.
Geochemistry, Exploration, Minerals, United States—Alaska.

47-1489
ARVA 90—Comparison of different avalanche victim locators. [ARVA 90—Vergleich verschiedener Lawinenverschütteten-Suchgeräte].
Schild, D., *Les Alpes*, Dec. 1991, 67(12), p.524-526, In German.
Avalanches, Rescue equipment, Rescue operations, Accidents, Detection, Subsurface investigations.

47-1490
Advective contributions to boundary layer moisture profiles in mountainous terrain.
Wooldridge, G.L., et al, Conference on Agriculture and Forest Meteorology, 20th, Salt Lake City, Sep. 10-13, 1991, Boston, American Meteorological Society, 1991, p.123-126, 8 refs.
Connell, B.H., Musselman, R.C., Massman, W.J.
Humidity, Soil air interface, Alpine landscapes, Turbulent boundary layer, Advection, Air flow, Water vapor, Vapor transfer.

47-1491
Air flow across an alpine forest clearing in winter.
Miller, D.R., et al, Conference on Mountain Meteorology, 5th, Boulder, CO, June 25-29, 1990, Boston, American Meteorological Society, 1990, p.172-175, 10 refs.
Lin, J.D., Lu, Z.N., Hubbard, R.M., Fox, D.G.
Wind velocity, Soil air interface, Alpine landscapes, Forest land, Forest canopy, Wind pressure, Air flow, Turbulent boundary layer.

47-1492
Hole story; facts and fallacies of potholes.
American Public Works Association, Chicago, IL, 1989, n.p., 14 refs.
Road maintenance, Pavements, Road icing, Subgrade maintenance, Cost analysis.

47-1493
Fight winter and win; a survival guide for public officials.
American Public Works Association, Chicago, IL, 1992, 9p.
Snow removal, Road icing, Road maintenance, Cost analysis.

47-1494
Annual report 1992.
National Snow and Ice Data Center. World Data Center- A for Glaciology, Boulder, University of Colorado, 1992, 45p., 37 refs.
Research projects, Bibliographies, Sea ice distribution, Air ice water interaction, Ice surveys, Data processing, Organizations.

47-1495
Ice and fog: detection and warning systems (Nov 83-present).
Whitney, C.M., MP 3193, Springfield, VA, U.S. National Technical Information Service, 1992, n.p., PB92-854504, Published search. 250 citations from the NTIS Bibliographic Database.
Bibliographies, Ice detection, Fog, Ice reporting, Warning systems.

47-1496
Avalanche events and weather conditions in Austria, winter 1987/88, 1988/89, 1989/90 and 1990/91. [Lawinenereignisse und Witterungsablauf in Österreich, Winter 1987/88, 1988/89, 1989/90 und 1990/91].
Luzian, R., *Forstliche Bundesversuchsanstalt. FBVA Berichte*, 1992, No.68, 188p., In German with English and French summaries. 10 refs.
Avalanches, Snow cover stability, Snowstorms, Snowfall, Accidents, Austria.

47-1497
Methane in permafrost sediments on the Kolyma-Indigirka lowland. [Metan v mnogoletnemerzlykh porodakh Kolymo-Indigirskoĭ nizmennosti].
Rivkina, E.M., et al, *Akademiia nauk SSSR. Doklady*, 1992, 323(3), p.559-562, In Russian. 9 refs.
Samarkin, V.A., Gilichinskiĭ, D.A.
Natural gas, Frozen ground chemistry, Permafrost, Sediments.

47-1498
Geoacoustic model of bottom sediments in the Baltic and Barents Seas. [Geoakusticheskaia model' donnykh otlozheniĭ Baltiĭskogo i Barentseva morei].
Il'in, A.V., et al, *Akademiia nauk SSSR. Doklady*, 1992, 323(5), p.953-956, In Russian. 6 refs.
Shurko, I.I.
Bottom sediment, Models, Underwater acoustics, Baltic Sea, Barents Sea.

47-1499
Ground moraines in European northeastern Russia and their lithostratigraphic significance. [Osnovnye moreny Evropeĭskogo Severo-Vostoka Rossii i ikh litostratigraficheskoe znacheniei].
Andreicheva, L.N., St. Petersburg, Nauka, 1992, 124p., In Russian. Refs. p.110-122.
Moraines, Pleistocene, Quaternary deposits, Glacial deposits, Clays, Lithology, Stratigraphy.

47-1500
Geochemical basis for the geotechnology of metals in frozen ground conditions. [Geokhimicheskie osnovy geotekhnologii metallov v usloviiakh merzloty].
Ptitsyn, A.B., Novosibirsk, Nauka, 1992, 118p., In Russian. Refs. p.111-118.
Moisture transfer, Soil water migration, Geochemistry, Metals, Frozen ground thermodynamics, Mathematical models, Freezing points.

47-1501
Earth's ozone shield and its variation. (Ozonnyĭ shchit Zemli i ego izmeneniia).
Aleksandrov, E.L., et al, St. Petersburg, Gidrometeoizdat, 1992, 288p., In Russian with English summary and table of contents. 216 refs.
Izrael', IU.A., Karol', I.L., Khrgian, A.Kh.
Ozone, Environmental impact, Atmospheric composition, Mathematical models, Military operation, International cooperation.

47-1502
Strength characteristics of frozen ground at variable temperatures. (Prochnostnye svoistva merzlykh gruntov pri peremennoĭ temperature).
Konovalov, A.A., Novosibirsk, Nauka, 1991, 91p., In Russian. 56 refs.
Frozen ground strength, Thermal regime, Permafrost bases, Frost heave, Dynamic loads, Static loads, Temperature variations.

47-1503
Asian snow cover-monsoon-ENSO connection.
Barnett, T.P., et al, Teleconnections linking worldwide climate anomalies. Edited by M.H. Glantz et al, United Kingdom, Cambridge University Press, 1991, p.191-225, Refs. p.223-225.
DLC QC891.8.C5 T45 1991
Atmospheric circulation, Precipitation (meteorology), Snow cover effect, Surface temperature, Climatic changes, Simulation, Wind factors.

47-1504
Snow hydrology.
Marshall, S., et al, International Conference on Global Climate Change, Los Alamos, NM, Oct. 21-24, 1991. Proceedings. Climate change and energy policy. Edited by J.C. Allred et al, New York, American Institute of Physics, 1992, p.149-154, 7 refs.
Glatzmaier, G., Roads, J.O.
DLC QC981.8.C5 I58 1991
Snow hydrology, Climatic changes, Snow cover distribution, Snow air interface, Models, Periodic variations, Global change.

47-1505
Observational evidence of changes in global snow and ice cover.
Barry, R.G., Workshop on Greenhouse-Gas-Induced Climatic Change, Amherst, MA, May 8-12, 1989. Edited by M.E. Schlesinger, Developments in Atmospheric Science No.19, Amsterdam, Elsevier Science Publishers, 1991, p.329-345, Refs. p.341-345.
DLC QC981.8.C5 G725 1991
Snow cover distribution, Ice cover, Global change, Glacier mass balance, Glacier oscillation, Climatic factors, Climatic changes, Periodic variations, Surface temperature.

47-1506
Simulation of natural acid sulfate weathering in an alpine watershed.
Bassett, R.L., et al, *Water resources research*, Sep. 1992, 28(9), p.2197-2209, 39 refs.
Miller, W.R., McHugh, J., Catts, J.G.
Watersheds, Alpine landscapes, Hydrogeochemistry, Weathering, Chemical properties, Mass balance, Surface waters, Snow composition, Simulation.

47-1507
Incorporating freeze-thaw calculations into a water balance model.
Fox, J.D., *Water resources research*, Sep. 1992, 28(9), p.2229-2244, 73 refs.
Soil freezing, Permafrost hydrology, Freeze thaw cycles, Water balance, Frost penetration, Thaw depth, Watersheds, Mathematical models, Snow cover effect, Runoff forecasting, Seepage.

47-1508
Laboratory measurements and parameterizations of supercooled water skin temperatures and bulk properties of gyrating hailstones.
Garcia-Garcia, F., et al, *Journal of the atmospheric sciences*, Nov. 15, 1992, 49(22), p.2058-2073, 49 refs.
List, R.
Hailstone growth, Water films, Supercooling, Surface temperature, Heat transfer, Ice water interface, Mathematical models, Wind tunnels, Simulation, Surface roughness.

47-1509
Detection of subbottom ice-bonded permafrost on the Canadian Beaufort Shelf by ground electromagnetic measurements.
Palacky, G.J., et al, *Geophysics*, Nov. 1992, 57(11), p.1419-1427, 21 refs.
Stephens, L.E.
Subsea permafrost, Detection, Sounding, Permafrost surveys, Electromagnetic prospecting, Route surveys, Geophysical surveys, Ice cover effect, Pipeline laying.

47-1510
Keeping mortar materials warm in winter.
Camillo, J., *Aberdeen's magazine of masonry construction*, Dec. 1991, 4(12), p.463-465.
Mortars, Cold weather construction, Construction equipment, Construction materials, Electric heating, Protection, Temperature control.

47-1511
Low-frequency light scattering from disordered hydrogen-bonded solids.
Mazzacurati, V., et al, *Physical review B*, Aug. 1, 1992, 96(5), p.2845-2852, 26 refs.
Merlo, V., Ruocco, G.
Solids, Hydrogen bonds, Light scattering, Ice physics, Ice structure, Molecular structure, Polarization (waves), Spectra, Analysis (mathematics), Protons.

47-1512
Global climatic changes in water and heat transfer—accumulation processes.
Dobrovol'skiĭ, S.G., Developments in atmospheric science, No.21, Amsterdam, Elsevier, 1992, 265p., Refs. p.245-261.
Global change, Climatic changes, Heat transfer, Models, Air water interactions, Water balance, Runoff.

47-1513
Features of physical geography and glacial resources in Qilian Mountains.
Wu, G.H., *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Cryopedology. Memoirs*, 1985, No.5, p.1-8, In Chinese. 2 refs.
Mountain glaciers, Glacier surveys, Water reserves, Glacial rivers, Glacial lakes, China—Qilian Mountains.

47-1514
Climatic conditions for the development of glacier and their effect on the characteristics of glaciers in Qilian Mountains.
Ding, L.F., et al, *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Cryopedology. Memoirs*, 1985, No.5, p.9-15, In Chinese. 8 refs.
Kang, X.C.
Mountain glaciers, Glacier surveys, Glacier alimentation, Glacier formation, Climatic factors, Precipitation (meteorology), China—Qilian Mountains.

47-1515
Thickness measurement of "July 1st" Glacier in Qilian Mountains and some problems in glacier measurement by gravimetric method.
Su, Z., *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Cryopedology. Memoirs*, 1985, No.5, p.16-21, In Chinese. 3 refs.
Glacier surveys, Glacier thickness, Mountain glaciers, Gravimetric prospecting, China—Qilian Mountains.

47-1516
Seismic survey in thickness of Glacier No.1 of Yanglong River.
Zeng, Z.G., et al, *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Cryopedology. Memoirs*, 1985, No.5, p.22-26, In Chinese. 5 refs.
Liu, J.R.
Glacier surveys, Glacier thickness, Mountain glaciers, Glacial rivers, Seismic surveys, China—Qilian Mountains.

47-1517
Ice formation of glaciers in Qilian Mountains.
Xie, Z.C., et al, *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Cryopedology. Memoirs*, 1985, No.5, p.27-40, In Chinese. 8 refs.
Wu, G.H., Wang, L.L., Wang, Z.X.
Glacier alimentation, Glacier formation, Glacier ice, Ice formation, Glacier surveys, Mountain glaciers, Mathematical models, China—Qilian Mountains.

47-1518
Mass balance of glaciers in Qilian Mountains.
Wang, Z.X., et al, *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Cryopedology. Memoirs*, 1985, No.5, p.41-53, In Chinese. 7 refs.
Xie, Z.C., Wu, G.H.
Glacier surveys, Glacier mass balance, Mountain glaciers, Mathematical models, China—Qilian Mountains.

47-1519
Temperature regime of No.5 Glacier, Yangloag River in Qilian Mountains.
Huang, M.H., et al, *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Cryopedology. Memoirs*, 1985, No.5, p.54-60, In Chinese. 6 refs.
Ma, F.R., Wang, Z.X., Liu, Z.X.
Glacier surveys, Glacier heat balance, Ice temperature, Glacier ice, Mountain glaciers, Thermal regime, China—Qilian Mountains.

47-1520
General features of glacier motion in Qilian Mountains.
Sun, Z.Z., et al, *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Cryopedology. Memoirs*, 1985, No.5, p.61-72, In Chinese. 7 refs.
Huang, M.H.
Glacier surveys, Glacier flow, Glacier oscillation, Mountain glaciers, China—Qilian Mountains.

47-1521
Preliminary research of sedimentary fabric of modern till in Qilian Mountains.
Wu, A.B., *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Cryopedology. Memoirs*, 1985, No.5, p.73-81, In Chinese. 7 refs.
Glacial deposits, Moraines, Glacier surveys, Glacial geology, Talus, Mountain glaciers, Soil texture, China—Qilian Mountains.

47-1522
Recent advance and retreat of glaciers in Qilian Mountains.
Xie, Z.C., et al, *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Cryopedology. Memoirs*, 1985, No.5, p.82-90, In Chinese. 8 refs.
Wu, G.H., Wang, L.L.
Glacier surveys, Glacier oscillation, Mountain glaciers, China—Qilian Mountains.

47-1523
Relationship between climatic variances and glacier changes during the last 20 years in Qilian Mountains.
Ding, L.F., et al, *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Cryopedology. Memoirs*, 1985, No.5, p.91-96, In Chinese. 2 refs.
Kang, X.C.
Glacier surveys, Glacier oscillation, Mountain glaciers, Climatic factors, Climatic changes, China—Qilian Mountains.

47-1524
Tree ring climate during the recent thousand years in Qilian Mountains and its reflection on the glacier.
Liu, G.Y., et al, *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Cryopedology. Memoirs*, 1985, No.5, p.97-108, In Chinese. 12 refs.
Wang, Y.X., Zhang, X.G., Li, C.F.
Glacier oscillation, Paleoclimatology, Phenology, Glacier surveys, Mountain glaciers, Age determination, China—Qilian Mountains.

47-1525
Alpine frozen soil development in Qilian Mountains and its relationship with glacial change.
Hu, S.X., *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Cryopedology. Memoirs*, 1985, No.5, p.109-115, In Chinese.
Glacier oscillation, Cryogenic soils, Desert soils, Mountain soils, Periglacial processes, Soil formation, China—Qilian Mountains.

47-1526
On problems of Quaternary Ice Age in Qilian Mountains.
Wu, G.H., *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Cryopedology. Memoirs*, 1985, No.5, p.116-123, In Chinese. 11 refs.
Glacier oscillation, Paleoclimatology, Pleistocene, Quaternary deposits, Alpine glaciation, China—Qilian Mountains.

47-1527
Variations of runoff supply and discharge of rivers with elevation in Qilian Mountains.
Lai, Z.M., *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Cryopedology. Memoirs*, 1985, No.5, p.124-130, In Chinese.
Meltwater, Runoff, River flow, Glacial rivers, Altitude, China—Qilian Mountains.

47-1528
Features of interior rivers and feeding of glacial meltwater in the Hexi region, Gansu Province.
Gao, Q.Z., et al, *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Cryopedology. Memoirs*, 1985, No.5, p.131-141, In Chinese. 4 refs.
Yang, X.Y.
Meltwater, Runoff, Glacial rivers, River flow, China—Qilian Mountains.

47-1529
Analysis and reasonable utilization of runoff in the Shiyang River.
Zhou, B.C., *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Cryopedology. Memoirs*, 1985, No.5, p.142-149, In Chinese.
Meltwater, Runoff, Glacial rivers, River flow, China—Qilian Mountains.

47-1530
Experimental investigations on the artificial augmentation of the ice and snow melting of glaciers in Qilian Mountains.
Bai, C.Y., et al, *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Cryopedology. Memoirs*, 1985, No.5, p.150-162, In Chinese. 4 refs.
Tian, C.X., Xie, Y.Q., Ding, L.F., Zhang, Y.L.
Meltwater, Artificial melting, Dusting, Glacier melting, Water reserves, Snowmelt, China—Qilian Mountains.

47-1531
Applicational experience and benefit analysis of artificial dusting glaciers with large scale in Qilian Mountains.
Bai, C.Y., *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Cryopedology. Memoirs*, 1985, No.5, p.163-171, In Chinese. 8 refs.
Meltwater, Artificial melting, Dusting, Glacier melting, Water reserves, China—Qilian Mountains.

47-1532
Formation and utilization of "stream icing" in the mountainous regions.
Bai, C.Y., et al, *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Cryopedology. Memoirs*, 1985, No.5, p.172-185, In Chinese. 3 refs.
Ding, L.F., Tian, C.X., Li, J.R., Zhang, Y.L.
Frost mounds, Meltwater, Water reserves, Naleds, Icing, Artificial melting, China—Qilian Mountains.

47-1533
Recent change and trend prediction of glaciers in Qilian Mountain.
Liu, C.H., et al, *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Geocryology. Memoirs*, 1992, No.7, p.1-9, In Chinese with English summary. 8 refs.
Song, G.P., Jin, M.X.
Glacier surveys, Glacier oscillation, Mountain glaciers, China—Qilian Mountains.

47-1534
Glacier water resources and effect of glacier water in stream runoff in Qilian Mountain.
Yang, Z.N., *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Geocryology. Memoirs*, 1992, No.7, p.10-20, In Chinese with English summary. 6 refs.
Glacier surveys, Meltwater, Runoff forecasting, Glacier oscillation, Water reserves, Stream flow, Glacial rivers, China—Qilian Mountains.

47-1535
Observation, interpolation and trend study of glacial mass balance on the Qiyi Glacier in Qilian Mountain.
Liu, C.H., et al, *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Geocryology. Memoirs*, 1992, No.7, p.21-33, In Chinese with English summary. 10 refs.
Xie, Z.C., Yang, H.A., Wei, Y.Z.
Glacier surveys, Glacier mass balance, Glacier oscillation, Mountain glaciers, Mathematical models, China—Qilian Mountains.

47-1536
Calculation of ice surface temperature and determination of temperature jump value in Qilian Mountain.
Liu, C.H., *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Geocryology. Memoirs*, 1992, No.7, p.34-39, In Chinese with English summary. 7 refs.
Ice air interface, Glacial meteorology, Glacier surfaces, Surface temperature, Air temperature, Glacier surveys, Mountain glaciers, Mathematical models, China—Qilian Mountains.

47-1537
Surface movement velocity of the Qiyi Glacier in Qilian Mountain.
Song, G.P., et al, *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Geocryology. Memoirs*, 1992, No.7, p.40-44, In Chinese with English summary. 1 ref.
Liu, C.H., Jin, M.X.
Glacier surveys, Glacier flow, Glacier oscillation, Glacier surfaces, Mountain glaciers, China—Qilian Mountains.

47-1538
Characteristics of the recent climatic variations over the Qilian Mountain area.
Kang, X.C., *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Geocryology. Memoirs*, 1992, No.7, p.45-53, In Chinese with English summary. 4 refs.
Ice air interface, Glacial meteorology, Climatic changes, Air temperature, Precipitation (meteorology), Mountain glaciers, Statistical analysis, China—Qilian Mountains.

47-1539
Study on the climatic variation in the Qilian Mountain region for the historical period.
Kang, X.C., *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Geocryology. Memoirs*, 1992, No.7, p.54-63, In Chinese with English summary. 14 refs.
Glacier oscillation, Climatic changes, Paleoclimatology, Phenology, Glacier surveys, Mountain glaciers, Age determination, China—Qilian Mountains.

47-1540
Runoff variation of the inland rivers in Gansu Province and its climate dependence.
Lai, Z.M., *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Geocryology. Memoirs*, 1992, No.7, p.64-70, In Chinese with English summary. 6 refs.
Meltwater, Runoff forecasting, Climatic factors, Climatic changes, River flow, Stream flow, Glacial rivers, Statistical analysis, China—Qilian Mountains.

47-1541
Analysis and simulation of annual runoff processes for some rivers in Hexi region.
Hu, X.G., *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Geocryology. Memoirs*, 1992, No.7, p.71-83, In Chinese with English summary. 7 refs.
Runoff forecasting, River flow, River basins, Surface drainage, Stream flow, Statistical analysis, Mathematical models, China—Qilian Mountains.

47-1542
Analysis of temperature-runoff relationship in the eastern section of Qilian Mountain.
Lai, Z.M., *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Geocryology. Memoirs*, 1992, No.7, p.84-90, In Chinese with English summary. 5 refs.
Runoff forecasting, River flow, River basins, Air temperature, Precipitation (meteorology), Climatic factors, Statistical analysis, China—Qilian Mountains.

47-1543
Runoff and its generation model of cold region in Binggou basin of Qilian Mountain.
Yang, Z.N., et al, *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Geocryology. Memoirs*, 1992, No.7, p.91-100, In Chinese with English summary. 10 refs.
Yang, Z.H., Zhang, X.C.
Runoff forecasting, River flow, River basins, Seasonal freeze thaw, Ground water, Subsurface drainage, Statistical analysis, Mathematical models, China—Qilian Mountains.

47-1544
Relationship between runoff and meteorological element in Binggou experiment basin of Qilian Mountain.
Cao, Z.T., et al, *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Geocryology. Memoirs*, 1992, No.7, p.101-110, In Chinese with English summary. 2 refs.
Wang, Q.
Runoff forecasting, River flow, Seasonal freeze thaw, Air temperature, Soil temperature, Precipitation (meteorology), Snowmelt, Ground water, Subsurface drainage, China—Qilian Mountains.

47-1545
Hydrochemical characteristics in Binggou basin of Heihe River in Qilian Mountain.
Sheng, W.K., et al, *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Geocryology. Memoirs*, 1992, No.7, p.111-120, In Chinese with English summary. 1 ref.
Zeng, A.W.
Hydrogeochemistry, River basins, Water chemistry, Water reserves, Precipitation (meteorology), Snowmelt, Ground water, China—Qilian Mountains.

47-1546
Distribution characteristics in space and time of precipitation of Heihe Basin in Qilian Mountain.
Yang, Z.N., et al, *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Geocryology. Memoirs*, 1992, No.7, p.121-132, In Chinese with English summary. 10 refs.
Cao, Z.T., Wang, Q.
Precipitation (meteorology), Runoff forecasting, River basins, Water reserves, China—Qilian Mountains.

47-1547
Water balance and water resources of Heihe Basin in Qilian Mountain.
Yang, Z.N., *Chinese Academy of Sciences. Lanzhou Institute of Glaciology and Geocryology. Memoirs*, 1992, No.7, p.133-147, In Chinese with English summary. 10 refs.
Runoff forecasting, Water balance, River basins, Water reserves, Precipitation (meteorology), Evaporation, Mathematical models, China—Qilian Mountains.

47-1548
Non-air-entrained high-strength concrete—is it frost resistant.
Cohen, M.D., et al, *ACI materials journal*, July-Aug. 1992, 89(4), p.406-415, 26 refs.
Zhou, Y.X., Dolch, W.L.
Concrete strength, Frost resistance, Air entrainment, Freeze thaw tests, Compressive properties, Concrete admixtures, Standards, Concrete curing, Mechanical tests.

47-1549
Annual cycle of radiation fluxes over the Arctic Ocean: sensitivity to cloud optical properties.
Curry, J.A., et al, *Journal of climate*, Nov. 1992, 5(11), p.1267-1280, 72 refs.
Ebert, E.E.
Marine atmospheres, Polar atmospheres, Cloud cover, Radiation balance, Light transmission, Optical properties, Ice crystal optics, Climatic factors, Periodic variations, Ice cover effect.

47-1550
Characteristic property in aqueous solutions: effect of iceberg formation of water surrounding solute on the solubility (or cmc) and its peculiar temperature dependence.
Shinoda, K., *Advances in colloid and interface science*, Sep. 28, 1992, Vol.41, p.81-100, 31 refs.
Solutions, Liquid solid interfaces, Hydrocarbons, Solubility, Ice formation, Enthalpy, Temperature effects, Thermodynamic properties, Chemical analysis, Icebergs.

47-1551
Sedimentology and depositional model for glaciolacustrine deposits in an ice-dammed tributary valley, western Tasmania, Australia.
Fitzsimons, S.J., *Sedimentology*, June 1992, 39(3), p.393-410, 48 refs.
Glaciation, Glacial geology, Glacial lakes, Sedimentation, Lacustrine deposits, Quaternary deposits, Pleistocene, Stratigraphy, Soil analysis.

47-1552
Waste water reuse by freeze concentration with a falling film reactor.
Müller, M., et al, *Water science and technology*, 1992, 26(7-8), Biennial Conference of the International Association on Water Pollution Research and Control, 16th, Washington, D.C., May 24-30, 1992. Proceedings, Pt.4. Edited by M. Suzuki et al, p.1475-1482, 15 refs.
Sekoulov, I.
Water treatment, Waste treatment, Freezing, Phase transformations, Freezing points, Ice water interface.

47-1553
Orographic enhancement of snowfall.
Dore, A.J., et al, *Environmental pollution*, 1992, 75(2), p.175-179, Presented in conjunction with the International Conference on Acidic Deposition, Glasgow, Scotland, Sep., 1990. 9 refs.
Choularton, T.W., Fowler, D., Crossley, A.
Precipitation (meteorology), Snowfall, Snow composition, Snow impurities, Topographic effects, Altitude, Scavenging, Chemical properties, Snow crystal growth, Ion density (concentration).

47-1554
Elemental source signatures of aerosols from the Canadian high Arctic.
Landsberger, S., et al, *Environmental pollution*, 1992, 75(2), p.181-187, Presented in conjunction with the International Conference on Acidic Deposition, Glasgow, Scotland, Sep., 1990. 28 refs.
Polar atmospheres, Air pollution, Aerosols, Atmospheric composition, Origin, Chemical properties, Sampling, Seasonal variations.

47-1555
Emissivity of terrestrial materials in the 8-14 micron atmospheric window.
Salisbury, J.W., et al, *Remote sensing of environment*, Nov. 1992, 42(2), p.83-106, 39 refs.
D'Aria, D.M.
Radiance, Infrared reconnaissance, Remote sensing, Geophysical surveys, Sea ice, Reflectivity, Ice optics, Spectra, Backscattering.

47-1556
Europa, Ganymede, and Callisto: new radar results from Arecibo and Goldstone.
Ostro, S.J., et al, *Journal of geophysical research*, Nov. 25, 1992, 97(E11), p.18,227-18,244, 35 refs.
Extraterrestrial ice, Satellites (natural), Remote sensing, Albedo, Radar echoes, Backscattering, Surface properties, Spectra, Polarization (waves), Regolith.

47-1557
Root mechanical properties related to disturbed and stressed habitats in the Arctic.
Jonasson, S., et al, *New phytologist*, Sep. 1992, 122(1), p.179-186, 30 refs.
Callaghan, T.V.
Plants (botany), Roots, Strength, Frost heave, Cold weather survival, Plant ecology, Tensile properties, Patterned ground, Arctic landscapes.

47-1558
Acidic mist and nitrogen fertilization effects on growth, nitrate reductase activity, gas exchange, and frost hardiness of red spruce seedlings.
L'Hirondelle, S.J., et al, *New phytologist*, Aug. 1992, 121(4), p.611-622, 49 refs.
Jacobson, J.S., Lassoie, J.P.
Trees (plants), Growth, Water vapor, Chemical properties, Frost resistance, Acclimatization, Air pollution, Environmental tests, Forestry.

47-1559
Influence of glacier hydrology on the dynamics of a large Quaternary ice sheet.
Arnold, N., et al, *Journal of Quaternary science*, June 1992, 7(2), p.109-124, 49 refs.
Sharp, M.
Pleistocene, Glacial hydrology, Ice sheets, Glacier flow, Climatic changes, Sea level, Basal sliding, Mathematical models, Ice volume.

47-1560
Strength development of concrete cured at low temperature.
Korhonen, C.J., et al, *Concrete international*, Dec. 1992, 14(12), MP 3194, p.34-39, 6 refs. For another version see 46-349.
Cortez, E.R., Charest, B.A.
Winter concreting, Concrete curing, Concrete strength, Concrete admixtures, Antifreezes, Temperature control, Temperature effects, Cold weather tests.

47-1561
Comparison of experimental and theoretical scattering effects from melting ice spheres at microwave and millimetre-wave frequencies.
Fletcher, P.N., et al, *IEE proceedings H. Microwaves, antennas and propagation*, Dec. 1992, 139(6), p.545-548, 10 refs.
Hardaker, P.J., Auchterlonie, L.J., Holt, A.R.
Precipitation (meteorology), Wave propagation, Hailstones, Ice melting, Radar echoes, Scattering, Water films, Analysis (mathematics), Attenuation, Ice optics.

47-1562
Circular polarization for remote sensing of precipitation: polarization diversity work at the National Research Council of Canada.
Antar, Y.M.M., et al, *IEEE antennas and propagation magazine*, Dec. 1992, 34(6), p.7-16, 38 refs.
Hendry, A., McCormick, G.C.
Precipitation (meteorology), Remote sensing, Radar echoes, Polarization (waves), Ice crystal optics, Wave propagation, Research projects, Antennas, Ice melting.

47-1563
Three-dimensional simulation of electrothermal deicing systems.
Yaslik, A.D., et al, *Journal of aircraft*, Nov.-Dec. 1992, 29(6), p.1035-1042, 16 refs.
De Witt, K.J., Keith, T.G., Jr., Boronow, W.
Aircraft icing, Ice removal, Electric heating, Ice solid interface, Heat transfer, Mathematical models.

47-1564
Numerical modeling of an advanced pneumatic impulse ice protection system for aircraft.
Ramamurthy, S., et al, *Journal of aircraft*, Nov.-Dec. 1992, 29(6), p.1057-1063, 6 refs.
Aircraft icing, Ice removal, Inflatable structures, Ice breaking, Ice solid interface, Vibration, Mathematical models, Fluid dynamics.

47-1565
Impact of heterogeneous chemistry on model predictions of ozone changes.
Granier, C., et al, *Journal of geophysical research*, Nov. 20, 1992, 97(D16), p.18,015-18,033, Refs. p.18,031-18,033.
Brasseur, G.
Ozone, Models, Atmospheric composition, Chemistry, Aerosols, Clouds (meteorology).
A two-dimensional chemical/transport model of the middle atmosphere is used to assess the importance of chemical heterogeneous processes both in the polar regions on polar stratospheric clouds (PSCs), and at other latitudes on sulfate aerosols. When conversion on type I and type II PSCs of N2O5 into HNO3 and of ClONO2 into reactive forms of chlorine is taken into account, enhanced ClO concentrations lead to the formation of a springtime "ozone hole" over the antarctic continent. No such major reduction in the ozone column is found in the arctic region. When conversion of nitrogen and chlorine compounds is assumed to occur on sulfate particles present in the lower stratosphere at all latitudes, significant perturbations in the chemistry are also found. For background aerosol conditions, the concentration of nitric acid is enhanced and agrees with observed values, while that of nitrogen oxides is reduced and agrees less than if heterogeneous processes are ignored in the model calculations. The concentration of the OH radical is significantly increased. Ozone number density appears to become larger between 16 and 30 km but smaller below 16 km, especially at high latitudes. (Auth. mod.)

47-1566
On the potential importance of the gas phase reaction CH3O2 + ClO—ClOO + CH3O and the heterogeneous reaction HOCl + HCl—H2O + Cl2 in "ozone hole" chemistry.
Crutzen, P.J., et al, *Geophysical research letters*, June 2, 1992, 19(11), p.1113-1116, 28 refs.
Müller, R., Brühl, C., Peter, T.
Ozone, Atmospheric composition, Chemical analysis, Models.
Attention is called to the great importance of the gas phase reaction ClO + CH3O2 - ClOO + CH3O and the heterogeneous reaction HCl + HOCl - Cl2 + H2O on polar stratospheric cloud (PSC) particles. These reactions may accomplish the almost complete conversion of HCl into ClOx radicals, thus leading to rapid destruction of ozone. (Auth.)

47-1567
New band of emission from high-energy-electron-irradiated ice at very low temperature.
Miyazaki, T., et al, *Journal of physical chemistry*, Nov. 12, 1992, 96(23), p.9558-9561, 16 refs.
Kamiya, Y., Fueki, K., Yasui, M.
Ice physics, Low temperature research, Luminescence, Molecular energy levels, Temperature effects, Spectra, Radiation absorption, Photometry.

47-1568
Condensation and evaporation of H2O on ice surfaces.
Haynes, D.R., et al, *Journal of physical chemistry*, Oct. 15, 1992, 96(21), p.8502-8509, 71 refs.
Tro, N.J., George, S.M.
Ice physics, Ice sublimation, Cloud physics, Ice surface, Ice vapor interface, Condensation, Evaporation, Water vapor, Lasers, Temperature effects.

47-1569
Effect of restricted geometries on the structure and thermodynamic properties of ice.
Handa, Y.P., et al, *Journal of physical chemistry*, Oct. 15, 1992, 96(21), p.8594-8599, 38 refs.
Zakrzewski, M., Fairbridge, C.
Ice physics, Ice formation, Liquid solid interfaces, Water structure, Phase transformations, Porous materials, Thermodynamic properties, Melting points, Temperature measurement, X ray diffraction.

47-1570
Chasing the rogue icebergs.
Vaughan, D., *New scientist*, Jan. 9, 1993, 137(1855), p.24-27.
Icebergs, Calving, Drift.
Some thoughts are presented on the saga of A24, a king size iceberg which broke away from the Filchner Ice Shelf in 1986. It began to drift from the shelf, grounded, broke free again, and floated out to sea where it began moving to the beat of the deeper ocean currents. It has continued northeastward into the South Atlantic, passing well eastward of the Falklands and west of South Georgia. Unconfirmed sighting reports place A24 as far north as 36S, about the same latitude as Buenos Aires. Apparently a deep crevasse developed in the Filchner Ice Shelf which eventually weakened enough to let A24 drop off. Also discussed as an adjunct of this calving process are the uncertainties in the interpretation of a global warming trend vis à vis the antarctic ice shelves. Different researchers, using the same data, have reached opposing conclusions; global warming will cause either greater melting, allowing more ice shelves to break up bringing on a considerable rise in sea level, or it will cause increased precipitation and the enlargement of glaciers and ice sheets. There is equal uncertainty as to whether the ice mass balance is positive or negative, and thus, whether the ice sheets are growing or shrinking.

47-1571
Study on the meteorological characteristics over King Sejong Station, Antarctica during 1990.
Nam, J.C., et al, *Journal of atmospheric research*, 1991, 8(1), p.63-70, In Korean with English summary. 4 refs.
Lee, B.Y.
Meteorological data, Snow accumulation, Antarctica—King Sejong Station.
Meteorological data collected at King Sejong Station during 1990 are analyzed to determine the meteorological characteristics over the region. The surface pressure, temperature, relative humidity, wind speed and cloud amount averages, and total snow accumulation, were 986.7 mb, -1.9 C, 93%, 7.8 m/s, 6.1 octas and 850.4 cm, respectively. Twenty-two blizzards were observed; the total duration time was 296 hrs, between Jan. and Oct. According to data, the weather in winter was severe because of blizzards with heavy snowfalls and strong winds, but it was comparatively mild in the summer. The weather during fall and spring was very variable. This kind of weather was due to the frequent occurrence of low pressure systems and the topographical blocking effects of the Antarctic Peninsula on the station. (Auth. mod.)

47-1572
Work of the wintering personnel of the 32nd Soviet Antarctic Expedition. [Rabota zimovochnogo sostava Tridtsat'vtoroĭ sovetskoĭ antarkticheskoĭ ekspeditsiĭ],
Vovk, V.IA., *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten'*, 1991, No.115, p.5-9, In Russian.
Research projects, Low temperature research, Expeditions.
A summary is given of the multidisciplinary operations of the 32nd Soviet Antarctic Expedition, carried out at 7 Soviet stations by 347 wintering-over participants, during 1987. A table is presented showing name of station, the field of activity (mainly meteorology, terrestrial physics, glaciology and biomedicine) and the type of research performed.

47-1573
Morphology and development of sea terraces on the shores of Bunger Hills. [Osobennosti morphologii i formirovaniia morskikh terras na poberezh'iakh zalivov oazisa Bangera (Vostochnaia Antarktida)],
Verkulich, S.R., *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten'*, 1991, No.115, p.9-14, In Russian. 4 refs.
Glacial geology, Geomorphology, Topographic features, Antarctica—Bunger Hills.
Significant geomorphological differences are found between the lower (up to 10 m above sea level) and upper (10-40 m above sea level) sections of the terraces of Bunger Hills shores, particularly regarding the time of their formation and further development. A glacio-morphological map of the area showing the water distribution of Pleistocene and Holocene sea transgressions is presented. A twofold connection is found between the topographic development of Bunger Hills shores and the sea transgressions. It is concluded that the lower section of the terraces was formed by a Mid-Holocene transgression; the upper section was formed considerably earlier, under strictly continental conditions, and doesn't present any visible evidence of marine action.

47-1574
Atmospheric radiation regime at Russkaya Station. [Osobennosti radiatsionnogo rezhima atmosfery raĭona stantsii Russkaya],
Mart'ianov, V.L., *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten'*, 1991, No.115, p.17-22, In Russian.
Solar radiation, Snowfall, Meteorological data, Antarctica—Russkaya Station.
The properties of the solar radiation regime at Russkaya Station are summarized as follows: the decrease of total solar radiation between Mar. and Nov. results in greater cyclonic activity in the northeastern portion of the Ross Sea; the occurrence of severe snowstorms at the station further decreases solar radiation by 60-75%, and decreases surface albedo. A table showing monthly values for temperature, cloudiness, wind speed, snowfall (number of days), percent of surface albedo, the length (%) of solar radiation, and radiation balance components at Russkaya Station from Mar. 1983 to Feb. 1984 is presented.

47-1575
Hydrology of Lake Glubokoye, King George I., winter 1987. [Gidrologicheskie raboty na ozere Glubokom na o-ve King-Dzhordzh (Vaterloo) v zimniĭ period 1987 g.].
Mart'ianov, V.L., et al, *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten'*, 1991, No.115, p.27-32, In Russian. 4 refs.
Babintsev, A.V., Pereĭra, O., Tartaro, L.
Lake ice, Glacial hydrology, Limnology, Antarctica—Glubokoye, Lake.
Hydrological investigations of Lake Glubokoye, carried out at Artigas Station by Soviet and Uruguayan scientists from May 22 to Sep. 21 1987, included water temperature measurements at different depths, ice thickness measurements, bathymetry and leveling profiles from the lake to Maxwell Bay. The data, which are presented on graphs, are similar to those obtained in 1969 and 1970, except for the water temperature, which was lower in 1987 (0-1C, at 10 m depth) than in 1969 (2C).

47-1576
Polarization characteristics of natural thermal emission from antarctic sea ice. [Poliarizatsionnye kharakteristiki sobstvennogo teplovogo izlucheniia morskogo antarkticheskogo l'da].
D...rskikh, A.N., et al, *Sovetskaia antarkticheskaia ek...ditsiia. Informatsionnyĭ biulleten'*, 1991, No.115, p.32-35, In Russian. 2 refs.
Thermal radiation, Radiometry, Sea ice, Analysis (mathematics).
Experimental investigations carried out on board the *Akademik Fedorov* from Oct. 1987 to June 1988 resulted in the determination of 6 polarization characteristics of radiothermal emission from sea ice, which are described. Also described are the main technical characteristics of the radiometric station Omega-S5 and the methods used in the investigation.

47-1577
Total atmospheric ozone measurements in Antarctica, 1988-1989. [Predvaritel'nye rezul'taty izmereniĭ obshchego soderzhaniia atmosfernogo ozona v Antarktide v 1988 i 1989 gg].
IUrganov, L.N., et al, *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten'*, 1991, No.115, p.66-69, In Russian.
Sveshnikov, A.M., Kondratiuk, A.I., Blium, E.M.
Ozone, Meteorological charts.
Tables showing 1988 and 1989 daily ozone averages in Dobson units for Aug.-Dec. at Mirnyy, Sep.-Dec. at Vostok, and Sep.-Dec. at Novolazarevskaya stations are presented, as are those obtained in 1989 from the ships *Polarstern* and *Akademik Fedorov* for Sep.-Oct. and Sep.-Nov., respectively, at various latitudes and longitudes and in different weather conditions.

47-1578
Aircraft take-off laboratory simulation for de/anti-icing study.
Laforte, J.L., et al, *Canadian aeronautics and space journal*, Dec. 1992, 38(4), p.183-193, 14 refs.
Bouchard, G., Louchez, P.R.
Aircraft icing, Antifreezes, Liquid solid interfaces, Fluid flow, Air flow, Performance, Simulation, Wind tunnels, Viscosity.

47-1579
Use of geotextiles in earth structures for oil—gas pipelines under West Siberia conditions.
Kushnir, S.IA., et al, *Soil mechanics and foundation engineering*, Nov. 1992, 29(3), p.81-84, Translated from Osnovaniia, fundamenty i mekhanika gruntov, 2 refs.
Strizhkov, S.N.
Gas pipelines, Earth fills, Cold weather construction, Geotextiles, Protection, Snowmelt, Synthetic materials, Embankments.

47-1580
Finite-element analysis of the transport of water, heat and solutes in frozen saturated-unsaturated soils with self-imposed boundary conditions.
Padilla, F., et al, International Conference on Computational Methods in Water Resources, 7th, Cambridge, MA, June, 1988. Proceedings, Vol.1. Modeling surface and sub-surface flows. Edited by M.A. Celia et al, Developments in Water Science No.35, United Kingdom, Computational Mechanics Publications, 1988, p.121-126, 12 refs.
Villeneuve, J.P., Leclerc, M.
DLC GB656.2.E42 C66 1988
Frozen ground physics, Mass transfer, Soil water migration, Phase transformations, Mathematical models, Saturation.

47-1581
Retrieval of total precipitable water over high-latitude regions using radiometric measurements near 90 and 183 GHz.
Wang, J.R., et al, *Journal of applied meteorology*, Dec. 1992, 31(12), p.1368-1378, 19 refs. For another version see 45-1598.
Boncyk, W.C., Dod, L.R., Sharma, A.K.
Atmospheric composition, Radiometry, Water vapor, Snow cover effect, Upwelling, Brightness, Aerial surveys, Snow depth.

47-1582
Numerical model for prediction of road temperature and ice.
Sass, B.H., *Journal of applied meteorology*, Dec. 1992, 31(12), p.1499-1506, 9 refs.
Road icing, Ice forecasting, Surface temperature, Meteorological factors, Heat balance, Mathematical models.

47-1583
Finite area element snow loading prediction—applications and advancements.
Gamble, S.L., et al, *Journal of wind engineering and industrial aerodynamics*, Oct. 1992, Vol.42, International Conference on Wind Engineering, 8th, Ontario, Canada, July 8-12, 1991. Proceedings, Pt.2. Progress in wind engineering. Edited by A.G. Davenport et al, p.1537-1548, 10 refs.
Kochanski, W.W., Irwin, P.A.
Roofs, Snow loads, Snow accumulation, Drift, Forecasting, Wind pressure, Heat transfer, Snow cover effect, Simulation, Wind tunnels.

47-1584
Frost heave and creep in the Sör Rondane Mountains, Antarctica.
Matsuoka, N., et al, *Arctic and alpine research*, Nov. 1992, 24(4), p.271-280, 24 refs.
Moriwaki, K.
Mountain soils, Geocryology, Frost heave, Soil creep, Soil temperature, Freeze thaw cycles, Periglacial processes, Insolation, Diurnal variations, Slope processes, Antarctica—Sör Rondane Mountains.
Frost heave, slope deformation, and ground temperature have been monitored over a 5 yr interval on ice-free mountains in Antarctica, where only diurnal frost action operates during the midsummer. The monitoring was done at three sites with similar soils but different local climates. Diurnal freeze-thaw cycles resulted in significant heave (max. 3.4 mm) and downslope movements (max. 1.5 cm/yr at the surface) on some wet slopes subject to both snow flurries and strong insolation. The estimation from the cumulative frost heave measurements indicates that frost creep is most responsible for the movements. The velocity profile, calculated using the values of thaw depth and frost heave, agreed fairly well with the actual profile, demonstrating that subsurface freeze-thaw frequency is the primary control of the profile. However, such activities are insignificant on the majority of slopes owing to little thawing and/or a moisture shortage. Significant frost heave and creep usually take place after the ground achieves water content of > 5% and has thawed deeper than 7 cm. (Auth. mod.)

47-1585
Reconstruction of mass balance variations for Franz Josef Glacier, New Zealand, 1913-1989.
Woo, M.K., et al, *Arctic and alpine research*, Nov. 1992, 24(4), p.281-290, 39 refs.
Fitzharris, B.B.
Glacier mass balance, Glacier melting, Climatic factors, Forecasting, Mathematical models, Periodic variations, Climatic changes.

47-1586
Nitrogen mineralization and streamwater chemistry, Rock Creek watershed, Denali National Park, U.S.A.
Stottlemyer, R., *Arctic and alpine research*, Nov. 1992, 24(4), p.291-303, 41 refs.
Limnology, Forest ecosystems, Watersheds, Hydrogeochemistry, Tundra, Nutrient cycle, Biomass, Surface waters, Site surveys.

47-1587
Development of an ice-dammed lake: the contemporary and older sedimentary record.
Johnson, P.G., et al, *Arctic and alpine research*, Nov. 1992, 24(4), p.304-313, 28 refs.
Kasper, J.N.
Limnology, Ice dams, Glacial lakes, Subglacial drainage, Sedimentation, Lacustrine deposits, Glacial hydrology, Stratigraphy, Water level, Pleistocene.

47-1588
Breakup of limestone bedrock by frost shattering and chemical weathering, eastern Canadian Arctic.
Dredge, L.A., *Arctic and alpine research*, Nov. 1992, 24(4), p.314-323, 49 refs.
Arctic landscapes, Bedrock, Geocryology, Frost shattering, Frost weathering, Periglacial processes, Freeze thaw cycles.

47-1589
Holocene vegetation histories from three sites in the tundra of northwestern Quebec, Canada.
Gajewski, K., et al, *Arctic and alpine research*, Nov. 1992, 24(4), p.329-336, 17 refs.
Garralla, S.
Paleobotany, Tundra, Forest lines, Vegetation patterns, Palynology, Site surveys.

47-1590
Reproductive ecology of *Saxifraga oppositifolia*: phenology, mating system, and reproductive success.
Stenström, M., et al, *Arctic and alpine research*, Nov. 1992, 24(4), p.337-343, 29 refs.
Molau, U.
Phenology, Plant ecology, Vegetation patterns, Alpine tundra, Pollen, Site surveys, Cold weather survival.

47-1591
Phytomass and primary productivity in several communities of a central Himalayan alpine meadow, India.
Rikhari, H.C., et al, *Arctic and alpine research*, Nov. 1992, 24(4), p.344-351, 31 refs.
Plants (botany), Alpine tundra, Plant ecology, Biomass, Vegetation patterns, Meadow soils, Site surveys, Grasses.

47-1592
Energy balance of dry tundra in West Greenland.
Rott, H., et al, *Arctic and alpine research*, Nov. 1992, 24(4), p.352-362, 25 refs.
Obleitner, F.
Tundra, Plant ecology, Soil air interface, Heat flux, Climatic factors, Surface energy, Evapotranspiration, Site surveys.

47-1593
Radiative forcing of climate from halocarbon-induced global stratospheric ozone loss.
Ramaswamy, R., et al, *Nature*, Feb. 27, 1992, 355(6303), p.810-812, 27 refs.
Schwarzkopf, M.D., Shine, K.P.
Climatic changes, Stratosphere, Ozone.
Observations from satellite and ground-based instruments indicate that between 1979 and 1990 there have been statistically significant losses of ozone in the lower stratosphere of the middle to high latitudes in both hemispheres. Here the authors determine the radiative forcing of the surface-troposphere system due to the observed decadal ozone losses, and compare it with that due to the increased concentrations of the other main radiatively active gases (CO_2, CH_4, N_2O and chlorofluorocarbons) over the same time period. The results indicate that a significant negative radiative forcing results from ozone losses in middle to high latitudes, in contrast to the positive forcing at all latitudes caused by the CFCs and other gases. As the anthropogenic emissions of CFCs and other halocarbons are thought to be largely responsible for the observed ozone depletions, the results suggest that the net decadal contribution of CFCs to the greenhouse climate forcing is substantially less than previously estimated. (Auth.)

47-1594
Evidence for heterogeneous reactions in the antarctic autumn stratosphere.
Keys, J.G., et al, *Nature*, Jan. 7, 1993, 361(6407), p.49-51, 24 refs.
Johnston, P.V., Blatherwick, R.D., Murcray, F.J.
Stratosphere, Chemical analysis, Clouds (meteorology), Ozone.
Measurements are presented of antarctic stratospheric NO_2 and HNO_3 concentrations taken in 1991. The results demonstrate that reactive nitrogen was converted to HNO_3 in autumn, before temperatures were low enough for polar stratospheric clouds to form. It is concluded that heterogeneous chemistry on background aerosols was responsible for this conversion, which brought with it the potential for additional ozone loss in the autumn. (Auth. mod.)

47-1595
CO2, CH4 and N2O flux through a Wyoming snowpack and implications for global budgets.
Sommerfeld, R.A., et al, *Nature*, Jan. 14, 1993, 361(6408), p.140-142, 23 refs.
Mosier, A.R., Musselman, R.C.
Snow composition, Soil chemistry, Gases, United States—Wyoming—Snowy Range.

47-1596
Numerical simulation of self-organized stone stripes.
Werner, B.T., et al, *Nature*, Jan. 14, 1993, 361(6408), p.142-145, 15 refs.
Hallet, B.
Patterned ground, Ground ice, Ice crystals, Models.

47-1597
Preferential use of organic nitrogen for growth by a non-mycorrhizal Arctic sedge.
Chapin, ... et al, *Nature*, Jan. 14, 1993, 361(640...3, 30 refs.
Moilane... nd, K.
Tundra, ... ils, Soil chemistry.

47-1598
Environmental conditions in the brine channels of antarctic sea ice. [Die Lebensbedingungen in den Solekanälchen des antarktisches Meereises].
Weissenberger, J., *Berichte zur Polarforschung*, 1992, No.111, 159p., In German with English summary. Refs.p.139-149.
Sea ice, Brines, Physical properties, Chemical properties, Ecology.
Brine channels which are formed in and between ice crystals during sea ice formation are a habitat for a variety of different organism groups. The physical and chemical parameters in the brine channels are governed by freezing processes and other sea ice properties. The aim of this thesis was to determine the physical and chemical *in situ* environment of sea ice. Volume, salinity, pH, chlorophyll a determinations as well as enumeration and classification of diatom species were done on brine and melted ice cores. Vertical profiles of all parameters were measured on 34 cores from 17 different ice flows. After removal of ice by sublimation, the shape of the brine channels was photographed using scanning electron microscopy at a resolution ranging from centimeters to a few microns. The three-dimensional array of the brine channels varied according to ice type as well as ice temperature.

47-1599
Biogeochemistry and zoogeography of lakes and rivers in arctic Alaska.
Kling, G.W., et al, *Hydrobiologia*, Sep. 21, 1992, 240(1-3), p.1-14, Refs. p.12-14.
O'Brien, W.J., Miller, M.C., Hershey, A.E.
Limnology, Geochemistry, Plankton, Sampling, Ecosystems, Site surveys, Water chemistry, Pipelines, Ion density (concentration).

47-1600
Cation export from Alaskan arctic watersheds.
Cornwell, J.C., *Hydrobiologia*, Sep. 21, 1992, 240(1-3), p.15-22, 22 refs.
Limnology, Watersheds, Stream flow, Weathering, Geochemistry, Ion diffusion, Mass balance, Ecosystems, Snowmelt, Decomposition.

47-1601
Flux of CO2 and CH4 from lakes and rivers in arctic Alaska.
Kling, G.W., et al, *Hydrobiologia*, Sep. 21, 1992, 240(1-3), p.23-36, 63 refs.
Kipphut, G.W., Miller, M.C.
Limnology, Air water interactions, Vapor transfer, Carbon dioxide, Natural gas, Water chemistry, Ecosystems, Seasonal variations, Atmospheric composition, Climatic changes.

47-1602
Silicon budget for an Alaskan arctic lake.
Cornwell, J.C., et al, *Hydrobiologia*, Sep. 21, 1992, 240(1-3), p.37-44, 38 refs.
Banahan, S.
Limnology, Ecosystems, Geochemistry, Sedimentation, Biomass, Nutrient cycle, Littoral zone.

47-1603
Biogeochemistry of manganese- and iron-rich sediments in Toolik Lake, Alaska.
Cornwell, J.C., et al, *Hydrobiologia*, Sep. 21, 1992, 240(1-3), p.45-59, Refs. p.57-59.
Kipphut, G.W.
Limnology, Geochemistry, Sedimentation, Bottom sediment, Ecosystems, Lacustrine deposits, Metals.

47-1604
Nitrogen and phosphorus concentrations and export for the upper Kuparuk River on the North Slope of Alaska in 1980.
Peterson, B.J., et al, *Hydrobiologia*, Sep. 21, 1992, 240(1-3), p.61-69, 26 refs.
Corliss, T.L., Kriet, K., Hobbie, J.E.
Limnology, Ecosystems, Geochemistry, Nutrient cycle, Tundra, Watersheds.

47-1605
Water and sediment export of the upper Kuparuk River drainage of the North Slope of Alaska.
Kriet, K., et al, *Hydrobiologia*, Sep. 21, 1992, 240(1-3), p.71-81, 22 refs.
Peterson, B.J., Corliss, T.L.
Limnology, Stream flow, Surface drainage, Ecosystems, Watersheds, Sediment transport, Suspended sediments, Tundra, Snowmelt.

47-1606
Influence of light and nutrient addition upon the sediment chemistry of iron in an arctic lake.
Sugai, S.F., et al, *Hydrobiologia*, Sep. 21, 1992, 240(1-3), p.91-101, 16 refs.
Kipphut, G.W.
Limnology, Ecosystems, Geochemistry, Nutrient cycle, Sedimentation, Light effects, Loading, Metals, Chemical analysis.

47-1607
Access pipes for sampling through thick ice.
Kipphut, G.W., et al, *Hydrobiologia*, Sep. 21, 1992, 240(1-3), p.267-269, 5 refs.
Whalen, S.C.
Limnology, Water chemistry, Samplers, Pipes (tubes), Lake ice, Subglacial observations, Design.

47-1608
Observations supporting the Pleistocene inland glaciation of High Asia.
Kuhle, M., *GeoJournal*, Oct.-Nov. 1991, 25(2-3), p.133-231, 58 refs.
Glaciation, Mountain glaciers, Pleistocene, Glacial geology, Geomorphology, Moraines, Snow line, Altitude, Topographic effects.

47-1609
Quaternary glaciation of the north slope of Karakorum Mountains.
Xu, D.M., *GeoJournal*, Oct.-Nov. 1991, 25(2-3), p.233-242.
Glaciation, Mountain glaciers, Quaternary deposits, Moraines, Pleistocene, Glacial geology, Tectonics, Geomorphology, Ice sheets, Snow line.

47-1610
Precipitation conditions for the development of the present glaciers on the northern slope of Karakorum.
Ding, Y.J., *GeoJournal*, Oct.-Nov. 1991, 25(2-3), p.243-248, 13 refs.
Mountain glaciers, Precipitation (meteorology), Glacier formation, Snow accumulation, Altitude, Temperature effects, Firn.

47-1611
Giant avalanche on K2 Mount, Karakorum.
Shen, Y.P., *GeoJournal*, Oct.-Nov. 1991, 25(2-3), p.249-254, 5 refs.
Mountain glaciers, Avalanche mechanics, Glaciology.

47-1612
Characteristics of glacier outburst flood in the Yarkant River, Karakorum Mountains.
Feng, Q.H., *GeoJournal*, Oct.-Nov. 1991, 25(2-3), p.255-263, 22 refs.
Mountain glaciers, Subglacial drainage, Glacial lakes, Glacial hydrology, Floods, Lake bursts, River basins, Glacier surveys, Ice dams, Meteorological factors.

47-1613
Zonation of flora and vegetation of the northern declivity of the Karakoram/Kunlun Mountains (SW Xinjiang China).
Dickoré, W.B., *GeoJournal*, Oct.-Nov. 1991, 25(2-3), p.263-284, 47 refs.
Plants (botany), Distribution, Vegetation patterns, Plant ecology, Altitude, Alpine landscapes, Pleistocene, Glaciation.

47-1614
Strength testing of marine sediments: laboratory and in-situ measurements.
Chaney, R.C., ed, *American Society for Testing and Materials. Special technical publication*, 1985, No.883, 558p., Refs. pa[illegible]esented at a symposium in San Diego, CA, [illegible]1984. For selected papers see 47-1615 th[illegible]617.
Demars, K.B., ed.
Bottom sediment, Ma[illegible]posits, Soil strength, Ocean bottom, Offshore drilling, Soil tests, Strain tests.

47-1615
Liquefaction potential of sediment in the northern Bering Sea.
Winters, W.J., *American Society for Testing and Materials. Special technical publication*, 1985, No.883, Strength testing of marine sediments: laboratory and in-situ measurements. Edited by R.C. Chaney and K.R. Demars, p.454-472, 29 refs. Presented at a symposium in San Diego, CA, Jan. 26-27, 1984.
Bottom sediment, Marine deposits, Soil strength, Ocean bottom, Deltas, Earthquakes, Ocean waves, Soil tests, Strain tests, United States—Alaska—Norton Sound.

47-1616
Deformation properties of warm permafrost.
Shields, D.H., et al, *American Society for Testing and Materials. Special technical publication*, 1985, No.883, Strength testing of marine sediments: laboratory and in-situ measurements. Edited by R.C. Chaney and K.R. Demars, p.473-486, 11 refs. Presented at a symposium in San Diego, CA, Jan. 26-27, 1984.
Domaschuk, L., Man, C.S., Kenyon, R.M.
Subsea permafrost, Frozen ground strength, Sands, Soil creep, Soil tests, Strain tests.

47-1617
Some aspects of the behavior of Beaufort Sea clays.
Jefferies, M.G., et al, *American Society for Testing and Materials. Special technical publication*, 1985, No.883, Strength testing of marine sediments: laboratory and in-situ measurements. Edited by R.C. Chaney and K.R. Demars, p.487-514, 26 refs. Presented at a symposium in San Diego, CA, Jan. 26-27, 1984.
Ruffell, J.P., Crooks, J.H.A., Hughes, J.M.O.
Bottom sediment, Marine deposits, Soil strength, Ocean bottom, Clay soils, Artificial islands, Offshore drilling, Soil tests, Strain tests, Beaufort Sea.

47-1618
Experimental techniques in condensed matter physics at low temperatures.
Richardson, R.C., ed, Frontiers in physics, No.67, Redwood City, CA, Addison-Wesley Publishing Company, 1988, 338p., Refs. passim.
Smith, E.N., ed.
Cryogenics, Low temperature research, Refrigeration, Artificial freezing, Laboratory techniques.

47-1619
Intelligent and localized weather prediction.
Reiter, E.R., et al, *U.S. National Research Council. Strategic Highway Research Program. Report*, 1992, SHRP-ID/UFR-92-614, 144p.
Doyle, D.K., Teixeira, L.
Road maintenance, Road icing, Weather forecasting, Ice forecasting, Ice reporting, Snowstorms, Computer programs, Data processing.

47-1620
Field guide to snow crystals.
LaChapelle, E.R., Cambridge, England, International Glaciological Society, 1992, 101p., 7 refs. For earlier version see 25-590.
Snow crystal structure, Metamorphism (snow), Depth hoar, Photographic techniques.

47-1621
***Winter* behavioural patterns of self draining roadways.**
Livet, J., et al, International Symposium on Snow Removal and Ice Control Technology, 3rd, Minneapolis, MN, Sep. 14-18, 1992, Paris, Société des Autoroutes Paris Rhin Rhône, 1992, 23p.
Fabre, P., Roussel, J.C.
Road maintenance, Road icing, Highway planning, Salting, Protective coatings, Surface drainage, France.

47-1622
Industrial applications of freeze concentration technology. Final report.
Barron, T.S., et al, *Electric Power Research Institute, Palo Alto, CA. Report*, June 1987, EPRI EM-5232, Var. p., Refs. passim.
Heist, J.A., Hunt, K.M., Wrobel, P.J.
Artificial freezing, Freeze drying, Manufacturing, Phase transformations, Waste treatment, Desalting, Condensation, Crystal growth, Cost analysis.

47-1623
***Fragilariopsis cylindrus* (Grunow) Krieger: the most abundant diatom in water column assemblages of antarctic marginal ice-edge zones.**
Kang, S.H., et al, *Polar biology*, Nov. 1992, 12(6-7), p.609-627, Refs. p.626-627.
Fryxell, G.A.
Sea ice, Ice cover effect, Algae, Antarctica—Bellingshausen Sea, Antarctica—Weddell Sea.
Planktonic diatoms were sampled in the ice-edge zone of the Bellingshausen Sea during the early austral spring of 1990 and of the Weddell Sea during the late spring of 1983, the autumn of 1986, and the winter of 1988. Cells from discrete water samples from 73 stations near the marginal ice-edge zones during all seasons were counted to gain quantitative information on the composition, abundance, and distribution of diatoms. Diatom abundance was dominated by the pennate diatom, usually nanoplanktonic, *Fragilariopsis cylindrus* (Grunow) Krieger. The average integrated abundance of *F. cylindrus* was about 35% of the total diatom abundance. The overall spatial patterns of *F. cylindrus* near the marginal ice-edge zones were similar, with the highest number of cells in open waters rather than ice-covered waters. When all 73 stations were included in the correlation analysis, the abundance of total diatoms was positively correlated with the abundance of *F. cylindrus*, suggesting that the ice-edge pulses of diatom assemblages in the water column largely reflected its abundance. Cluster analysis revealed that the stations in marginal ice-edge zones were not only separated by seasons and locations, but they also separated based on location of stations in relation to the ice edge (open water stations vs. ice-covered stations). (Auth. mod.)

47-1624
Determination of soil moisture distribution from impedance and gravimetric measurements.
Ungar, S.G., et al, *Journal of geophysical research*, Nov. 30, 1992, 97(D17), MP 3195, p.18,969-18,977, 7 refs.
Layman, R., Campbell, J.E., Walsh, J., McKim, H.J.
Soil water, Soil science, Dielectric properties, Electrical measurement, Probes, Soil tests, Design, Water content.
Daily measurements of the soil dielectric properties at 5 and 10 cm were obtained at five locations throughout the First ISLSCP Field Experiment (FIFE) test site during the 1987 intensive field campaigns. An automated vector voltmeter was used to monitor the complex electrical impedance, at 10 MHz, of cylindrical volumes of soil delineated by specially designed soil moisture probes buried at these locations. The objective of this exercise was to test the hypothesis that the soil impedance is sensitive to the moisture content of the soil and that the imaginary part (that is, capacitive reactance) can be used to calculate the volumetric water content of the soil. These measurements were compared with gravimetric samples collected at these locations by the FIFE staff science team. Examination of the data reveals that the impedance probe is a more consistent source of time series information than traditional measurements and is potentially more closely linked to the physical parameters which are both remotely sensible and required for surface energy/mass exchange determination.

47-1625
***In situ* meteorological sounding archives for arctic studies.**
Kahl, J.D., et al, *American Meteorological Society. Bulletin*, Nov. 1992, 73(11), p.1824-1830, 12 refs.
Polar atmospheres, Sounding, Meteorological data, Air temperature, Research projects, Data processing, Weather stations.

47-1626
Influence of beam size on the flexural strength of sea ice, freshwater ice and iceberg ice.
Parsons, B.L., et al, *Philosophical magazine A*, Dec. 1992, 66(6), p.1017-1036, 24 refs.
Ice strength, Ice sheets, Flexural strength, Ice breaking, Mechanical tests, Ice volume, Ice solid interface, Mechanical properties, Icebergs, Sea ice, Analysis (mathematics).

47-1627
NMR imaging of roots: effects after root freezing of containerised conifer seedlings.
Southon, T.E., et al, *Physiologia plantarum*, Oct. 1992, 86(2), p.329-334, 28 refs.
Mattsson, A., Jones, R.A.
Trees (plants), Imaging, Roots, Cold stress, Damage, Freezing, Temperature effects, Nuclear magnetic resonance, Revegetation.

47-1628
Effect of density extremum on the solidification of water on a vertical wall of a rectangular cavity.
Braga, S.L., et al, *Experimental thermal and fluid science*, Nov. 1992, 5(6), p.703-713, 23 refs.
Viskanta, R.
Solidification, Convection, Fluid dynamics, Liquid solid interfaces, Density (mass/volume), Temperature effects, Water flow, Phase transformations, Freezing rate, Thermal analysis.

47-1629
Brine investigations.
Bianchi, F., et al, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore biologia. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: biology. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.81-83, Reprinted from Berichte zur Polarforschung, 1989, 62, p.95-97.
Brines, Biomass, Sea ice.
Brine was collected from various different ice floes to determine the composition of the different assemblages; to obtain estimates of organism numbers and biomass; to study the chemical composition of the brine; and to investigate the activity of sea ice organisms, i.e. C-14 uptake, nitrogen regeneration and O2 production. Results indicate that biological activity within the ice is already very high long before the ice melts or breaks up. This activity is even more enhanced when the assemblages mentioned in this report are exposed to the surrounding sea water or when infiltration of sea water occurs more freely. In this way the sea ice becomes the most important substratum for primary production during the antarctic winter and spring.

47-1630
Phytoplankton communities.
Bianchi, F., et al, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore biologia. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: biology. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.84-91, Reprinted from Berichte zur Polarforschung, 1989, 62, p.117-124.
Ice cover effect, Biomass, Sea water, Chemical composition.
The objectives of this study were: to follow the spring development of phytoplankton on a spatial scale; to relate the biological and chemical properties (biomass and species composition as well as oxygen and nutrient concentrations to hydrographic properties of the water column); and to determine the effects of sea ice cover and ice melting on the phytoplankton. The ice observations of the area of investigation can be divided into three zones: the open water zone reaching from 58S to approximately 60S, the ice edge zone with increasing ice cover to the south up to 62 deg 30'S, and the pack ice zone. Some of the findings are discussed.

47-1631
Greenland glaciers and the "greenhouse effect," status 1991.
Braithwaite, R.J., et al, *Grönlands geologiske undersögelse. Rapport*, 1992, No.155, p.9-13, 26 refs.
Reeh, N., Weidick, A.
Glacier surveys, Glacier melting, Global warming, Ice sheets, Air ice water interaction, Sea level, Greenland.

47-1632
Meltwater refreezing in the accumulation area of the Greenland ice sheet: Pâkitsoq, summer 1991.
Braithwaite, R.J., et al, *Grönlands geologiske undersögelse. Rapport*, 1992, No.155, p.13-17, 9 refs.
Pfeffer, W.T., Blatter, H., Humphrey, N.F.
Glacial hydrology, Glacier alimentation, Meltwater, Glacier melting, Global warming, Ice sheets, Sea level, Greenland.

47-1633
GGU's mineral resource activities and their role for the mineral industry.
Schönwandt, H.K., *Grönlands geologiske undersögelse. Rapport*, 1992, No.155, p.17-19, 10 refs.
Exploration, Minerals, Economic development, Natural resources, Geological surveys, Greenland.

47-1634
Geological setting of Precambrian supracrustal belts: a fundamental part of mineral resource evaluation in Greenland.
Dawes, P.R., et al, *Grönlands geologiske undersögelse. Rapport*, 1992, No.155, p.19-23, 38 refs.
Schönwandt, H.K.
Exploration, Minerals, Natural resources, Geological surveys, Greenland.

47-1635
Björnesund Project, west Greenland.
Appel, P.W.U., *Grönlands geologiske undersögelse. Rapport*, 1992, No.155, p.24-27, 11 refs.
Exploration, Minerals, Gold, Geological surveys, Greenland.

47-1636
Petroleum-geological activities in 1991: reassessment of areas of earlier exploration and improvement of information service to industry.
Christiansen, F.G., et al, *Grönlands geologiske undersögelse. Rapport*, 1992, No.155, p.28-30, 16 refs.
Pulvertaft, T.C.R.
Exploration, Crude oil, Petroleum industry, Economic development, Geological surveys, Greenland.

47-1637
Renewed petroleum geological studies onshore west Greenland.
Christiansen, F.G., et al, *Grönlands geologiske undersögelse. Rapport*, 1992, No.155, p.31-35, 24 refs.
Exploration, Crude oil, Petroleum industry, Geological surveys, Natural resources, Greenland.

47-1638
Disko Bugt Project 1991, west Greenland.
Kalsbeek, F., et al, *Grönlands geologiske undersögelse. Rapport*, 1992, No.155, p.36-41, 33 refs.
Christiansen, F.G.
Exploration, Minerals, Geological surveys, Natural resources, Greenland.

47-1639
Gold and base metal potential of the Lower Proterozoic Karrat Group, west Greenland.
Thomassen, B., *Grönlands geologiske undersögelse. Rapport*, 1992, No.155, p.57-66, 34 refs.
Exploration, Minerals, Gold, Geological surveys, Geochemistry, Natural resources, Greenland.

47-1640
Jakobshavn Isbrae area during the climatic optimum.
Weidick, A., *Grönlands geologiske undersögelse. Rapport*, 1992, No.155, p.67-72, 16 refs.
Glacier surveys, Glacier oscillation, Paleoclimatology, Ice sheets, Glaciation, Calving, Greenland.

47-1641
Tourmalinites in supracrustal rocks in the Björnesund area, west Greenland.
Appel, P.W.U., *Grönlands geologiske undersögelse. Rapport*, 1992, No.155, p.73-78, 19 refs.
Exploration, Minerals, Geological surveys, Geochemistry, Greenland.

47-1642
Degree-day factor, energy balance, and the increased melting of the Greenland ice sheet under a warmer climate.
Braithwaite, R.J., *Grönlands geologiske undersögelse. Rapport*, 1992, No.155, p.79-83, 20 refs.
Glacier surveys, Glacier melting, Global warming, Ice sheets, Glacier heat balance, Ice air interface, Degree days, Greenland.

47-1643
Regolith exploration geochemistry in arctic and temperate terrains.
Kauranne, K., et al, Handbook of exploration geochemistry, Vol.5, Amsterdam, Elsevier Science Publishers, 1992, 443p., Refs. p.391-417.
Salminen, R., Eriksson, K.
Geochemistry, Exploration, Minerals, Glacial deposits, Regolith, Soil chemistry, Geological surveys, Stratigraphy.

47-1644
Great breakthrough in the theory of formation of thick layered ground ice—the tenth anniversary of Cheng's theory.
Zhou, Y.W., et al, *Journal of glaciology and geocryology*, June 1992, 14(2), p.97-100, In Chinese. Literature review in honor of Cheng Guodong. 30 refs.
Huang, M.H.
Ground ice, Ice formation, Soil freezing, Periglacial processes.

47-1645
Experimental study on conditions for ice formation of saturated sand in freezing and thawing cycles.
Wang, J.C., et al, *Journal of glaciology and geocryology*, June 1992, 14(2), p.101-106, In Chinese with English summary. 4 refs.
Cheng, G.D., Zhang, H.D., Liu, J.M.
Soil freezing, Ice formation, Freeze thaw cycles, Sands, Saturation.

47-1646
Application limit for reducing heave of sulphate saline soil by mixing sodium chloride.
Ding, Y.Q., et al, *Journal of glaciology and geocryology*, June 1992, 14(2), p.107-114, In Chinese with English summary. 5 refs.
Chen, X.B.
Soil freezing, Frost heave, Frost resistance, Saline soils, Soil stabilization.

47-1647
Variation features of large-scale snow cover in Northern Hemisphere.
Wang, G.Y., et al, *Journal of glaciology and geocryology*, June 1992, 14(2), p.115-121, In Chinese with English summary. 7 refs.
Zeng, Q.Z.
Snow cover distribution, Climatic changes, Global change, Periodic variations, Seasonal variations.

47-1648
Results of snow surface sublimation measurements in the mountain area of Urumqi River Basin.
Yang, D.Q., et al, *Journal of glaciology and geocryology*, June 1992, 14(2), p.122-128, In Chinese with English summary. 9 refs.
Zhang, Y.S.
Snow air interface, Snow evaporation, Snow surveys, Snow surface, China—Tian Shan.

47-1649
Characteristics of seasonal snow cover in Urumqi River Basin.
Zhang, Z.Z., et al, *Journal of glaciology and geocryology*, June 1992, 14(2), p.129-133, In Chinese with English summary. 1 ref.
Yang, D.Q.
Snow cover distribution, Snow surveys, River basins, Snow depth, Precipitation (meteorology), Air temperature, Seasonal variations, China—Tian Shan.

47-1650
Investigation on the distribution of snow cover in the burned forest region of Amur of Da Hinggan Ling.
Liang, L.H., et al, *Journal of glaciology and geocryology*, June 1992, 14(2), p.134-140, In Chinese with English summary. 11 refs.
Zhou, Y.W.
Snow cover distribution, Snow surveys, Snow depth, Snow density, Forest fires, Forest land, China—Greater Khingan Range.

47-1651
Study on local circulation and temperature in alpine glaciated area.
Kang, X.C., *Journal of glaciology and geocryology*, June 1992, 14(2), p.141-152, In Chinese with English summary. 16 refs.
Alpine glaciation, Glacial meteorology, Mountain glaciers, Air temperature, Surface temperature, Ice air interface, Soil air interface, Microclimatology.

47-1652
Evolution of Quaternary glaciers and environment on the eastern side of the Geladandong Peak.
Deng, X.F., et al, *Journal of glaciology and geocryology*, June 1992, 14(2), p.153-160, In Chinese with English summary. 7 refs.
Zhang, W.J.
Alpine glaciation, Paleoclimatology, Mountain glaciers, Glacier oscillation, Glacial deposits, Quaternary deposits, Snow line, China—Qinghai-Xizang Plateau.

47-1653
Comprehensive regional division of the global periglacial geomorphology.
Zhu, C., *Journal of glaciology and geocryology*, June 1992, 14(2), p.161-167, In Chinese with English summary. 27 refs.
Permafrost distribution, Periglacial processes, Geomorphology, Cryogenic soils, Climatic factors.

47-1654
Freeze-up and break-up of ice cover on the Shengli Reservoir, Heilongjiang Province.
Xie, Y.G., *Journal of glaciology and geocryology*, June 1992, 14(2), p.168-173, In Chinese with English summary.
Reservoirs, Ice breakup, Freezeup, Lake ice, China—Heilongjiang Province.

47-1655
Extreme heavy debris flow in Mt. Gongga.
Lu, R.R., *Journal of glaciology and geocryology*, June 1992, 14(2), p.174-177, In Chinese with English summary. 1 ref.
Mudflows, Landslides, Outwash, Avalanche deposits, Mass movements (geology), Accidents, China—Sichuan Province.

47-1656
Achievement and its standing of researches of international antarctic glaciology—report on SCAR International Conference on Antarctic Science.
Qin, D.H., *Journal of glaciology and geocryology*, June 1992, 14(2), p.178-183, In Chinese.
Meetings, Research projects, International cooperation, Paleoclimatology, Global warming, Air ice water interaction, Glacier surveys, Ice surveys, Ice sheets, Ice shelves, Antarctica.
The 1st International Conference on Antarctic Science, Bremen, Germany, Sep 22-27, 1991, sponsored by SCAR (Scientific Committee on Antarctic Research) with the Alfred Wegener Institute for Polar and Marine Research, is reviewed. 335 scientists from 27 countries attended. Main topics included past climatic changes recorded in ice cores, and studies of antarctic ice sheets, ice shelves, and sea ice as factors in the global climate and as indicators of global warming. It is suggested that such studies are also important for the IGBP (International Geosphere-Biosphere Programme) of SCAR.

47-1657
Preliminary report on the Sino-USSR joint glaciological expedition to Mt. Xixabangma region, 1991.
Su, Z., et al, *Journal of glaciology and geocryology*, June 1992, 14(2), p.184-186, In Chinese.
Orlov, A.V.
Glacier surveys, Expeditions, Mountain glaciers, International cooperation, Himalaya Mountains.

47-1658
Determining depth of phase change front of solid water in soil.
Tsibul'skiĭ, V.R., et al, *Journal of glaciology and geocryology*, Sep. 1992, 14(3), p.193-201, In Chinese with English summary. 5 refs.
Kitaev, V.V.
Ground thawing, Freezing front, Thaw depth, Soil freezing, Frozen ground temperature, Soil temperature, Mathematical models.

47-1659
Mathematical modelling of near-shore permafrost thermal regimes, western Canadian Arctic.
Wang, B.L., *Journal of glaciology and geocryology*, Sep. 1992, 14(3), p.202-209, In Chinese with English summary. 15 refs.
Subsea permafrost, Permafrost thermal properties, Frozen ground temperature, Thermal regime, Pipelines, Shore erosion, Mathematical models, Canada—Northwest Territories - Mackenzie River Delta.

47-1660
Constitutive relations of frozen soil in uniaxial compression.
Zhu, Y.L., et al, *Journal of glaciology and geocryology*, Sep. 1992, 14(3), p.210-217, In Chinese with English summary. 6 refs.
Zhang, J.Y., Peng, W.W., Shen, Z.Y., Miao, L.N.
Frozen ground strength, Frozen ground compression, Soil tests, Soil stabilization, Strain tests, Mathematical models.

47-1661
Effect of tunnel wall rock refreeze on lining stability.
Wu, Q.B., et al, *Journal of glaciology and geocryology*, Sep. 1992, 14(3), p.218-225, In Chinese with English summary. 3 refs.
Wu, Z.W.
Frozen rock strength, Frozen ground expansion, Tunnels, Frost resistance, Soil stabilization, Linings, Walls, Mathematical models.

47-1662
Simultaneous monitoring of mass balance fluctuations and runoff of the Tianshan glaciers.
Diurgerov, M.B., et al, *Journal of glaciology and geocryology*, Sep. 1992, 14(3), p.226-232, In Chinese with English summary. 11 refs.
Glacier surveys, Glacier mass balance, Glacier oscillation, Mountain glaciers, Meltwater, Runoff, China—Tian Shan.

47-1663
Glaciologic studies on Guliya Ice Cap.
Yao, T.D., et al, *Journal of glaciology and geocryology*, Sep. 1992, 14(3), p.233-241, In Chinese with English summary. 9 refs.
Jiao, K.Q., Zhang, X.P., Yang, Z.H., Thompson, L.G.
Glacier surveys, Glacier thickness, Paleoclimatology, Ice cores, Glacier oscillation, Ice temperature, Mountain glaciers, China—Kunlun Mountains.

47-1664
Mountain glacier fluctuations and climatic change during the last 100 years.
Wang, N.L., et al, *Journal of glaciology and geocryology*, Sep. 1992, 14(3), p.242-250, In Chinese with English summary. 35 refs.
Zhang, X.S.
Glacier oscillation, Mountain glaciers, Climatic changes, Glacier surveys, Climatic factors, Paleoclimatology, Global warming.

47-1665
Runoff analysis and estimation of the Binggou Basin in the Qilian Mountain.
Yang, Z.H., et al, *Journal of glaciology and geocryology*, Sep. 1992, 14(3), p.251-257, In Chinese with English summary. 2 refs.
Yang, Z.N., Wang, Q.
Runoff forecasting, Active layer, River flow, River basins, Seasonal freeze thaw, Ground water, Stream flow, China—Qilian Mountains.

47-1666
Characteristics of precipitation in the source area of the Urumqi River Basin.
Yang, D.Q., et al, *Journal of glaciology and geocryology*, Sep. 1992, 14(3), p.258-266, In Chinese with English summary. 17 refs.
Kang, E.S., Blumer, F.
Precipitation (meteorology), River basins, Snow surveys, Snow depth, China—Tian Shan.

47-1667
Basic characteristics of river ice in the Urumqi River Basin.
Zhang, Z.Z., *Journal of glaciology and geocryology*, Sep. 1992, 14(3), p.267-270, In Chinese with English summary. 2 refs.
River ice, Ice conditions, River basins, Runoff forecasting, River flow, Ice air interface, Air temperature, China—Tian Shan.

47-1668
Measures against frost weathering of hydraulic concrete structures.
Zhu, Q.H., *Journal of glaciology and geocryology*, Sep. 1992, 14(3), p.271-276, In Chinese.
Concrete freezing, Frost protection, Frost weathering, Concrete durability, Concrete structures, Hydraulic structures.

47-1669
Present state of ice core bubble study.
Zhang, L.M., et al, *Journal of glaciology and geocryology*, Sep. 1992, 14(3), p.277-284, In Chinese. 25 refs.
Yao, T.D.
Ice cores, Paleoclimatology, Bubbles, Gas inclusions, Impurities, Research projects.

47-1670
Snowline/ the equilibrium line.
Huang, M.H., *Journal of glaciology and geocryology*, Sep. 1992, 14(3), p.285-286, In Chinese. 10 refs.
Snow line, Snow ice interface, Glacier ablation, Glacier alimentation, Glacier oscillation, Terminology.

47-1671
Two-wavelength holographic interferometry study on the solidification of a binary alloy around a horizontal pipe.
Spatz, T.L., et al, *Journal of heat transfer*, Nov. 1992, 114(4), p.998-1010, 44 refs.
Poulikakos, D.
Solutions, Solidification, Liquid solid interfaces, Heat transfer, Holography, Liquid phases, Analysis (mathematics), Thermal diffusion, Temperature effects.

47-1672
Freezing flow in a subcooled permeable medium.
Griffiths, S.K., et al, *Journal of heat transfer*, Nov. 1992, 114(4), p.1036-1041, 12 refs.
Nilson, R.H.
Fluid flow, Freezing, Liquid solid interfaces, Porous materials, Thermal conductivity, Flow rate, Saturation, Mathematical models, Permeability.

47-1673
Thermocapillary convection during solid-liquid phase change.
Voth, T.E., et al, *Journal of heat transfer*, Nov. 1992, 114(4), p.1068-1070, 17 refs.
Liu, A., Bergman, T.L.
Ice melting, Hydrodynamics, Phase transformations, Liquid solid interfaces, Heat transfer, Convection, Liquid phases, Solid phases.

47-1674
Specific hydrogeological conditions of the North-Muya Ridge.
Shabinin, L.L., et al, *Soviet geology and geophysics*, 1991, 32(12), p.76-80, Translated from Geologiia i geofizika. 11 refs.
Rzhechitskiĭ, IU.P., Zuliar, N.G.
Hydrogeology, Engineering geology, Discontinuous permafrost, Bedrock, Subsurface drainage, Tunnels, Surface waters, Tectonics, Water level.

47-1675
Model calculations of Auger energy shifts in liquid water and ice.
Knuts, S., et al, *Physica scripta*, 1992, Vol.T41, International Workshop on Auger Spectroscopy and Electronic Structure, 2nd, Malmo, Sweden, Sep. 4-6, 1991. Edited by K. Wandelt et al, p.95-103, 38 refs.
Agren, H.
Ice spectroscopy, Ionization, Ice structure, Water structure, Ice electrical properties, Spectra, Molecular energy levels, Analysis (mathematics), Polarization (charge separation).

47-1676
Image contrast in high-resolution electron microscopy of biological macromolecules: TMV in ice.
Henderson, R., *Ultramicroscopy*, Oct. 1992, 46(1-4), Workshop on Quantitative Electron Microscopy, Berlin, Germany, Dec. 2-7, 1991. Edited by E. Seitler, p.1-18, 37 refs.
Electron microscopy, Molecular structure, Microbiology, Vitreous ice, Ice optics, Resolution, Laboratory techniques, Ice structure, Scattering.

47-1677
Quantitative energy-filtered electron microscopy of biological molecules in ice.
Langmore, J.P., et al, *Ultramicroscopy*, Oct. 1992, 46(1-4), Workshop on Quantitative Electron Microscopy, Berlin, Germany, Dec. 2-7, 1991. Edited by E. Seitler, p.349-373, 57 refs.
Smith, M.F.
Electron microscopy, Microbiology, Molecular structure, Vitreous ice, Ice optics, Resolution, Laboratory techniques, Ice structure.

47-1678
Comparison between wave propagation in water-saturated and air-saturated porous materials.
Albert, D.G., *Journal of applied physics*, Jan. 1, 1993, 73(1), MP 3196, p.28-36, 36 refs.
Porous materials, Sound waves, Wave propagation, Fluid dynamics, Interfaces, Analysis (mathematics), Physical properties, Reflectivity, Snow acoustics, Underwater acoustics.
Through use of classical Biot theory, propagation characteristics within water-filled and air-filled materials were compared in the 10 Hz-100 kHz band. Numerical calculations show that the ratio of fluid to solid motion for the slow compressional wave is around 2 in water-filled sand, but greater than 300 in air-filled sand. In addition, calculations of plane wave transmission from a fluid into a fluid-saturated porous solid show that when the fluid is water, nearly all of the incident energy is transferred

to the reflected wave and to the transmitted fast compressional wave that is traveling mainly in the solid frame. Only a slight frequency dependence occurs in the energy transfer. When the fluid is air, however, the interaction of the waves with the boundary becomes strongly dependent upon frequency, and most of the incident energy is transferred to the reflected wave and to the transmitted slow compressional wave traveling mainly in the pores. These theoretical results justify the different approaches used to treat reflections from porous materials in underwater and aeroacoustics. For reflections, air-filled soil or snow can be approximately modeled as a modified fluid rather than as a viscoelastic solid, the approximation commonly used to model saturated undersea sediments.

47-1679
Structure and physical properties of snow and ice.
[Seppyo no kozo to bussei].
Maeno, N., ed, Kiso seppyogaku koza (Basic glaciology lectures), Vol.1, Tokyo, Kokon Shoin, 1986, 209p., In Japanese. Refs. passim.
Fukuda, M., ed, Kuroda, T.
Ice crystal structure, Ice crystal growth, Snow crystal structure, Metamorphism (snow), Snow crystal growth, Snow thermal properties, Ice thermal properties, High pressure ice, Molecular energy levels, Molecular structure, Nucleation, Mathematical models.

47-1680
Climate, history and the modern world.
Lamb, H.H., London, Methuen and Company, 1982, 387p., 13 refs.
Climatic changes, History, Paleoclimatology, Global change.

47-1681
Proceedings.
Aircraft Ground Deicing Conference, Denver, CO, Sep. 20-22, 1988, Warrendale, PA, Society of Automotive Engineers, 1989, 272p. P-217.
Aircraft icing, Chemical ice prevention, Ice detection, Ice forecasting, Ice removal, Safety, Accidents.

47-1682
Handbook of test methods for evaluating chemical deicers.
Chappelow, C.C., et al, *U.S. National Research Council. Strategic Highway Research Program. Handbook*, 1992, SHRP-H-332, 283p., Refs. passim.
Road icing, Chemical ice prevention, Road maintenance, Concrete freezing, Cold weather tests, Corrosion, Environmental impact, Standards, Manuals.

47-1683
Polar hydrology—data bases. [Polar hydrologi—kunnskapsinventering].
Sand, K., *Norsk hydroteknisk laboratorium. Rapport*, 1989, STF60 A89011, 13p. + appends., In Norwegian. 1 ref.
Bibliographies, Data processing, Research projects, Hydrology.

47-1684
Comparison of snowmelt intensities in urban and rural areas of Norway.
Sand, K., International Conference [on] Urban Hydrology under Wintry Conditions, Narvik, Norway, Mar. 19-21, 1990, 1990, 13p., 4 refs.
Snowmelt, Runoff forecasting, Snow hydrology, Rain, Urban planning, Norway.

47-1685
Urban snowmelt research in Norway: measurements and modelling approach.
Thorolfsson, S.T., et al, Urban Drainage and New Technologies, Dubrovnik, Yugoslavia, June 17-21, 1991, 1991, 8p., 9 refs.
Sand, K.
Snowmelt, Runoff forecasting, Snow hydrology, Urban planning, Norway.

47-1686
Snowmelt runoff modelling with short time steps.
Sand, K., International Northern Research Basins Symposium/Workshop, 8th, Abisko, Sweden, Mar. 26-30, 1990, 1990, 15p., 14 refs.
Snowmelt, Runoff forecasting, Snow hydrology, Mathematical models.

47-1687
Norwegian Meteorological Institute.
Förland, E.J., International Organizing Committee for the WMO Solid Precipitation Measurement Intercomparison, 3rd session, Helsinki, Sep. 6-9, 1988, Geneva, World Meteorological Organization, 1988, 4p.
Precipitation gages, Research projects, International cooperation, Organizations, Norway.

47-1688
Investigation of icequakes on the Greenland icesheet near Jakobshavn Icestream, June-July 1980.
Qamar, A., et al, Boulder, University of Colorado, World Data Center A for Glaciology, 1983, 38p., 10 refs.
St. Lawrence, W.
Icequakes, Ice deformation, Ice sheets, Glacier flow, Glacier surveys, Seismic surveys, Greenland.

47-1689
How has the problem been solved over many centuries. Background to and description of recent nordic activities in the correction of precipitation measurement. [Kommer ett mangahundraarigt problem att lösas. Bakgrund till och beskrivning av senaste nordiska aktiviteter inom nederbördskorrigering].
Madsen, H., et al, *Vannet i norden*, 1988, No.3, p.3-11, In Swedish. 5 refs.
Precipitation (meteorology), Weather observations, Meteorological data, Precipitation gages, Statistical analysis.

47-1690
Recent results from drill cores on Jostedalsbreen. [Noen resultat fra kjerneborringer pa Jostedalsbreen].
Gjessing, Y., *Bergen, Norway. University. Meteorological report series*, 1988, No.6, 18p., In Norwegian with English summary. 10 refs.
Ice cores, Glacier ice, Ice composition, Drill core analysis, Impurities, Glacier surveys, Meltwater, Water chemistry, Norway.

47-1691
Cold air production and drainage in Finnmarksvidda. Part 6. Diurnal and group averages from measurements in the period 1987-1988. [Kaldluftsproduksjon og kaldluftsdrenasje pa Finnmarksvidda. Del 6. Dognmidler og gruppemidler av malinger i perioden 1987-1988].
Hanssen-Bauer, I., *Bergen, Norway. University. Meteorological report series*, 1989, No.1, 51p., In Norwegian with English summary. 2 refs.
Air temperature, Wind velocity, Wind direction, Air flow, Diurnal variations, Norway.

47-1692
Cold air production and drainage in Finnmarksvidda. Part 5. Cold air drainage along the Alta Valley during a week in winter with a weak pressure gradient over Finnmark. [Kaldluftsproduksjon og kaldluftsdrenasje pa Finnmarksvidda. Del 5. Kaldluftsdrenasje langs Altavassdraget gjennom en vinteruke med svakt trykkfelt over Finnmarksvidda].
Hanssen-Bauer, I., *Bergen, Norway. University. Meteorological report series*, 1988, No.9, 17p., In Norwegian with English summary. 4 refs.
Air temperature, Wind velocity, Wind direction, Air flow, Wind pressure, Topographic effects, Norway.

47-1693
Cold air production and drainage in Finnmarksvidda. Part 4. Study on the drainage flow through a canyon with variable scale wind pressure. [Kaldluftsproduksjon og kaldluftsdrenasje pa Finnmarksvidda. Del 4. Studier av drenasjeström gjennom en canyon ved forskjellige storstilte vindforhold].
Hanssen-Bauer, I., *Bergen, Norway. University. Meteorological report series*, 1988, No.8, 20p., In Norwegian with English summary. 2 refs.
Air temperature, Wind velocity, Wind direction, Air flow, Wind pressure, Topographic effects, Norway.

47-1694
Cold air production and drainage in Finnmarksvidda. Part 3. Study on the flow in a canyon with neutral stability. [Kaldluftsproduksjon og kaldluftsdrenasje pa Finnmarksvidda. Del 3. Studie av strömning i en canyon ved nöytral skiktning].
Gjessing, Y., et al, *Bergen, Norway. University. Meteorological report series*, 1988, No.3, 22p., In Norwegian with English summary. 4 refs.
Hanssen-Bauer, I.
Air temperature, Wind velocity, Wind direction, Air flow, Topographic effects, Norway.

47-1695
Cold air production and drainage in Finnmarksvidda. Part 2. Diurnal and group averages from measurements in the period 1984-87. [Kaldluftsproduksjon og kaldluftsdrenasje pa Finnmarksvidda. Del 2. Dögnmidler og gruppemidler av malinger i perioden 1984-87].
Hanssen-Bauer, I., et al, *Bergen, Norway. University. Meteorological report series*, 1988, No.2, 104p., In Norwegian with English summary.
Gjessing, Y.
Air temperature, Wind velocity, Wind direction, Air flow, Diurnal variations, Norway.

47-1696
Cold air production and drainage in Finnmarksvidda. Part 1. Statement of the problem, background data and outline. [Kaldluftsproduksjon og kaldluftsdrenasje pa Finnmarksvidda. Del 1. Problemstillinger, bakgrunnsmateriale og maleopplegg].
Gjessing, Y., et al, *Bergen, Norway. University. Meteorological report series*, 1988, No.1, 17p., In Norwegian with English summary. 12 refs.
Hanssen-Bauer, I.
Air temperature, Wind velocity, Wind direction, Air flow, Topographic effects, Norway.

47-1697
Prince William Sound starts to recover.
Nichols, A.B., *Water environment and technology*, May 1990, 2(5), p.48-55.
Oil spills, Environmental impact, Oil recovery, Water pollution, Ecosystems, Accidents, Legislation, Cost analysis, United States—Alaska—Prince William Sound.

47-1698
Global warming: myth or reality.
Nichols, A.B., *Water environment and technology*, June 1990, 2(6), p.48-55.
Global warming, Atmospheric circulation, Atmospheric composition, Air ice water interaction, Air pollution, Environmental impact.

47-1699
Proceedings of the 1st International Conference on Cryopedology.
International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992, Pushchino, Pushchino Research Centre, 1992, 272p., Proceedings include "Cryosols: the effects of cryogenesis on the processes and peculiarities of soil formation," (Nov. 10-14) and "Joint Russian-American Seminar on Cryopedology and Global Change" (Nov. 15-16). For individual papers see 47-1700 through 47-1743.
Gilichinskiĭ, D.A., ed.
Geocryology, Cryogenic soils, Desert soils, Permafrost, Soil profiles, Soil formation, Soil microbiology, Soil chemistry, Frozen ground.

47-1700
Cryopedology: fundamental and technical basis.
Makeev, O.V., International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.7-15, 14 refs.
Geocryology, Soil science.

47-1701
Circumarctic map of permafrost and ground ice conditions.
Brown, J., International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.15-21, 37 refs.
Permafrost distribution, Ground ice, Ice conditions, Maps.

47-1702
Formation and properties of soils in the permafrost regions of Canada.
Tarnocai, C., et al, International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.21-42, Refs. p.39-42.
Smith, C.A.S.
Cryogenic soils, Soil formation, Soil physics, Soil chemistry, Discontinuous permafrost, Continuous permafrost, Geocryology.

47-1703
Soil-forming rates and processes in cold desert soils of Antarctica.
Bockheim, J.G., et al, International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.42-56, Refs. p.54-56.
Wilson, S.C.
Soil formation, Soil chemistry, Saline soils, Desert soils, Soil surveys, Antarctica—Transantarctic Mountains, Antarctica—Ellsworth Mountains.
The authors examined 420 soils from 15 chronosequences in 10 regions of the Transantarctic Mountains and the Ellsworth Mountains. Rate functions were determined by plotting soil property versus time of exposure for soils ranging from Holocene to late Quaternary in age. The soil chronosequences occur in three climatic zones: subxerous (coastal), ultraxerous (plateau), and xerous (intermediate). The morphogenetic salt stage and the electroconductivity of the salt-enriched layer are predictive of total salts in the profile within a climatic zone. The distribution of salts in the profile also varies with climatic

zone. In pre-late-Quaternary soils salt pans occur at shallower depths in ultraxerous soils but are thicker in xerous soils. The depth of staining (oxidation) is related linearly to age of exposure, independent of climatic zone. The proportions of silt and clay in the profile are dependent not only on drift age but also on drift composition. Rate functions for accumulation of weathering products for soils in warm, polar, and cold deserts were compared. Profile quantities of clay, Fe_d, and $CaCO_3$ are greatest in soils of equivalent age in warm deserts, followed by polar deserts, and cold deserts. However, soluble salts accumulate more readily in cold desert soils than in polar desert soils because of the greater aridity. (Auth. mod.)

47-1704
Recent cryomorphic soils and underlying permafrost.
Gubin, S.V., International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.56-59.
Cryogenic soils, Frozen ground, Permafrost origin.

47-1705
Properties and genesis of cryosols at Marble Point, McMurdo Sound region, Antarctica.
Campbell, I.B., et al, International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.59-66, 12 refs.
Claridge, G.G.C., Balks, M.R.
Desert soils, Cryogenic soils, Soil profiles, Glacial deposits, Antarctica—McMurdo Sound.
Cryosols at Marble Point, McMurdo Sound are formed predominantly from late Last Glaciation Ross Glacial Drift and show little pedogenetic development. The inclusion of some more weathered materials within the tills and soil profiles, and the remnants of soils on more weathered rock outcrops, suggest that the landscape was previously exposed to greater weathering. Soil properties are thus a result of a complex pedogenetic history. (Auth.)

47-1706
Cryogenesis and forest soil formation in Middle Siberia.
Ershov, IU.I., et al, International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.66-71, 3 refs.
Cryogenic soils, Forest soils, Geocryology, Soil formation, Steppes, Taiga, USSR—Siberia.

47-1707
Aspects of the genesis, geography and evolution of the soils of Greenland.
Jakobsen, J.H., International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.71-84, 27 refs.
Podsol, Soil formation, Soil profiles, Soil erosion, Soil chemistry, Greenland.

47-1708
New data on soil geography of the north-eastern Siberia (NES).
Mazhitova, G.G., International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.84-88, 5 refs.
Soil profiles, Soil surveys, Soil chemistry, Cryogenic soils.

47-1709
Geographic laws of spatial soil cover organization in the Yamal Peninsula.
Aparin, B.F., et al, International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.88-94.
Savel'eva, T.S.
Soil formation, Tundra, Cryogenic soils, Mosses, Lichens, USSR—Yamal Peninsula.

47-1710
European North: soil degradation due to technogenic pollution.
Kriuchkov, V.V., International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.94-97.
Soil pollution, Environmental impact, Forest ecosystems, Snow impurities, Soil chemistry, Geocryology, Cryogenic soils, Taiga, Degradation.

47-1711
Experience in compiling the soil-ecological and soil conservation maps of circumpolar regions of north-east Eurasia.
Naumov, E.M., International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.98-104.
Soil mapping, Ecology, Geocryology, Cryogenic soils, Soil conservation, Degradation, Cryoturbation, Solifluction.

47-1712
Resistance of cryogenic soils to anthropogenic influences.
Vasil'evskaia, V.D., International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.104-107, 4 refs.
Cryogenic soils, Geocryology, Environmental impact, Ground ice.

47-1713
Ecology of cryogenic anthropogenically disturbed soils of the Yamal and peculiarities of their recultivation.
Firsova, V.P., et al, International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.108-111.
Rozhdestvenskiĭ, IU.F.
Cryogenic soils, Environmental impact, Ecology, Revegetation, Protective vegetation, Grasses, Ecosystems, USSR—Yamal Peninsula.

47-1714
Winter water migration through deep-frozen soils of West Siberia.
Panfilov, V.P., et al, International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, P.111-115, 11 refs.
Kravtsov, IU.V., Slesarev, I.V.
Soil water migration, Ground water, Freezing front, Cryogenic soils, USSR—Siberia.

47-1715
Mass transfer in freezing saline soils.
Ershov, E.D., et al, International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.115-122, 6 refs.
Lebedenko, IU.P., Chuvilin, E.M., Naumova, N.S.
Cryogenic soils, Saline soils, Soil freezing, Mass transfer, Moisture transfer.

47-1716
Sublimational drainage of frozen soils in Zabaikalye.
Zhelezniak, I.I., et al, International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.122-126, 6 refs.
Kochmen'eva, N.V.
Ice sublimation, Drainage, Ground ice, Seasonal freeze thaw, Frozen ground, Radiometry, USSR—Transbaikal.

47-1717
Transfer of ions within the system soil-snow and the role of ice surface in their migration in frozen soils.
Ostroumov, V.E., et al, International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.127-135, 19 refs.
Demidov, V.V., Gershevich, V.D.
Mass transfer, Ions, Cryogenic soils, Ice crystals, Ice surface, Snow mechanics, Snow composition, Frozen ground chemistry, Frozen ground mechanics.

47-1718
Effect of freezing-thawing cycles on the heat-mass-exchangeable properties of cryogenic soils.
Stepanov, A.V., et al, International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.136-139, 2 refs.
Timofeev, A.M., Kravtsova, O.N.
Freeze thaw cycles, Cryogenic soils, Heat transfer, Mass transfer, Thermal conductivity, Frozen ground thermodynamics.

47-1719
Effect of prolonged freezing on chemical properties of soils and clays.
Polubesova, T.A., et al, International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.140-145, 10 refs.
Shirshova, L.T.
Cryogenic soils, Clays, Forest soils, Chernozem, Frozen ground chemistry, Freeze thaw cycles.

47-1720
Specific features of mineral changing in cryogenic soils under gleyformation process.
Zvereva, T.S., International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.145-148.
Cryogenic soils, Soil profiles, Soil formation, Clay minerals.

47-1721
Investigations of primary minerals cryogenic weathering as related to podzolization.
Martynenko, I.A., et al, International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.149-153, 7 refs.
Podsol, Geocryology, Weathering, Minerals.

47-1722
Silt-enriched horizons due to vertical mesosorting in cryogenic soils.
Regairaz, M.C., International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.154-167, Refs. p.165-167.
Cryogenic soils, Soil profiles, Soil formation, Frost action.

47-1723
Heat circulation in soil under North conditions.
Pavlov, A.V., International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.168-173, 5 refs.
Heat balance, Radiation balance, Thermal regime, Soil temperature, Seasonal freeze thaw.

47-1724
Heat energetics of cryopedogenesis.
Kulikov, A.I., et al, International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.173-177, 3 refs.
Dugarov, V.I.
Soil formation, Frozen ground thermodynamics, Cryogenic soils, Forest soils, Seasonal freeze thaw.

47-1725
Energy resource of winter season in Siberia and polar areas.
Karnatsevich, I.V., International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.177-179, 1 ref.
Ice heat flux, Snow heat flux, Radiation balance, Antarctica—Mirnyy Station, Antarctica—Vostok Station.
A new method of analyzing the radiation function is presented. All land is divided into warm and cold areas. In cold areas the year is divided into 2 radiation seasons depending on the presence or absence of short wave radiation. Investigation of heat balance data from the 2 polar regions (including Vostok and Mirnyy stations) shows that there are stable heat and water structures during both radiation seasons. (Auth. mod.)

47-1726
Dynamics of heat-mass transfer in cryogenic soils of north-east Yakutia.
Davydov, S.P., et al, International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.180-184, 4 refs.
Butsenko, A.N.
Cryogenic soils, Heat transfer, Mass transfer, Soil water, Ground thawing, Soil freezing, Active layer, USSR—Yakutia.

47-1727
Soil microbial communities under cryptogamic plants in tundra and arctic deserts.
Parinkina, O.M., et al, International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.185-189, 3 refs.
Piin, T.
Biomass, Ecosystems, Algae, Lichens, Mosses, Bacteria, Desert soils, Cryogenic soils.

47-1728
Organic matter and its availability to microorganisms in antarctic soils.
Bölter, M., International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.189-199, 22 refs.
Soil composition, Soil profiles, Soil microbiology, Cryogenic soils.
Distribution and properties of organic matter were analyzed in soils from the Maritime and Continental Antarctic area. The soils could be classified as Cambisols and Leptosols with respect to their genesis and function in these environments. Organic matter is mainly concentrated in the upper horizons in thin layers of only a few centimeters. There is great variation in the concentration of organic matter. This variation depends on the plant cover and aspects of the microrelief. Analyses of the C/N ratio and the ratios between particulate and dissolved carbohydrates indicate differences in the structure of these terrestrial environments. Actual concentrations of dissolved carbohydrates show significant values of low molecular weight substances. Their relation to processes in soil formation and aspects of microbial metabolism are discussed. (Auth.)

47-1729
Cryogenesis and functioning of microbial communities in soil of Zabaikalye areas.
Kulikov, A.I., et al, International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.199-203, 1 ref.
Nimaeva, S.Sh.
Cryogenic soils, Soil microbiology, Soil profiles, Chernozem, Forest soils, Meadow soils, Taiga, Steppes, USSR—Transbaikal.

47-1730
Effect of soil freezing on the composition and properties of humus.
Plotnikova, T.A., et al, International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.203-208, 3 refs.
Orlova, N.E.
Soil freezing, Chernozem, Forest soils, Podsol, Peat, Soil composition.

47-1731
Emission of CO2 and CH4 from northern wetlands to atmosphere: dynamics, controlling factors and tentative mechanisms.
Panikov, N.S., et al, International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.208-215, 5 refs.
Zelenev, V.V.
Wetlands, Tundra, Taiga, Soil air interface, Carbon dioxide, Climatic changes.

47-1732
Gas-geochemical processes as a result of soil seasonal freezing and thawing in the cryolithozone.
Glotov, V.E., International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.216-220, 10 refs.
Seasonal freeze thaw, Soil freezing, Ground thawing, Active layer, Cryogenic soils.

47-1733
Regularities of the nitrogen regime of seasonally freezing soils of Karelia.
Fedorets, N.G., International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.220-222, 3 refs.
Cryogenic soils, Nutrient cycle, USSR—Karelia.

47-1734
Humus accumulation and soil formation in Svalbard.
Lag, J., International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.222-228, 12 refs.
Soil formation, Frozen ground, Solifluction, Cryoturbation, Peat, Norway—Svalbard.

47-1735
Microorganisms in permafrost.
Zviagintsev, D.G., International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.229-232, 7 refs.
Permafrost, Soil microbiology, Biomass, Bacteria, Fungi.

47-1736
Purple non-sulphur bacterium from ancient cryogenic rocks of the Kolyma Lowland.
Burashnikova, E.N., et al, International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.232-240, 20 refs.
Gogotov, I.N.
Bacteria, Frozen rocks, Rock properties, USSR—Yakutia.

47-1737
Simulation of the climate on Mars for exobiological studies.
Lindberg, C., et al, International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.240-243.
Horneck, G.
Mars (planet), Extraterrestrial ice.

47-1738
Sulfate-reducing bacteria in constant-frozen soils.
Vaĭnshteĭn, M.B., et al, International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.243-247, 5 refs.
Gogotova, G.I.
Soil microbiology, Bacteria, Sediments, Reservoirs, Frozen ground, Tundra, Permafrost.

47-1739
Isolation of mercury resistant bacteria from permafrost samples of Kolyma Lowland.
Petrova, M.A., et al, International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.247-251, 15 refs.
Bacteria, Permafrost, Tundra, Soil microbiology, USSR—Yakutia.

47-1740
Role of organic matter on nitric and nitrous oxide formation of Nitrosomonas and Nitrobacter.
Ehrich, S., et al, International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.251-259, 18 refs.
Vollmer, M., Stüven, R., Bock, E.
Permafrost, Soil microbiology, Bacteria.

47-1741
Influence of cryoconservation on amino acids composition of archeoseeds Arctofila fulva in permafrost conditions.
Stakhov, L.F., et al, International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.259-262.
Gilichinskiĭ, D.A., Stakhova, L.N.
Paleobotany, Plants (botany), Permafrost.

47-1742
Formation of soil-ground temperatures in the drained lake depressions in subarctic Yakutia.
Gavrilova, M.K., International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.262-268, 3 refs.
Soil temperature, Frozen ground temperature, Thaw depth, Thermal regime, USSR—Yakutia.

47-1743
Viable microorganisms in permafrost: the spectrum of possible applications to new investigations.
Gilichinskiĭ, D.A., International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.268-270.
Soil microbiology, Paleoecology, Paleobotany, Permafrost.

47-1744
High latitude environments and environmental change.
Kullman, L., *Progress in physical geography*, Dec. 1992, 16(4), p.478-488, Refs. p.484-488.
Polar atmospheres, Ecosystems, Air pollution, Climatic changes, Environmental impact, Bibliographies, Accuracy, Global warming.

47-1745
Annual report—1991-92.
Colorado Avalanche Information Center, Denver, Colorado Geological Survey, 1992, 54p. + append.
Avalanche forecasting, Safety, Snow surveys, Meteorological factors, Education, Snow accumulation.

47-1746
Prospecting and mapping of mountain permafrost and associated phenomena.
King, L., et al, *Permafrost and periglacial processes*, Apr.-June 1992, 3(2), International Workshop on Permafrost and Periglacial Environments in Mountain Areas, Interlaken, Switzerland, Sep. 16-20, 1991. Proceedings. Edited by W. Haeberli, p.73-81, With French summary. 53 refs.
Gorbunov, A.P., Evin, M.
Permafrost surveys, Mountain soils, Permafrost indicators, Permafrost distribution, Mapping, Geophysical surveys, Exploration, Accuracy, Climatic changes.

47-1747
Distribution of mountain permafrost and climate.
Cheng, G.D., et al, *Permafrost and periglacial processes*, Apr.-June 1992, 3(2), International Workshop on Permafrost and Periglacial Environments in Mountain Areas, Interlaken, Switzerland, Sep. 16-20, 1991. Proceedings. Edited by W. Haeberli, p.83-91, With French summary. 51 refs.
Dramis, F.
Mountain soils, Permafrost distribution, Climatic factors, Altitude, Climatic changes, Permafrost surveys.

47-1748
Present-day periglacial processes and landforms in mountain areas.
Lautridou, J.P., et al, *Permafrost and periglacial processes*, Apr.-June 1992, 3(2), International Workshop on Permafrost and Periglacial Environments in Mountain Areas, Interlaken, Switzerland, Sep. 16-20, 1991. Proceedings. Edited by W. Haeberli, p.93-101, With French summary. Refs. p.98-101.
Francou, B., Hall, K.
Periglacial processes, Slope processes, Mountain soils, Landforms, Geophysical surveys, Research projects.

47-1749
Interactions and relations between mountain permafrost, glaciers, snow and water.
Harris, S.A., et al, *Permafrost and periglacial processes*, Apr.-June 1992, 3(2), International Workshop on Permafrost and Periglacial Environments in Mountain Areas, Interlaken, Switzerland, Sep. 16-20, 1991. Proceedings. Edited by W. Haeberli, p.103-110, With French summary. Refs. p.108-110.
Corte, A.E.
Mountain soils, Permafrost hydrology, Permafrost distribution, Permafrost origin, Precipitation (meteorology), Rock glaciers, Climatic factors, Periglacial processes.

47-1750
Construction, environmental problems and natural hazards in periglacial mountain belts.
Haeberli, W., *Permafrost and periglacial processes*, Apr.-June 1992, 3(2), International Workshop on Permafrost and Periglacial Environments in Mountain Areas, Interlaken, Switzerland, Sep. 16-20, 1991. Proceedings. Edited by W. Haeberli, p.111-124, With French summary. 37 refs.
Mountain soils, Mass flow, Periglacial processes, Slope stability, Safety, Cold weather construction, Alpine landscapes, Damage, Countermeasures.

47-1751
Borehole logging in alpine permafrost, Upper Engadin, Swiss Alps.
Vonder Mühll, D.S., et al, *Permafrost and periglacial processes*, Apr.-June 1992, 3(2), International Workshop on Permafrost and Periglacial Environments in Mountain Areas, Interlaken, Switzerland, Sep. 16-20, 1991. Proceedings. Edited by W. Haeberli, p.125-132, With French summary. 21 refs.
Holub, P.
Permafrost surveys, Permafrost thickness, Permafrost structure, Boreholes, Recording, Alpine landscapes, Geophysical surveys.

47-1752
Automated mapping of mountain permafrost using the program PERMAKART within the geographical information system ARC/INFO.
Keller, F., *Permafrost and periglacial processes*, Apr.-June 1992, 3(2), International Workshop on Permafrost and Periglacial Environments in Mountain Areas, Interlaken, Switzerland, Sep. 16-20, 1991. Proceedings. Edited by W. Haeberli, p.133-138, With French summary. 15 refs.
Permafrost surveys, Permafrost distribution, Permafrost forecasting, Mountain soils, Mapping, Computer applications, Computer programs, Rock glaciers, Geophysical surveys, Topographic surveys.

47-1753
Model of potential direct solar radiation for investigating occurrences of mountain permafrost.
Funk, M., et al, *Permafrost and periglacial processes*, Apr.-June 1992, 3(2), International Workshop on Permafrost and Periglacial Environments in Mountain Areas, Interlaken, Switzerland, Sep. 16-20, 1991. Proceedings. Edited by W. Haeberli, p.139-142, With French summary. 9 refs.
Hoelzle, M.
Permafrost distribution, Permafrost indicators, Mountain soils, Insolation, Snow cover distribution, Solar radiation, Mathematical models, Seasonal variations, Correlation.

47-1754
Permafrost occurrence from BTS measurements and climatic parameters in the eastern Swiss Alps.
Hoelzle, M., *Permafrost and periglacial processes*, Apr.-June 1992, 3(2), International Workshop on Permafrost and Periglacial Environments in Mountain Areas, Interlaken, Switzerland, Sep. 16-20, 1991. Proceedings. Edited by W. Haeberli, p.143-147, With French summary. 15 refs.
Permafrost distribution, Snow cover effect, Permafrost indicators, Insolation, Snow temperature, Climatic factors, Discontinuous permafrost, Subsurface investigations, Correlation.

47-1755
Monitoring of periglacial phenomena in the Furggentälti Swiss Alps.
Krummenacher, B., et al, *Permafrost and periglacial processes*, Apr.-June 1992, 3(2), International Workshop on Permafrost and Periglacial Environments in Mountain Areas, Interlaken, Switzerland, Sep. 16-20, 1991. Proceedings. Edited by W. Haeberli, p.149-155, With French summary. 5 refs.
Budmiger, K.
Periglacial processes, Monitors, Alpine landscapes, Photogrammetric surveys, Rock glaciers, Geophysical surveys.

47-1756
Creep of alpine permafrost, investigated on the Murtel rock glacier.
Wagner, S., *Permafrost and periglacial processes*, Apr.-June 1992, 3(2), International Workshop on Permafrost and Periglacial Environments in Mountain Areas, Interlaken, Switzerland, Sep. 16-20, 1991. Proceedings. Edited by W. Haeberli, p.157-162, With French summary. 14 refs.
Permafrost surveys, Periglacial processes, Permafrost mass transfer, Soil creep, Boreholes, Rock glaciers, Deformation, Geocryology.

47-1757
Observations on the rock glaciers of Monte Emilius (Valle d'Aosta, Italy).
Smiraglia, C., *Permafrost and periglacial processes*, Apr.-June 1992, 3(2), International Workshop on Permafrost and Periglacial Environments in Mountain Areas, Interlaken, Switzerland, Sep. 16-20, 1991. Proceedings. Edited by W. Haeberli, p.163-168, With French summary. 10 refs.
Rock glaciers, Geophysical surveys, Periglacial processes, Discontinuous permafrost, Geomorphology, Classifications, Climatic factors.

47-1758
Evidence of intrapermafrost groundwater flow beneath an active rock glacier in the Swiss Alps.
Vonder Mühll, D.S., *Permafrost and periglacial processes*, Apr.-June 1992, 3(2), International Workshop on Permafrost and Periglacial Environments in Mountain Areas, Interlaken, Switzerland, Sep. 16-20, 1991. Proceedings. Edited by W. Haeberli, p.169-173, With French summary. 12 refs.
Rock glaciers, Taliks, Periglacial processes, Permafrost hydrology, Permafrost heat transfer, Boreholes, Permafrost surveys, Temperature measurement, Ground water.

47-1759
Stresses in ground-freezing problems with infinite boundaries.
Askar, H.G., *Journal of engineering mechanics*, Jan. 1993, 119(1), p.58-73, 26 refs.
Soil freezing, Temperature distribution, Frozen ground mechanics, Artificial freezing, Thermal stresses, Phase transformations, Soil temperature, Thermal analysis, Mathematical models, Freezing front.

47-1760
Estimating effects of snow on shrub availability for black-tailed deer in southwestern British Columbia.
Hovey, F.W., et al, *Wildlife Society bulletin*, 1992, 20(3), p.308-313, 19 refs.
Harestad, A.S.
Plants (botany), Plant ecology, Snow cover effect, Growth, Site surveys, Vegetation patterns, Snow depth.

47-1761
Preliminary analysis of measured sound propagation over various seasonal snow covers.
Albert, D.G., MP 3197, International Symposium on Long-range Sound Propagation, 4th, Hampton, VA, May 16-17, 1990. Proceedings, NASA Conference Publication 3101, Hampton, VA, National Aeronautics and Space Administration, 1990, p.51-57, 7 refs.
Snow acoustics, Snow cover effect, Sound transmission, Wave propagation, Acoustic measurement, Seasonal variations, Attenuation.
This paper details measurements of acoustic pulse propagation in the 5 to 500 Hz frequency band which were conducted under various snow cover conditions during the 1989-1990 winter in New Hampshire to determine the effect of snow cover thickness and other snow properties on the absorption of acoustic pulses. Blank pistol shots were used as the source of the acoustic waves, and geophones and microphones in an 80 m long linear array served as receivers. Snow thicknesses ranged from 0.05 to 0.35 m, and densities varied from 100 to 350 kg/cu m during the 10 separate measurement days. An automatic fitting procedure for the normalized experimental and theoretical waveforms was used to determine the effective flow resistivity of the snow covers, and gave values in agreement with earlier results.

47-1762
Global changes during the latest glacial-interglacial cycle.
Kotliakov, V.M., et al, *Polar geography and geology*, Apr.-June 1992, 16(2), p.89-113, Translated from Izvestiia Rossiiskoy Akademii nauk, Seriia geograficheskaia, 1992, No.1. Refs. p.110-113.
Lorius, K.
Paleoclimatology, Ice cores, Climatic changes, Global warming, Air temperature, Ice melting, Carbon dioxide, Sea level, Drill core analysis, Antarctica—Vostok Station.
This review article summarizes the results of Soviet-French investigations into the ice core from a deep drillhole at Vostok Station. Changes in air temperature, snow accumulation, greenhouse gases, aerosols and other chemical components in the environment are traced over 160,000 years, i.e., over a full climatic cycle. Orbital and atmospheric impacts on the climate and on the role of greenhouse gases in these processes are analyzed. On the basis of these analyses, it is predicted that with a doubling of atmospheric CO2, temperatures may rise by 3-4 C. This in turn could lead to a massive collapse of the world's marine ice sheets and to a sea-level rise of 5-7 m; mountain glaciers in temperate and subtropical latitudes would almost entirely disappear. (Auth. mod.)

47-1763
Reflection of twentieth-century climatic warming in glacier cores from Nordaustlandet.
Sin'kevich, S.A., *Polar geography and geology*, Apr.-June 1992, 16(2), p.114-122, Translated from Materialy gliatsiologicheskikh issledovanii, 1991, No.71. 22 refs.
Climatic changes, Global warming, Ice cores, Air temperature, Ice dating, Snow accumulation, Glacial hydrology, Temperature variations, Firn, Norway—Spitsbergen.

47-1764
Glaciological mapping and global seasonal snow storage.
Kotliakov, V.M., et al, *Polar geography and geology*, Apr.-June 1992, 16(2), p.123-147, 18 refs. For Russian original see 47-315 or 20F-46990.
Snow retention, Water storage, Snow cover distribution, Classifications, Snow water equivalent, Hydrologic cycle, Glacier surveys, Mapping, Moisture transfer.
The areas and volumes (in water equivalent) of seasonal snow cover in 10 sublatitudinal glaciological zones have been calculated from the maps of snow and ice storage in the *World Atlas of Snow and Ice Resources*. These zones are combined into five glaciological belts, subdivided by sublongitudinal boundaries into 36 glaciological provinces, including both Northern and Southern Hemispheres. (Auth. mod.)

47-1765
Large-scale characteristics of the global distribution of snow cover.
Loktionova, E.M., *Polar geography and geology*, Apr.-June 1992, 16(2), p.148-159, 14 refs. For Russian original see 47-316 or 20F-46991.
Snow cover distribution, Snow retention, Water storage, Atmospheric circulation, Snow air interface, Classifications, Periodic variations, Topographic effects.
This paper presents a scheme for regionalization of the world's snow cover on the basis of latitudinal belts. Such parameters as snow storage and duration of snow cover (with an analysis of variations in these parameters) are examined for each belt and for subdivisions within the belts. The patterns that emerge are placed in the context of controlling influences such as ocean currents and patterns of atmospheric circulation. (Auth.)

47-1766
Impact of glaciation on paleoecological conditions in northeastern Russia.
Shishorina, Zh.G., *Polar geography and geology*, Apr.-June 1992, 16(2), p.160-166, 21 refs. For Russian original see 47-342.
Paleoecology, Glaciation, Pleistocene, Vegetation patterns.

47-1767
Pollen and spores from glaciers and from the proglacial zone in the Arctic and Antarctica.
Surova, T.G., et al, *Polar geography and geology*, Apr.-June 1992, 16(2), p.167-173, 9 refs. For Russian original see 47-340 or 20B-46994.
Vtiurin, B.I., Troitskiĭ, L.S.
Palynology, Glacier surfaces, Vegetation patterns, Atmospheric circulation, Sampling, Geobotanical interpretation.
The results of spore/pollen analysis of surface samples collected from glaciers and from proglacial zones in the Arctic (Spitsbergen) and Antarctica are presented. Surface samples collected in Antarctica contain mainly pollen and spores transported from New Zealand and South America. An anthropogenic origin, however, is also possible. It is obvious that spore/pollen analysis of sediment samples in the high latitudes helps to cast light on the patterns of atmospheric circulation both at present and in the recent past. (Auth. mod.)

47-1768
Heterogeneous interactions of ClONO2 and HCl on nitric acid trihydrate at 202 K.
Abbatt, J.P.D., et al, *Journal of physical chemistry*, Sep. 17, 1992, 96(19), p.7674-7679, 23 refs.
Molina, M.J.
Cloud physics, Atmospheric composition, Heterogeneous nucleation, Ozone, Ice vapor interface, Vapor pressure, Water films, Chemical properties, Simulation.
Using a low-pressure flow tube coupled to a mass spectrometer, reaction probabilities (gammas) for ClONO2 + H2O - HOCl + HNO3 (1) and ClONO2 + HCl - Cl2 + HNO3 (2) have been measured on nitric acid trihydrate (NAT) films at 202 K for reactant partial pressures in the .000001 Torr range. When the water vapor pressure over the NAT film approaches that of ice, gamma 1 = 0.002 and gamma 2 > 0.2. For lower water partial pressures, characteristic of HNO3-rich NAT, the gammas decrease by 2 orders of magnitude. For HCl partial pressures of .000005 Torr, the experiments indicate that H2O-rich NAT films take up HCl in amounts similar to those taken up by water-ice surfaces; HNO3-rich NAT films take up to orders of magnitude less HCl. At high HCl partial pressures much greater uptake by both H2O-rich and HNO3-rich films is observed, indicating that the NAT films melt under these conditions. This experiment simulates the chemical reactions judged responsible for the depletion of atmospheric ozone over Antarctica. (Auth. mod.)

47-1769
Permafrost creep and rockglaciers.
Barsch, D., *Permafrost and periglacial processes*, July-Sep. 1992, 3(3), International Workshop on Permafrost and Periglacial Environments in Mountain Areas, Interlaken, Switzerland, Sep. 16-20, 1991. Proceedings. Edited by W. Haeberli, p.175-188, With French summary. 87 refs.
Rock glaciers, Periglacial processes, Permafrost mass transfer, Soil creep, Permafrost indicators, Classifications, Mountain soils, Geocryology.

47-1770
Permafrost research sites in the Alps: excursions of the International Workshop on Permafrost and Periglacial Environments in Mountain Areas.
Haeberli, W., et al, *Permafrost and periglacial processes*, July-Sep. 1992, 3(3), International Workshop on Permafrost and Periglacial Environments in Mountain Areas, Interlaken, Switzerland, Sep. 16-20, 1991. Proceedings. Edited by W. Haeberli, p.189-202, 23 refs.
Permafrost surveys, Alpine landscapes, Expeditions, Periglacial processes, Rock glaciers, Site surveys, Soil science, Research projects.

47-1771
Vertical movements of boulders in a subnival boulder pavement at 2800 m a.s.l. in the Alps (France).
Pissart, A., et al, *Permafrost and periglacial processes*, July-Sep. 1992, 3(3), International Workshop on Permafrost and Periglacial Environments in Mountain Areas, Interlaken, Switzerland, Sep. 16-20, 1991. Proceedings. Edited by W. Haeberli, p.203-208, With French summary. 26 refs.
Francou, B.
Periglacial processes, Geocryology, Rock mechanics, Frost heave, Nivation, Soil formation, Snow cover effect, Temperature effects, Geomorphology.

47-1772
10 year surficial velocities on a rock glacier (Laurichard, French Alps).
Francou, B., et al, *Permafrost and periglacial processes*, July-Sep. 1992, 3(3), International Workshop on Permafrost and Periglacial Environments in Mountain Areas, Interlaken, Switzerland, Sep. 16-20, 1991. Proceedings. Edited by W. Haeberli, p.209-213, With French summary. 8 refs.
Reynaud, L.
Periglacial processes, Geocryology, Rock glaciers, Talus, Slope processes, Permafrost mass transfer, Glacier mass balance, Correlation, Velocity measurement.

47-1773
Rock glaciers in Svalbard and Norway.
Sollid, J.L., et al, *Permafrost and periglacial processes*, July-Sep. 1992, 3(3), International Workshop on Permafrost and Periglacial Environments in Mountain Areas, Interlaken, Switzerland, Sep. 16-20, 1991. Proceedings. Edited by W. Haeberli, p.215-220, With French summary. 12 refs.
Sörbel, L.
Periglacial processes, Rock glaciers, Talus, Permafrost surveys, Distribution, Geocryology, Norway—Svalbard.

47-1774
Periglacial climatic conditions and vertical form associations in Quebrada Benjamin Matienzo, Mendoza, Argentina.
Ahumada, A.L., *Permafrost and periglacial processes*, July-Sep. 1992, 3(3), International Workshop on Permafrost and Periglacial Environments in Mountain Areas, Interlaken, Switzerland, Sep. 16-20, 1991. Proceedings. Edited by W. Haeberli, p.221-224, With French summary. 13 refs.
Periglacial processes, Rock glaciers, Geocryology, Permafrost indicators, Altitude, Geomorphology.

47-1775
Alpine periglacial landforms of eastern North America: a review.
Clark, G.M., et al, *Permafrost and periglacial processes*, July-Sep. 1992, 3(3), International Workshop on Permafrost and Periglacial Environments in Mountain Areas, Interlaken, Switzerland, Sep. 16-20, 1991. Proceedings. Edited by W. Haeberli, p.225-230, With French summary. 28 refs.
Schmidlin, T.W.
Landforms, Alpine landscapes, Periglacial processes, Permafrost distribution, Geocryology.

47-1776
Ground temperature measurements in mountain permafrost, Jotunheimen, southern Norway.
Ödegard, R.S., et al, *Permafrost and periglacial processes*, July-Sep. 1992, 3(3), International Workshop on Permafrost and Periglacial Environments in Mountain Areas, Interlaken, Switzerland, Sep. 16-20, 1991. Proceedings. Edited by W. Haeberli, p.231-234, With French summary. 10 refs.
Sollid, J.L., Liestöl, O.
Periglacial processes, Permafrost indicators, Mountain soils, Permafrost distribution, Soil temperature, Temperature variations, Discontinuous permafrost, Temperature measurement, Norway.

47-1777
Permafrost environment of the Daisetsu Mountains, Hokkaido, Japan.
Sone, T., *Permafrost and periglacial processes*, July-Sep. 1992, 3(3), International Workshop on Permafrost and Periglacial Environments in Mountain Areas, Interlaken, Switzerland, Sep. 16-20, 1991. Proceedings. Edited by W. Haeberli, p.235-240, With French summary. 11 refs.
Permafrost distribution, Periglacial processes, Mountain soils, Freezing indexes, Snow cover effect, Freeze thaw cycles, Climatic factors, Landforms.

47-1778
Note on ground thermal regimes and global solar radiation at 4720 m a.s.l., High Andes of Argentina.
Happoldt, H., et al, *Permafrost and periglacial processes*, July-Sep. 1992, 3(3), International Workshop on Permafrost and Periglacial Environments in Mountain Areas, Interlaken, Switzerland, Sep. 16-20, 1991. Proceedings. Edited by W. Haeberli, p.241-245, With French summary. 8 refs.
Schrott, L.
Periglacial processes, Mountain soils, Soil temperature, Thermal regime, Temperature variations, Insolation, Frost penetration, Geocryology, Rock glaciers, Argentina.

47-1779
Perennial névés and the hydrology of rock glaciers.
Tenthorey, G., *Permafrost and periglacial processes*, July-Sep. 1992, 3(3), International Workshop on Permafrost and Periglacial Environments in Mountain Areas, Interlaken, Switzerland, Sep. 16-20, 1991. Proceedings. Edited by W. Haeberli, p.247-252, With French summary. 9 refs.
Periglacial processes, Rock glaciers, Snowmelt, Water flow, Subsurface drainage, Water supply, Geocryology, Springs.

47-1780
Active rock glaciers and the lower limit of discontinuous alpine permafrost, Khumbu Himalaya, Nepal.
Jakob, M., *Permafrost and periglacial processes*, July-Sep. 1992, 3(3), International Workshop on Permafrost and Periglacial Environments in Mountain Areas, Interlaken, Switzerland, Sep. 16-20, 1991. Proceedings. Edited by W. Haeberli, p.253-256, With French summary. 15 refs.
Periglacial processes, Rock glaciers, Permafrost distribution, Discontinuous permafrost, Seismic surveys, Permafrost indicators, Alpine landscapes, Geocryology.

47-1781
Southern limit of relict rock glaciers, Central Apennines, Italy.
Dramis, F., et al, *Permafrost and periglacial processes*, July-Sep. 1992, 3(3), International Workshop on Permafrost and Periglacial Environments in Mountain Areas, Interlaken, Switzerland, Sep. 16-20, 1991. Proceedings. Edited by W. Haeberli, p.257-260, With French summary. 5 refs.
Kotarba, A.
Periglacial processes, Rock glaciers, Permafrost indicators, Permafrost distribution, Geocryology, Geomorphology.

47-1782
Statistical analysis of the spatial distribution of rock glaciers, Spanish Central Pyrenees.
Chueca, J., *Permafrost and periglacial processes*, July-Sep. 1992, 3(3), International Workshop on Permafrost and Periglacial Environments in Mountain Areas, Interlaken, Switzerland, Sep. 16-20, 1991. Proceedings. Edited by W. Haeberli, p.261-265, With French summary. 10 refs.
Periglacial processes, Rock glaciers, Distribution, Geophysical surveys, Statistical analysis, Paleoclimatology.

47-1783
Rock glaciers and periglacial phenomena in the Southern Carpathians.
Urdea, P., *Permafrost and periglacial processes*, July-Sep. 1992, 3(3), International Workshop on Permafrost and Periglacial Environments in Mountain Areas, Interlaken, Switzerland, Sep. 16-20, 1991. Proceedings. Edited by W. Haeberli, p.267-273, With French summary. 16 refs.
Periglacial processes, Rock glaciers, Distribution, Geocryology, Mountain soils, Climatic factors, Landforms.

47-1784
Effects of freezing on the measurement of solids in wastewater sludges. [Effets de la congélation sur la mesure des matières solides dans les boues d'épuration].
Roy, N.A., et al, *Sciences et techniques de l'eau*, May 1990, 23(2), p.191-197, In French with English summary. 4 refs.
Desjardins, M.A.
Waste treatment, Sludges, Sampling, Preserving, Freezing, Solids, Temperature effects, Accuracy.

47-1785
Crystal growth and dendritic solidification.
Sethian, J.A., et al, *Journal of computational physics*, Feb. 1992, 98(2), p.231-253, 44 refs.
Strain, J.
Crystal growth, Theories, Solidification, Liquid solid interfaces, Liquid cooling, Liquid phases, Solid phases, Mathematical models, Dendritic ice, Anisotropy.

47-1786
Protein interaction with ice.
Hew, C.L., et al, *European journal of biochemistry*, Jan. 15, 1992, 203(1-2), p.33-42, 70 refs.
Yang, D.S.C.
Cryobiology, Ice growth, Heterogeneous nucleation, Antifreezes, Ice nuclei, Bacteria, Artificial snow, Chemical analysis.

47-1787
Ice threshold in molecular clouds: a diagnostic of the infrared radiation field.
Williams, D.A., et al, *Royal Astronomical Society, Monthly notices*, Oct. 1, 1992, 258(3), p.599-601, 33 refs.
Hartquist, T.W., Whittet, D.C.B.
Cosmic dust, Extraterrestrial ice, Infrared radiation, Ice detection, Remote sensing, Ice sublimation, Ice optics, Optical properties.

47-1788
Comment on "The episodic acidification of Adirondack Lakes during snowmelt" by Douglas A. Schaefer et al.
Eshleman, K.N., et al, *Water resources research*, Oct. 1992, 28(10), p.2869-2878, Includes reply. 25 refs. For article under discussion see 45-224.
Schaefer, D.A., Driscoll, C.T.
Hydrogeochemistry, Limnology, Lake water, Snowmelt, Chemical properties, Surface drainage, Water chemistry, Statistical analysis, Watersheds, Periodic variations.

47-1789
***In situ* patterns of intracellular photosynthate allocation by sea ice algae in the Canadian High Arctic.**
Smith, R.E.H., et al, *Polar biology*, Nov. 1992, 12(6-7), p.545-551, 39 refs.
Herman, A.W.
Sea ice, Marine biology, Algae, Ice composition, Distribution, Ice bottom surface, Photosynthesis, Sampling, Light effects.

47-1790
Dynamics of ice algae and phytoplankton in Frobisher Bay.
Hsiao, S.I.C., *Polar biology*, Nov. 1992, 12(6-7), p.645-651, 25 refs.
Sea ice, Biomass, Ice composition, Marine biology, Growth, Ecosystems, Ice water interface, Plankton, Algae.

47-1791
Asthenospheric ice-load effects in a global dynamical-system model of the Pleistocene climate.
Saltzman, B., et al, *Climate dynamics*, Oct. 1992, 8(1), p.1-11, 27 refs.
Verbitskiĭ, M.IA.
Paleoclimatology, Ice loads, Pleistocene, Ice sheets, Isostasy, Climatic changes, Bedrock, Calving, Carbon dioxide, Ice volume, Periodic variations.

47-1792
Geomorphological and glaciological research during the 2nd P.N.R.A. expedition to Terra Nova Bay, 1986-1987. [Risultati preliminari delle ricerche geomorfologiche e glaciologiche svolte nella seconda spedizione del P.N.R.A. (Baia Terra Nova, 1986/87)].
Baroni, C., et al, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore Scienze della Terra. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: Earth Sciences. Collection of publications Jan. 1986-July 1991). Rome, ENEA, [1991], p.83-90. In Italian with English summary. Reprinted from Acqua-Aria, 1988, 4, p.431-438. 15 refs.
Orombelli, G.
Geomorphology, Glacial geology, Glacier oscillation, Antarctica--Terra Nova Bay.
Glacial-geological observations were carried out at Terra Nova Bay. Evidence of at least 4 glaciations have been observed: the oldest two are referred to the pre-Pleistocene. All along the coastal belt the youngest glacial drift contains fragments of marine shells, supporting the hypothesis of the expansion of a grounded Ross Ice Shelf. Holocene glacier fluctuations were studied and two minor neoglacial advances have been observed. Near Edmonson Point a glacier advance has been dated to about 1000 years B.P. C-14 ages have been obtained for Holocene raised beaches, ranging from 5770 +/- 60 B.P. to the present. A rate of 3 mm/year can be estimated for the isostatic uplift during the last 4500 years. A geomorphological map at a scale of 1:10,000 has been produced for the area surrounding the Italian station. (Auth.)

47-1793
Ice composition evidence of marine ice transfer along the bottom of a small antarctic ice shelf.
Souchez, R., et al, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore Scienze della Terra. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: Earth Sciences. Collection of publications Jan. 1986-July 1991). Rome, ENEA, [1991], p.503-506. Reprinted from Geophysical Research Letters, May 1991, 18(5), p.849-852. 21 refs.
Ice shelves, Ice composition, Ice water interface, Sea water freezing, Antarctica—Hells Gate.
The existence of marine ice transfer along the underside of the Hells Gate ice shelf (Victoria Land) is indicated by an isotopic and chemical study of ice cores. Because of top surface ablation, the marine ice formed at the ice shelf-ocean interface ultimately appears at the shelf surface. A succession of congelation, platelet and frazil ice is shown to occur. The combined study of stable isotope composition and of the sodium content of these different ice types proves to be a valuable tool for specifying the ice shelf-ocean interactions in this area. Two different freezing zones separated by a melting zone exist: the parent water for the frazil ice is meltwater from congelation ice which appears in the upstream zone. (Auth.)

47-1794
Bioclimatology of frost.
Kalma, J.D., et al, Advances in Bioclimatology Vol.2. Berlin, Springer-Verlag, 1992, 144p., Refs. p.123-138.
Laughlin, G.P., Caprio, J.M., Hamer, P.J.C.
DLC QC929.H6 B56 1992
Plants (botany), Frost forecasting, Cold weather survival, Plant ecology, Frost protection, Phenology, Agriculture, Temperature effects, Meteorological factors.

47-1795
Overwinter nitrate loss and denitrification potential of cultivated soils in Alberta.
Heaney, D.J., et al, *Soil biology and biochemistry*. Sep. 1992, 24(9), p.877-884, 18 refs.
Agriculture, Frozen ground chemistry, Decomposition, Snow cover effect, Soil air interface, Soil tests, Climatic factors, Chemical analysis.

47-1796
Postglacial emergence in the Canadian High Arctic: integrating glacioisostasy, eustasy, and late deglaciation.
England, J., *Canadian journal of earth sciences*. May 1992, 29(5), p.984-999, With French summary. 69 refs.
Marine geology, Pleistocene, Glacial geology, Ice sheets, Sea level, Isostasy, Climatic changes, Quaternary deposits, Radioactive age determination, Glacier melting.

47-1797
Late glacial ice margins and deglacial chronology for southeastern Baffin Island and Hudson Strait, eastern Canadian Arctic.
Stravers, J.A., et al, *Canadian journal of earth sciences*. May 1992, 29(5), p.1000-1017, With French summary. 71 refs.
Miller, G.H., Kaufman, D.S.
Marine geology, Pleistocene, Marine deposits, Glacial geology, Glacier flow, Quaternary deposits, Radioactive age determination, Sea level, Stratigraphy, Drill core analysis.

47-1798
Peatland development in relation to Holocene climatic change in Manitoba and Saskatchewan (Canada).
Kuhry, P., et al, *Canadian journal of earth sciences*. May 1992, 29(5), p.1070-1090, With French summary. 49 refs.
Halsey, L.A., Bayley, S.E., Vitt, D.H.
Paleobotany, Paleoclimatology, Wetlands, Peat, Climatic changes, Vegetation patterns, Soil analysis, Distribution.

47-1799
Approximation of interference effects in dynamic ice-structure interactions.
Abul-Azm, A.G., et al, *Journal of offshore mechanics and arctic engineering*. Nov. 1992, 114(4), p.299-309, 7 refs.
Williams, A.N.
Offshore structures, Stability, Ice sheets, Ice solid interface, Pile structures, Vibration, Wave propagation, Design criteria, Analysis (mathematics), Seismology, Mechanical properties, Earthquakes.

47-1800
Analysis of energy dissipation caused by snow compaction during displacement plowing.
Hansen, A.C., *Transportation research record*. 1991, No.1304, p.177-181, 7 refs.
Road maintenance, Snow removal, Snow mechanics, Snow compaction, Performance, Plastic deformation, Design criteria, Analysis (mathematics), Wave propagation.

47-1801
Influence of wind, temperature, and deicing chemicals on snow accretion.
Adams, E.E., et al, *Transportation research record*. 1991, No.1304, p.182-187, 4 refs.
Alger, R.G., Beckwith, J.P.
Pavements, Chemical ice prevention, Antifreezes, Rubber ice friction, Snow accumulation, Wind factors, Performance, Blowing snow, Road maintenance.

47-1802
Goal-oriented design of an improved displacement snowplow.
Crane, R.L., et al, *Transportation research record*. 1991, No.1304, p.188-192, 10 refs.
Damson, M.H., Pell, K.M.
Road maintenance, Research projects, Snow removal, Equipment, Design criteria, Experimentation, Snow mechanics, Ice solid interface, Theory, Meteorological factors.

47-1803
PASCON: an expert system for passive snow control on highways.
Kaminski, D.F., et al, *Transportation research record*. 1991, No.1304, p.193-201, 13 refs.
Mohan, S.
Road maintenance, Winter maintenance, Snow accumulation, Countermeasures, Computer programs, Drift, Forecasting, Climatic factors, Blowing snow, Computer applications.

47-1804
Application of routing technologies to rural snow and ice control.
Haslam, E., et al, *Transportation research record*. 1991, No.1304, p.202-211, 37 refs.
Wright, J.R.
Road maintenance, Winter maintenance, Transportation, Snow removal, Route surveys, Design criteria, Mathematical models, Urban planning.

47-1805
Integrating GIS and CAD for transportation data base development.
Wang, J.Y., et al, *Transportation research record*. 1991, No.1304, p.212-218, 4 refs.
Wright, J.R.
Road maintenance, Transportation, Winter maintenance, Snow removal, Route surveys, Design criteria, Data processing, Urban planning, Mapping.

47-1806
Negatively buoyant jet (or plume) with applications to snowplow exit flow behavior.
Lindberg, W.R., et al, *Transportation research record*. 1991, No.1304, p.219-229, 23 refs.
Petersen, J.D.
Road maintenance, Winter maintenance, Snow removal, Fluid dynamics, Snow mechanics, Fluid flow, Performance, Simulation, Analysis (mathematics), Design criteria, Buoyancy.

47-1807
Chemical undercutting of ice on highway pavement materials.
Blackburn, R.R., et al, *Transportation research record*. 1991, No.1304, p.230-242, 8 refs.
Bauer, K.M., McElroy, A.D., Pelkey, J.E.
Road icing, Winter maintenance, Pavement bases, Salting, Ice removal, Ice deterioration, Substrates, Ice solid interface, Forecasting.

47-1808
Overview of sea ice physical properties and their variability.
Richter-Menge, J.A., et al, *SPIE—The International Society for Optical Engineering. Proceedings*. 1992, Vol.1750, MP 3198, Ocean optics XI, p.486-497. 40 refs.
Perovich, D.K.
Sea ice, Variations, Physical properties, Optical properties, Ice crystal optics, Remote sensing, Albedo, Ice growth, Brines.
An understanding of the physical properties of sea ice and their variability is critical both to interpret observations of the optical properties and to develop models of radiative transfer. Sea ice has an intricate structure consisting of platelets of fresh ice with inclusions of brine and air. These inclusions strongly affect the optical properties. The physical properties of the ice are highly dependent on the growth conditions and the seasonal evolution of the ice. Consequently, the state and structure of the ice exhibit large spatial and temporal variability. For example, the crystal texture can be granular or columnar, while crystal sizes can vary from millimeters to a few centimeters. Observed brine volumes can vary from 0% in the surface layer of multi-year ice to as much as 50% in the skeletal layer at the bottom of a growing ice sheet. Densities show a similar variability, ranging from 0.60 to 0.92 g/cu cm. Because of this variability there is a need to use the large body of ice property observations to develop ice property models, either of an empirical or physical nature.

47-1809
Light reflection from a sea ice cover during the onset of summer melt.
Perovich, D.K., et al, *SPIE—The International Society for Optical Engineering. Proceedings*. 1992, Vol.1750, MP 3199, Ocean optics XI, p.508-516. 11 refs.
Govoni, J.W.
Sea ice, Remote sensing, Albedo, Ice optics, Reflectivity, Light scattering, Ice melting, Surface properties.
Spectral measurements of albedo, bidirectional reflectance function, and polarized reflectance were made for sea ice conditions found during the onset of melt in the Canadian Arctic. The wavelength region studied was from the ultraviolet to the near infrared (370-1000 nm). Results for five surface types are presented: a) dry snow, b) dry snow with a glazed surface, c) bare ice, d) blue ice, and e) a melt pond. Results indicate that spectral albedos decrease at all wavelengths as the melt season progresses and the surface conditions evolve from a) through e), and that the decrease is most pronounced at longer wavelengths. Reflectance data suggest that a) at most angles reflectance has the same spectral shape as albedo, b) at 30 deg elevation reflectance is for the most part azimuthally isotropic and c) at 60 deg elevation a significant specular component was evident at 0 deg azimuth, especially for the bare ice case.

47-1810
Solar UV-spectra in various environmental conditions.
Huber, M., et al, International Conference on Alpine Meteorology, 22nd, Toulouse, France, Sep. 1992, 1992, p.413-415, 4 refs.
Blumthaler, M., Ambach, W.
Atmospheric density, Mountains, Solar radiation, Ultraviolet radiation, Ozone, Radiation balance, Radiation absorption, Spectra.

47-1811
Passive microwave remote sensing applied for snow monitoring in a Norwegian test site.
Rognes, A., *European Space Agency. European Space Research and Technology Centre. Report*. Dec. 1992, FSD/AR/2521/ar, 60p., 7 refs.
Remote sensing, Radiometry, Image processing, Data processing, Snow cover distribution, Sensor mapping, Microwaves, Brightness, Spaceborne photography, Computer programs.

47-1812
Evaporation and ice growth in Mackenzie Delta lakes.
Marsh, P., *International Association of Hydrological Sciences. Publication*, 1991, No.206, International Symposium on Hydrology of Natural and Manmade Lakes, Vienna, Austria, Aug. 11-24, 1991. Proceedings. Edited by G. Schiller et al, p.257-266, 21 refs.
Lakes, Water level, Hydrologic cycle, Water balance, Ice growth, Evaporation, Climatic factors, Climatic changes, Mathematical models, Air ice water interaction.

47-1813
Monitoring grain size of suspended sediments in rivers.
Bogen, J., *International Association of Hydrological Sciences. Publication*, 1992, No.210, International Symposium on Erosion and Sediment Transport Monitoring Programmes in River Basins, Oslo, Norway, Aug. 24-28, 1992. Proceedings. Edited by J. Bogen et al, p.183-190, 8 refs.
River flow, Grain size, Suspended sediments, Particle size distribution, Sampling, Sediment transport, Glacial hydrology, Periodic variations, Meltwater, River basins.

47-1814
Reliability and representativeness of a suspended sediment concentration monitoring programme for a remote alpine proglacial river.
Gurnell, A.M., et al, *International Association of Hydrological Sciences. Publication*, 1992, No.210, International Symposium on Erosion and Sediment Transport Monitoring Programmes in River Basins, Oslo, Norway, Aug. 24-28, 1992. Proceedings. Edited by J. Bogen et al, p.191-200, 3 refs.
Clark, M.J., Hill, C.T., Greenhalgh, J.
Stream flow, Glacial hydrology, Suspended sediments, Sampling, Measuring instruments, Turbulent flow, Meltwater, Accuracy.

47-1815
Temporal variability of suspended sediment flux from a subarctic glacial river, southern Iceland.
Lawler, D.M., et al, *International Association of Hydrological Sciences. Publication*, 1992, No.210, International Symposium on Erosion and Sediment Transport Monitoring Programmes in River Basins, Oslo, Norway, Aug. 24-28, 1992. Proceedings. Edited by J. Bogen et al, p.233-243, 23 refs.
Dolan, M., Tomasson, H., Zophoniasson, S.
River flow, Suspended sediments, Glacial hydrology, Sampling, Sediment transport, Meltwater, Seasonal variations, River basins.

47-1816
General report—soil freezing-ground freezing.
Andersland, O.B., et al, International Conference on Soil Mechanics and Foundation Engineering, 12th, Rio de Janeiro, Brazil, Aug. 13-18, 1989. Proceedings, Vol.4, Rotterdam, A.A. Balkema Publishers, 1992, p.2657-2672, 45 refs.
Soil freezing, Soil stabilization, Artificial freezing, Construction, Soil mechanics, Design, Liquefied gases, Shafts (excavations), Frost heave, Subsurface structure.

47-1817
Strength and creep behaviour of frozen saline fine sand.
Jessberger, H.L., International Conference on Soil Mechanics and Foundation Engineering, 12th, Rio de Janeiro, Brazil, Aug. 13-18, 1989. Proceedings, Vol.5, Rotterdam, A.A. Balkema Publishers, 1992, p.3033.
Soil creep, Soil tests, Frozen ground mechanics, Saline soils, Soil strength, Temperature effects.

47-1818
Mineral criterion for evaluating the frost-susceptibility of pavement structures and soils.
Brandl, H., International Conference on Soil Mechanics and Foundation Engineering, 12th, Rio de Janeiro, Brazil, Aug. 13-18, 1989. Proceedings, Vol.5, Rotterdam, A.A. Balkema Publishers, 1992, p.3034-3035.
Pavements, Soil composition, Frost resistance, Clay minerals, Design criteria, Mineralogy.

47-1819
Development of field screening methods for TNT, 2,4-DNT and RDX in soil.
Jenkins, T.F., et al, MP 3200, Annual Environmental Research and Development Symposium, 16th, Williamsburg, VA, June 23-25, 1992. Proceedings, Aberdeen, MD, U.S. Army Corps of Engineers, 1992, p.33-45, Report No.CETHA-TS-CR-92063, 18 refs. For another version see 46-3066.
Walsh, M.E.
Soil pollution, Explosives, Soil analysis, Soil tests, Detection, Chemical analysis, Waste disposal.
Simple field-screening methods are presented for detecting 2,4,6-TNT, 2,4-DNT and RDX in soil. Concentrations of TNT, 2,4-DNT and RDX are estimated from their absorbances at 540, 570 and 507 nm, respectively. Detection limits are about 1 microgram/g for 2,4,6-TNT and RDX, and about 2 microgram/g for 2,4-DNT. Concentration estimates from field analyses correlate well with laboratory analyses.

47-1820
Review of current and potential future sampling practices for volatile organic compounds in soil.
Hewitt, A.D., MP 3201, Annual Environmental Research and Development Symposium, 16th, Williamsburg, VA, June 23-25, 1992. Proceedings, Aberdeen, MD, U.S. Army Corps of Engineers, 1992, p.75-82, Report No.CETHA-TS-CR-92063, 9 refs.
Soil pollution, Soil tests, Sampling, Accuracy, Core samplers, Chemical analysis.
This study compares two sampling and handling methods for the collection of soils to be analyzed for volatile organic compounds (VOCs). One method, which may be incorporated into future protocols, uses a simple subcoring device that allows set volumes of soil to be removed rapidly from the surrounding substrate and transferred to a tared analysis vessel, that a) can be analyzed via needle-septum puncture, b) attaches to a purge-and- trap system, or c) contains methanol. This less disruptive method not only limits mechanical fracturing during collection and lengthy sample exposure while transferring, but avoids soiling of the collection vessel seals. The findings show that, in order to acquire more accurate VOC concentrations in vadose zone soils, there is a need to limit disruptive and exposure practices.

47-1821
Antarctic Project: physics of the atmosphere and cosmophysics. Collection of publications Jan. 1986-July 1991, Vol.1. [Progetto Antartide: settori fisica dell'atmosfera e cosmofisica. Raccolta pubblicazioni gennaio 1986-luglio 1991, Vol.1],
Italy. Programma Nazionale di Ricerche in Antartide, Rome, ENEA, [1991], 634p., Refs. passim.
For selected papers see I-47680 through I-47692 or 47-1822 through 47-1827.
Ozone, Meteorology.
This is the first of two volumes of a collection of papers dealing with physics of the atmosphere and cosmophysics in Antarctica: some of them are abstracts prepared for meetings. They report on research performed within the framework of the Italian Antarctic Program, and have been published in national and international journals. *The aim of the collection is to simplify* access to this scientific literature, made difficult by the elapsed time from the publication date, the limited number of copies still available and their different places of origin. A chronological list has been provided. (Auth. mod.)

47-1822
Lidar measurements of antarctic atmospheric parameters. [Misure lidar di parametri atmosferici in Antartide],
Stefanutti, L., et al, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settori fisica dell'atmosfera e cosmofisica. Raccolta pubblicazioni gennaio 1986-luglio 1991, Vol.1. (Antarctic Project: physics of the atmosphere and cosmophysics. Collection of publications Jan. 1986-July 1991, Vol.1), Rome, ENEA, [1991], p.27-41, In Italian. Reprinted from IROE-CNR, Internal report, Dec. 1986. 10 refs.
Ozone, Lidar, Meteorological data.
The great advantages of the use of lidar in obtaining vertical profiles of various atmospheric parameters in remote areas are discussed. The characteristics of the elastic backscatter lidar and the differential absorption lidar are described, and the installation of these systems at year-round stations in Antarctica, such as McMurdo or Amundsen-Scott, is recommended.

47-1823
Ozone hole over Antarctica. [Il buco di ozono sull'Antartide],
Visconti, G., Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settori fisica dell'atmosfera e cosmofisica. Raccolta pubblicazioni gennaio 1986-luglio 1991, Vol.1. (Antarctic Project: physics of the atmosphere and cosmophysics. Collection of publications Jan. 1986-July 1991, Vol.1), Rome, ENEA, [1991], p.102-117, In Italian. Reprinted from *Il Nuovo saggiatore*, 1987, 5(3), p.34-49.
Ozone, Atmospheric composition, Atmospheric circulation.
A review is presented of the dynamics of ozone depletion in Antarctica, including a discussion on residual circulation, ozone chemistry, radiation, and the different theories on the formation of the ozone hole.

47-1824
Atmospheric microphysical measurements in Terra Nova Bay. [Misure di microfisica dell'atmosfera presso la baia de Terra Nova in Antartide],
Guerrini, A., et al, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settori fisica dell'atmosfera e cosmofisica. Raccolta pubblicazioni gennaio 1986-luglio 1991, Vol.1. (Antarctic Project: physics of the atmosphere and cosmophysics. Collection of publications Jan. 1986-July 1991, Vol.1), Rome, ENEA, [1991], p.145-154, In Italian with English summary. Reprinted from Acqua-Aria, 1988, 4, p.453-461. 23 refs.
Ozone, Meteorological data, Meteorological instruments, Antarctica—Terra Nova Bay Station.
Preliminary results of meteorological investigations carried out at Terra Nova Bay during the Italian Antarctic Expedition of 1986-1987 are presented. Data charts include atmospheric turbidity measurements, ground ozone concentrations, and temperature and wind measurements. Analysis of data reveals a high temperature gradient (1-1.5C) between 3 and 6 m levels. A description is given of the instruments used, some of which were installed during the previous expedition.

47-1825
Ozone hole. [Il buco dell'ozono],
Stefanutti, L., Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settori fisica dell'atmosfera e cosmofisica. Raccolta pubblicazioni gennaio 1986-luglio 1991, Vol.1. (Antarctic Project: physics of the atmosphere and cosmophysics. Collection of publications Jan. 1986-July 1991, Vol.1), Rome, ENEA, [1991], p.159-164, In Italian. Reprinted from Atti della Fondazione Giorgio Ronchi, Nov.-Dec. 1988, 43(6). 12 refs.
Ozone, Atmospheric composition, Air pollution.
The dynamics of the ozone hole are described, and various chemical processes occurring in the antarctic stratosphere are reviewed, with particular regard to chlorine catalytic cycles and the role of polar stratospheric clouds in the antarctic heterogeneous chemistry. Stratospheric chlorine sources, found to be the primary cause of the ozone hole, are attributed to CFC emissions produced by man.

47-1826
Absolute determination of the cross sections of ozone in the wavelength region 339-355 nm at temperatures 220-293 K.
Cacciani, M., et al, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settori fisica dell'atmosfera e cosmofisica. Raccolta pubblicazioni gennaio 1986-luglio 1991, Vol.1. (Antarctic Project: physics of the atmosphere and cosmophysics. Collection of publications Jan. 1986-July 1991, Vol.1), Rome, ENEA, [1991], p.259-264, Reprinted from Journal of geophysical research, June 20, 1989, 94(D6), p.8485-8490. 14 refs. .
Di Sarra, A., Fiocco, G., Amoruso, A.
Ozone, Data processing, Meteorological instruments.
Absolute measurements of the ozone absorption coefficient in the Huggins bands at different temperatures have been carried out. Ozone is produced by an electrical discharge and stored cryogenically; differential absorption measurements are subsequently obtained in a slowly evolving mixture of ozone and molecular oxygen. High resolution (to 0.12 nm) measurements cover a spectral range (339-355 nm) where the ozone absorption shows a strong dependence on temperature. Results at 293 and 220 K are reported; they are particularly interesting in view of the utilization of this spectral region as a low-absorption reference channel for the observation of atmospheric ozone profiles by active probing techniques. Coherent radiation at two wavelengths, around 355 and 353 nm, respectively, can be obtained as the third harmonic of the fundamental output of a Nd:YAG laser and by H2 Raman shifting of an XeCl excimer laser output. (Auth.)

47-1827
Lidar in Antarctica.
Stefanutti, L., et al, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settori fisica dell'atmosfera e cosmofisica. Raccolta pubblicazioni gennaio 1986-luglio 1991, Vol.1. (Antarctic Project: physics of the atmosphere and cosmophysics. Collection of publications Jan. 1986-July 1991, Vol.1), Rome, ENEA, [1991], p.623-629, Reprinted from Società Italiana di Fisica, 1989, 21, p.297-302. 12 refs.
Ozone, Lidar, Antarctica—Terra Nova Bay Station.
A review of the ozone hole issue is presented, and the dynamics of its formation are described. The advantages of the lidar technique in Antarctica for the investigation of polar atmosphere, with particular interest in climatological problems and in the ozone hole phenomenon, are discussed. The 1987-1988 lidar activities at Terra Nova Bay Station are outlined.

47-1828
Proceedings. Vol.2.
International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, 806p., Refs. passim. For selected papers see 47-1829 through 47-1879 or F-47695, F-47697, F-47699, F-47700, G-47694, G-47696 and G-47698.
Triantafyllou, M.S., ed. Chung, J.S., ed. Karal, K., ed. Tunik, A.L., ed.
Ice loads, Ice solid interface, Ice cover strength, Ice pressure, Offshore structures, Underground pipelines, Cold weather construction, Frost heave, Ice deformation, Ice navigation, Permafrost beneath structures, Power line icing, Offshore drilling.
This is a collection of 450 papers, 7 of which are pertinent to Antarctica, presented at the 2nd International Offshore and Polar Engineering Conference (ISOPE-92) held in San Francisco, June 14-19, 1992. Recent international developments and a review of frontier technologies are covered, including global offshore and Arctic petroleum technology, polar (Arctic and Antarctic) technology, ice technology, atmospheric icing, gas hydrates, ocean energy, geotechnical engineering, superconductivity applications and other emerging topics.

47-1829
Civil engineering in the arctic North Slope, Alaska.
Manikian, V., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.1-6, 7 refs.
Petroleum industry, Underground pipelines, Cold weather operation, Cold weather construction, Logistics, Docks, Bridges, Bank protection (waterways), Ice control, Artificial islands, United States - Alaska - North Slope.

47-1830
Arctic pipeline limit states for secondary loadings.
Khatib, I.F., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.7-14, 21 refs.
Underground pipelines, Frost heave, Soil pressure.

47-1831
Arctic pipeline risk assessments.
Weber, B.J., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.15-20.
Mudan, K.S.
Pipelines, Oil spills, Safety, Leakage, Accidents.

47-1832
Evaluation of wind-induced vibration of arctic pipelines.
Sause, R., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.21-31, 12 refs.
Hart, J.D., Ford, G.W.
Suspended pipelines, Wind pressure, Damping, Wind factors, Tundra, Pipeline supports, Vibration.

47-1833
New frost heave prediction method for design of northern pipelines.
Nixon, J.F., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.32-39, 20 refs.
Underground pipelines, Frost heave, Permafrost beneath structures, Pipeline freezing, Discontinuous permafrost, Permafrost preservation, Freezing front, Ice lenses, Mathematical models.

47-1834
France-Canada joint study of deformation of an experimental pipeline by differential frost heave.
Williams, P.J., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.40-45, 7 refs.
Riseborough, D.W., Smith, M.W.
Underground pipelines, Frost heave, Permafrost beneath structures, Freeze thaw tests.

47-1835
Plastic buckling of pipes under bending and internal pressure.
Kim, H.O., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.46-51, 15 refs.
Underground pipelines, Frost heave, Permafrost beneath structures, Plastic deformation, Mathematical models.

47-1836
Experience in full-scale tests of arctic gas pipelines.
Kharionovskii, V.V., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.110-118, 14 refs.
Underground pipelines, Frost heave, Permafrost beneath structures, Gas pipelines, Pipeline supports, Freeze thaw tests.

47-1837
API X65 grade normalized and tempered seamless tubes with improved low temperature toughness.
Cumino, G., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.134-141, 3 refs.
Zoppetti, F., Anelli, E., Poli, A.
Pipes (tubes), Steels, Frost resistance, Low temperature tests.

47-1838
Tension and compression tests of 13-3/8" lbs/ft L-80 HF-ERW casings with buttress connections.
Konno, N., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.169-173, 2 refs.
Koyuba, M., Suzuki, N., Matsuda, E.
Well casings, Steels, Frost resistance, Permafrost beneath structures, Settlement (structural).

47-1839
Arctic Research Commission's role in fostering engineering research.
Gerwick, B.C., Jr., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.548-552, 8 refs.
Research projects, Economic development, Cold weather operation, Cold weather construction, Environmental protection, Exploration, Global change, International cooperation.

47-1840
Nansen Arctic Ocean Drilling Program.
Johnson, L., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.553-556, 4 refs.
Kristoffersen, Y., Thiede, J., Vorren, T.
Offshore drilling, Research projects, Bottom sediment, Paleoclimatology, Marine deposits, Ocean bottom, Air ice water interaction, Global change, Drill core analysis.

47-1841
Construction of platforms for the Russian northern continental shelf.
Eranti, E., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.557-563, 7 refs.
Kärnä, T.
Offshore structures, Offshore drilling, Ice solid interface, Ice loads, Exploration, Petroleum industry, International cooperation, USSR.

47-1842
Panelised forms of building construction for antarctic regions.
Incoll, P., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.564-570, 4 refs.
Large panel buildings, Prefabrication, Modular construction, Cold weather performance, Cold weather construction, Antarctica.
Panelized buildings are defined as buildings in which the floor, walls, and roof are prefabricated in large panels for rapid assembly on site. The differences between panelized buildings and other forms of prefabrication are discussed and the advantages of the panelized design for antarctic buildings are identified. The development of the concept to date is described and further directions of this development are identified. (Auth.)

47-1843
Safety in ice navigation in antarctic waters.
Brune, E., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.571-576, 2 refs.
Ice navigation, Ice routing, Ice reporting, Antarctica.
Too many serious accidents have happened in the pristine environment of the Antarctic due to the increase of shipping, lack of proper ice seamanship and/or operating the wrong vessel at the wrong time in the wrong area of the Antarctic. This paper will focus upon the regulations of the classification companies, the various areas of Antarctica regarding distribution of sea ice, and the possibility of using 'near-real time' ice charts with ice routing. (Auth.)

47-1844
Prefabricated engineering services for use in antarctic regions: pipe lines in harsh environments.
Archibald, J., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.577-586, 4 refs.
Prefabrication, Water pipelines, Utilities, Sanitary engineering, Pipeline insulation, Antarctica - Casey Station, Antarctica - Davis Station, Antarctica - Mawson Station.
Prefabricated engineering services are defined as engineering items such as pipework, valve assemblies and power distribution which are mostly fabricated in the manufacturing phase and thus require minimum effort and time for construction in the harsh antarctic environment. This concept is discussed along with the alternative design configuration considered during the design development stages, through initial manufacture, field trials, practical application and modification. (Auth.)

47-1845
Snowdrift around antarctic building—effects of corner geometry and wind incidence.
Kwok, K.C.S., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.587-591, 12 refs.
Smedley, D.J., Kim, D.H.
Snowdrifts, Snow loads, Buildings, Modular construction, Cold weather construction, Wind pressure, Wind tunnels, Antarctica.
Modelling of antarctic snowdrifting was conducted in a turbulent boundary layer wind tunnel. A series of 7 models was designed, based on extended dimensions of a shipping container. Tests were carried out to investigate the effects of varying the model corner geometry and the angle of wind incidence on snowdrift formation. The results were used to formulate design guidelines for buildings in Antarctica. (Auth.)

47-1846
Near breakup of the surface-flooded ice wharf at McMurdo Station, Antarctica.
Barthelemy, J.L., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.592-599, 5 refs.
Ice wharves, Ice breakup, Ice (construction material), Artificial freezing, Accidents, Antarctica - McMurdo Station.
During the International Geophysical Year, and for several years thereafter, supply ships escorted by icebreakers moored to the sea ice off McMurdo Station and discharged cargo onto sleds. In the mid-sixties, Winter Quarters Bay was cleared of ice and ships began to dock directly along the shoreline at McMurdo. Elliott Quay, a major dock structure built to arrest the resulting progressive erosion, was destroyed by a freak storm in Mar 1972. Since then, a succession of man-made ice

wharves have been built to handle ship traffic. In Jan. 1991, the newest ice wharf broke into several fragments as a vessel was moored alongside. The National Science Foundation selected a task force to investigate the incident. This paper describes the events preceding the mishap and presents the findings of the task force. (Auth.)

47-1847
Short and long term coastal changes along the U.S. Beaufort Sea.
Miller, M.C., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.600-607, 16 refs.
Gadd, P.E.
Shore erosion, Shoreline modification, Offshore landforms, Beaches, Arctic landscapes, Topographic surveys, United States—Alaska—North Slope.

47-1848
Wind and tidal induced currents in an ice covered ocean.
Furnes, G.E., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.608-617, 5 refs.
Air ice water interaction, Drift, Ocean currents, Tidal currents, Ice cover effect, Wind factors, Mathematical models.

47-1849
Ice accretion on energized line insulators.
Farzaneh, M., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.618-624, 15 refs.
Kiernicki, J., Drapeau, J.F.
Power line icing, Ice accretion, Electrical insulation, Electric corona.

47-1850
Effect of voltage polarity on icicles grown on line insulators.
Farzaneh, M., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.625-631, 13 refs.
Laforte, J.L.
Power line icing, Ice accretion, Electrical insulation, Electric corona.

47-1851
Numerical simulation model of cable icing using an elliptical ice shape.
McComber, P., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.632-640, 14 refs.
Druez, J.
Power line icing, Ice accretion, Ice loads, Mathematical models.

47-1852
Determination of design values for sea ice physico-mechanical properties.
Polomoshnov, A.M., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.641-650, 6 refs.
Truskov, P.A., Tambovskiĭ, V.S.
Offshore structures, Ice solid interface, Ice loads, Ice cover strength, Offshore drilling, Ice surveys, Statistical analysis, USSR—Sakhalin Island.

47-1853
Compressibility of spray ice.
Domaschuk, L., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.651-655, 3 refs.
Shields, D.H., Tong, Y.X.
Spray freezing, Artificial islands, Ice strength, Ice (construction material), Artificial freezing, Ice islands, Ice creep, Compressive properties, Mathematical models.

47-1854
Landfast ice pressure measurements in the Beaufort Sea.
Sayed, M., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.656-661, 10 refs.
Frederking, R.M.W.
Fast ice, Ice pressure, Ice loads, Ice pileup, Ice push, Beaufort Sea.

47-1855
Continuum damage propagation in a wedge-shape ice bar.
Shin, J.G., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.662-665, 8 refs.
Kim, J.D., Karr, D.G.
Ice deformation, Ice solid interface, Ice cracks, Ice cover strength, Ice pressure, Ice loads, Ice creep, Crack propagation, Mathematical models.

47-1856
Study of oil intrusion influence on physical properties of sea ice.
Gavrilo, V.P., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.666-669, 5 refs.
Tarashkevich, V.N.
Oil spills, Ice cover strength, Impurities, Snow ice interface, Ice water interface, Sea ice.

47-1857
Influence of structural anisotropy of sea ice on its mechanical and electrical properties.
Borodkin, V.A., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.670-674, 15 refs.
Gavrilo, V.P., Kovalev, S.M., Lebedev, G.A.
Ice crystal structure, Ice cover strength, Ice electrical properties, Sea ice.
Experimental investigations for the determination of the tensile strength in pressing-on samples of one-year old sea ice cover 90 cm thick are reported. The upper layer, from 0 to 40 cm, consisted of small granular ice types V7, V8; the lower layer, from 80 to 90 cm, consisted of ice type V6. Strength determination at one-axis pressing of ice samples was done on a hydraulic press. It is concluded that oriented sea ice crystal structures occur in most regions of the Arctic and Antarctic. The mechanical properties of such ice depend on the direction of loading, which can be important for navigation in ice-covered regions. A correlation is found between the crystalline structure, mechanical and electrical properties of ice.

47-1858
Investigations of fracture toughness K1c of sea ice.
Rogachko, S.I., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.675-676, 2 refs.
Burdiug, T.P.
Ice cover strength, Ice cracks, Ice deformation, Sea ice.

47-1859
Cook Inlet ice loads calculated using historical data and probabilistic methods.
Utt, M.E., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.677-680, 20 refs.
Turner, B.E.
Ice loads, Ice solid interface, Ice cover strength, Ice cover thickness, Offshore structures, Statistical analysis, United States—Alaska—Cook Inlet.

47-1860
First year ice ridge characteristics and loads on offshore structures.
Eranti, E., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.681-687, 14 refs.
Lehmus, E., Nortala-Hoikkanen, A.
Ice loads, Ice solid interface, Pressure ridges, Ice cover strength, Ice pressure, Offshore structures.

47-1861
Design ice force estimating system.
Kato, K., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.688-695, 19 refs.
Ice loads, Ice solid interface, Ice pressure, Pressure ridges, Ice cover strength, Offshore structures, Statistical analysis.

47-1862
***In-situ* stress measurements in a fast ice and possible tidal loads on structures.**
Nikitin, V.A., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.696-702, 4 refs.
Shushlebin, A.I., Sheĭkin, I.B.
Ice loads, Ice solid interface, Fast ice, Ice pressure, Offshore structures, Tides.

47-1863
Ice action onto multilegged structures due to change of water level.
Matskevitch, D.G., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.703-708, 14 refs.
Shkhinek, K.N.
Ice loads, Ice solid interface, Ice pressure, Ice cover strength, Offshore structures, Piles, Water level, Water pressure, Mathematical models.

47-1864
Experimental research on ice load.
Cai, Z.R., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.709-713, 6 refs.
Zhao, G.R.
Ice loads, Ice solid interface, Ice pressure, River ice, Bridges.

47-1865
Ice investigations for the proof of tidal power plant designs.
Monosov, L.M., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.714-717, 5 refs.
Ice loads, Ice solid interface, Ice pressure, Electric power, Tides, Offshore structures, Hydraulic structures, USSR.

47-1866
Methodology for full-scale iceberg impact experiments in the Antarctic.
Guichard, A., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.718-723, 12 refs.
Engler, M., Klein, K., Fauquemberg, P.
Icebergs, Ice loads, Ice solid interface, Ice pressure, Offshore structures, Impact tests, Antarctica—Dumont d'Urville Station.
The methodology used in conducting full scale iceberg impact experiments in two antarctic campaigns is discussed. It involves measurement of iceberg dimensions, iceberg motions, and contact area with a rocky cliff. (Auth.)

47-1867
Effect of confining stress on brittle indentation failure of columnar ice.
Grape, J.A., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.724-731, 25 refs.
Schulson, E.M.
Ice loads, Ice solid interface, Ice cover strength, Ice pressure, Ice deformation, Brittleness.

47-1868
Some results from the Labrador Ice Margin Experiment.
Kjeldsen, S.P., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.732-739, 16 refs.
Olsen, R.B.
Ice cover strength, Ice water interface, Ice navigation, Ice edge, Ocean waves, Ice routing, Ice reporting, Ice surveys, Mathematical models, Labrador Sea.

47-1869
Combined creep and yield model of ice under multiaxial stress.
Fish, A.M., MP 3202, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.740-749, 37 refs.
Ice cover strength, Ice creep, Ice deformation, Ice loads, Ice solid interface, Ice pressure, Ice models, Mathematical models.
A combined creep and yield model has been developed for ice in a multiaxial stress state. The equations of the model describe the entire creep process, including primary, secondary, and tertiary creep, at both constant stresses and constant strain rates in terms of normalized (dimensionless) time $t = t/tm$. Secondary creep is considered an inflection point defining the time to failure (tm). The minimum strain rate at failure is described by a modified Norton-Glen power equation, which, as well as the time to failure, includes a parabolic yield criterion. The yield criterion is selected either in the form of an extended von Mises-Drucker-Prager or an extended Mohr-Coulomb rupture model. The criteria take into account that at a certain magnitude of mean normal stresses *(sigma* max) the shear strength of ice reaches a maximum value due to local melting of ice. The model has been verified using test data on yield of polycrystalline ice at -11.8 C and on creep of saline ice at -5 C, both under triaxial compression *(sigma*2 = *sigma*3).

47-1870
Preliminary results of the U.S. Navy localized ice impact test program.
Devine, E.A., et al, MP 3203, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.750-763, 26 refs.
Sodhi, D.S.
Ice loads, Ice solid interface, Ice pressure, Ice navigation, Metal ice friction, Ice edge, Ships, Military equipment, Military operation, Impact tests.
A naval surface ship scale-model ice impact test program has been completed. Under this program, towed scale-models of the USCGC *Polar Sea* and a conceptual naval frigate were equipped with a specialized sensor which permitted the measurement of localized loads resulting from impact to urea-ice scale-model floes. The *Polar Sea* tests were performed for validation of the test procedures through comparison with full-scale test data available for this ship. The frigate tests are intended for validation of analytical loads models to be used for future structural design and operational assessments of U.S. Navy surface ships.

47-1871
Procedure for dynamic soil-structure-ice interaction.
Kärnä, T., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.764-771, 15 refs.
Ice loads, Ice solid interface, Ice pressure, Offshore structures, Impact tests, Dynamic loads, Soil pressure, Soil strength, Impact tests, Dynamic loads, Computerized simulation, Mathematical models.

47-1872
Coastal jet and ice flow movement.
Bando, K., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.772-776, 10 refs.
Sonu, C.J.
Drift, Ocean currents, Ice floes, Coastal topographic features, Shores, Topographic effects, Mathematical models.

47-1873
***Methodology of the determination of the parameters* of large ships designed for the independent navigation in ice-covered waters and of those supported by icebreakers.**
Tsoĭ, L.G., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.777-779, 5 refs.
Tanker ships, Ice navigation, Icebreakers.

47-1874
Technique and the results of ice trials of an icebreaking cargo motorship of CA-15 type.
Tsoĭ, L.G., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.780-782, 2 refs.
Ice navigation, Icebreakers, Cargo.

47-1875
Strength parameters of hummocks.
Truskov, P.A., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.783-789, 2 refs.
Pressure ridges, Ice cover strength, Ice loads, Ice pressure, Hummocks, Ice pileup, USSR—Sakhalin Island.

47-1876
Consideration of the mode of contact ice failure in determining ice forces acting on offshore structures.
Tsuprik, V.G., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.790-794, 12 refs.
Ice loads, Ice solid interface, Ice cover strength, Ice pressure, Ice pileup, Offshore structures.

47-1877
***Changeability of ice cover* and navigation conditions in the Bering Sea.**
IAkunin, L.P., International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.795-796.
Sea ice distribution, Ice navigation, Ice routing, Bering Sea.

47-1878
Probability estimation of moving pressure ridge contacts with pipelines.
Surkov, G.A., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.797-800, 6 refs.
Truskov, P.A.
Pressure ridges, Ice scoring, Ice solid interface, Underground pipelines, Ice loads.

47-1879
Selection of the subsea pipeline route for the offshore Chaivo field.
Skurikhin, V.A., et al, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.801-806, 7 refs.
Surkov, G.A., Truskov, P.A.
Underground pipelines, Pressure ridges, Ice routing, Ice loads, Ice scoring, Route surveys, USSR—Sakhalin Island.

47-1880
Bryophytes of the Melville Hills region, Northwest Territories.
Scotter, G.W., et al, *Canadian field-naturalist*, Jan.-Mar. 1992, 106(1), p.100-104, 19 refs.
Vitt, D.H.
Mosses, Arctic landscapes, Site surveys, Distribution, Tundra, Vegetation patterns, Ecosystems.

47-1881
Lichens of the Cape Parry and Melville Hills regions, Northwest Territories.
Thomson, J.W., et al, *Canadian field-naturalist*, Jan.-Mar. 1992, 106(1), p.105-111, 17 refs.
Scotter, G.W.
Lichens, Arctic landscapes, Distribution, Site surveys, Tundra, Vegetation patterns, Ecosystems.

47-1882
Concentration of black liquor by freeze crystallization.
Egan, C.J., et al, TAPPI Engineering Conference, San Francisco, CA, Sep. 13-16, 1982. Proceedings, Book 3, Technical Association of the Pulp & Paper Industry, 1982, p.471-479.
Davis, H.E.
Manufacturing, Solutions, Artificial freezing, Vacuum freezing, Ice crystal growth, Performance, Wood, Cost analysis, Design.

47-1883
Seismicity associated with icebergs calving from glaciers near Mawson, East Antarctica.
Gaull, B.A., et al, *Australian Journal of Earth Sciences*, 1992, Vol.39, p.473-480, 19 refs.
Adamson, D.A., Pickard, J.
Glacier ablation, Calving, Icebergs, Icequakes, Icefalls, Seismology, Forecasting, Ice mechanics, Cracking (fracturing), Antarctica—Mawson Station.
Icebergs produced from the termini of non-floating or partly floating outlet glaciers at the seaward margin of the antarctic ice sheet near Mawson were photographed and measured. Seismic records at Mawson are interpreted in terms of catastrophic calving of these icebergs from ice cliffs into the sea to produce low frequency seismic signals of varying amplitude and duration. It is shown how parameters of foreshocks to these ice falls could have been used to predict the approximate time and location of one of the falls. These data were compared with those from other icequake and earthquake studies. Further studies of this type are expected to reveal a greater understanding of ice dynamics and to assist with estimation of the mass of ice leaving Antarctica and of ice fall prediction, which has immediate ramifications for safety of base personnel. (Auth. mod.)

47-1884
Freezable, flotable water lines?.
Ainsworth, L., *Public works*, Dec. 1992, 123(13), p.42-43.
Water pipelines, Lakes, Subsurface structures, Pipeline freezing, Pipe laying, Polymers, Frost resistance, Cold weather performance, Floating structures.

47-1885
Simulations of continental ice sheet growth over the last glacial-interglacial cycle: experiments with a one level seasonal energy balance model including seasonal ice albedo feedback.
Deblonde, G., et al, *Global and planetary change*, Nov. 1992, 6(1), p.37-55, 54 refs.
Peltier, W.R., Hyde, W.T.
Ice sheets, Ice volume, Pleistocene, Paleoclimatology, Ice growth, Heat balance, Albedo, Mathematical models, Climatic factors, Solar radiation.

47-1886
Experience with rutschblocks.
Jamieson, J.B., et al, *Avalanche review*, Dec. 1992, *11*(2), p.1,4-5, 3 refs.
Johnston, C.D.
Snow cover stability, Avalanche forecasting, Slope stability, Snow trenches, Mechanical tests, Skis, Loading.

47-1887
Mountain conifers reduce snow avalanche hazard in French Alps.
Jenkins, M.J., *Avalanche review*, Jan. 1993, 11(3), p.4-5, 6 refs.
Trees (plants), Avalanche engineering, Revegetation, Slope stability, Forest strips, Protection.

47-1888
Measurements of snow temperature during rain.
Conway, H., et al, *Avalanche review*, Jan. 1993, 11(3), p.6-7, 12 refs.
Benedict, R.
Snow temperature, Temperature measurement, Snow hydrology, Water flow, Seepage, Rain, Ice water interface, Isotherms, Wettability, Snow cover stability.

47-1889
Polar hydrology—Svalbard.
Norwegian National Committee for Hydrology, Norway. National Research and Development Program, Oslo, Norwegian Research Council for Science and the Humanities, Dec., 1992, 49p.
Research projects, Polar atmospheres, Ecosystems, Hydrology, Environmental protection, Monitors, Climatic changes.

47-1890
Registration of vehicular tracks on the Svalbard archipelago.
Raheim, E., *Norsk Polarinstitutt. Meddelelser*, 1992, No.122, 51p., 24 refs.
Tundra, Surface structure, All terrain vehicles, Environmental impact, Damage, Photointerpretation, Classifications, Geophysical surveys, Monitors, Arctic landscapes, Discontinuous permafrost.

47-1891
Hydrogen-bond cooperativity and free-volume effects on normal and supercooled water self-diffusion.
Lamanna, R., et al, *Physical review A*, Dec. 15, 1992, 46(12), p.R7367-R7370, 27 refs.
Cannistraro, S.
Liquid cooling, Water structure, Supercooling, Self diffusion, Water temperature, Hydrogen bonds, Thermodynamic properties, Phase transformations, Molecular structure.

47-1892
Review of recent findings in well-casing studies.
Parker, L.V., MP 3204, Annual Environmental Research and Development Symposium, 16th, Williamsburg, VA, June 23-25, 1992. Proceedings, Aberdeen, MD, U.S. Army Corps of Engineers, 1992, p.83-91, Report No.CETHA-TS-CR-92063, 19 refs.
Ground water, Water pollution, Sampling, Well casings, Materials, Stability, Monitors, Chemical analysis, Degradation, Leaching.
For some time regulatory agencies have been concerned about 1) whether casing and screen materials used in groundwater-monitoring sorb or leach analytes of interest and 2) the resistance of these materials to degradation by the environment. This paper reviews recent findings on the suitability of several types of well casings for groundwater-monitoring applications.

47-1893
Airborne millimeter-wave FM-CW radar for thickness profiling of freshwater ice.
Yankielun, N.E., *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, Nov. 1992, CR 92-20, 77p., ADA-259 368, 68 refs.
Ice cover thickness, Airborne radar, Electromagnetic prospecting, Lake ice, River ice.
The ability to profile rapidly and accurately the structure of freshwater ice down to a thickness of a few centimeters over large surfaces of frozen ponds, lakes and rivers has wide military, industrial, commercial and recreational application, including safety and trafficability surveys. A prototype broadband millimeter wave (26.5 to 40 GHz) FM-CW radar, employing real-time data acquisition and digital signal processing techniques, has been developed for continuously recording the thickness profile of freshwater ice. Thickness resolution is better than 3 cm +/- 10%, which improves on short-pulse and FM-CW radars operating at frequencies less than 10 GHz. These other radars have a best reported thickness resolution of approximately 10 cm with a +/- 10% accuracy; this is insufficient because a freshwater ice sheet as thin as 5 cm, floating on water, can be safely traversed by an individual of average weight. System specifications include a 15-dBm output RF power level, a 0.066-second sweep rate and less than a 50-dB signal-to-noise-ratio. This radar was tested on the ground and from a helicopter at heights of up to 7 m above ice surfaces at speeds up to 40 km/hr. Pond and river ice sheets between 3 and 35 cm thick, with and without fresh snow cover, and with minimal surface roughness have been profiled. Results have shown direct correlation between radar and borehole thickness measurements. Losses from volume scattering by imbedded air bubbles did not significantly affect the system's capability to discern the air/ice and ice/water scattering boundaries.

47-1894
Design and analysis of a low speed drag plow for use in deep snow.
Walsh, M.R., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, Sep. 1992, CR 92-19, 51p., ADA-258 858, 15 refs.
Richmond, P.W.
Snow removal, Equipment, Design, Cold weather performance.
Winter logistical operations employing wheeled vehicles are severely restricted because of traction losses in deep snow. To enable the use of wheeled vehicles for off-road winter deployment, an independent drag-plow was developed to be attached to the pintel mount of the U.S. Army's small unit support vehicle (SUSV). Small-scale testing revealed significant stability problems with a towed wedge-shaped plow model. Geometric modifications to the plow design and a 4-bar parallel motion towing linkage were developed to stabilize plow roll and pitch, respectively. A welded aluminum half-width model incorporating these modifications was successfully tested at Keweenaw Research Center in northern Michigan in Jan., 1991. Parameters measured during testing included pitch and roll angles, drawbar forces, speed, plowed geometry, and snow characteristics. These parameters were used to determine the feasibility of a full-scale model capable of plowing a 2.45 m path in 1 m-deep low density snow, leaving 15 cm of snow as ground cover. The model performed well in medium density snow, with drawbar forces in the 5.6-kN range. Plow penetration was limited by a geometric constant of the 4-bar linkage, with 15 deg the approximate maximum link angle from horizontal. Pitch and roll stability in off-road applications was excellent, with the plow demonstrating an ability to right itself and dig in after encountering obstacles. Successful half-width tests have proven the concept of utilizing a SUSV-towed V-plow for clearing access roads in deep snow for off-road winter operations. Data extrapolation of half-width tests demonstrates that a full-scale plow is feasible.

47-1895
Comparison of thawing soil strength measurements for predicting vehicle performance.
Shoop, S.A., *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, Sep. 1992, CR 92-17, 11p., ADA-258 263, 9 refs.
Soil strength, Ground thawing, Thaw depth, Soil water, Shear strength, Shear stress, Freeze thaw tests, Vehicles, Cold weather performance.
The CRREL Instrumented Vehicle (CIV), shear annulus, direct shear, and triaxial compression devices were used to characterize the strength of thawed and thawing soil. These strength values can be used in simple traction models to predict the tractive performance of vehicles. Strength was evaluated in terms of the parameters of cohesion and internal angle of friction based on the Mohr-Coulomb failure criterion. It is proposed here that an instrumented vehicle is best suited for terrain characterization for mobility studies because the conditions created by a tire slipping on a soil surface are exactly duplicated. The cohesion and internal angle of friction values from the shear annulus were found to overpredict traction because of the low normal stress applied by the annulus and the curved nature of the failure envelope. Of all the tests, the direct shear test yielded the highest internal angle of friction value, most likely because the test was run at a slow deformation rate under drained conditions. The triaxial test results were the most similar to those from the vehicle. All test methods show internal angle of friction increasing with soil moisture up to the liquid limit of the soil, and then decreasing. As measured with the vehicle, internal angle of friction was also found to be strongly influenced by the thaw depth.

47-1896
Laboratory investigation of trash rack freezeup by frazil ice.
Andersson, A., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, Sep. 1992, CR 92-16, 11p., ADA-258 120, 5 refs.
Daly, S.F.
Frazil ice, Channels (waterways), Freezeup.
A series of tests was conducted in a refrigerated flume facility to determine the ice accumulation pattern on models of water intake trash racks. Data gathered included the flow velocity, the water temperature and the porosity of the accumulated frazil ice (mean porosity is 0.67). Frazil accumulates first on the upstream face of the trash rack bars (being insensitive to bar shape), and then bridges between individual bars near the water surface, proceeding downward until the entire trash rack is blocked. Flow through the rack became highly nonuniform during the accumulation process.

47-1897
Effectiveness and variability of digestion procedures for zinc determination in aged, contaminated soils.
Reynolds, C.M., *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, Aug. 1992, CR 92-15, 13p., ADA-258 454, 35 refs.
Soil pollution, Metals.
Owing to the numerous advantages provided by microwave digestions, regulatory agencies are recognizing its value, yet most reported comparisons of microwave digestions with other accepted methods have used ores, laboratory-spiked soils, or soils with unexceptional, rather than elevated, metal concentrations. Objectives of this research included evaluating microwave digestion for routine laboratory use and comparing microwave, block digester, and hot-plate soil digestion techniques for determining zinc in aged, zinc-contaminated soils. Soil samples, chosen to provide a more realistic and rigorous test of the digestion procedures than would spike recovery methods, and known to contain appreciable quantities of zinc, were collected from sites near a zinc smelter that had operated for more than 80 years. To obtain a range of zinc concentrations, surface (0-20 cm) samples of Weikert silt loam soil (loamy-skeletal, mixed, mesic, shallow Typic Dystrochrept) were collected from a location subject to airborne contamination from the smelter site. Very highly significant effects for digestion method, soil, and method x soil interaction were observed. Considering all the soils analyzed as a group, there was no significant difference in zinc release between two separate microwave digestions, or between the hot-plate and block digestion methods. However, microwave digestion resulted in significantly more complete metal release and greater metal concentration values than did either the hot-plate or block digestion methods. Effect of digestion method was not constant among soils. Uniformity for the microwave digestion replications was better than for either block or hot-plate methods. Incomplete digestion and contamination occurred more frequently using hot-plate digestion. For two separate but identical microwave digestion treatments, the average coefficient of variability (CV) values of digestion replication means were 20.5% and 28.7%, respectively. The analogous values for the block digestion and hot-plate methods were 39.2% and 69.5%, respectively. The hot-plate digestion variability was *significantly greater than* either the block digestion or microwave methods. Microwave digestions provided markedly faster digestion times and often greater zinc release than other methods. Zinc release using microwave digestions was equal to or greater than that using other methods. This study demonstrated that regardless of digestion method, variability within a soil sample presents significant challenges, both in obtaining uniform analytical results and in interpretations.

47-1898
Potential cause for low lead and chromium recoveries during acid extractions.
Hewitt, A.D., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Oct. 1992, SR 92-23, 6p., ADA-259 228, 8 refs.
Cragin, J.H.
Soil pollution, Wastes.
When high concentrations (>100 mg/L) of Pb and Cr (IV) are present together in solution, PbCrO4 precipitates, resulting in losses of these two metals. Moderate acidification with 1-2% HNO3 does not prevent precipitation loss. Caution is necessary when preparing standard solutions or handling acidic extracts of environmental samples containing high levels of Pb and Cr, since undetected formation of metal chromates will result in low recoveries of these metals.

47-1899
Determination of the water content of snow by dielectric measurements.
Camp, P.R., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, July 1992, SR 92-18, 38p., ADA-256 299, 22 refs.
LaBrecque, D.R.
Snow water content, Dielectric properties, Snow electrical properties.
The dielectric properties of wet and dry natural snow were studied in the frequency range of 50 Hz to 100 kHz to determine whether measurements made in this frequency range might prove useful in evaluating the water content of snow. Dielectric heating at 20 kHz proved a very useful means of modifying the water content from 0 to 30% by weight. Six different natural snows were used in these experiments. Meltwater was analyzed for conductivity, pH, and impurity content. In addition to developing information on the dielectric properties of wet and dry snow, the authors measured the changes produced in dry snow by altering its density over the range of 0.11 to 0.66 g/cu cm. Details of the experimental technique and the data obtained are fully reported. Results do not lead to optimism about the usefulness of measurements in this frequency range alone for the determination of water content.

47-1900
Sensitivity of southern ocean sea-ice simulations to different atmospheric forcing algorithms.
Stössel, A., *Tellus*, Oct. 1992, 44A(5), p.395-413, 45 refs.
Sea ice, Boundary value problems, Interfaces, Models.
Sea ice is sensitively dependent on the fluxes of energy, mass and momentum between the ocean and the atmosphere, making it worth investigating the modification of these fluxes by the respective boundary layers. Atmospheric forcing in the present investigation is changed from monthly observational data, to daily modelled values computed by an operational numerical weather-prediction model. Applying these computations directly, as atmospheric surface forcing to the sea ice-oceanic mixed-layer model, yields encouraging results, indicating the general reliability of these data. Fluxes derived from the atmospheric forcing are modified in a first step to include the stability dependency of the atmospheric surface layer. Compared to the application of usual adjustment practices, this leads to improved results, especially with respect to the ice velocities in divergent ice fields. In the next step, the atmospheric forcing level is raised to the geostrophic level, thus incorporating the entire atmospheric boundary layer. While the forcing fields become less dependent on the prescribed boundary conditions of the weather-prediction model, the simulations appear to be reasonable only when the near-surface wind forcing is applied, the overall roughness length is increased and the large-scale stability is reduced. This leads to important implications for coupled atmosphere-sea ice-ocean models. (Auth.)

47-1901
Radioactive fallout on Tyrolean glaciers. [Radioktiver fall out auf Gletschern Tirols].
Ambach, W., et al, *Berichte. Naturwissenschaftlich-Medizinischer Verein in Innsbruck*, Oct. 1991, Vol.78, p.7-17, In German with English summary, 14 refs.
Glacier surfaces, Mountain glaciers, Snow impurities, Fallout, Sampling, Radioactive isotopes.

47-1902
Tyrol's ice-man.
Ambach, W., et al, *Lancet*, June 13, 1992, Vol.339, p.1471.
Ambach, E., Tributsch, W.
Glaciology, Biomass, Glacial deposits, Preserving, Age determination, Pleistocene, Chemical analysis.

47-1903
Vapor diffusion coefficient for snow.
Colbeck, S.C., *Water resources research*, Jan. 1993, 29(1), MP 3205, p.109-115, 23 refs.
Snow physics, Water vapor, Vapor diffusion, Snow permeability, Ice vapor interface, Mathematical models, Temperature effects, Mass transfer, Porosity.
The coefficients of diffusion for water vapor in snow and other porous media are fundamental parameters of great importance. While they are generally thought to be greater than the coefficient for air, there is much uncertainty about what value to use. Attempts to determine the diffusion coefficient in snow experimentally have led to contradictory results, but Yosida's experiments seem to give reasonable results. Yosida's idea of hand-to-hand diffusion is quantified here in a particle-to-particle model which shows that the diffusion coefficient depends on the mean pore size, and that the coefficient in snow is four to seven times greater than in air.

47-1904
Unusual case: backpack moves through a glacier.
Ambach, W., et al, *Journal of wilderness medicine*, 1992, Vol.3, p.219-220, 1 ref.
Moser, W.
Glacier flow, Sediment transport, Glacier ablation.

47-1905
Discovery of human bones in the Prägratkees (Tyrolean Alps) in 1953 and 1990. (Zur Ausaperung menschlicher Knochen am Prägratkees (Tirol) in den Jahren 1953 und 1990).
Ambach, E., et al, *Beiträge zur Gerichtlichen Medizin*, 1992, Vol.50, p.37-41, In German with English summary. 4 refs.
Glacial deposits, Biomass, Mountain glaciers, Accidents, Glacier oscillation.

47-1906
Corpses released from glacier ice: glaciological and forensic aspects.
Ambach, W., et al, *Journal of wilderness medicine*, 1992, Vol.3, p.372-376, 8 refs.
Glacial deposits, Biomass, Ice cover effect, Preserving, Glacier ablation, Decomposition, Glacier flow.

47-1907
***Homo tirolensis*, a mummy frozen in time.**
Ambach, E., et al, *Lancet*, Feb. 1, 1992, 339(8788), p.296.
Tributsch, W., Henn, R., Ambach, W.
Glacial deposits, Biomass, Preserving, Accidents.

47-1908
Fatal accidents on glaciers: forensic, criminological, and glaciological conclusions.
Ambach, E., et al, *Journal of forensic sciences*, Sep. 1991, 36(5), p.1469-1473, 4 refs.
Tributsch, W., Henn, R.
Glaciology, Accidents, Glacier flow, Biomass, Glacial deposits, Age determination.

47-1909
Is mummification possible in snow.
Ambach, E., et al, *Forensic science international*, 1992, Vol.54, p.191-192, 4 refs.
Tributsch, W., Ambach, W.
Glacial deposits, Snow cover effect, Preserving, Biomass, Snow physics, Vapor pressure, Evaporation.

47-1910
Bibliography of ice and snow research at Trent University, up to December 1991.
Adams, P., *Trent University. Geography research project report*, 1992, No.1, 16p.
Bibliographies, Research projects, Snow cover, Ice cover.

47-1911
Unsurfaced road management rating system.
Eaton, R.A., et al, *APWA reporter*, Jan. 1993, MP 3206, p.25, 4 refs.
Darling, M.
Road maintenance, Classifications, Urban planning, Computer programs.

47-1912
Acquisition of land based high resolution seismic profiles in glacial basins, two case studies in the alpine foreland of Switzerland.
Pugin, A., et al, *Eclogae geologicae Helvetiae*, 1992, 85(2), p.491-502, With French summary. 19 refs.
Rossetti, S.
Glacial deposits, Alpine landscapes, Seismic surveys, Seismic reflection, Profiles, Stratigraphy, Geophysical surveys, Data processing.

47-1913
Dependence of post-stable fluidelastic behavior on the degrees-of-freedom of a tube bundle.
Lever, J.H., et al, MP 3207, ASME Symposium on Flow-induced Vibration and Noise, Vol.2, New York, American Society of Mechanical Engineers, 1992, p.167-187, PVP-Vol.242, Refs. p.185-187.
Rzentkowski, G.
Pipes (tubes), Fluid flow, Stability, Structural analysis, Turbulent flow, Analysis (mathematics), Oscillations, Design criteria, Heat pipes.

47-1914
River and lake ice conditions as interpreted from microwave imagery.
Melloh, R.A., et al, MP 3208, Army Science Conference, June 22-25, 1992, Proceedings, Vol.2, U.S. Department of the Army, 1992, p.381-395, 16 refs.
Gatti, L.W.
River ice, Radar photography, Lake ice, Ice conditions, Microwaves, Synthetic aperture radar, Radiometry, Image processing, Sensor mapping, Surface structure, Polarization (waves), Classifications.
This study has resulted in several findings that will be useful for imagery analysis of the surface features of frozen lakes and rivers: active radar systems provide the capability to distinguish rough-textured from smooth-ice covers, zones of variable ice surface roughness within rough ice fields can be differentiated, C- and L-band data are more sensitive than P-band to the range of surface roughnesses encountered, and polarization synthesis and signatures provide a way to improve contrast of ice features on radar imagery. Ka-band passive microwave systems allow the differentiation of wet versus dry snow conditions, open water in ice-covered rivers and lakes, and compacted areas in depth hoar snowpacks. Possible applications of these results include location of river bridging sites, dangerous thin-ice zones, packed-snow trails, and preferential water supply points.

47-1915
Application of infinite elements to phase change situations on deforming meshes.
Sullivan, J.M., Jr., et al, *International journal of numerical methods in engineering*, 1992, Vol.33, MP 3209, p.1861-1874, 21 refs.
O'Neill, K.
Phase transformations, Boundary value problems, Heat transfer, Solidification, Soil freezing, Artificial freezing, Waste treatment, Radioactive wastes, Mathematical models, Temperature distribution.
In this paper the advantages of time dependent mesh adaption for the solution of phase change problems are enhanced by the joining of a new formulation for infinite elements to far boundaries. This is accomplished through a co-ordinate transformation within the framework of conventional 2-D quadratic, biquadratic, and linear-quadratic elements. Standard 2 by 2 Gauss-Legendre quadrature suffices throughout and normal Galerkin finite element features are undisturbed, including strict conservation of energy. The formulation is independent of global co-ordinates, entails no restrictions on the unknown function and should be applicable to other problem types. All test cases on quadrilateral and triangular grids show very significant improvements with infinite elements relative to comparable solution systems using strictly finite grids.

47-1916
Southern Lake Michigan coastal ice and sediment sample data: shoreface and ice profiles (winter 1990/91).
McCormick, M., et al, *U.S. Geological Survey. Open-file report*, 1991, 91-619-A, 32p., Report includes 3.5 in. computer diskette incorporating bathymetric data. 15 refs.
Geophysical surveys, Ice erosion, Lake ice, Littoral zone, Shore erosion, Sedimentation, Ice composition, Profiles, Sampling, Fast ice, Sounding.

47-1917
Temperature and precipitation series at Norwegian arctic meteorological stations.
Nordli, P.Ø., *Det Norske Meteorologiske Institutt. Rapport*, Dec. 1990, No.40/90, 14p., 5 refs.
Polar atmospheres, Meteorological data, Climatic changes, Air temperature, Temperature variations, Periodic variations, Global warming.

47-1918
Climate of Spitsbergen.
Hanssen-Bauer, I., et al, *Det Norske Meteorologiske Institutt. Rapport*, Dec. 1990, No.39/90, 40p., 19 refs.
Kristensen Solas, M., Steffensen, E.L.
Climatology, Meteorological data, Permafrost surveys, Snow surveys, Air temperature, Periodic variations, Snow depth, Weather stations.

47-1919
Village uses a multiple defense strategy for snow removal.
Miller, R.H., *Public works*, Apr. 1992, 123(4), p.42-44.
Winter maintenance, Road maintenance, Snow removal, Cold weather operation.

47-1920
Improved ice and snow control with pavement-specific forecasting.
Kelley, J.R., *Public works*, Apr. 1992, 123(4), p.46-47,83, 2 refs.
Winter maintenance, Road maintenance, Ice forecasting, Meteorological data, Pavements, Surface temperature, Salting, Cold weather operation, Urban planning.

47-1921
Designing for ice conditions in marinas.
Wortley, C.A., *Public works*, Apr. 1992, 123(4), p.48-50, 3 refs.
Docks, Ports, Design criteria, Lake ice, Ice conditions, Protection, Classifications.

47-1922
Ice melters and concrete damage: are they related.
Balkin, L.E., et al, *Public works*, Apr. 1992, 123(4), p.50-51.
Schend, R.C.
Winter maintenance, Concrete pavements, Ice removal, Concrete durability, Damage, Ice melting, Specifications, Salting.

47-1923
Guide to proper salt storage. *Public works*, Apr. 1992, 123(4), p.55-56,82-83, 1 ref.
Winter maintenance, Salting, Preserving, Countermeasures, Tanks (containers), Design.

47-1924
Snow fence guide. *Public works*, Apr. 1992, 123(4), p.57-59, 1 ref.
Winter maintenance, Blowing snow, Snow fences, Snow retention, Design.

47-1925
One city's guide to snow and ice operations and planning.
Usher, B., *Public works*, July 1992, 123(8), p.36-37.
Winter maintenance, Road maintenance, Snow removal, Ice removal, Urban planning.

47-1926
Sidewalk snow removal at the foot of the Rockies.
Ruiz, J., *Public works*, July 1992, 123(8), p.49-50.
Winter maintenance, Sidewalks, Snow removal, Urban planning.

47-1927
Effects of banning salt for roadway de-icing.
Strizek, P., *Public works*, July 1992, 123(8), p.54,82.
Road maintenance, Winter maintenance, Ice removal, Salting, Urban planning, Environmental impact.

47-1928
Apples and oranges of salt and sand.
Jones, R.H., *Public works*, July 1992, 123(8), p.58-59.
Road maintenance, Winter maintenance, Snow removal, Ice removal, Salting, Sanding, Cold weather performance.

47-1929
Now it's plowed, but is it safe. *Public works*, July 1992, 123(8), p.62-63,91.
Winter maintenance, Road maintenance, Snow removal, Safety, Cold weather operation.

47-1930
Some aspects of the interaction between chemical and dynamic processes relating to the antarctic ozone hole.
Eckman, R.S., et al, *Advances in space research*, Jan. 1993, 13(1), p.(1)311-(1)319, 28 refs.
Ozone, Stratosphere, Atmospheric composition, Models.
Observational and modeling studies have been conducted to examine the interaction between the chemical and dynamical processes that occur during springtime in the lower stratosphere of the Southern Hemisphere. The temporal evolution of the ozone distribution and the circulation during 1987 is contrasted with that for 1988 as an illustrative example of how dynamical processes and the resulting meteorological conditions modulate the ozone depletion. Concurrently with the observational analysis, an effort was initiated to simulate the ozone depletion during austral spring using a three-dimensional chemical transport model. The model includes a parameterized representation of the heterogeneous processes thought to be important in this region. The simulation indicates that the inclusion of this additional chemistry, which results in the release of free chlorine and the redistribution of odd nitrogen into reservoir species, reproduces many aspects of the observations. While significant uncertainties and difficulties remain in order to include heterogeneous chemistry in stratospheric models in a self-consistent manner, the preliminary results are encouraging and provide an impetus for improving current models. (Auth.)

47-1931
Hydrocarbon contamination on the Antarctic Peninsula. I. Arthur Harbor-subtidal sediments.
Kennicutt, M.C., II, et al, *Marine pollution bulletin*, Oct. 1992, 24(10), p.499-506, 14 refs.
McDonald, T.J., Denoux, G.J., McDonald, S.J.
Water pollution, Sediments, Hydrocarbons, Antarctica, Arthur Harbor.

Near-field contamination in Arthur Harbor can be traced to spills, ship and boating activities, and run-off. Soil samples from Palmer Station and Old Palmer Station contain hydrocarbons derived from diesel fuel, lubrication oil, and hydraulic fluid. Most of the contamination in subtidal sediments around Palmer Station is due to diesel fuel spills. Subtidal sediments below an abandoned open incineration site also contain combustion-derived polynuclear aromatic hydrocarbons (PAH). Soils collected at Old Palmer Station were also contaminated with diesel fuel residues and combustion-derived PAH. High concentrations of these contaminants were detected in nearby subtidal sediments. Small amounts of diesel fuel contamination are detectable throughout Arthur Harbor. Despite being abandoned for years, soils in the vicinity of Old Palmer Station and Base N represent the most concentrated source of contaminants in Arthur Harbor. Environmentally sound practices at Palmer Station have helped to minimize local contamination.

47-1932
Hydrocarbon contamination on the Antarctic Peninsula. II. Arthur Harbor inter- and subtidal limpets *(Nacella concinna)*.
Kennicutt, M.C., II, et al, *Marine pollution bulletin*, Oct. 1992, 24(10), p.506-511, 6 refs.
McDonald, T.J., Denoux, G.J., McDonald, S.J.
Water pollution, Hydrocarbons, Marine biology, Antarctica—Arthur Harbor, Antarctica—Palmer Station.
Accidental and operational releases of hydrocarbons during activities in support of scientific bases in the Antarctic can contaminate organisms in close proximity to these locations. Intertidal and subtidal limpets in Arthur Harbor were found to contain elevated levels of polynuclear aromatic hydrocarbons near Palmer and Old Palmer Stations. Contamination was highest in the intertidal and decreased with increasing water depth in the subtidal. The highest concentrations of tissue contamination were found in intertidal areas associated with high levels of onshore soil contamination. Limpets *(Nacella concinna)* preferentially incorporated the more water soluble aromatic compounds, suggesting exposure to dissolved contaminants in run-off rather than particulates or slicks. This was in contrast to subtidal sediments that were primarily contaminated with freshly spilled diesel fuel. While contamination was present near stations, the concentrations observed are 1-2 orders of magnitude lower than the initial contamination caused by the *Bahia Paraiso* diesel fuel spill in 1989.

47-1933
Study of the phase diagram water fraction of the system water-glycine-sucrose by DTA and X-ray diffraction methods.
Shalaev, E.IU., et al, *Thermochimica acta*, Feb. 3, 1992, 196(1), p.213-220, 16 refs.
Cryobiology, Thermal analysis, Solutions, Freeze drying, Phase transformations, Ice formation, Temperature effects, Preservation, Melting points, X ray analysis.

47-1934
Simulation of time variation in seasonal snowcover based on routinely available data.
Ujihashi, Y., et al, *Journal of natural disaster science*, 1991, 13(2), p.57-68, 16 refs.
Takase, N.
Snow hydrology, Snowmelt, Runoff forecasting, Snow cover distribution, Snow water equivalent, Snow compression, Mathematical models, Simulation, Seasonal variations.

47-1935
Snow damage in an urban area with heavy snow fall: definition of the amount of snow damage and appraisal.
Umemura, T., et al, *Journal of natural disaster science*, 1991, 13(1), p.1-11, 11 refs.
Kamimura, S., Otaki, H.
Snowfall, Damage, Snow cover effect, Cost analysis, Safety, Urban planning, Analysis (mathematics).

47-1936
Freeze-control strategy and air-to-air energy recovery performance.
Phillips, E.G., et al, *ASHRAE journal*, Dec. 1992, 34(12), p.44-45,48-49, 6 refs.
Fisher, D.R., Chant, R.E., Bradley, B.C.
Heat recovery, Air conditioning, Defrosting, Climatic factors, Performance, Degree days, Enthalpy.

47-1937
Large isotope effect due to quantum tunneling in the conversion reaction of electrons to H and D atoms in irradiated H2O/D2O ice.
Muto, H., et al, *Journal of physical chemistry*, June 25, 1992, 96(13), p.5211-5213, 19 refs.
Matsuura, K., Nunome, K.
Ice physics, Ice spectroscopy, Deuterium oxide ice, Phase transformations, Molecular energy levels, Hydrogen bonds, Low temperature research, Electron paramagnetic resonance.

47-1938
'Flickering switch' of Late Pleistocene climate change.
Taylor, K.C., et al, *Nature*, Feb. 4, 1993, 361(6411), p.432-436, 27 refs.
Climatic changes, Ice cores, Ice sheets, Research projects, Greenland.

47-1939
***Absence of evidence for greenhouse warming over the* Arctic Ocean in the past 40 years.**
Kahl, J.D., et al, *Nature*, Jan. 28, 1993, 361(6410), p.335-337, 22 refs.
Air temperature, Temperature variations, Models, Arctic Ocean.

47-1940
Fire beneath the ice.
Monastersky, R., *Science news*, Feb. 13, 1993, 143(7), p.104-107, 1 ref.
Aerial surveys, Volcanoes, Ice sheets, Antarctica—Marie Byrd Land.
Announcement is made of a submerged, active volcano beneath Ice Stream B on the West Antarctic Ice Sheet. Over the past six years, two researchers have made aerial radar investigations above the area and have found a layer of water-logged till below a depression in the ice stream. The presence of this lubricant was confirmed in 1990 when drillers pulled up samples of slurpy sediments from beneath the ice. Working from the idea that the source producing the sink and the till could be a volcano, the two researchers brought more than seven kg of equipment and 25 computers to their field camp. Radar images outlined a mountain rising steeply under the ice to a summit 650 m above the surrounding bedrock. The peak is cone-shaped, roughly similar to Mt. Fuji. Furthermore, there is evidence that it is still active, erupting occasionally, and growing.

47-1941
Active volcanism beneath the west antarctic ice sheet and implications for ice-sheet stability.
Blankenship, D.D., et al, *Nature*, Feb. 11, 1993, 361(6412), p.526-530, 17 refs.
Aerial surveys, Volcanoes, Ice sheets, Antarctica—Marie Byrd Land, Antarctica—Whitmore Mountains.
It is widely understood that the collapse of the West Antarctic ice sheet (WAIS) would cause a global sea level rise of 6 m, yet there continues to be considerable debate about the detailed response of this ice sheet to climate change. Because its bed is grounded well below sea level, the stability of the WAIS may depend on geologically controlled conditions at the base which are independent of climate. In particular, heat supplied to the base of the ice sheet could increase basal melting and thereby trigger ice streaming, by providing the water for a lubricating basal layer of till on which ice streams are thought to slide. Ice streams act to protect the reservoir of slowly moving inland ice from exposure to oceanic degradation, thus enhancing ice-sheet stability. Presented here is aerogeophysical evidence for active volcanism and associated elevated heat flow beneath the WAIS near the critical region where ice streaming begins. If this heat flow is indeed controlling ice-stream formation, then penetration of ocean waters inland of the thin hot crust of the active portion of the West Antarctic rift system could lead to the disappearance of ice streams, and possibly trigger a collapse of the inland ice reservoir. (Auth.)

47-1942
Recent changes of Arctic tundra ecosystems from a net carbon dioxide sink to a source.
Oechel, W.C., et al, *Nature*, Feb. 11, 1993, 361(6412), p.520-523, 36 refs.
Carbon dioxide, Tundra, Heat flux, Cryogenic soils.

47-1943
Physiological responses of a small antarctic diatom *(Chaetoceros* sp.) to simulated environmental constraints associated with sea-ice formation.
Gleitz, M., et al, *Marine ecology progress series*, Nov. 1992, 88(2/3), p.271-278, 38 refs.
Thomas, D.N.
Plankton, Temperature effects, Physiological effects, Sea ice, Ice formation.
The physiological responses of a small unicellular *Chaetoceros* species, isolated from the Weddell Sea, to changes in temperature, salinity and irradiance simulating those that occur during new-ice formation were investigated. The combination of increased salinity, increased quantum irradiance and decreased temperature significantly reduced growth and photosynthetic rates compared to the control, although cellular metabolism was not inhibited. The cells retained the capacity to photoacclimate, which was observed in the variations in cellular chlorophyll a concentrations and carbon allocation patterns. In terms of photosynthesis, a doubling of quantum irradiance apparently compensated for the adverse effects of increased salinity and lowered temperature. It is thus hypothesized that at least some species of the late season phytoplankton population survive incorporation into ice and continue to photosynthesize and grow under the extreme conditions encountered during sea-ice formation. This potentially prolongs the antarctic vegetation period well into late austral autumn and winter, enhancing the total primary production available for higher trophic levels. (Auth.)

47-1944
How unstable is the west antarctic ice sheet.
Frolich, R.M., *Physics world*, Nov. 1992, 5(11), p.21-22, 1 ref.
Glacier flow, Glacier beds, Models.
The author critiques a numerical model developed by D. MacAyeal which incorporates the interaction of a glacier with its bed to predict glacier movement. The critique rests on these major points. The MacAyeal model restricts the modelling to where the ice sheet bed is far below sea level and drainage is almost entirely through ice streams, and cannot resolve ice streams individually. The model requires 50,000 years to reach a steady state, and when it uses simplified surface-temperature and sea level variations through ten glacial cycles, the model ice sheet never reaches a steady state and completely collapses. MacAyeal's new claim is that the potential for collapse depends on the present distribution of sub-glacial till which is itself poorly known. For the MacAyeal paper being critiqued see 47-352 (20F-47003).

47-1945
Nevada takes close look at CMA efficacy.
Nelson, R.J., *Roads and bridges*, June 1992, 30(6), p.32-34.
Snow removal, Chemical ice prevention, United States—Nevada.

47-1946
Icy prospects for a warmer world.
Davidson, G., *New scientist*, Aug. 8, 1992, No.1833, p.23-26.
Climatology, Sea level, Ice sheets, Ablation.
The processes involved with ice sheets growing and ablating as global warming occurs are reviewed; the physical processes attending, and models used to predict, sea level rises are examined; and the pros and cons of possible rapid sea level rises are considered. It is concluded that rapid sea level rises are unlikely but that if temperatures increase by more than 5C the melting of ice sheets in both polar regions would occur and sea level rises would inevitably follow.

47-1947
Measurement and modelling of cloudwater deposition to a snow-covered forest canopy.
Gallagher, M.W., et al, *Atmospheric environment*, Nov. 1992, 26A(16), p.2893-2903, 23 refs.
Beswick, K.M., Choularton, T.W.
Forest canopy, Precipitation (meteorology), Cloud droplets, Snow cover effect, Turbulent exchange, Cloud cover, Mass transfer, Environmental impact.

47-1948
Determinations of methyl iodide in the antarctic atmosphere and the south polar sea.
Reifenhäuser, W., et al, *Atmospheric environment*, Nov. 1992, 26A(16), p.2905-2912, 27 refs.
Heumann, K.G.
Polar atmospheres, Hydrocarbons, Marine atmospheres, Marine biology, Sea water, Chemical composition, Atmospheric composition, Ozone, Environmental impact, Sampling.
Methyl iodide (CH_3I) concentrations were determined in the atmosphere and in surface sea water near the Antarctic Peninsula with a gas chromatographic/electron capture detector system during Oct.-Dec. 1987. The mean air concentration of methyl iodide was 2.4 pptv with a corresponding seawater concentration of 2.6 ng/l. In addition, chloroiodomethane (CH_2ClI) was detected in some of the seawater samples as a second volatile organoiodine species. No relationship between methyl iodide and biogenic brominated methanes was found. From this it follows that methyl iodide has a different pathway of biogenic production in marine organisms than the brominated methanes. Based on a two-phase model, a global sea-to-air flux for methyl iodide of 80 billion g/yr was calculated. This is important for the balance of the global biogeochemical iodine cycle, assuming that methyl iodide is by far the dominant volatile organoiodine species in the environment. (Auth. mod.)

47-1949
Thermodynamics of pollutant removal as an indicator of possible source areas for arctic haze.
Bowling, S.A., et al, *Atmospheric environment*, Nov. 1992, 26A(12), p.2953-2961, 22 refs.
Shaw, G.E.
Polar atmospheres, Precipitation (meteorology), Air pollution, Haze, Atmospheric physics, Thermodynamics, Scavenging, Humidity, Ice crystals.

47-1950
State of water in acclimating vegetative buds from *Malus* and *Amelanchier* and its relationship to winter hardiness.
Vertucci, C.W., et al, *Physiologia plantarum*, Dec. 1992, 86(4), p.503-511, 37 refs.
Stushnoff, C.
Plant physiology, Supercooling, Plant tissues, Freezing, Cold tolerance, Unfrozen water content, Desiccation, Cold weather survival, Trees (plants), Temperature effects.

47-1951
Carbonate isotopic composition of the loess-paleosol sequence and its implication of paleoclimatic change.
Gu, Z.Y., *Chinese science bulletin*, Dec. 1991, 36(23), p.1979-1983, 19 refs.
Paleoclimatology, Soil analysis, Climatic changes, Soil chemistry, Loess, Isotope analysis, Oxygen isotopes, Carbon isotopes.

47-1952
Experimental study of the influence of mixing silt on ice creep.
Li, G., et al, *Chinese science bulletin*, Nov. 1992, 37(21), p.1827-1830, 3 refs.
Wang, M.H., Huang, M.H., Wang, W.T.
Ice creep, Glacier ice, Ice composition, Sediments, Strain tests, Glacier flow, Ice deformation, Shear strain.

47-1953
Temperature evolution of porous ice samples covered by a dust mantle.
Kömle, N.I., et al, *Icarus*, Apr. 1992, 96(2), p.204-212, 21 refs.
Steiner, G.
Extraterrestrial ice, Porous materials, Dust, Ice solid interface, Ice temperature, Vapor diffusion, Thermal conductivity, Temperature variations, Permeability, Mathematical models.

47-1954
Nordic Hydrological Conference 1992.
Nordisk hydrologisk konferanse, Alta, Norway, Aug. 4-6, 1992, Nordisk Hydrologisk Forening (Nordic Association for Hydrology). Nordisk Hydrologisk Program (Nordic Hydrological Programme). NHP rapport, No.30, Oslo, 1992, 757p., In Norwegian and English. Refs. passim. For selected papers see 47-1955 through 47-1985.
Östrem, G., ed.
Snowmelt, Runoff forecasting, Flood forecasting, Climatic changes, Glacial rivers, Meltwater, Snow hydrology, Snow surveys, Glacier surveys, Economic development.

47-1955
Climate change and energy production: status and plans. [Klimaendringer og energirproduksjon: status og planer].
Saelthun, N.R., Nordisk hydrologisk konferanse (Nordic Hydrological Conference), Alta, Norway, Aug. 4-6, 1992. Edited by G. Östrem, Oslo, 1992, p.37-46, In Norwegian with English abstract. 5 refs.
Climatic changes, Electric power, Economic development, Runoff forecasting, Climatic factors, Meltwater, Snowmelt, Water reserves.

47-1956
Frequency of extremes and its relation to climate fluctuations.
Krasovskaia, I., et al, Nordisk hydrologisk konferanse (Nordic Hydrological Conference), Alta, Norway, Aug. 4-6, 1992. Edited by G. Östrem, Oslo, 1992, p.47-58, 7 refs.
Gottschalk, L.
Climatic changes, Flood forecasting, Climatic factors, Records (extremes), Statistical analysis.

47-1957
Floods in Sweden—occurrence and trends.
Lindström, G., Nordisk hydrologisk konferanse (Nordic Hydrological Conference), Alta, Norway, Aug. 4-6, 1992. Edited by G. Östrem, Oslo, 1992, p.65-74, 6 refs.
Climatic changes, Flood forecasting, Snowmelt, Runoff forecasting, Statistical analysis, Sweden.

47-1958
Hydrological modeling of extreme floods in Sweden. [Hydrologisk modellering av extrema flöden i Sverige].
Harlin, J., Nordisk hydrologisk konferanse (Nordic Hydrological Conference), Alta, Norway, Aug. 4-6, 1992. Edited by G. Östrem, Oslo, 1992, p.107-117, In Swedish with English summary. 7 refs.
Flood forecasting, Runoff forecasting, Snowmelt, Records (extremes), Computerized simulation, Statistical analysis, Sweden.

47-1959
Measurement and simulation of runoff from long-term rains and snowmelt. Study site: Risvollan in Trondheim. [Malt og simulert avrenning fra langtidsnedbör og snösmelting. Studieomrade: Risvollan i Trondheim].
Thorolfsson, S.T., et al, Nordisk hydrologisk konferanse (Nordic Hydrological Conference), Alta, Norway, Aug. 4-6, 1992. Edited by G. Östrem, Oslo, 1992, p.127-135, In Norwegian with English summary. 6 refs.
Högeli, S.
Runoff forecasting, Snowmelt, Rain, Computerized simulation, Norway.

47-1960
Design events in urban and suburban areas in coastal Norway. Basis for model modification. [Dimensjonerende hendelser i urbane og delvis urbane omrader i kyst-Norge. Grunnlag for modelltilpasning].
Thorolfsson, S.T., Nordisk hydrologisk konferanse (Nordic Hydrological Conference), Alta, Norway, Aug. 4-6, 1992. Edited by G. Östrem, Oslo, 1992, p.154-161, In Norwegian with English summary. 9 refs.
Runoff forecasting, Snowmelt, Norway.

47-1961
Use of a digital terrain model in snowmelt modeling. [Bruk av en digital terrengmodell i snösmeltemodeller].
Kolberg, S., Nordisk hydrologisk konferanse (Nordic Hydrological Conference), Alta, Norway, Aug. 4-6, 1992. Edited by G. Östrem, Oslo, 1992, p.196-203, In Norwegian with English summary. 11 refs.
Runoff forecasting, Snowmelt, Snow hydrology, Topographic effects, Norway.

47-1962
Monitoring and modelling snow storage in Swedish mountain basins.
Brandt, M., Nordisk hydrologisk konferanse (Nordic Hydrological Conference), Alta, Norway, Aug. 4-6, 1992. Edited by G. Östrem, Oslo, 1992, p.204-210, 4 refs.
Runoff forecasting, Snowmelt, Snow surveys, Snow water equivalent, Snow retention, Snow hydrology, Watersheds, Flood forecasting, Sweden.

47-1963
Snowmelt degree-day values for HBV-model in Finland.
Vehviläinen, B., Nordisk hydrologisk konferanse (Nordic Hydrological Conference), Alta, Norway, Aug. 4-6, 1992. Edited by G. Östrem, Oslo, 1992, p.211-220, 3 refs.
Runoff forecasting, Snowmelt, Degree days, Snow surveys, Snow hydrology, Watersheds, Finland.

47-1964
Electrical conductivity in soil solution of frozen and unfrozen soils measured by time domain reflectometry.
Lundin, L.C., et al, Nordisk hydrologisk konferanse (Nordic Hydrological Conference), Alta, Norway, Aug. 4-6, 1992. Edited by G. Östrem, Oslo, 1992, p.241-250, 19 refs.
Johnsson, H.
Soil water, Unfrozen water content, Soil freezing, Frozen ground thermodynamics, Moisture detection, Electrical resistivity, Mathematical models.

47-1965
Vertically distributed soil moisture simulations.
Sandén, P., et al, Nordisk hydrologisk konferanse (Nordic Hydrological Conference), Alta, Norway, Aug. 4-6, 1992. Edited by G. Östrem, Oslo, 1992, p.251-264, 25 refs.
Gardelin, M., Espeby, B.
Soil water migration, Soil pollution, Snowmelt, Snow hydrology, Soil chemistry, Leaching, Seepage, Computerized simulation.

47-1966
Simple soil temperature model.
Sandén, P., Nordisk hydrologisk konferanse (Nordic Hydrological Conference), Alta, Norway, Aug. 4-6, 1992. Edited by G. Östrem, Oslo, 1992, p.296-301, 6 refs.
Soil temperature, Soil air interface, Soil water migration, Soil pollution, Soil chemistry, Snowmelt, Snow water equivalent, Leaching, Seepage, Mathematical models.

47-1967
Significance of groundwater levels for discharge peak flows.
Lundin, L.C., Nordisk hydrologisk konferanse (Nordic Hydrological Conference), Alta, Norway, Aug. 4-6, 1992. Edited by G. Östrem, Oslo, 1992, p.316-323, 15 refs.
Ground water, Flood forecasting, Snowmelt, Runoff, Water table, Forest land, Sweden.

47-1968
Phosphorus in runoff from soil erosion areas. Phosphorus adsorbed by inorganic silt particles in fluvial sediment transport. [Fosfor i avrenning fra jorderosjonsomrader. Fosfor adsorbert til uorganiske finpartikler i fluvial sedimenttransport].
Brynildsen, A., Nordisk hydrologisk konferanse (Nordic Hydrological Conference), Alta, Norway, Aug. 4-6, 1992. Edited by G. Östrem, Oslo, 1992, p.346-353, In Norwegian with English summary. 5 refs.
Soil erosion, Water pollution, Snowmelt, Snow impurities, Runoff, Water chemistry, Sediment transport, Norway.

47-1969
Studies of some acid springs in till, Lofsdalen, Sweden.
Knutsson, G., Nordisk hydrologisk konferanse (Nordic Hydrological Conference), Alta, Norway, Aug. 4-6, 1992. Edited by G. Östrem, Oslo, 1992, p.366-375, 13 refs.
Moraines, Springs (water), Water chemistry, Water pollution, Snowmelt, Snow impurities, Runoff, Soil chemistry, Ground water, Sweden.

47-1970
Flood control on the middle reaches of the River Iijoki.
Ottavainen, P., et al, Nordisk hydrologisk konferanse (Nordic Hydrological Conference), Alta, Norway, Aug. 4-6, 1992. Edited by G. Östrem, Oslo, 1992, p.431-442, 4 refs.
Alatalo, H., Hooli, J.
Flood control, Flood forecasting, Flow control, Ice breakup, Water retention, Dredging, Cost analysis, Finland.

47-1971
Flood control in Luleälven. Sensitivity analysis of new Swedish guidelines. [Flödesdimensionering i Luleälven. Känslighetsanalys av de nya svenska riktlinjerna].
Brandesten, C.O., Nordisk hydrologisk konferanse (Nordic Hydrological Conference), Alta, Norway, Aug. 4-6, 1992. Edited by G. Östrem, Oslo, 1992, p.443-452, In Swedish with English summary. 3 refs.
Flood control, Flood forecasting, Snow depth, Runoff forecasting, Spillways, Sweden.

47-1972
Flood forecasting and snow mapping by satellite. [Flomvarsling og snökartlegging med satellitt].
Lundquist, D., et al, Nordisk hydrologisk konferanse (Nordic Hydrological Conference), Alta, Norway, Aug. 4-6, 1992. Edited by G. Östrem, Oslo, 1992, p.453-459, In Norwegian with English summary. 15 refs.
Krokli, B.
Flood forecasting, Snow surveys, Snow cover distribution, Snow water equivalent, Snow hydrology, Spaceborne photography, Norway.

47-1973
Effects of Alta's development on ice conditions. [Virkninger av Altautbyggingen pa isforholdene].
Asvall, R.P., Nordisk hydrologisk konferanse (Nordic Hydrological Conference), Alta, Norway, Aug. 4-6, 1992. Edited by G. Östrem, Oslo, 1992, p.469-478, In Norwegian with English summary.
River ice, Ice conditions, Economic development, Environmental impact, Electric power, Norway.

47-1974
Effect of water course regulation on the local climate. [Verknad av vassdragsregulering pa lokalklimaet].
Nordli, P.Ö., Nordisk hydrologisk konferanse (Nordic Hydrological Conference), Alta, Norway, Aug. 4-6, 1992. Edited by G. Östrem, Oslo, 1992, p.497-505, In Norwegian with English summary. 12 refs.
Air temperature, Air ice water interaction, Economic development, Environmental impact, Electric power, Flow control, Norway.

47-1975
Geomorphological changes in the Fortun River: an assessment of the impact of the altered fluvial processes after river regulation for hydropower.
Fergus, T., Nordisk hydrologisk konferanse (Nordic Hydrological Conference), Alta, Norway, Aug. 4-6, 1992. Edited by G. Östrem, Oslo, 1992, p.506-514, 17 refs.
River flow, Runoff forecasting, Snowmelt, Meltwater, Economic development, Environmental impact, Electric power, Flow control, Sediment transport, Norway.

47-1976
Ice reduction of winter discharges.
Leppäjärvi, R., Nordisk hydrologisk konferanse (Nordic Hydrological Conference), Alta, Norway, Aug. 4-6, 1992. Edited by G. Östrem, Oslo, 1992, p.563-567, 2 refs.
Runoff forecasting, River ice, Flood forecasting, River flow, Ice cover effect, Finland.

47-1977
On the choice of threshold levels in partial duration series.
Rosbjerg, D., et al, Nordisk hydrologisk konferanse (Nordic Hydrological Conference), Alta, Norway, Aug. 4-6, 1992. Edited by G. Östrem, Oslo, 1992, p.604-615, 21 refs.
Madsen, H.
Flood forecasting, River flow, Meltwater, Glacial rivers, Statistical analysis, Norway.

47-1978
KOFOT—a practical tool for comparative analysis and extension of runoff series.
Hisdal, H., et al, Nordisk hydrologisk konferanse (Nordic Hydrological Conference), Alta, Norway, Aug. 4-6, 1992. Edited by G. Östrem, Oslo, 1992, p.622-631, 16 refs.
Olaussen, E.
Runoff forecasting, River flow, Stream flow, Meltwater, Glacial rivers, Statistical analysis, Norway.

47-1979
Landsat Thematic Mapper (TM) derived reflectance from a mountainous watershed during the snow melt season.
Winther, J.G., Nordisk hydrologisk konferanse (Nordic Hydrological Conference), Alta, Norway, Aug. 4-6, 1992. Edited by G. Östrem, Oslo, 1992, p.632-642, 13 refs.
Runoff forecasting, Snow surveys, Snow cover distribution, Albedo, Alpine landscapes, Watersheds, Photointerpretation, Spaceborne photography.

47-1980
Glacier hydrology in a changing climate.
Jóhannesson, T., et al, Nordisk hydrologisk konferanse (Nordic Hydrological Conference), Alta, Norway, Aug. 4-6, 1992. Edited by G. Östrem, Oslo, 1992, p.683-692, 18 refs.
Sigurdsson, O.
Glacier oscillation, Glacier surveys, Glacial hydrology, Glacial rivers, Glacier mass balance, Global warming.

47-1981
Polar hydrology: Norwegian hydrological research activities in Svalbard. [Polar hydrologi: Norsk hydrologisk forskningsaktivitet pa Svalbard].
Sand, K., et al, Nordisk hydrologisk konferanse (Nordic Hydrological Conference), Alta, Norway, Aug. 4-6, 1992. Edited by G. Östrem, Oslo, 1992, p.693-702, In Norwegian with English summary. 8 refs.
Winther, J.G.
Research projects, Water reserves, Water balance, Permafrost hydrology, Glacial hydrology, Norway—Svalbard.

47-1982
Variations of climate and glacier mass balance, Svartisen, Norway.
Theakstone, W.H., et al, Nordisk hydrologisk konferanse (Nordic Hydrological Conference), Alta, Norway, Aug. 4-6, 1992. Edited by G. Östrem, Oslo, 1992, p.703-710, 23 refs.
Knudsen, N.T.
Glacier oscillation, Glacier surveys, Glacier mass balance, Climatic changes, Climatic factors, Norway.

47-1983
Establishment of gauging stations under arctic conditions—the Svalbard experience.
Skretteberg, R., Nordisk hydrologisk konferanse (Nordic Hydrological Conference), Alta, Norway, Aug. 4-6, 1992. Edited by G. Östrem, Oslo, 1992, p.711-717.
Runoff, Stream flow, Flow measurement, Water reserves, Water balance, Permafrost hydrology, Glacial rivers, Norway—Svalbard.

47-1984
Time series analyses of radiation, temperature and discharge at Austre Okstindbreen, Nordland, Norway.
Knudsen, N.T., et al, Nordisk hydrologisk konferanse (Nordic Hydrological Conference), Alta, Norway, Aug. 4-6, 1992. Edited by G. Östrem, Oslo, 1992, p.718-727, 9 refs.
Jensen, L.
Glacier surveys, Glacial hydrology, Meltwater, Glacial rivers, Glacial lakes, Subglacial drainage, Norway.

47-1985
Volumetric changes at the East Svartisen ice cap during 1945-85.
Knudsen, N.T., et al, Nordisk hydrologisk konferanse (Nordic Hydrological Conference), Alta, Norway, Aug. 4-6, 1992. Edited by G. Östrem, Oslo, 1992, p.728-735, 9 refs.
Theakstone, W.H., Bendixen, O.
Glacier oscillation, Glacier surveys, Glacier mass balance, Climatic changes, Climatic factors, Norway.

47-1986
Problems of optimization in avalanche studies. [Zadachi optimizatsii v lavinovedeniĭ].
Bozhinskiĭ, A.N., *Moscow. Universitet. Vestnik. Seriia 5: Geografiia*, Sep.-Oct. 1990, No.5, p.38-43, In Russian. 5 refs.
Avalanche mechanics, Countermeasures, Cost analysis, Analysis (mathematics).

47-1987
Chemical analysis of snow cover as an indicator of contamination in the Kola Peninsula. [Khimicheskiĭ sostav snezhnogo pokrova kak pokazatel' zagriazneniia na Kol'skom poluostrove].
Boltenko, E.L., et al, *Moscow. Universitet. Vestnik. Seriia 5: Geografiia*, Sep.-Oct. 1991, No.5, p.60-64, In Russian. 9 refs.
Evseev, A.V., Korzun, A.V., Sukhova, T.G.
Snow impurities, Snow cover, Snow composition, Metals, Pollution, USSR—Kola Peninsula.

47-1988
Structure and genesis of layered ground ice in Western Siberia. [Stroenie i genezis plastovykh l'dov Zapadnoĭ Sibiri].
Shpolianskaia, N.A., *Moscow. Universitet. Vestnik. Seriia 5: Geografiia*, Sep.-Oct. 1991, No.5, p.73-83, In Russian. 18 refs.
Ground ice, Layers, Ice structure, Ice formation, USSR—Siberia.

47-1989
Characteristics of the formation of the cryogenic structure of the upper layer of permafrost in the southern Gydan Peninsula. [Osobennosti formirovaniia kriogennogo stroeniia verkhnego gorizonta vechnoĭ merzloty na iuge p-ova Gydan].
Konstantinov, S.A., *Moscow. Universitet. Vestnik. Seriia 5: Geografiia*, July-Aug. 1991, No.4, p.48-53, In Russian. 14 refs.
Permafrost structure, Cryogenic structures, Active layer, USSR—Gydan Peninsula.

47-1990
Avalanche risk: classification and control. [Lavinnyĭ risk: klassifikatsiia i upravlenie].
Andreev, IU.B., et al, *Moscow. Universitet. Vestnik. Seriia 5: Geografiia*, Mar.-Apr. 1992, No.2, p.29-35, In Russian with English summary. 8 refs.
Bozhinskiĭ, A.N., Ushakova, L.A.
Avalanche forecasting, Avalanche formation.

47-1991
Study of the distribution of snow cover in the central forest-steppe. [Izuchenie raspredeleniia snezhnogo pokrova v tsentral'noĭ lesostepi].
Kitaev, L.M., *Akademiia nauk SSSR. Izvestiia. Seriia geograficheskaia*, Jan.-Feb. 1992, No.1, p.64-68, In Russian. 4 refs.
Snow cover distribution, Steppes, Water balance.

47-1992
Sea level variations during ice-covered periods in the Baltic Sea.
Omstedt, A., et al, *Geophysica*, 1991, 27(1-2), p.41-61, 16 refs.
Nyberg, L.
Sea level, Sea ice, Ice cover effect, Air ice water interaction, Ice conditions, Analysis (mathematics), Seasonal variations, Internal friction, Classifications.

47-1993
Applications of ground-penetrating radar in Quaternary geology. [Beispiele zur Anwendung von Georadar in der Quartärgeologie].
Grasmück, M.P., *Eclogae geologicae Helvetiae*, 1992, 85(2), p.471-490, In German with English summary. 17 refs.
Geophysical surveys, Quaternary deposits, Subsurface investigations, Radar echoes, Glacial deposits, Performance, Profiles, Hydrogeology.

47-1994
Comments on "An arctic hurricane over the Bering Sea".
Reed, R.J., et al, *Monthly weather review*, Nov. 1992, 120(11), p.2713-2715, 12 refs. Includes reply. For article under discussion see 46-1610.
Businger, S.
Marine meteorology, Atmospheric disturbances, Terminology, Accuracy.

47-1995
Foundations for statistical-physical precipitation retrieval from passive microwave satellite measurements. Part 2: emission-source and generalized weighting-function properties of a time-dependent cloud-radiation model.
Mugnai, A., et al, *Journal of applied meteorology*, Jan. 1993, 32(1), p.17-39, 24 refs.
Smith, E.A., Tripoli, G.J.
Precipitation (meteorology), Microwaves, Radiation balance, Cloud physics, Radiometry, Brightness, Ice crystal optics, Scattering, Mathematical models, Statistical analysis, Upwelling.

47-1996
Guard against freezing in water lines.
Kenny, T.M., *Chemical engineering progress*, Sep. 1991, 87(9), p.44-47.
Water pipelines, Pipeline freezing, Protection, Valves, Temperature control, Drainage, Design, Temperature variations, Performance.

47-1997
Low-temperature viscosity characteristics of synthetic aviation oils.
Echin, A.I., et al, *Chemistry and technology of fuels and oils*, Jan. 1993, 28(5-6), p.337-341, Translated from Khimiia i tekhnologiia topliv i masel, 1992, No.6. 4 refs.
Zakunin, V.N., Tarannikova, T.N.
Aircraft, Lubricants, Synthetic materials, Low temperature tests, Cold weather performance, Viscosity, Temperature effects, Physical properties.

47-1998
Computationally efficient approximations to stratiform cloud microphysics parameterization.
Ghan, S.J., et al, *Monthly weather review*, Aug. 1992, 120(8), p.1572-1582, 26 refs.
Easter, R.C.
Cloud cover, Cloud physics, Heat balance, Climatic factors, Precipitation (meteorology), Snow pellets, Ice water interface, Mathematical models, Water content, Ice melting, Phase transformations.

47-1999
On the accuracy of lichenometric dates: an assessment based on "Little Ice Age" moraine sequence of Nigardsbreen, southern Norway.
Bickerton, R.W., et al, *Holocene*, 1992, 2(3), p.227-237, 60 refs.
Matthews, J.A.
Glacial deposits, Moraines, Age determination, Lichens, Glacier oscillation, Accuracy, Arctic landscapes.

47-2000
Mid-Holocene glacial activity in the Pyrenees.
Gellatly, A.F., et al, *Holocene*, 1992, 2(3), p.266-270, 10 refs.
Grove, J.M., Switsur, V.R.
Glacier oscillation, Glacial deposits, Radioactive age determination, Moraines, Glacial geology.

47-2001
On: "An analytical study of a two-layer transient thermal conduction problem as applied to soil temperature surveys" by T.H. Larson and A.T. Hsui.
Lunardini, V.J., et al, *Geophysics*, Dec. 1992, 57(12), MP 3210, p.1644-1645, 4 refs. For paper under discussion see 46-4484.
Larson, T.H., Hsui, A.T.
Soil temperature, Thermal conductivity, Heat capacity, Accuracy, Permafrost heat transfer, Analysis (mathematics).

47-2002
Reuse of converted asphalt in asphalt binders and asphalt deck layers—examination of long-term reactions. [Wiederverwendung von Ausbauasphalt in Asphaltbinder- und Asphaltdeckschichten—Untersuchungen zum Langzeitverhalten],
Charif, K., *Bitumen*, 1992, 54(3), p.97-104, In German. 7 refs.
Bitumens, Pavements, Physical properties, Temperature effects, Cold weather performance.

47-2003
Polymer-modified asphalts—international research results on possible modifications and properties. [Polymermodifizierte Asphalte—Internationale Forschungsergebnisse über Modifizierungsmöglichkeiten und Eigenschaften],
Schneider, U., *Bitumen*, 1992, 54(1), p.14-20, In German. 8 refs.
Bitumens, Physical properties, Admixtures, Polymers, Design criteria, Cold weather performance, Pavements.

47-2004
Major hydrocarbon structures in Barents Sea, Kara Sea regions. *Offshore*, Jan. 1993, 53(1), p.34-35.
Petroleum industry, Offshore drilling, Exploration, Hydrocarbons, Geologic structures.

47-2005
Black carbon concentration in Byrd Station ice core: from 13,000 to 700 years before present.
Chýlek, P., et al, *Annales geophysicae*, Aug. 1992, 10(8), p.625-629, 28 refs.
Johnson, B., Wu, H.
Ice sheets, Ice cores, Paleoclimatology, Carbon black, Aerosols, Climatic changes, Biomass, Forest fires, Sampling, Periodic variations, Antarctica—Byrd Station.
In this paper, data concerning the concentration of black carbon in 22 ice core samples from Byrd Station (West Antarctica) covering the time period from about 13,000 to 700 years before present are presented. For the first time, black carbon concentrations were obtained in an ice core which included a part of the last climatic transition. An average black carbon concentration of 0.1 microgram/kg was found to pertain to the Wisconsin-Holocene climatic transition. After the transition the black carbon concentration in the ice core oscillated between 0.1 and 0.95 microgram/kg, with an average concentration of 0.5 microgram/kg. The increase in black carbon concentration occurred several hundred years after changes in *delta*O-18, CO2 and CH4 characterizing the end of the last (Wisconsin) ice age. It is suggested that expansion of the land biomass during the early Holocene was responsible for the observed increase of black carbon concentration in the Byrd Station ice core. (Auth. mod.)

47-2006
Acoustic sounder experimentation in Victoria Land, Antarctica.
Fiocco, G., et al, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settori fisica dell'atmosfera e cosmofisica. Raccolta pubblicazioni gennaio 1986-luglio 1991, Vol.2. (Antarctic Project: physics of the atmosphere and cosmophysics. Collection of publications Jan. 1986-July 1991, Vol.2), Rome, ENEA, [1991], p.119-133, Reprinted from proceedings of the 5th International Symposium on Acoustic Remote Sensing, New Delhi (India), Feb. 6-9, 1990, 15p. 8 refs.
Mastrantonio, G., Ocone, R., Argentini, S.
Meteorological instruments, Wind (meteorology), Acoustic measurement, Ice sheets, Antarctica—Terra Nova Bay, Antarctica—Nansen Ice Sheet.
In the 1987-88 summer a 3 axis sodar with 1.2 m diameter antennas was installed at Terra Nova Bay for a duration of approximately 40 days. During the 1988-89 campaign, the sodar was deployed on the Nansen Ice Sheet and ran uninterruptedly for about 40 days. All systems deployed had a Doppler capability. There are significant differences between the measurements carried out at the two locations. The main features observed at Terra Nova Bay were the frequent presence of strong convection and episodes of sustained subsidence. The convective activity, with sometimes large values of vertical velocity, is related to the extensive deglaciation and to the large amounts of heat absorbed at the ground. Starting with the second campaign, a complete and continuous description of the three-dimensional wind field was obtained; several katabatic wind episodes have been recorded. Strong signals associated with large negative values of the vertical velocities were occasionally observed during snowstorms and attributed to precipitating graupel. (Auth. mod.)

47-2007
Measurements of climatic parameters and ground-level ozone at Terra Nova Bay in Antarctica.
Giovanelli, G., et al, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settori fisica dell'atmosfera e cosmofisica. Raccolta pubblicazioni gennaio 1986-luglio 1991, Vol.2. (Antarctic Project: physics of the atmosphere and cosmophysics. Collection of publications Jan. 1986-July 1991, Vol.2), Rome, ENEA, [1991], p.483-495, Reprinted from Il Nuovo cimento, Jan.-Feb. 1991, 14C(1), p.1-13. 14 refs.
Ozone, Meteorological data, Antarctica—Terra Nova Bay Station.
The results of local meteorology, solar radiation and ground-level ozone measurements taken in Dec. '86-Feb. '87 at Terra Nova Bay are presented. The site of the Italian base camp is characterized by a thin strip of deglaciated ground, along which the temperature measurements close to the ground and up to 6 m high show a strongly superdiabatic profile. This irregular trend of the temperature in the surface layer is mainly due to the high incoming levels of radiation and to the extreme transparency of the atmosphere. This is also shown by the low values of the ratio between total radiation and diffuse radiation. The ground is thus subjected to intense heating, especially in the warmer hours of the day, while the surface layer of the atmosphere is characterized by strong upward heat fluxes and by turbulent convective movements. Vertical temperature profile measurements show an almost forced persistence in the superdiabatic trend, which tends towards isothermic values only as a result of rapid variations in the direction and intensity of the wind, connected to the downward flux of cold air masses, shown also by the simultaneous increases in ground-level ozone concentrations. (Auth. mod.)

47-2008
Cryogenic systems of some gold-quartz deposits. [Kriogennye sistemy nekotorykh zoloto-kvartsevykh mestorozhdeniĭ],
Taĭsaev, T.T., *Akademiia nauk SSSR. Doklady*, 1991, 317(2), p.440-443, In Russian. 15 refs.
Geochemistry, Geocryology, Gold.

47-2009
Determining the mean parameters of heat transfer through snow cover. [K opredeleniiu osrednennykh kharakteristik teploperedachi cherez snezhnyĭ pokrov],
Zviagin, V.V., et al, *Akademiia nauk SSSR. Doklady*, 1991, 316(5), p.1085-1088, In Russian. 1 ref.
Shreĭber, I.R.
Heat transfer coefficient, Analysis (mathematics), Snow cover, Snow thermal properties.

47-2010
Winter ice on the German coast between the Ems and Oder Rivers, 1991/92. [Der Eiswinter 1991/92 im deutschen Küstengebiet zwischen Ems und Oder],
Koslowski, G., *Deutsche hydrographische Zeitschrift*, 1991-92, 44(3), p.153-155, In German. 4 refs.
Shores, Sea ice distribution, Ice cover thickness, Seasonal variations, Air temperature.

47-2011
Characterization of different ice habits according to nucleation processes in the electrolyte LiCl-RH2O ($6<R<9$).
Fornazero, J., et al, *Journal of non-crystalline solids*, Nov. 11, 1992, 150(1-3), International Conference on the Structure of Non-Crystalline Materials, 5th, Sendai, Japan, Sep. 2-6, 1991, Proceedings. Edited by K. Suzuki et al, p.413-418, 11 refs.
El Hachadi, A., Dupuy-Philon, J.
Solutions, Supercooling, Ice formation, Heterogeneous nucleation, Ice physics, Light scattering, Ice water interface, Low temperature research.

47-2012
Report on field work in Svalbard. [Rapport fra feltarbeid pa Svalbard],
Bruland, O., Norwegian Institute of Technology. Division of Hydraulic & Sanitary Engineering, University of Trondheim, 1992, 11p., In Norwegian.
Arctic landscapes, Permafrost hydrology, Active layer, Water balance, Snow retention.

47-2013
Water balance study in Svalbard—inspection of various forms of snow erosion, June 5-10, 1991. [Vassbalansestudie pa Svalbard synfaring, diverse montasje og snömaling—05-10.06.91],
Frisvold, H., et al, Norwegian Institute of Hydrology. Division of Hydraulic & Sanitary Engineering, University of Trondheim, 1991, 16p., In Norwegian.
Tveit, J.
Arctic landscapes, Snow cover distribution, Measurement, Water balance, Hydrology.

47-2014
Low-temperature scanning electron microscopy study of ice cream. 1. Techniques and general microstructure.
Caldwell, K.B., et al, *Food structure*, 1992, 11(1), p.1-9, Includes discussion. 23 refs.
Goff, H.D., Stanley, D.W.
Colloids, Frozen liquids, Scanning electron microscopy, Ice microstructure, Ice sublimation, Laboratory techniques, Low temperature research.

47-2015
Low-temperature scanning electron microscopy study of ice cream. 2. Influence of selected ingredients and processes.
Caldwell, K.B., et al, *Food structure*, 1992, 11(1), p.11-23, Includes discussion. 17 refs.
Goff, H.D., Stanley, D.W.
Frozen liquids, Colloids, Scanning electron microscopy, Ice microstructure, Freezing rate, Physical properties, Temperature effects, Storage.

47-2016
Lodgepole pine response to nitrogenous fertilizers applied on and off snow, and to associated damage by small mammals.
Marshall, V.G., et al, *Forest ecology and management*, Nov. 1992, 54(1-4), p.225-238, 34 refs.
Barclay, H.J., Hetherington, E.D.
Forestry, Trees (plants), Nutrient cycle, Snow cover effect, Growth, Forest ecosystems, Seasonal variations, Leaching.

47-2017
Impact of constituent ions of acid mist on assimilation and stomatal conductance of Norway spruce prior and post mid-winter freezing.
Eamus, D., et al, *Environmental pollution*, 1993, 79(2), p.135-142, 26 refs.
Murray, M.B.
Trees (plants), Transpiration, Frost resistance, Air pollution, Environmental tests, Environmental impact, Plant physiology, Temperature effects, Chemical properties, Vapor diffusion.

47-2018
Response of the Canadian permafrost environment to climatic change.
Woo, M.K., et al, *Physical geography*, Oct.-Dec. 1992, 13(4), p.287-317, Refs. p.311-317.
Lewkowicz, A.G., Rouse, W.R.
Global warming, Climatic changes, Permafrost transformation, Permafrost heat balance, Water balance, Periglacial processes, Temperature effects, Environmental impact.

47-2019
Influence of terrain on bedrock temperatures.
Lewis, T.J., et al, *Global and planetary change*, Dec. 1992, 6(2-4), p.87-100, 27 refs.
Wang, K.
Soil temperature, Boreholes, Geothermometry, Snow cover effect, Climatic changes, Topographic effects, Bedrock, Temperature variations, Paleoclimatology, Global change.

47-2020
Climatic changes in central and eastern Canada inferred from deep borehole temperature data.
Wang, K., et al, *Global and planetary change*, Dec. 1992, 6(2-4), p.129-141, 48 refs.
Lewis, T.J., Jessop, A.M.
Boreholes, Geothermometry, Climatic changes, Soil temperature, Surface temperature, Topographic effects, Global warming, Accuracy, Paleoclimatology.

47-2021
Paleoclimate change and heat flow density inferred from temperature data in the Superior Province of the Canadian Shield.
Shen, P.Y., et al, *Global and planetary change*, Dec. 1992, 6(2-4), p.143-165, Refs. p.163-165.
Beck, A.E.
Boreholes, Geothermometry, Climatic changes, Soil temperature, Surface temperature, Paleoclimatology, Temperature variations, Analysis (mathematics), Thermal conductivity.

47-2022
Ground temperature histories in eastern and central Canada from geothermal measurements: evidence of climatic change.
Beltrami, H., et al, *Global and planetary change*, Dec. 1992, 6(2-4), p.167-184, 43 refs.
Jessop, A.M., Mareschal, J.C.
Boreholes, Geothermometry, Soil temperature, Surface temperature, Paleoclimatology, Climatic changes, Temperature variations, Accuracy, Global warming.

47-2023
Surface-temperature history during the last 1000 years near Prudhoe Bay, Alaska: applying control theory to the inversion of borehole temperature profiles.
Kakuta, S., *Global and planetary change*, Dec. 1992, 6(2-4), p.225-244, 5 refs.
Boreholes, Paleoclimatology, Geothermometry, Soil temperature, Surface temperature, Permafrost heat balance, Correlation, Analysis (mathematics), Temperature variations.

47-2024
Reduced geothermal gradients in the shallow West-Siberian Platform.
Duchkov, A.D., et al, *Global and planetary change*, Dec. 1992, 6(2-4), p.245-250, 11 refs.
Deviatkin, V.N.
Permafrost transformation, Permafrost distribution, Temperature gradients, Climatic changes, Geothermometry, Soil temperature, Surface temperature, Boreholes, Temperature variations.

47-2025
Geothermal conditions for gas hydrate stability in the Beaufort-Mackenzie area: the global change aspect.
Judge, A.S., et al, *Global and planetary change*, Dec. 1992, 6(2-4), p.251-263, 49 refs.
Majorowicz, J.A.
Gas inclusions, Hydrates, Stability, Natural gas, Global warming, Geothermometry, Permafrost heat transfer, Temperature variations, Decomposition.

47-2026
Toward using borehole temperatures to calibrate an isotopic paleothermometer in central Greenland.
Cuffey, K.M., et al, *Global and planetary change*, Dec. 1992, 6(2-4), p.265-268, 11 refs.
Alley, R.B., Grootes, P.M., Anandakrishnan, S.
Boreholes, Temperature measurement, Ice temperature, Ice cores, Paleoclimatology, Oxygen isotopes, Surface temperature, Correlation, Temperature variations, Accuracy.

47-2027
Evidence for denitrification in the 1990 antarctic spring stratosphere: 1. Lidar and temperature measurements.
Gobbi, G.P., et al, *Geophysical research letters*, Nov. 1991, 18(11), p.1995-1998, 17 refs.
Deshler, T., Adriani, A., Hofmann, D.J.
Stratosphere, Clouds (meteorology), Water vapor, Lidar.
Lidar soundings of the lower stratosphere were made between Aug. 30 and Oct. 11, 1990, at McMurdo Station. Polar stratospheric clouds (PSCs) were observed in only two periods: between Sep. 5 and 10, and on Oct. 7. During these days McMurdo was well within the polar vortex, and temperatures in the lower stratosphere reached seasonal minima. Temperature soundings and two water vapor measurements were also made in the same period. The water vapor content between 11 and 20 km was found to be between 2 and 3 ppmv. Using these values for water vapor, condensation temperatures for water and nitric acid trihydrate were calculated and compared with the temperature measurements. Analysis of these comparisons, together with the lidar observations, indicated that PSCs appeared only when temperatures were below the threshold condensation point for an air mass containing approximately 1 ppbv nitric acid. This was observed from the beginning of measurements on Aug. 30, and suggests that the antarctic lower stratosphere was highly denitrified both at the end of winter and during the early spring of 1990. (Auth.)

47-2028
Ice record of greenhouse gases.
Raynaud, D., et al, *Science*, Feb. 12, 1993, 259(5097), p.926-934, Numerous refs.
Ice sheets, Gas inclusions, Ice cores, Climatic changes, Greenland, Antarctica—Vostok Station.
Gases trapped in polar ice provide the most direct record of the changes in greenhouse gas levels during the past 150,000 years. The best documented trace-gas records are for CO2 and CH4. Measurements corresponding to the industrial period document the recent changes in growth rate. The variability observed over the last 1000 years constrains the possible feedbacks of a climate change on the trace gases under similar conditions as exist today. Changes in the levels of greenhouse gases during the glacial-interglacial cycle overall are found to parallel, at least at high southern latitudes, changes in temperature; this relation suggests that greenhouse gases play an important role as an amplifier of the initial orbital forcing of Earth's climate, and also helps to assess the feedbacks on the biogeochemical cycles in a climate system in which the components are changing at different rates. (Auth.)

47-2029
Evaluating the possible application of pneumohydraulic equipment to lower water temperature at the Krasnoyarsk hydroelectric power plant outlet in winter. [K otsenke vozmozhnosti primeneniia pnevmogidravlicheskikh ustanovok dlia snizheniia temperatury vody na vykhode s Krasnoiarskoĭ GES v zimniĭ period]
Nazarov, I.I., *Izvestiia vysshikh uchebnykh zavedenii. Stroitel'stvo i arkhitektura*, Jan. 1991, No.1, p.77-80, In Russian. 6 refs.
Electric power, Cold weather operation, Water temperature, Ice cover effect, Reservoirs.

47-2030
Optimizing the composition of frost resistant concrete with a mixed filler. [Optimizatsiia sostava morozostoĭkogo betona so smeshannym zapolnitelem]
Osetinskiĭ, IU.V., et al, *Izvestiia vysshikh uchebnykh zavedenii. Stroitel'stvo i arkhitektura*, Feb. 1991, No.2, p.44-46, In Russian. 4 refs.
Saar, V.A., Podval'nyĭ, A.M.
Frost resistance, Concrete aggregates.

47-2031
Energy criterion for low temperature failure of asphalt concrete. [Energeticheskiĭ kriteriĭ nizkotemperaturnogo razrusheniia asfal'tobetona]
Gubach, L.S., et al, *Izvestiia vysshikh uchebnykh zavedenii. Stroitel'stvo*, Feb. 1992, No.2, p.50-52, In Russian. 1 ref.
Khrushchev, V.A., Starkov, G. B.
Bituminous concretes, Cracking (fracturing), Cold weather performance.

47-2032
Formation of a closure channel upon rupture of a frozen dam. [Formirovanie prorana pri razrushenii merzloĭ plotiny]
Moroz, A.A., *Izvestiia vysshikh uchebnykh zavedenii. Stroitel'stvo*, Feb. 1992, No.2, p.72-75, In Russian. 3 refs.
Analysis (mathematics), Earth dams, Frozen ground mechanics.

47-2033
New technology for insulating the bottom of an alluvial reservoir on a frozen base. [Novaia tekhnologiia ekranirovaniia lozha namyvnogo nakopitelia na merzlom osnovanii]
Kuznetsov, G.I., et al, *Izvestiia vysshikh uchebnykh zavedenii. Stroitel'stvo*, Mar. 1992, No.3, p.84-91, In Russian. 5 refs.
Shalginova, L.T.
Reservoirs, Alluvium, Thawing, Active layer.

47-2034
Space and time variability of temperature inversion in the lower troposphere of the Arctic. [Prostranstvenno-vremennaia izmenchivost' inversiĭ v nizhneĭ troposfere Arktiki]
Nagurnyĭ, A.P., et al, *Akademiia nauk SSSR. Doklady*, 1991, 319(5), p.1110-1113, In Russian. 10 refs.
Timerev, A.A., Egorov, S.A.
Temperature inversions, Meteorology, Boundary layer.

47-2035
Thermal processes caused by the formation of defects in materials at cryogenic temperatures. [O teplovykh protsessakh pri obrazovanii defektov v materialakh v oblasti kriogennykh temperatur]
Deviatkin, E.A., et al, *Akademiia nauk. Doklady*, 1992, 324(3), p.541-545, In Russian. 7 refs.
Simonov, I.V.
Analysis (mathematics), Heat capacity, Low temperature research, Thermodynamics, Materials.

47-2036
Flows of fractal-broken ice. [Techeniia fraktal'no-bitogo l'da]
Gol'dshteĭn, R.V., et al, *Akademiia nauk. Doklady*, 1992, 324(3), p.576-581, In Russian. 9 refs.
Mosolov, A.B.
Ice mechanics, Analysis (mathematics), Viscous flow, Ice navigation.

47-2037
Estimating permafrost zone dynamics in northern Eurasia under global climatic warming. [K otsenke dinamiki zony mnogoletneĭ merzloty v Severnoĭ Evrazii pri global'nom poteplenii klimata]
Velichko, A.A., et al, *Akademiia nauk. Doklady*, 1992, 324(3), p.667-671, In Russian. 13 refs.
Nechaev, V.P.
Permafrost, Global warming, Climatic changes.

47-2038
Paleoclimate of the northwestern Altai Mountains in the Eopleistocene. [Paleoklimat severo-zapada Gornogo Altaia v eopleistotsene]
Derevianko, A.P., et al, *Akademiia nauk. Doklady*, 1992, 324(4), p.842-846, In Russian. 12 refs.
Paleoclimatology, Pleistocene, USSR—Altai Mountains.

47-2039
Hydrobiological studies in the Arctic: the structure of bottom communities in the Spitsbergen Archipelago (western part). [Gidrobiologicheskie issledovaniia v Arktike: rastitel'nye soobshchestva arkhipelaga Shpitsbergen (zapadnaia chast')]
Vozzhinskaia, V.B., et al, *Akademiia nauk. Doklady*, 1992, 324(6), p.1332-1335, In Russian. 5 refs.
Bolduman, M.M., Pestrikov, V.V., Sorokin, A.L.
Ecology, Marine biology, Plant ecology, Algae, Norway—Svalbard.

47-2040
Small and planetary bodies of the solar system: the critical mass of icy bodies. [Malye i planetnye tela solnechnoĭ sistemy: kriticheskaia massa ledianykh tel]
Sliuta, E.N., et al, *Akademiia nauk. Doklady*, 1992, 325(4), p.692-696, In Russian. 15 refs.
Voropaev, S.A.
Extraterrestrial ice, Analysis (mathematics), Satellites (natural).

47-2041
Names of glaciers in the Kuban' River basin. [Gliatsionimiia basseĭna Kubani]
Khapaev, S.A., *Akademiia nauk SSSR. Izvestiia. Seriia geograficheskaia*, Sep.-Oct. 1990, No.5, p.100-105, In Russian. 13 refs.
Glaciers, Glacier surveys.

47-2042
Hummocks and hummocky landscapes as indicators of the natural conditions of Tien Shan. [Kochki i kochkarniki kak indikatory mestnykh fiziko-geograficheskikh usloviĭ Tian'-Shania]
Tarakanov, A.G., *Akademiia nauk SSSR. Izvestiia. Seriia geograficheskaia*, May-June 1991, No.3, p.112-118, In Russian. 9 refs.
Hummocks, Hydrogeology, Lithology, Seasonal freeze thaw, Permafrost indicators, USSR—Tien Shan.

47-2043
Ice-cloud depolarization of backscatter for CO2 and other infrared lidars.
Eberhard, W.L., *Applied optics*, Oct. 20, 1992, 31(30), p.6485-6490, 29 refs.
Remote sensing, Lidar, Cloud physics, Ice crystal optics, Backscattering, Polarization (waves), Ice detection, Wave propagation, Precipitation (meteorology).

47-2044
Weichselian stratigraphy and palaeoenvironments at Bellsund, western Svalbard.
Landvik, J.Y., et al, *Boreas*, Dec. 1, 1992, 21(4), p.335-358, 53 refs.
Quaternary deposits, Glacial deposits, Stratigraphy, Paleoclimatology, Glacial geology, Marine deposits, Age determination.

47-2045
Global carbon dioxide budget.
Sundquist, E.T., *Science*, Feb. 12, 1993, 259(5097), p.934-941, Numerous refs.
Ice cores, Gas inclusions, Carbon dioxide.
The increase in atmospheric CO2 levels during the last deglaciation was comparable in magnitude to the recent historical increase. However, global CO2 budgets for these changes reflect fundamental differences in rates and in source and sinks. The modern oceans are a rapid net CO2 sink, whereas the oceans were a gradual source during the deglaciation. Unidentified terrestrial CO2 sinks are important uncertainties in both the deglacial and recent CO2 budgets. The deglacial CO2 budget represents a complexity of long-term dynamic behavior that is not adequately addressed by current models used to forecast future atmospheric CO2 levels. (Auth.)

47-2046
Power and knowledge in international environmental politics: the case of stratospheric ozone depletion.
Litfin, K.T., Los Angeles, University of California, 1992, 474p., University Microfilms order No. 92-13646, Ph.D. thesis. Refs. p.440-474.
Ozone, Environmental protection, International cooperation, Climatic changes.
The availability of scientific knowledge to the relevant decision makers was a necessary condition for the negotiation of the Montreal Protocol on Substances that Deplete the Ozone Layer, but it was far from being a sufficient one. The power of science was a function of the political context in which it was debated, a context which was defined substantially by the discovery of the antarctic ozone hole. The prominence of knowledge-based power in at least some situations means that conven-

tional materialist notions of power should be expanded to include a more discursive and productive conception of power. Environmental problems are not merely physical events, but informational phenomena. A case study methodology is used to develop an interactive conception of power and knowledge. A detailed study of the Montreal Protocol is offered, as well as less detailed studies of the international policy processes of acid rain and global climate change. (Auth. mod.)

47-2047
Late Neogene antarctic glacio-eustatic record, Victoria Land Basin margin, Antarctica.
Ishman, S.E., et al. *American Geophysical Union. Antarctic research series*, 1992, Vol.56, Antarctic paleoenvironment: a perspective on global change. Part one. Edited by J.P. Kennett and D.A. Warnke, p.327-347, Refs. p.344-347.
Rieck, H.J.
Sea level, Marine deposits, Paleoecology, Ice volume, Paleobotany, Glacial geology, Antarctica—Victoria Land.
Glaciomarine and marine sediments recovered at Dry Valley Drilling Project (DVDP) sites 10 and 11 represent the most complete Miocene and Pliocene (6 Ma to 2.8 Ma) sequence to date from the antarctic continent. These cores document changing glacial and sea level conditions in the Victoria Land Basin throughout much of the late Neogene. Widely fluctuating bathymetries and environmental conditions indicated from benthic foraminifer and diatom distributions provide a detailed and well-constrained late Neogene sea level and glacial history of the antarctic region. The timing of these eustatic fluctuations, and the fluctuations in glacial/nonglacial conditions in the Taylor Valley region of the Victoria Land Basin throughout the late Neogene, significantly affect the interpretations of ice volume history of Antarctica. The paleoenvironmental record from DVDP 10 and 11 provides evidence for an unstable Late Neogene East Antarctic Ice Sheet and its influence on global sea level. (Auth. mod.)

47-2048
Liquid water with an *ab initio* potential: X-ray and neutron scattering from 238 to 368 K.
Corongiu, G., et al. *Journal of chemical physics*, Aug. 1, 1992, 97(3), p.2030-2038, 19 refs.
Clementi, E.
Water structure, Supercooling, Molecular energy levels, Neutron scattering, Temperature effects, Simulation, Molecular structure, Heavy water.

47-2049
Erratum: liquid water with an *ab initio* potential: X-ray and neutron scattering from 238 to 368 K.
Corongiu, G., et al. *Journal of chemical physics*, Dec. 1, 1992, 97(11), p.8818, 2 refs. For pertinent paper see 47-2048.
Clementi, E.
Water structure, Supercooling, Molecular energy levels, Temperature effects, Simulation, Accuracy.

47-2050
Charge separation by ice and water drops during growth and evaporation.
Dong, Y.Y., et al. *Journal of geophysical research*, Dec. 20, 1992, 97(D18), p.20,361-20,371, 39 refs.
Hallett, J.
Cloud physics, Thunderstorms, Cloud electrification, Charge transfer, Simulation, Ice crystal growth, Evaporation, Ion diffusion, Cloud droplets, Ice electrical properties, Ice water interface.

47-2051
Wind forcing and ice motion in the Weddell Sea region.
Kottmeier, C., et al. *Journal of geophysical research*, Dec. 20, 1992, 97(D18), p.20,373-20,383, 24 refs.
Olf, J., Frieden, W., Roth, R.
Sea ice distribution, Drift, Air ice water interaction, Wind factors, Drift stations, Periodic variations, Velocity, Antarctica—Weddell Sea.
This paper relates to data from seven buoys, which were deployed for 14 months beginning in Oct. 1986 on ice floes in the southeastern Weddell Sea. The buoys were equipped with air pressure and temperature sensors, propeller anemometers for wind speed and direction measurements (five buoys) and a current meter (one buoy). The data transmission and buoy tracking were achieved with the aid of the Argos satellite system. The data are used to correlate seasonal variations in ice drift velocity to wind forcing. (Auth. mod.)

47-2052
Dew and frost chemistry at a midcontinent site, United States.
Wagner, G.H., et al. *Journal of geophysical research*, Dec. 20, 1992, 97(D18), p.20,591-20,597, 17 refs.
Steele, K.F., Peden, M.E.
Air pollution, Water vapor, Condensation, Frost, Chemical composition, Chemical properties, Precipitation (meteorology), Ion density (concentration), Sampling, Environmental impact.

47-2053
One-dimensional modeling study of carbonaceous haze effects on the springtime arctic environment.
Emery, C.A., et al. *Journal of geophysical research*, Dec. 20, 1992, 97(D18), p.20,599-20,613, 28 refs. For another version see 46-5260.
Haberle, R.M., Ackerman, T.P.
Polar atmospheres, Climatic factors, Air pollution, Haze, Radiation absorption, Air ice water interaction, Heat flux, Surface temperature, Mathematical models, Humidity, Boundary layer.

47-2054
Seasonal cycle of nitrogen oxides in the arctic troposphere at Barrow, Alaska.
Honrath, R.E., Jr., et al. *Journal of geophysical research*, Dec. 20, 1992, 97(D18), p.20,615-20,630, 54 refs.
Jaffe, D.A.
Polar atmospheres, Atmospheric composition, Ozone, Chemical properties, Air pollution, Seasonal variations, Sampling, Photochemical reactions.

47-2055
Measurements and model calculations of HCl column amounts and related parameters over McMurdo during the austral spring in 1989.
Liu, X., et al. *Journal of geophysical research*, Dec. 20, 1992, 97(D18), p.20,795-20,804, 47 refs.
Blatherwick, R.D., Murcray, F.J., Keys, J.G., Solomon, S.
Polar atmospheres, Atmospheric density, Atmospheric composition, Ozone, Chemical properties, Seasonal variations, Photochemical reactions.
Solar spectra obtained from a ground-based Fourier transform infrared instrument at McMurdo in the spring of 1989 have been analyzed to determine total HCl column amounts. A one-dimensional photochemical model was used to simulate the rate of recovery of HCl in the springtime. Low column amounts were observed in early Sept. and may be attributed to the heterogeneous conversion of HCl to active chlorine species during the polar night. The rate of recovery of HCl is consistent with its production by chlorine atoms reacting with methane and is dependent on concentrations of active chlorine species and NO molecules in the altitude region from 12 to 22 km. High HCl column amounts were observed following recovery in late Oct., suggesting that the lower stratosphere in the polar region had descended relative to mid-latitudes and that the degree of dechlorination of the transported air was very small. (Auth. mod.)

47-2056
Diagnostic model study of the seasonal variation of global ozone and the antarctic ozone hole.
Akiyoshi, H., et al. *Journal of geophysical research*, Dec. 20, 1992, 97(D18), p.20,837-20,853, 46 refs.
Uryu, M.
Polar atmospheres, Atmospheric composition, Ozone, Atmospheric circulation, Seasonal variations, Mathematical models.
A simple two-dimensional model is constructed to simulate and gain an understanding of the global distribution of ozone and its seasonal variation. The time dependence of the diffusion coefficients is neglected, except in the polar regions. The effects of the meridional circulation, consisting of the following three components, are taken into account: (1) an annually varying component due to the annual variation in the heating of ozone, oxygen, and water vapor, which is assumed to be anti-symmetric (symmetric with a 6 month shift) about the equator; (2) a nonseasonal, steady component of the transport circulation with ascending air in the tropics and descending air in the middle and high latitudes of both hemispheres; and (3) an annually varying component of the transport circulation which represents planetary wave activity, strong convection in the tropics, and other seasonally variable factors. Although the employed circulations and diffusion coefficients are ad hoc, the simple model simulates the main features of the global distribution of ozone and its seasonal variation. The antarctic ozone hole is discussed from a global point of view. The possibility of a weak Oct. minimum in the antarctic total ozone amount, without introducing chlorine chemistry, is suggested. (Auth. mod.)

47-2057
Cryogenic wedge within gravels, north of Kempten, Bavaria, F.R.G.
Menzies, J., et al. *Zeitschrift für Geomorphologie*, Sep. 1992, 36(3), p.365-374, With German and French summaries. 22 refs.
Habbe, K.A.
Gravel, Geocryology, Ice wedges, Glacial deposits, Fossil ice, Cryogenic structures, Periglacial processes, Paleoclimatology.

47-2058
Wind-chill properties of various clothing types. [Abkühlung durch Wind bei verschiedener Bekleidung].
Erhart, B., et al. International Conference on Mountain Medicine, 11th, Innsbruck, Austria, Nov., 1988, Innsbruck, Austria, Gerhard Flora, 1991, p.63-75, In German. 4 refs.
Ennemoser, O., Ambach, A.
Wind chill, Clothing, Cold weather performance, Thermal insulation, Materials, Temperature effects.

47-2059
Physical assessment of the wind chill index. [Physikalische Bewertung des Wind Chill Index].
Ennemoser, O., et al. International Conference on Mountain Medicine, 11th, Innsbruck, Austria, Nov., 1988, Innsbruck, Austria, Gerhard Flora, 1991, p.76-82, In German. 6 refs.
Ambach, W., Erhart, B.
Wind chill, Mountains, Thermal insulation, Cold weather performance, Temperature effects.

47-2060
Protection of pyramidal piles and driven blocks from frost heaving.
Zhukov, N.V., et al. *Soil mechanics and foundation engineering*, Jan. 1993, 29(4), p.104-109, Translated from Osnovaniia, fundamenty i mekhanika gruntov, 1992, No.4. 10 refs.
Karabanova, L.P., Balov, I.L.
Cold weather construction, Foundations, Piles, Frost heave, Protection, Frozen ground mechanics, Plates, Heat recovery.

47-2061
Experience with pile sinking in plastic-frozen soils by bored-driven and bored-drop methods.
Vlokh, V.P., *Soil mechanics and foundation engineering*, Jan. 1993, 29(4), p.124-125, Translated from Osnovaniia, fundamenty i mekhanika gruntov, 1992, No.4.
Pile driving, Cold weather construction, Permafrost beneath structures, Design.

47-2062
Snow removing equipment for a multipurpose motor vehicle chassis. [Snegoochistitel'noe oborudovanie dlia mnogotselevogo avtodorozhnogo shassi].
Nishnevich, E.L., et al. *Stroitel'nye i dorozhnye mashiny*, Jan. 1991, No.1, p.14-15, In Russian.
Shatalov, N.V., Zavrazhin, IU.I.
Snow removal, Motor vehicles, Equipment, Road maintenance.

47-2063
Bulldozer equipment with a controlled blade for maintaining mountain roads. [Bul'dozernoe oborudovanie s upravliaemym otvalom dlia soderzhaniia gornykh dorog].
Turgumbaev, D.D., et al. *Stroitel'nye i dorozhnye mashiny*, Feb. 1992, No.2, p.17-18, In Russian.
Dzhylkychiev, A.I., Isakov, K., Raĭmkulov, K.I.
Equipment, Road maintenance, Snow removal.

47-2064
Bench tests and accelerated operating life tests of the EO-5124 excavator equipment under various above and below freezing temperatures. [Stendovye issledovaniia i uskorennye resursnye ispytaniia rabochego oborudovaniia ekskavatora EO-5124 pri razlichnoĭ polozhitel'noĭ i otritsatel'noĭ temperature].
Mikheenko, V.V., *Stroitel'nye i dorozhnye mashiny*, July 1992, No.7, p.2-5, In Russian.
Low temperature tests, Construction equipment, Cold weather tests, Cold weather construction.

47-2065
EO-4124A and EO-4125A multipurpose backhoe excavators. [Odnokovshovye universal'nye ekskavatory EO-4124A i EO-4125A].
Gavrilov, N.I., et al. *Stroitel'nye i dorozhnye mashiny*, May 1991, No.5, p.2-4, In Russian.
Nemchinov, G.A., Akinfiev, A.A., Kotel'nikov, B.N.
Construction equipment, Cold weather construction.

47-2066
Chain-type excavators for digging slit trenches in rocks. [Tsepnye ekskavatory dlia razrabotki shcheleĭ v skal'nykh porodakh].
Vartanov, S.Kh., et al. *Stroitel'nye i dorozhnye mashiny*, May 1991, No.5, p.4-6, In Russian.
Lebedeva, V.G., Kadzhaia, T.G.
Construction equipment, Cold weather construction.

47-2067
Power ice borers. [Mekhanizirovannye ledobury].
Tavrizov, V.M., *Stroitel'nye i dorozhnye mashiny*, May 1991, No.5, p.18-20, In Russian.
Ice drills, Construction equipment, Cold weather construction.

47-2068
Structural analysis of the suspension of a rotary snow blower. [Strukturnyi analiz podveski rotornogo snegoochistitelia].
Savel'ev, A.G., et al. *Stroitel'nye i dorozhnye mashiny*. Oct. 1991, No.10, p.22-24. In Russian. 4 refs.
Polivanov, IU.P.
Snow removal, Design, Equipment.

47-2069
Testing of assembly units, sets and machines to be used in extreme conditions. [Ispytaniia sborochnykh edinits, agregatov i mashin, podlezhashchikh ekspluatatsii v ekstremal'nykh usloviiakh].
Degtiareva, A.L., et al. *Stroitel'nye i dorozhnye mashiny*. Nov. 1991, No.11, p.30. In Russian.
Zhavoronkov, V.I.
Low temperature tests, Cold chambers.

47-2070
Seasonal changes of antarctic marine bacterioplankton.
Delille, D., et al. *Kieler Meeresforschungen, Sonderheft*. 1991, No.8, European Marine Microbiology Symposium, 4th, Kiel, Germany, Oct.8-12, 1990. Proceedings, edited by G. Rheinheimer et al, p.213-218, 24 refs.
Mallard, L.
DLC QH91.A1 K53 No.8, 1991
Sea ice, Plankton, Water chemistry, Water temperature, Antarctica—Géologie Archipelago.
During a one-year period the development of antarctic coastal seawater bacterioplankton was followed. Two field stations (surface and deep water = 20 m) were sampled daily in 1989 in the Terre Adélie area. The survey included physicochemical (temperature and particulate organic matter) and bacteriological (total and heterotrophic bacteria, bacterial production) measurements. Whereas bacterial parameters at the deep water station remained fairly constant, bacterial parameters in surface waters generally increased during the year, obviously in relation to the formation of sea ice. (Auth.)

47-2071
Occurrence of heavy metals in antarctic and Greenland ancient ice and recent snow.
Boutron, C.F., et al. NATO Advanced Study Institute on Metal Speciation in the Environment, Cesme, Turkey, Oct. 9-20, 1989. Proceedings. Edited by J.A.C. Broekaert et al. NATO Advanced Science Institutes, Series G. Ecological Sciences. Vol.23, Berlin, Springer-Verlag, 1990, p.137-151, 32 refs.
Görlach, U.
DLC TD196.M4 N37 1989
Ice sheets, Snow impurities, Ice composition, Sampling, Metals, Accuracy, Atmospheric circulation.
This review suggests that current understanding of the occurrence of heavy metals in antarctic and Greenland ancient ice and recent snow is still limited, although a high quality but still incomplete data set is now available for lead. Data on the speciation of heavy metals are presently not available for Antarctica and Greenland. (Auth. mod.)

47-2072
Attenuation due to snow fall on an earth-space path.
Dong, Q.S., International Symposium on Recent Advances in Microwave Technology, 2nd, Beijing, China, Sep. 4-8, 1989. Proceedings. Edited by B. Malat et al. Beijing, International Academic Publishers, 1989, p.407-410, 1 ref.
DLC TK7876.I58
Antennas, Snow cover effect, Attenuation, Microwaves, Radio communication, Ice melting, Precipitation (meteorology), Wave propagation

47-2073
Scattering effects of ice needles in satellite communications.
Howard, J., *International Symposium on Recent Advances in Microwave Technology*, 2nd, Beijing, China, Sep. 4-8, 1989. Proceedings. Edited by B. Malat et al. Beijing, International Academic Publishers, 1989, p.411-415, 2 refs.
DLC TK7876.I58
Telecommunication, Microwaves, Ice crystal optics, Scattering, Ice needles, Wave propagation, Mathematical models.

47-2074
Removal of atmospheric aerosols in the sub-arctic region.
Selin, E., et al. *Journal of aerosol science*. 1992, 23(Sup.1), European Aerosol Conference, Oxford, UK, Sep. 7-11, 1992. Proceedings, p.S965-S968, 8 refs.
Subpolar regions, Scavenging, Atmospheric composition, Aerosols, Chemical properties, Air pollution, Sampling.

47-2075
Aerosols in the Arctic—results and evidence from the 1991 1992 EASOE aircraft measurement campaigns.
Below, M., et al. *Journal of aerosol science*. 1992, 23(Sup.1), European Aerosol Conference, Oxford, UK, Sep. 7-11, 1992. Proceedings, p.S1019-S1022, 3 refs.
Polar atmospheres, Aerosols, Atmospheric composition, Aerial surveys, Ozone, Sampling, Particle size distribution.

47-2076
Spatial considerations of snow chemistry as a non-point contamination source in alpine watersheds.
Elder, K., et al. USA/USSR Joint Conference on Environmental Hydrology and Hydrogeology, 1st, Leningrad, USSR, June 18-21, 1990. Proceedings. Edited by J.E. Moore et al. Minneapolis, American Institute of Hydrology, 1991, p.31-38, 19 refs
Williams, M.W., Dozier, J.
DLC GB652.U83 1991
Alpine landscapes, Watersheds, Snow surveys, Snow cover distribution, Chemical composition, Snow water equivalent, Ion density (concentration), Snow impurities, Sampling, Classifications.

47-2077
Identification and mitigation of glacier-related hazards: examples from the Cordillera Blanca, Peru.
Reynolds, J.M., Geohazards: natural and man-made, Geosciences in International Development Series, London, Chapman and Hall, 1992, p.143-157, 27 refs.
DLC GB5014.G64
Glacial hydrology, Snow cover stability, Mountains, Accidents, Flood forecasting, Countermeasures.

47-2078
Climate since A.D. 1500.
Bradley, R.S., ed. London, Routledge, 1992, 679p., Refs. passim. For selected papers see 47-2079 through 47-2102.
Jones, P.D., ed.
Paleoclimatology, Climatic changes, Air temperature, Ice cores, Precipitation (meteorology), Global warming, History, Meteorological data, Weather observations, Phenology.

47-2079
Climate since A.D. 1500: introduction.
Bradley, R.S., et al. Climate since A.D. 1500. Edited by R.S. Bradley and P.D. Jones, London, Routledge, 1992, p.1-16, 44 refs.
Jones, P.D.
Paleoclimatology, Air temperature, Climatic changes, Precipitation (meteorology), Meteorological data, Weather observations, History.

47-2080
Hudson's Bay Company ships' log-books as sources of sea ice data, 1751-1870.
Catchpole, A.J.W., Climate since A.D. 1500. Edited by R.S. Bradley and P.D. Jones, London, Routledge, 1992, p.17-39, 51 refs.
Sea ice distribution, Ice surveys, Paleoclimatology, Climatic changes, Ice conditions, Ice edge, History.

47-2081
Historical and instrumental evidence of climate: western Hudson Bay, Canada, 1714-1850.
Ball, T.F., Climate since A.D. 1500. Edited by R.S. Bradley and P.D. Jones, London, Routledge, 1992, p.40-73, 33 refs.
Paleoclimatology, Air temperature, Climatic changes, Snowfall, Meteorological data, Weather observations, History, Canada.

47-2082
Historical climate records from the northeastern United States, 1640-1900.
Baron, W.R., Climate since A.D. 1500. Edited by R.S. Bradley and P.D. Jones, London, Routledge, 1992, p.74-91, 52 refs.
Paleoclimatology, Air temperature, Climatic changes, Precipitation (meteorology), Meteorological data, Weather observations, History, United States—New England.

47-2083
Documentary evidence for changes in the climate of Iceland, A.D. 1500 to 1800.
Ogilvie, A.E.J., Climate since A.D. 1500. Edited by R.S. Bradley and P.D. Jones, London, Routledge, 1992, p.92-117, 63 refs.
Sea ice distribution, Paleoclimatology, Air temperature, Climatic changes, Precipitation (meteorology), Meteorological data, Weather observations, History, Iceland.

47-2084
Monthly temperature and precipitation in central Europe 1525-1979: quantifying documentary evidence on weather and its effects.
Pfister, C., Climate since A.D. 1500. Edited by R.S. Bradley and P.D. Jones, London, Routledge, 1992, p.118-142, 34 refs.
Paleoclimatology, Air temperature, Climatic changes, Precipitation (meteorology), Phenology, Meteorological data, Weather observations, History.

47-2085
Reconstructing the climate of northern Italy from archive sources.
Camuffo, D., et al, Climate since A.D. 1500. Edited by R.S. Bradley and P.D. Jones, London, Routledge, 1992, p.143-154, 31 refs.
Enzi, S.
Paleoclimatology, Air temperature, Climatic changes, Precipitation (meteorology), Meteorological data, Weather observations, History, Italy.

47-2086
Three historical data series on floods and anomalous climatic events in Italy.
Pavese, M.P., et al, Climate since A.D. 1500 Edited by R.S. Bradley and P.D. Jones, London, Routledge, 1992, p.155-170, 26 refs.
Paleoclimatology, Climatic changes, Floods, Meteorological data, Weather observations, History, Italy.

47-2087
Documentary evidence from the U.S.S.R.
Borisenkov, E.P., Climate since A.D. 1500. Edited by R.S. Bradley and P.D. Jones, London, Routledge, 1992, p.171-183, 33 refs.
Paleoclimatology, Climatic changes, Air temperature, Precipitation (meteorology), Meteorological data, Weather observations, History, USSR.

47-2088
Climatic variations in the longest instrumental records.
Jones, P.D., et al, Climate since A.D. 1500. Edited by R.S. Bradley and P.D. Jones, London, Routledge, 1992, p.246-268, 29 refs.
Bradley, R.S.
Paleoclimatology, Air temperature, Climatic changes, Precipitation (meteorology), Meteorological data, Weather observations, History.

47-2089
Mapping climate using tree-rings from western North America.
Fritts, H.C., et al, Climate since A.D. 1500. Edited by R.S. Bradley and P.D. Jones, London, Routledge, 1992, p.269-295, 39 refs.
Shao, X.M.
Paleoclimatology, Climatic changes, Air temperature, Precipitation (meteorology), Phenology, Growth.

47-2090
Dendroclimatic evidence from northern North America.
D'Arrigo, R.D., et al, Climate since A.D. 1500. Edited by R.S. Bradley and P.D. Jones, London, Routledge, 1992, p.296-311, 52 refs.
Jacoby, G.C., Jr.
Paleoclimatology, Climatic changes, Air temperature, Precipitation (meteorology), Phenology, Growth, Solar activity.

47-2091
Dendroclimatic evidence from the Great Plains of the United States.
Meko, D.M., Climate since A.D. 1500. Edited by R.S. Bradley and P.D. Jones, London, Routledge, 1992, p.312-330, 43 refs.
Paleoclimatology, Climatic changes, Air temperature, Precipitation (meteorology), Phenology, Growth, Solar activity.

47-2092
Dendroclimatic evidence from eastern North America.
Cook, E.R., et al, Climate since A.D. 1500. Edited by R.S. Bradley and P.D. Jones, London, Routledge, 1992, p.331-348, 66 refs.
Stahle, D.W., Cleaveland, M.K.
Paleoclimatology, Climatic changes, Precipitation (meteorology), Phenology, Growth.

47-2093
Dendroclimatic evidence from the northern Soviet Union.
Graybill, D.A., et al, Climate since A.D 1500. Edited by R.S. Bradley and P.D. Jones, London, Routledge, 1992, p.393-414, 50 refs.
Shiiatov, S.G.
Paleoclimatology, Climatic changes, Air temperature, Phenology, Growth, USSR.

47-2094
Dendroclimatic evidence from the western Himalaya.
Hughes, M.K., Climate since A.D. 1500. Edited by R.S. Bradley and P.D. Jones, London, Routledge, 1992, p.415-431, 24 refs.
Paleoclimatology, Climatic changes, Air temperature, Precipitation (meteorology), Phenology, Growth, Himalaya Mountains.

47-2095
Dendroclimatic studies in China.
Wu, X.D., Climate since A.D. 1500. Edited by R.S. Bradley and P.D. Jones, London, Routledge, 1992, p.432-445, 35 refs.
Paleoclimatology, Climatic changes, Air temperature, Precipitation (meteorology), Phenology, Growth, China.

47-2096
South American dendroclimatological records.
Boninsegna, J.A., Climate since A.D. 1500. Edited by R.S. Bradley and P.D. Jones, London, Routledge, 1992, p.446-462, 53 refs.
Paleoclimatology, Climatic changes, Glacier oscillation, Air temperature, Precipitation (meteorology), Phenology, Growth.

47-2097
Ice core climate signals from Mount Logan, Yukon, A.D. 1700-1897.
Holdsworth, G., et al, Climate since A.D. 1500. Edited by R.S. Bradley and P.D. Jones, London, Routledge, 1992, p.483-504, 53 refs.
Krouse, H.R., Nosal, M.
Ice cores, Paleoclimatology, Climatic changes, Mountain glaciers, Air temperature, Precipitation (meteorology), Ice composition, Drill core analysis, Oxygen isotopes, Canada—Yukon Territory—Logan, Mount.

47-2098
Arctic from Svalbard to Severnaya Zemlya: climatic reconstructions from ice cores.
Tarussov, A.V., Climate since A.D. 1500. Edited by R.S. Bradley and P.D. Jones, London, Routledge, 1992, p.505-516, 19 refs.
Ice cores, Paleoclimatology, Climatic changes, Glacial hydrology, Glacier oscillation, Ice sheets.

47-2099
Ice core evidence from Peru and China.
Thompson, L.G., Climate since A.D. 1500. Edited by R.S. Bradley and P.D. Jones, London, Routledge, 1992, p.517-548, 69 refs.
Ice cores, Paleoclimatology, Climatic changes, Mountain glaciers, Air temperature, Precipitation (meteorology), Ice composition, Oxygen isotopes, Drill core analysis, Global warming, Peru, China--Qinghai-Xizang Plateau.

47-2100
Ice core evidence from the Antarctic Peninsula region.
Peel, D.A., Climate since A.D. 1500. Edited by R.S. Bradley and P.D. Jones, London, Routledge, 1992, p.549-571, 38 refs.
Ice cores, Paleoclimatology, Climatic changes, Ice sheets, Air temperature, Precipitation (meteorology), Ice composition, Oxygen isotopes, Ice dating, Drill core analysis, Antarctica—Antarctic Peninsula.
Ice core records from the Gomez Site on the southern Palmer Land plateau (spanning the years 1942-1980), Dolleman I. (1795-1986), James Ross I. (1850-1980), and Orcadas Station in the South Orkney Is. (1903-present), are compared. Except for Orcadas which is strongly moderated by the surrounding ocean, all the records indicate an overall increasing temperature trend (0.07 C/yr) and an increasing snow accumulation rate (by about 20%) since 1955. A strong positive isotope anomaly and deuterium excess in the records for 1933-38 and 1973-77 may have been caused by the development of a large polynya in the Weddell Sea.

47-2101
Paleoenvironmental conditions in Antarctica since A.D. 1500: ice core evidence.
Mosley-Thompson, E., Climate since A.D. 1500. Edited by R.S. Bradley and P.D. Jones, London, Routledge, 1992, p.572-591, 40 refs.
Ice cores, Paleoclimatology, Climatic changes, Ice sheets, Air temperature, Precipitation (meteorology), Ice composition, Oxygen isotopes, Ice dating, Drill core analysis, Antarctica—Siple Station, Antarctica—Amundsen-Scott Station.
Ice core records for the last 500 years from the East and West Antarctic Ice Sheets are synthesized, mostly from the Siple and Amundsen-Scott South Pole stations. The records of *delta*O-18 and dust concentrations from Siple suggest warmer and less dusty atmospheric conditions from 1600 to 1830 (which occurred during much of the period from about 1500-1880 corresponding with the Little Ice Age in the Northern Hemisphere), while the records from South Pole indicate that opposite conditions, that is, cooler and more dusty, were prevalent over the East Antarctica Plateau during the same period. There may have been a slight cooling trend in the sector between 40E and 30W and a slight warming trend for the rest of Antarctica and the Antarctic Peninsula from 1945 to 1985, but there is insufficient evidence to indicate any consistent trend over all of Antarctica.

47-2102
Climatic variations over the last 500 years.
Jones, P.D., et al, Climate since A.D. 1500. Edited by R.S. Bradley and P.D. Jones, London, Routledge, 1992, p.649-665, 57 refs.
Bradley, R.S.
Paleoclimatology, Climatic changes, Air temperature, Precipitation (meteorology), Global warming.

47-2103
Expert system approach to establish design snow and wind loads.
Embleton, K.M., Winnipeg, University of Manitoba, 1990, 263p., M.S. Thesis. 37 refs.
Snow loads, Wind pressure, Buildings, Cold weather construction, Cold weather performance, Building codes, Computer programs, Computer applications.

47-2104
Analysis and design for frost effect in soil-steel structures.
Ghobrial, N., Windsor, Ontario, University, 1990, 117p., M.S. thesis. 95 refs.
Steel structures, Culverts, Frost action, Soil freezing, Frost protection, Frost resistance, Frost heave, Soil stabilization.

47-2105
Synoptic scale ice-atmosphere interaction off the east coast of Canada.
Nazarenko, D.M., Montreal, McGill University, 1990, 158p., M.S. thesis. With French summary. Refs. p.100-110.
Ice air interface, Sea ice distribution, Ice surveys, Ice reporting, Ice forecasting, Ice edge, Air ice water interaction, Synoptic meteorology, Storms, Radiometry, Spaceborne photography, Canada.

47-2106
Permafrost degradation and thermokarst processes associated with human-induced disturbances, Fort Norman, Northwest Territories.
Gallinger, B.J., et al, Edmonton, University of Alberta, 1991, 228p., M.S. thesis. Refs. passim.
Permafrost preservation, Ground thawing, Thermokarst, Active layer, Thaw depth, Thawing rate, Frozen ground settling, Thaw consolidation, Human factors, Environmental impact, Canada—Northwest Territories—Fort Norman.

47-2107
Ice-nucleating activity in the freeze-tolerant tardigrade *Adorybiotus coronifer*.
Westh, P., et al, *Comparative biochemistry and physiology*, 1991, 99A(3), p.401-404, 31 refs.
Kristiansen, J., Hvidt, A.
Cryobiology, Cold tolerance, Organic nuclei.

47-2108
Snow and ice control. *Public works*, Apr. 15, 1991, 122(5), p.B/88-B/103.
Road icing, Road maintenance, Salting, Snow removal, Snow fences.

47-2109
Solvated water molecules and hydrogen-bridged networks in liquid water.
Corongiu, G., et al, *Journal of chemical physics*, Feb. 1, 1993, 98(3), p.2241-2249, 17 refs.
Clementi, E.
Water structure, Molecular structure, Molecular energy levels, Temperature effects, Supercooling, Hydrogen bonds, Simulation, Correlation.

47-2110
Detection of radical pairs in glassy systems.
Harrison, N., et al, *Royal Society, London. Faraday transactions*, Jan. 7, 1993, 89(1), p.59-61, 13 refs.
Symons, M.C.R.
Frozen liquids, Molecular energy levels, Photochemical reactions, Molecular structure, Ionization, Spectra, Anisotropy, Low temperature research, Electron paramagnetic resonance.

47-2111
Ultraviolet-induced amorphization of cubic ice and its implications for the evolution of ice grains.
Kouchi, A., et al, Colloquium of the International Astronomical Union, 126th, Kyoto, Japan, Aug. 27-30, 1990. Proceedings. Origin and evolution of interplanetary dust. Edited by A.C. Levasseur-Regourd et al, Astrophysics and Space Science Library Vol.173, Dordrecht, Kluwer Academic Publishers, 1991, p.87-90, 7 refs.
Kuroda, T.
DLC GB791.I563
Extraterrestrial ice, Simulation, Cubic ice, Amorphous ice, Phase transformations, Ultraviolet radiation, Low temperature research, Cosmic dust, Temperature effects.

47-2112
Ice particle emission from cometary analogues.
Kohl, H., et al, Colloquium of the International Astronomical Union, 126th, Kyoto, Japan, Aug. 27-30, 1990. Proceedings. Origin and evolution of interplanetary dust. Edited by A.C. Levasseur-Regourd et al, Astrophysics and Space Science Library Vol.173, Dordrecht, Kluwer Academic Publishers, 1991, p.257-260, 4 refs.
Grün, E.
DLC GB791.I563
Extraterrestrial ice, Cosmic dust, Simulation, Ice sublimation, Insolation, Particles, Ice physics.

47-2113
Plasma emission from high velocity impacts of microparticles onto water ice.
Timmermann, R., et al, Colloquium of the International Astronomical Union, 126th, Kyoto, Japan, Aug. 27-30, 1990. Proceedings. Origin and evolution of interplanetary dust. Edited by A.C. Levasseur-Regourd et al, Astrophysics and Space Science Library Vol.173, Dordrecht, Kluwer Academic Publishers, 1991, p.375-378, 6 refs.
Grün, E.
DLC GB791.I563
Extraterrestrial ice, Ice sublimation, Impact tests, Ionization, Cosmic dust, Electric fields.

47-2114
Comparison of 3 micron features of trapped H2O and H2O frost in SiO condensate with observed dust features.
Wada, S., et al, Colloquium of the International Astronomical Union, 126th, Kyoto, Japan, Aug. 27-30, 1990. Proceedings. Origin and evolution of interplanetary dust. Edited by A.C. Levasseur-Regourd et al, Astrophysics and Space Science Library Vol.173, Dordrecht, Kluwer Academic Publishers, 1991, p.429-432, 9 refs.
Sakata, A., Tokunaga, A.T.
DLC GB791.I563
Extraterrestrial ice, Cosmic dust, Simulation, Ice sublimation, Condensation, Spectra, Infrared spectroscopy.

47-2115
Experiment to monitor four iceberg scours on the Grand Banks of Newfoundland.
Davidson, S.H., et al, *Canada. Environmental Studies Research Funds. Report*, Dec. 1991, No.107, 110p., With French summary. 50 refs.
Collins, W.T., Simpkin, P.G.
Icebergs, Ice scoring, Ocean bottom, Bottom sediment, Bottom topography, Sediment transport, Topographic surveys, Geological surveys, Oceanographic surveys, Cost analysis, Canada—Newfoundland—Grand Banks.

47-2116
Excursion guide for northern Finland-Norway-Sweden. Revised edition.
Sollid, J.L., ed, *Oslo. Universitet. Geografisk institutt. Meddelelser. Naturgeografisk serie. Rapport*, 1989, No.12, International Conference on Permafrost, 5th, Trondheim, Norway, Aug. 2-5, 1988, 105p., Refs. p.94-103.
Alpine glaciation, Glacial geology, Geological surveys, Glacial erosion, Moraines, Rock glaciers, Periglacial processes, Permafrost beneath roads, Frost mounds, Avalanches, Nivation, Finland, Norway, Sweden.

47-2117
Numerical simulation of pack ice movement using the momentum conservation method.
Rheem, C.K., et al. *National Research Council Canada. Institute for Marine Dynamics. Institute report.* Dec. 1992, IR-1992-22, 7p., Translated from the Japanese. 4 refs. Presented at the International Symposium on Okhotsk Sea and Sea Ice, 8th, Mombetsu, Hokkaido, Japan, Jan. 31-Feb. 5, 1993.
Yamaguchi, H., Kato, H.
Pack ice, Ice loads, Drift, Ice friction, Ice water interface, Ice solid interface, Ice floes, Ice models, Mathematical models.

47-2118
Model-scale study of the frictional and cohesive properties of floating ice rubble.
Case, P.C., *National Research Council Canada. Institute for Marine Dynamics. Laboratory memorandum,* Apr. 1991, LM-1991-03, 113p., 18 refs.
Ice friction, Ice adhesion, Ice cover strength, Ice deformation, Floating ice, Ice loads, Internal friction, Shear strength, Strain tests.

47-2119
Verification of CSA code for fixed offshore concrete structures.
Allyn, N., et al, *Canada. Environmental Studies Research Funds. Report,* Nov. 1992, No.112, 62p., With French summary. 3 refs.
Cichanski, W.J., Adebar, P.
Concrete structures, Concrete strength, Offshore structures, Ice loads, Ice solid interface, Icebergs, Ice control, Concrete durability, Ocean waves, Building codes, Mathematical models, Canada.

47-2120
Development of a wheeled runway for McMurdo on the Ross Ice Shelf.
Blaisdell, G.L., et al, MP 3211, Cambridge, England, Scientific Committee on Antarctic Research, 1992, 31p., 14 refs. Presented to the Standing Committee on Antarctic Logistics and Operations (SCALOP), at the 22nd meeting of SCAR, San Carlos de Bariloche, Argentina, June 15-19, 1992.
Klokov, V.D., Diemand, D.
Ice runways, Ice shelves, Ice cover strength, Snow compaction, Cold weather construction, Ice (construction material), Snow (construction material), Logistics, Airplanes, Antarctica—McMurdo Station.
The U.S. Antarctic Program currently operates aircraft from an annual sea ice runway at McMurdo until about Dec. 15th of each year. After that time it is limited to use of a snow runway and ski-wheel aircraft. Large cargo aircraft of this type are very specialized and in short supply. On the Ross Ice Shelf near McMurdo, an experimental runway to support heavy wheeled aircraft has been constructed. This runway capitalizes on the natural characteristics of the location and uses only snow and ice for construction materials. Such a runway is appealing because of its ability to support heavy wheeled cargo aircraft while requiring a relatively small construction and maintenance effort, and causes only minimal impact to the site. The runway is located inside the transition zone between the accumulation and ablation regions on the ice shelf. It uses a thin permanent cap of snow over natural blue ice to a) level undulations in the underlying surface, and b) protect the ice from intense solar radiation during the peak of summer (to prevent subsurface melt-pool formation). The snow cap was produced by compaction with a heavy roller during the warmest part of the year and the snow was then left to sinter and strengthen with falling temperatures. In early Feb. the snow cover was strong enough to support wheeled operation of a fully loaded LC-130.

47-2121
Glaciofluvial sediment transfer of a subpolar glacier, Erikbreen, Svalbard.
Vatne, G., et al, *Stuttgarter Geographische Studien,* 1992, Vol.117, p.253-266, 23 refs.
Etzelmüller, B., Ödegard, R.S., Sollid, J.L.
Glacial erosion, Outwash, Sediment transport, Suspended sediments, Moraines, Subglacial drainage, Glacial deposits, Glacial hydrology, Glacial rivers, Glacier surveys, Norway—Spitsbergen.

47-2122
Climate change and evapotranspiration modelling.
Nordic Seminar on Evapotranspiration Models for Simulating Climate Change Impact on the Catchment Water Balance, Vettre Hotel, Asker, Norway, Mar. 16-17, 1992, Nordic Hydrological Programme. NHP report, No.31, Oslo, 1992, 160p., Refs. passim. For selected paper see 47-2123.
Tallaksen, L., ed, Hassel, K.A., ed.
Runoff forecasting, Climatic changes, Evapotranspiration, Water balance, Snowmelt, Global warming.

47-2123
Modelling hydrological effects of climate change.
Saelthun, N.R., Nordic Seminar on Evapotranspiration Models for Simulating Climate Change Impact on the Catchment Water Balance, Vettre Hotel, Asker, Norway, Mar. 16-17, 1992. Edited by L. Tallaksen and K.A. Hassel. Climate change and evapotranspiration modelling, Oslo, 1992, p.73-80, 11 refs.
Runoff forecasting, Climatic changes, Evapotranspiration, Snowmelt, Global warming, Computerized simulation.

47-2124
Sierra Nevada winter storms: a study using microwave radiometry, ice crystal and isotopic analysis technique.
Demoz, B.B., Reno, University of Nevada, 1992, 164p., University Microfilms order No.9230122, Ph.D. thesis. Refs. p.149-155.
Ice storms, Snowstorms, Supercooled clouds, Topographic effects, Cloud seeding, Clouds (meteorology), Unfrozen water content, Radiometry, Isotope analysis, United States—Sierra Nevada.

47-2125
Advances in micromechanics of granular materials.
U.S./Japan Seminar on Micromechanics of Granular Materials, 2nd, Potsdam, NY, Aug. 5-9, 1991, Studies in applied mechanics, No.31, Amsterdam, Elsevier Science Publishers, 1992, 461p., Refs. passim. For selected papers see 46-3077, 46-3078, 47-2126, and 47-2127.
Shen, H.H., ed.
Shear flow, Avalanche modeling.

47-2126
Experiments on ice-sphere flows along an inclined chute.
Nishimura, K., et al, U.S./Japan Seminar on Micromechanics of Granular Materials, 2nd, Potsdam, NY, Aug. 5-9, 1991. Edited by H.H. Shen et al. Advances in micromechanics of granular materials, Amsterdam, Elsevier Science Publishers, 1992, p.123-129, 4 refs.
Kosugi, K., Nakagawa, M.
Avalanche modeling, Avalanche mechanics, Ice friction.

47-2127
Simulations of rapid bimodal granular flows.
Nakagawa, M., et al, U.S./Japan Seminar on Micromechanics of Granular Materials, 2nd, Potsdam, NY, Aug. 5-9, 1991. Edited by H.H. Shen et al. Advances in micromechanics of granular materials, Amsterdam, Elsevier Science Publishers, 1992, p.131-140, 8 refs.
Imaizumi, T.
Shear flow, Avalanche modeling, Mass movements, Mathematical models.

47-2128
Goals and priorities to guide United States arctic research. Biennial statement.
U.S. Arctic Research Commission, Washington, D.C., Jan. 1993, 35p., 13 refs.
Research projects, Regional planning, Natural resources, Environmental protection, Economic development, International cooperation, Legislation, Organizations.

47-2129
Arctic research priorities. Annual report of the Arctic Research Commission to the President and the Congress of the United States for the period 1 October 1991-30 September 1992.
U.S. Arctic Research Commission, Washington, D.C., Jan. 31, 1993, 39p., 21 refs.
Research projects, Regional planning, Natural resources, Environmental protection, Economic development, International cooperation, Legislation, Organizations.

47-2130
Winter Weather Workshop.
U.S. National Weather Service Winter Weather Workshop, Portland, OR, Sep. 15-18, 1992, *U.S. National Oceanic and Atmospheric Administration. National Weather Service. Western Region. NOAA technical memorandum,* Dec. 1992, NWS WR-218, Var. p., Refs. passim. For selected papers see 47-2131 through 47-2142.
Snowstorms, Weather forecasting, Snowfall, Lake effects, Weather observations, Meteorological charts, Meteorological data.

47-2131
River flood forecasting in the Northeast during ice jam situations.
Austin-Smith, A., et al, *U.S. National Oceanic and Atmospheric Administration. National Weather Service. Western Region. NOAA technical memorandum,* Dec. 1992, NWS WR-218, U.S. National Weather Service Winter Weather Workshop, Portland, OR, Sep. 15-18, 1992, 10p., 5 refs.
Hawley, T., Kilpatric, B., Gabrielsen, P.
Ice jams, Flood forecasting, River ice.

47-2132
Front Range/Palmer Divide blizzard of 7 Jan 1992.
Wolf, R.A., et al, *U.S. National Oceanic and Atmospheric Administration. National Weather Service. Western Region. NOAA technical memorandum,* Dec. 1992, NWS WR-218, U.S. National Weather Service Winter Weather Workshop, Portland, OR, Sep. 15-18, 1992, 6p., 1 ref.
McQueen, R.
Snowstorms, Weather forecasting, Snowfall, United States—Colorado.

47-2133
Observing and forecasting a mesoscale snow event using MAPS.
Glancy, R.T., et al, *U.S. National Oceanic and Atmospheric Administration. National Weather Service. Western Region. NOAA technical memorandum,* Dec. 1992, NWS WR-218, U.S. National Weather Service Winter Weather Workshop, Portland, OR, Sep. 15-18, 1992, 11p., 8 refs.
Wolf, R.A., Thaler, E.R.
Snowstorms, Weather forecasting, Snowfall, Weather observations, Meteorological charts, Meteorological data, Data processing, United States—Colorado.

47-2134
Operational use of an orographic snow model.
Scott, C., *U.S. National Oceanic and Atmospheric Administration. National Weather Service. Western Region. NOAA technical memorandum,* Dec. 1992, NWS WR-218, U.S. National Weather Service Winter Weather Workshop, Portland, OR, Sep. 15-18, 1992, 7p., 2 refs.
Snowstorms, Weather forecasting, Snowfall, Alpine landscapes, Topographic effects, Computerized simulation, Mathematical models, United States—Wyoming.

47-2135
Operational use of an orographic precipitation model.
Hayes, P.S., *U.S. National Oceanic and Atmospheric Administration. National Weather Service. Western Region. NOAA technical memorandum,* Dec. 1992, NWS WR-218, U.S. National Weather Service Winter Weather Workshop, Portland, OR, Sep. 15-18, 1992, 14p., 3 refs.
Weather forecasting, Precipitation (meteorology), Alpine landscapes, Topographic effects, Computerized simulation, Mathematical models, United States—Washington.

47-2136
Analysis of the record-breaking northern plains snowstorm of October 27-29 1991.
Abeling, W.A., et al, *U.S. National Oceanic and Atmospheric Administration. National Weather Service. Western Region. NOAA technical memorandum,* Dec. 1992, NWS WR-218, U.S. National Weather Service Winter Weather Workshop, Portland, OR, Sep. 15-18, 1992, 22p., 4 refs.
Raps, V.
Snowstorms, Weather forecasting, Snowfall, Records (extremes), Plains, Weather observations, Meteorological charts, Meteorological data, United States—North Dakota, United States—South Dakota.

47-2137
Snowstorms over the western Washington lowlands.
Ferber, G.K., *U.S. National Oceanic and Atmospheric Administration. National Weather Service. Western Region. NOAA technical memorandum,* Dec. 1992, NWS WR-218, U.S. National Weather Service Winter Weather Workshop, Portland, OR, Sep. 15-18, 1992, 23p., 16 refs.
Snowstorms, Weather forecasting, Snowfall, Weather observations, Meteorological charts, Meteorological data, United States—Washington.

47-2138
Use of high resolution data from the Nested Grid Model for the prediction of lake-effect snows.
Niziol, T.A., et al. *U.S. National Oceanic and Atmospheric Administration. National Weather Service. Western Region. NOAA technical memorandum.* Dec. 1992, NWS WR-218, U.S. National Weather Service Winter Weather Workshop, Portland, OR, Sep. 15-18, 1992, 11p., 13 refs.
McLaughlin, S.
Lake effects, Snowstorms, Weather forecasting, Snowfall, Weather observations, Meteorological charts, Meteorological data, Computerized simulation, Data processing, United States—New York.

47-2139
Lake effect snow events in eastern New York.
Snyder, W.R., *U.S. National Oceanic and Atmospheric Administration. National Weather Service. Western Region. NOAA technical memorandum,* Dec. 1992, NWS WR-218, U.S. National Weather Service Winter Weather Workshop, Portland, OR, Sep. 15-18, 1992, 10p.
Lake effects, Snowstorms, Weather forecasting, Snowfall, Weather observations, Meteorological charts, Meteorological data, United States—New York.

47-2140
Case study of a mesoscale snow event in New York's Capital District.
Wooldridge, M.E., et al. *U.S. National Oceanic and Atmospheric Administration. National Weather Service. Western Region. NOAA technical memorandum,* Dec. 1992, NWS WR-218, U.S. National Weather Service Winter Weather Workshop, Portland, OR, Sep. 15-18, 1992, 13p., 4 refs.
Snyder, W.R.
Lake effects, Snowstorms, Weather forecasting, Snowfall, Weather observations, Meteorological charts, Meteorological data, United States—New York.

47-2141
NGM model output error and the effect on forecasting a Great Basin cyclogenic event: a case study.
Conger, M.C., *U.S. National Oceanic and Atmospheric Administration. National Weather Service. Western Region. NOAA technical memorandum,* Dec. 1992, NWS WR-218, U.S. National Weather Service Winter Weather Workshop, Portland, OR, Sep. 15-18, 1992, 38p., 17 refs.
Atmospheric disturbances, Snowstorms, Weather forecasting, Precipitation (meteorology), Weather observations, Meteorological charts, Meteorological data, Computerized simulation, Data processing, United States—Utah.

47-2142
Winter severity index for Pittsburgh, Pennsylvania.
Nouhan, V.J., *U.S. National Oceanic and Atmospheric Administration. National Weather Service. Western Region. NOAA technical memorandum,* Dec. 1992, NWS WR-218, U.S. National Weather Service Winter Weather Workshop, Portland, OR, Sep. 15-18, 1992, 17p., 7 refs.
Snowstorms, Weather forecasting, Snowfall, Weather observations, Meteorological data, United States—Pennsylvania—Pittsburgh.

47-2143
SAR: a new ice analysis tool.
Kniskern, F.E., *Mariners weather log,* 1993, 37(1), p.22-23.
Sea ice, Remote sensing, Synthetic aperture radar, Airborne radar, Ice conditions, Ice navigation, Radar photography.

47-2144
Iceberg warnings.
Ezman, A.T., *Mariners weather log,* 1993, 37(1), p.56-59.
Marine transportation, Icebergs, Ice reporting, Ice navigation, Radio communications.

47-2145
Water balance in Svalbard—snow erosion, May 19-24, 1992. [Vassbalansestudie pa Svalbard—Snomaling 19.05-24.05. 1992].
Tveit, J., Norwegian Institute of Technology. Division of Hydraulic and Sanitary Engineering. Report, Trondheim, University of Trondheim, June 1992, 51p., In Norwegian.
Arctic landscapes, Snow hydrology, Snow surveys, Water balance, Snowmelt.

47-2146
Development of ice and precipitation in New Mexican summertime cumulus clouds.
Blyth, A.M., et al, *Royal Meteorological Society. Quarterly journal A,* Jan. 1993, 119(509), p.91-120, Refs. p.117-120.
Latham, J.
Cloud physics, Precipitation (meteorology), Aerial surveys, Ice crystal growth, Snow pellets, Wind factors, Temperature effects, Fluid dynamics.

47-2147
Fundamental research on external factors affecting the freezing of supercooled water.
Saito, A., et al, *International journal of heat and mass transfer,* Oct. 1992, 35(10), p.2527-2536, With French, German and Russian summaries. 4 refs.
Water temperature, Supercooling, Temperature control, Freezing, Heat transfer, Air conditioning, Liquid solid interface.

47-2148
Evolution theory for optimal control of a Couette iceform design model.
LaFleur, R.S., *International journal of heat and mass transfer,* Oct. 1992, 35(10), p.2617-2629, With French, German and Russian summaries. 33 refs.
Design criteria, Ice formation, Heat flux, Fluid dynamics, Ice water interface, Thermal analysis, Mathematical models, Thermodynamics.

47-2149
Example of the Couette iceform design model: flat plate ice formation.
LaFleur, R.S., *International journal of heat and mass transfer,* Oct. 1992, 35(10), p.2631-2642, With French, German and Russian summaries. 15 refs.
Design criteria, Ice formation, Fluid dynamics, Heat transfer, Ice water interface, Laminar flow, Mathematical models, Turbulent boundary layer, Plates.

47-2150
New propulsion system for a multi-purpose icebreaker. [Neue Antriebssysteme für Mehrzweckeisbrecher], *Hansa,* Jan. 1993, 130(1), p.50-51, In German.
Icebreakers, Construction, Engines, Specifications.

47-2151
Frost-and-salt resistant concretes. [Morozosolestoike betony].
Gurskis, V.V., *Beton i zhelezobeton,* Apr. 1992, No.4, p.18-20, In Russian. 5 refs.
Frost resistance, Concrete freezing, Concrete admixtures, Salinity, Corrosion.

47-2152
Quick-setting claydite-concrete for winter concreting. [Bystrotverdeiushchii keramzitobeton dlia zimnego betonirovaniia].
Ferronskaia, A.V., et al, *Beton i zhelezobeton,* June 1992, No.6, p.12-14, In Russian. 2 refs.
Koroviakov, V.F., Chumakov, L.D., Mel'nichenko, S.V.
Winter concreting, Concrete hardening, Concretes, Frost resistance.

47-2153
Predicting the frost resistance of concrete. [Prognozirovanie morozostoikosti betona].
Sizov, V.P., *Beton i zhelezobeton,* June 1992, No.6, p.25-27, In Russian. 6 refs.
Frost resistance, Forecasting, Concretes.

47-2154
Effect of the structure of cement stone with admixtures of micro-silica and super-plasticizer on concrete properties. [Vliianie struktury tsementnogo kamnia s dobavkami mikrokremnezema i superplastifikatora na svoistva betona].
Kaprielov, S.S., et al, *Beton i zhelezobeton,* July 1992, No.7, p.4-7, In Russian. 7 refs.
Sheinfel'd, A.V., Krivoborodov, IU.R.
Cement admixtures, Concretes, Concrete admixtures, Frost resistance.

47-2155
Concrete hardening with low water requirement cements at subfreezing temperatures. [Tverdenie betonov na VNV pri otritsatel'nykh temperaturakh].
Krasnovskii, B.M., et al, *Beton i zhelezobeton,* Feb. 1991, No.2, p.17-18, In Russian.
Concrete hardening, Winter concreting, Cements.

47-2156
Application of the superplasticizer SFS as an antifrost admixture for concrete. [Primenenie plastifikatora SFS v kachestve protivomoroznoi dobavki dlia betona].
D'iachenko, S.S., et al, *Beton i zhelezobeton,* May 1991, No.5, p.11-12, In Russian. 3 refs.
Fedorov, A.A., Kaminskii, V.F., Verzhanovskaia, E.V.
Concretes, Concrete admixtures, Frost resistance.

47-2157
Effect of temperature and time on stresses in frozen concrete under thermal cycling. [Vliianie temperatury i vremeni na napriazheniia v zamorozhennom betone pri termotsiklirovanii].
Ben'kov, V.N., et al, *Beton i zhelezobeton,* Oct. 1991, No.10, p.7-9, In Russian. 4 refs.
Sergeeva, E.S.
Temperature effects, Time factor, Stresses, Concretes, Winter concreting.

47-2158
Field studies of the hardening of concrete piles in winter. [Naturnye issledovaniia tverdeniia betona svai v zimnee vremia].
Krylov, B.A., et al, *Beton i zhelezobeton,* Oct. 1991, No.10, p.22-24, In Russian.
Dediukhov, A.A.
Concrete piles, Winter concreting, Concrete hardening.

47-2159
Superplasticizer based on poly-electrolytic compounds. [Superplastifikator na osnove polielektrolitnykh kompleksov].
Simonenko, L.I., et al, *Beton i zhelezobeton,* Nov. 1991, No.11, p.18-20, In Russian.
Stambulko, V.I.
Frost resistance, Concretes, Salinity, Corrosion, Concrete admixtures, Freeze thaw cycles.

47-2160
Moisture deformation of concrete with admixtures under cyclic freeze-thaw. [Vlazhnostnye deformatsii betona s dobavkami pri tsiklicheskikh zamorazhivaniiakh i ottaivaniiakh].
Almazov, V.O., et al, *Beton i zhelezobeton,* Nov. 1991, No.11, p.29-30, In Russian. 4 refs.
Starchenko, O.V.
Freeze thaw cycles, Concretes, Concrete admixtures, Moisture, Deformation.

47-2161
Alkali-silicate concrete for salt-and-frost resistant structures. [Shchelochesilikatnyi beton dlia solemorozostoikikh konstruktsii].
Guzeev, E.A., et al, *Beton i zhelezobeton,* Sep. 1990, No.9, p.4-6, In Russian. 2 refs.
Borisenko, V.M., Spataev, I.O.
Frost resistance, Concretes, Salinity, Corrosion, Winter concreting, Cold weather construction.

47-2162
Protective wall for an offshore platform in the North Sea. [Zashchitnaia stenka morskoi platformy v Severnom more].
Volkov, IU.S., *Beton i zhelezobeton,* Sep. 1990, No.9, p.30-31, In Russian.
Offshore structures, Concrete structures, Reinforced concretes, North Sea.

47-2163
Frost resistance of concretes with air draw-in and gas-forming admixtures. [Morozostoikost' betonov s vozdukhovovlekaiushchimi i gazoobrazuiushchimi dobavkami].
[Anbykh, N.N., *Beton i zhelezobeton,* May 1990, No.5, p.35-37, In Russian.
Frost resistance, Concrete admixtures, Concretes.

47-2164
Transport of marine organic matter evidenced in antarctic snow.
Cini, R., et al, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.191-204, 25 refs.
Snow impurities, Aerosols, Marine atmospheres, Atmospheric circulation, Antarctica—Melbourne, Mount.
The presence of marine aerosol in antarctic snow and its transport conditions are discussed. Results of some physico-chemical parameters relating to the process of marine aerosol formation are reported for two snow samples of different characteristics. Fluorescent surfactant matter in both samples is evidenced. Further UV photolysis on marine water after a laboratory aerosolization process seems to confirm the exclusive marine origin of organic matter for snow sampled at 1130 m altitude on Mt. Melbourne. (Auth.)

47-2165
1991 ozone hole.
Clarkson, T.S., et al, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.303-309, 17 refs.
Nichol, S.E.
Ozone, Air temperature, Seasonal variations, Antarctica—Arrival Heights.
Observations of total ozone from Arrival Heights, near Scott Base, since early 1988 have shown significant depletions of ozone in every spring season. These depletions represent a loss of about half of the ozone column. The season-to-season varia-

tions of total ozone and temperatures in the lower stratosphere are discussed here with particular reference to the changing relationships between temperature and ozone amounts. The 1991 ozone depletion event is as severe as in any previous year and its progress up to Nov. 22 is described. (Auth.)

47-2166
DSIR's stratospheric trace gas programme in Antarctica.
Matthews, W.A., et al, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.311-321, 17 refs.
Keys, J.G., Solomon, S.
Ozone, Atmospheric composition, Models, Polar regions, Antarctica—Arrival Heights.
The Department of Scientific and Industrial Research, Physical Sciences Laboratory at Lauder in Central Otago has had an active stratospheric trace gas program in Antarctica since 1982. From that time, an NO2 spectrometer system has been operated in the zenith looking mode from the New Zealand Laboratory at Arrival Heights. The data gathered from this spectrometer system, particularly in spring and fall, provide an insight into the active photochemistry occurring in the stratosphere at high latitudes. The influence of planetary waves is clearly visible in the data series, and the interchange between the oxide of nitrogen storage reservoirs is discussed. Additional NO2 and now also O3 spectrometer systems, built by DSIR but operated jointly, are now also in use at Halley Bay and Showa Station. Simple box model chemical studies, when compared with the observations from both Arrival Heights and Halley Bay, suggest that both the seasonal trend and the diurnal variation in NO2 is best simulated when reactions on background aerosols are also included in the calculations. (Auth.)

47-2167
Estimates of denitrification in the 1990 antarctic spring stratosphere.
Gobbi, G.P., et al, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.323-326, 5 refs.
Adriani, A., Ugazio, S., Viterbini, M.
Ozone, Stratosphere, Atmospheric composition, Air temperature, Antarctica—McMurdo Station.
Twenty-one lidar and temperature soundings were made at McMurdo between Aug. 30 and Oct. 11, 1990. The temperature and lidar soundings were compared to calculated condensation temperatures for NAT, for air containing 2-3 ppmv water and 1-5 ppbv HNO3. During the measurement period McMurdo was within the polar vortex. Since the observations lasted more than 40 days, and the stratospheric circumpolar transit time at 78S is of the order of 6 days, these soundings explored a representative sample of the antarctic vortex airmass. The 1990 ozone depletion over McMurdo took place between Aug. 28 and Oct. 8. During this period no increase in HNO3 above the 1 ppbv threshold seems to have taken place, even when the vortex wall was near the station. These observations indicate that the antarctic stratosphere was highly denitrified prior to and during the period of ozone depletion in 1990. (Auth. mod.)

47-2168
Pinatubo in the Antarctic?.
Stefanutti, L., et al, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.327-343.
Ozone, Stratosphere, Backscattering, Aerosols, Air pollution, Antarctica—Dumont d'Urville Station.
On July 20, 1991 the POLE lidar located at Dumont d'Urville detected a very strong backscattered signal at heights between 20 and 24 km. The scattering ratio of this signal varied between 300 and 2400 and apparently represented a very strong depolarization. Finding it difficult to attribute this to a polar stratospheric cloud, the authors suggest that such a signal might have been caused by a strong loading of the stratosphere by the Pinatubo eruption. (Auth.)

47-2169
Preliminary ozone measurements by means of DIAL in Dumont d'Urville.
Stefanutti, L., et al, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.345-358, 2 refs.
Ozone, Lidar, Stratosphere, Measurement, Data processing, Antarctica—Dumont d'Urville Station.
In 1991, the new ozone lidar began operating at Dumont d'Urville Station in the frame of the Network of Detection of Stratospheric Changes (NDSC). A first partial analysis of the data obtained from Apr. to Oct. 1991 is presented. Due to bad weather conditions, which limited the number of measurements, and only partial data transmission, this analysis has to be considered preliminary. When ozonesonde data were available, a comparison between the lidar and the ozonesonde data was made, showing that the ozone lidar can operate properly in Antarctica. The ozone profiles obtained above 15 km seem generally to be in good agreement with the ozonesonde data. More problematic is the retrieval of data between 10 and 15 km, and only in a few cases have good results been obtained there. (Auth. mod.)

47-2170
Simulation of lidar depolarization by polar stratospheric clouds.
Flesia, C., et al, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.359-365, 14 refs.
Mugnai, A., Stefanutti, L.
Ozone, Stratosphere, Polar atmospheres, Simulation, Backscattering.
In this study, the authors analyze the potential of combined lidar backscatter and depolarization measurements of polar stratospheric clouds (PSCs) for deriving information on their microphysical properties. In particular, they use backscattering simulations for nonspherical nitric acid trihydrate (NAT), HNO3 3H2O, prolate spheroids in conjunction with PSC lidar observations, to obtain information on the first three moments of the Type I PSC particle size distribution (i.e., particle concentration, mean radius, and standard deviation) and on particle orientation, thus introducing further distinction between Type Ia and Type Ib PSCs. (Auth.)

47-2171
1991 spring lidar campaign for polar stratospheric clouds studies at McMurdo, Antarctica: preliminary results.
Adriani, A., et al, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.367-373, 5 refs.
Di Donfrancesco, G., Gobbi, G.P.
Ozone, Stratosphere, Lidar, Polar atmospheres, Antarctica—McMurdo Station.
Polar stratospheric cloud studies have been in progress since the 1990 spring at McMurdo Station; in the 1991 season, a lidar system was operated for a period of 45 days. Some preliminary results are described in this paper, including comments on the more interesting phenomena observed, along with an overview of the meteorological and the climatic context in which they took place. (Auth.)

47-2172
Formation and growth of PSCs in a 2D model: effects on the secular ozone trend.
Pitari, G., et al, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.375-396, 15 refs.
Rizi, V., Verdecchia, M.
Polar atmospheres, Models, Atmospheric composition, Ozone, Stratosphere.
A zonally averaged model of the stratosphere is used to assess the role of chemical processes contributing to the ozone trend in the last decade, with the TOMS data for 1980 and 1990 adopted as the observational reference. A satisfactory agreement with the observed trend is found only when chlorine chemistry in polar stratospheric clouds (PSC) is included. It is shown that a correct parameterization of microphysical processes leading to PSC formation is crucial for correctly simulating the heterogeneous polar depletion of ozone, which in turn affects the O3 global balance through a dynamical dilution of the ozone hole. A zero- dimensional code for PSC microphysics, whose inclusion in the 2D transport model is in progress, is described. (Auth.)

47-2173
Total ozone measurements from Scott Base, Antarctica with a Dobson and a Brewer spectrophotometer.
Nichol, S.E., et al, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.469-475, 11 refs.
Valenti, C.
Ozone, Measuring instruments, Solar radiation, Antarctica—Scott Base.
This study presents total ozone measurements from Scott Base for the period of Feb. 1989 to Oct. 1990, using both a Dobson and a Brewer spectrophotometer. The data considered here have been restricted to direct sun measurements. The 54 km separation in the siting of the two instruments is expected to have a minimal effect on the measurements. The results from several intercomparisons between Dobson and Brewer spectrophotometers show agreement within an rms error of 1% when the instrument calibration constants are derived calibration constants, as is the case in this study. On average, the Dobson AD direct sun measurements are between 2 and 4% higher than the Brewer direct sun measurements.

47-2174
Correlating the auroral activity with the southern high- latitude O3-content.
Orsini, S., et al, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.477-490, 27 refs.
Candidi, M., Storini, M.
Ozone, Solar activity, Geomagnetism, Polar atmospheres.
Data from the TOMS instrument on Nimbus-7 are compared with the AE time series to look for a possible connection between magnetospheric activity and the variation in extent of the area where depressed atmospheric O3 content is observed over the high-latitude Southern Hemisphere. Preliminary results are reported; the 1984 vernal equinox is analyzed in connection with the passage at the Earth of two interplanetary perturbations. A positive correlation is found between the magnetospheric activity induced by the solar-wind macrostructures (identified by the analysis of the galactic cosmic-ray modulation) and the high-latitude global O3 depletion. (Auth.)

47-2175
Combined observations of tropospheric and stratospheric thin clouds at McMurdo, Antarctica.
Adriani, A., et al, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.491-503, 15 refs.
Gobbi, G.P., Viterbini, M., Ugazio, S.
Polar atmospheres, Ozone, Data processing, Stratosphere, Lidar, Antarctica—McMurdo Station.
A balloon-borne sonde and a lidar have been developed to make combined observations of thin tropospheric and stratospheric clouds. This combined experiment has been set up to study antarctic polar stratospheric clouds, the cloud layer deeply involved in the process of the ozone hole. The sonde collects cloud particles larger than 4 microns on a transparent impactor; shape, dimension and size distribution of the particles are obtained from these frames. The lidar provides complementary information about PSC optical depth, backscattering, depolarization, vertical distribution and temporal evolution. Balloon launches are made upon lidar detection of PSCs. Characteristics of both instruments are described. The first version of the experiment was tested during a winter campaign at McMurdo Station. Preliminary results are presented. (Auth.)

47-2176
Synoptic climatology in environmental analysis; a primer.
Yarnal, B., London, Belhaven Press, 1993, 195p., Refs. p.171-186.
Atmospheric circulation, Environmental impact, Synoptic meteorology, Air pollution, Global change, Statistical analysis.

47-2177
DC flashover performance of iced insulators under pressure and pollution conditions.
Zhang, J.H., et al, International Conference on Properties and Applications of Dielectric Materials, 3rd, Tokyo, Japan, July 8-12, 1991. Proceedings, New York, Institute of Electrical and Electronics Engineers, 1991, p.957-960, 5 refs.
Shu, L.C., Sun, C.X., Gu, L.G.
DLC TK3401.I59
Power line icing, Ice cover effect, Pollution, Electrical resistivity, Charge transfer, Simulation, Ice pressure, Dielectric properties.

47-2178
Interannual variability of wintertime snow cover across the Northern Hemisphere.
Gutzler, D.S., et al, *Journal of climate*, Dec. 1992, 5(12), p.1441-1447, 13 refs.
Rosen, R.D.
Snow cover distribution, Climatology, Seasonal variations, Synoptic meteorology, Atmospheric circulation, Statistical analysis, Correlation, Climatic changes.

47-2179
Arctic cloudiness: comparison of ISCCP-C2 and Nimbus-7 satellite-derived cloud products with a surface-based cloud climatology.
Schweiger, A.J., et al, *Journal of climate*, Dec. 1992, 5(12), p.1514-1527, 33 refs.
Key, J.R.
Polar atmospheres, Cloud cover, Climatology, Meteorological data, Remote sensing, Periodic variations, Radiometry, Correlation, Statistical analysis.

47-2180
Polar Ocean Profiler: a new generation of oceanographic and meteorological sensory platform.
Morison, J.H., et al, Oceans '91, Honolulu, HI, Oct. 1-3, 1991. Proceedings. Ocean technologies and opportunities in the Pacific for the 90's, New York, Institute of Electrical and Electronics Engineers, 1991, p.627-632, 5 refs.
Backes, J.L., May, C.W.
DLC TC1505.O33917
Oceanography, Telemetering equipment, Drift stations, Hydrography, Design, Meteorological data, Sensors, Ice navigation.

47-2181
Autonomous Conductivity Temperature Vehicle: recent developments.
Morison, J.H., et al, Oceans '91, Honolulu, HI, Oct. 1-3, 1991. Proceedings. Ocean technologies and opportunities in the Pacific for the 90's, New York, Institute of Electrical and Electronics Engineers, 1991, p.633-637, 1 ref.
Light, R.
DLC TC1505.O33917
Oceanography, Submarines, Subglacial observations, Remote sensing, Design, Water temperature, Salinity, Performance.

47-2182
Electromagnetic communications through the seawater-ice-air interface.
Steeves, G., et al, Oceans '91, Honolulu, HI, Oct. 1-3, 1991. Proceedings. Ocean technologies and opportunities in the Pacific for the 90's, New York, Institute of Electrical and Electronics Engineers, 1991, p.638-644, 10 refs.
Millen, T., Nangraves, J.
DLC TC1505.O33917
Oceanography, Ocean bottom, Radio communication, Water level, Height finding, Telemetering equipment, Ice cover effect, Data transmission, Wave propagation, Air ice water interaction, Design.

47-2183
Arctic ice stress measurements.
Lau, P.A., et al, Oceans '91, Honolulu, HI, Oct. 1-3, 1991. Proceedings. Ocean technologies and opportunities in the Pacific for the 90's, New York, Institute of Electrical and Electronics Engineers, 1991, p.645-650, 7 refs.
Knoke, G.S.
DLC TC1505.O33917
Sea ice, Ice deformation, Ice cover strength, Ice surveys, Stresses, Sensors, Data processing, Ice mechanics, Performance.

47-2184
Ice mechanics in the LeadEx program.
Coon, M.D., et al, Oceans '91, Honolulu, HI, Oct. 1-3, 1991. Proceedings. Ocean technologies and opportunities in the Pacific for the 90's, New York, Institute of Electrical and Electronics Engineers, 1991, p.651-656, 8 refs.
Echert, D.C., Lau, P.A., Browne, C.M.
DLC TC1505.O33917
Sea ice, Ice deformation, Ice mechanics, Measuring instruments, Ice cover strength, Performance, Sensors, Stresses.

47-2185
Radio-echo-sounding on Browning Pass, Terra Nova Bay area, Antarctica.
Sievers, J., et al, *Polarforschung*, 1990 (Publ. 92), 60(2), p.135-137.
Redfield, T., Delisle, G.
Ice cover thickness, Radio echo soundings, Antarctica--Browning Pass.
Browning Pass is a 17.5 km long by about 3 km wide NE-SW running valley that forms an easy access route from Campbell Glacier to Priestley Glacier and the Nansen Ice Shelf. Because of its smooth snow surface, Browning Pass has served in the past as a landing site for Hercules as well as smaller aircraft. An attempt was made to determine the snow and ice thickness along several radio-echo sounding (RES) profiles across Browning Pass. Values around 100 m were measured in the NE part and of 50 m or less in the SW part. The high moisture content of the snow in the SW part of the investigated area, however, might have prevented the radar signals from measuring the true depth of bedrock. Arguments are presented which nevertheless suggest a shallow snow and ice cover in Browning Pass.

47-2186
Site survey for future heat flow measurements, Prince Albert Mountains, Antarctica.
Delisle, G., et al, *Polarforschung*, 1990 (Publ. 92), 60(2), p.138-139.
Sievers, J.
Site surveys, Heat flux, Ice cover thickness, Antarctica--Prince Albert Mountains.
The aim of this survey was the identification of ice fields with an internal temperature field characterized by predominantly conductive heat transfer. Blue ice fields of limited thickness and minor surface topography are most favorable in this respect. Suitable drill sites on blue ice fields at which terrestrial heat flow is to be measured will be selected after evaluation of the available data.

47-2187
Sea salt dependent electrical conduction in polar ice.
Moore, J.C., et al, *Journal of geophysical research*, Dec. 10, 1992, 97(B13), p.19,803-19,812, 41 refs.
Paren, J.G., Oerter, H.
Ice sheets, Ice cores, Chemical analysis, Electrical resistivity, Salt ice, Defects, Ion density (concentration), Solubility, Temperature effects, Antarctica--Dolleman Island.
A 45 m length of ice core from Dolleman I., Antarctic Peninsula has been dielectrically analyzed at 5 cm resolution using the dielectric profiling (DEP) technique. The core has also been chemically analyzed for major ionic impurities. A statistical analysis of the measurements shows that the LF (low frequency) conductivity is determined both by neutral salt and acid concentrations. Salts (probably dispersed throughout the ice fabric) determine the dielectric conductivity. The salt conduction mechanism is probably due to Bjerrum L defects alone, created by the incorporation of chloride ions in the lattice. Samples of ice from beneath the Filchner-Ronne Ice Shelf were also measured, and display a similar conduction mechanism below a solubility limit of about 400 micromoles of chloride. The temperature dependence of the neutral salt, acid and pure ice contributions to the LF conductivity of natural ice between -70 C and 0 C is discussed. These results allow a comprehensive comparison of dielectric and chemical data from natural ice. (Auth. mod.)

47-2188
Numerical and experimental study of wavy ice structure in a parallel plate channel.
Weigand, B., et al, NATO Advanced Study Institute on Interactive Dynamics of Convection and Solidification, Chamonix, France, Mar. 8-13, 1992. Proceedings. Edited by S.H. Davis et al, NATO Advanced Science Institutes, Series E. Applied Sciences, Vol.219, Dordrecht, Kluwer Academic Publishers, 1992, p.233-235, 6 refs.
Beer, H.
DLC QC326.158
Laminar flow, Ice formation, Ice water interface, Heat transfer, Turbulent flow, Mathematical models, Forecasting.

47-2189
Seasonality in the mineral stability of a subalpine spodosol.
Zabowski, D., et al, *Soil science*, Dec. 1992, 154(6), p.497-507, 31 refs.
Ugolini, F.C.
Podsol, Soil composition, Clay minerals, Chemical composition, Stability, Seasonal variations, Temperature effects.

47-2190
Fragipan formation in argillic brown earths (Fragiudalfs) of the Milfield Plain, north-east England. 1. Evidence for a periglacial stage of development.
Payton, R.W., *Journal of soil science*, Dec. 1992, 43(4), p.621-644, 59 refs.
Soil formation, Soil analysis, Soil composition, Periglacial processes, Permafrost indicators, Geocryology, Soil texture, Quaternary deposits, Patterned ground.

47-2191
Variation in light attenuation by the permanent ice cap of Lake Bonney during spring and summer.
Priscu, J.C., *Antarctic journal of the United States*, 1991, 26(5), p.223-224, 2 refs.
Lake ice, Light transmission, Ice cover effect, Biomass, Antarctica--Bonney, Lake.
This article presents quantitative data on changes in ice opacity of the ice cap on the east lobe of Lake Bonney during the 1989-1990 austral summer. Integrated daily incident and underwater irradiance (immediately beneath the ice) between Nov. 16, 1989 and Jan. 20, 1990 are shown in a figure. Incident irradiance gradually increased until mid-Dec. and then decreased, whereas underwater irradiance declined sharply during the first week in Dec. and remained relatively constant to the end of the study period. The variability in underwater light transmission caused by the permanent ice cap of Lake Bonney can influence the photophysiology of phytoplankton existing in the water column.

47-2192
Natural fluorescence and photosynthetic quantum yields in vertically stable phytoplankton from perennially ice-covered lakes (dry valleys).
Lizotte, M.P., et al, *Antarctic journal of the United States*, 1991, 26(5), p.226-228, 10 refs.
Priscu, J.C.
Limnology, Ice cover effect, Light transmission, Photosynthesis, Antarctica--McMurdo Dry Valleys, Antarctica--Bonney, Lake, Antarctica--Hoare, Lake, Antarctica--Fryxell, Lake
The natural fluorescence technique was tested for various stratified phytoplankton populations in the lakes of the McMurdo Dry Valleys. The authors measured natural fluorescence profiles, the phytoplankton variables relevant to models predicting chlorophyll and production, chlorophyll *a* concentrations, and primary production rates in Lake Bonney (east and west lobes), Lake Hoare and Lake Fryxell. The 3.0 to 4.5 m of ice cover on these lakes has one obvious advantage for measurements of natural fluorescence: red light is strongly attenuated by ice, effectively eliminating contamination of the upwelling signal by backscattered sunlight. Profiles of natural fluorescence as a function of available irradiance closely traced chlorophyll *a* concentrations but with an offset of approximately 1 m. Chlorophyll *a* concentration can be predicted from natural fluorescence based on the quantum yield of fluorescence and the chlorophyll *a* specific absorption coefficient for the phytoplankton. Thus, natural fluorescence appears to be an applicable technique for estimating chlorophyll *a* concentrations in stratified phytoplankton populations of the dry-valley lakes.

47-2193
Liquid water: theory & experiment.
Teixeira, J., NATO Advanced Study on Propagation of Correlation in Constrained Systems, Cargese, France, July 2-14, 1990. Proceedings. Edited by H.E. Stanley et al, NATO Advanced Science Institutes, Series E. Applied Sciences. Vol.188, Dordrecht, Kluwer Academic Publishers, 1990, p.167-187, 12 refs.
DLC QC20.7.C6 N37
Water structure, Molecular energy levels, Hydrogen bonds, Supercooling, Low temperature research, Temperature effects, Correlation.

47-2194
Hydrogen-bond structures in water & ice.
Dore, J., NATO Advanced Study on Propagation of Correlation in Constrained Systems, Cargese, France, July 2-14, 1990. Proceedings. Edited by H.E. Stanley et al, NATO Advanced Science Institutes, Series E. Applied Sciences. Vol.188, Dordrecht, Kluwer Academic Publishers, 1990, p.188-197, 20 refs.
DLC QC20.7.C6 N37
Hydrogen bonds, Molecular structure, Water structure, Ice structure, Supercooling, Amorphous ice, Ice physics, Neutron diffraction, Correlation.

47-2195
Remote sensing and polar climate.
Crane, R.G., *Earth and mineral sciences*, Spring 1986, 55(3), p.38-41, 6 refs.
Remote sensing, Sea ice, Clouds (meteorology), Climatic changes.
The increased understanding of the role of polar regions in effecting and affecting changes in global climate is reviewed. It is suggested that this influence may be starting to surpass that of tropical regions to do the same thing. In assessing the roles of the arctic and antarctic areas, the use of remote sensing tools in the analyses of observations of sea ice, polar clouds, and the relationships between them is judged to be one of the most significant advances in learning, because of the larger areas that can be monitored more frequently and more quickly.

47-2196
Ice sheets and climate.
Alley, R.B., *Earth and mineral sciences*, 1989, 58(3), p.41-45, 4 refs.
Ice sheets, Ice accretion, Ice creep, Climatic changes, Sea level, Antarctica--West Antarctica, Greenland.
Sea levels have fluctuated over the last hundreds of thousands of years largely because of changes in the volume of major ice sheets. Currently, sea level is rising slowly because of thermal expansion of the oceans and the melting of mountain glaciers. Greenhouse warming in the future can be expected to accelerate mountain glacier melting and begin melting the Greenland ice sheet, but it will also remove some water from the oceans through increased snowfall in Antarctica. The net result would be slow or zero sea-level rise over the next century or longer. However, dramatic sea level rise would occur if the greenhouse warming trend destabilized the marine West Antarctic ice sheet. Such an event would result in tremendous economic dislocation and the potential for human disaster. Studies to date have discovered new feedback mechanisms that tend to stabilize the ice sheet, but much work remains to be accomplished before confident predictions can be made.

47-2197
Antarctic snow cruiser.
Muller, P., *American heritage of invention and technology*, Winter 1993, 8(3), p.63-64.
Snow vehicles.
This latest update on the fate of Tom Poulter's snow cruiser sketches the rush of the construction and display phase of the vehicle, the onloading on Nov. 15, 1939, and the near disastrous off-loading on the Ross Ice Shelf in early January 1940. Though it made a good bivouac, being warm and comfortable at a stationary location, it had severe flaws: it was so heavy it sank into the snow; the wheels provided no traction; and it was seriously underpowered. As WWII approached, the cruiser was abandoned and its fate became unknown. Some have said the ice it rested on broke from the shelf, floated out to sea, and sank. No sightings were reported. Others say the Soviets rescued it and took it home with them; this remains unverified. For earlier accounts see CRREL 1534 (1939); 2642 (1940); 4287 (1940, French); 4814 (1945); and 40-4012 (Antarctic Bibliography 15G-33977, 1986)

47-2198
Primary production and organic matter destruction in Spitsbergen tundra.
Opaliński, K.W., *Polish polar research*, 1991, 12(3), p.419-432, With Polish summary. 45 refs.
Tundra, Biomass, Vegetation factors, Mosses.

47-2199
NWRI digest.
Cooley, J., ed, *Canada. National Water Research Institute. Newsletter*, Winter 1993, No.16, 8p., Refs. passim.
Air pollution, Water pollution, Snow impurities, Snowmelt, Environmental impact, Ecosystems, Health, Canada.

47-2200
Penetration of rocks by continuous water jets.
Harris, H.D., et al, MP 3212, International Symposium on Jet Cutting Technology, 2nd, Cambridge, England, Apr. 2-4, 1974, Bedford, England, British Hydromechanics Research Association, [1974], p.H1/1-H1/15, 4 refs.
Mellor, M.
Rock drilling, Hydraulic jets, Penetration tests.
Data on the penetration of Berea sandstone, Indiana limestone and Barre granite by continuous water jets are presented and discussed. These data do not confirm the existence of a threshold pressure, and there is a high sensitivity of penetration to low traverse speeds. Several schemes for achieving large penetrations are presented.

47-2201
Adhesion of ice to coatings and the performance of ice release coatings.
Croutch, V.K., et al, *Journal of coatings technology*, Dec. 1992, 64(815), p.41-53, 52 refs.
Hartley, R.A.
Ice adhesion, Protective coatings, Ice prevention, Ice removal, Ice loads, Ice solid interface, Ship icing.

47-2202
Morphological and human changes of Swiss lakeshores. [Morphologische und anthropogene Veränderungen der Schweizer Seeufer],
Huber, A., *Wasser, Energie, Luft—Eau, énergie, air*, 1992, 84(11/12), p.334-336, In German with French and English summaries. 4 refs.
Glacial lakes, Shore erosion, Shoreline modification, Human factors, Switzerland.

47-2203
Stability of moraine lakes in high alpine glacier regions. [Zur Stabilität von Moränenseen in hochalpinen Gletschergebieten],
Haeberli, W., *Wasser, Energie, Luft—Eau, énergie, air*, 1992, 84(11/12), p.361-364, In German. 20 refs.
Glacial lakes, Moraines, Lake bursts, Alpine glaciation, Alpine landscapes, Switzerland.

47-2204
Hot water drill for glaciological research. [Der Heisswasserbohrer und seine Anwendung in der glaziologischen Forschung],
Iken, A., *Wasser, Energie, Luft—Eau, énergie, air*, 1992, 84(11/12), p.365-368, In German with French and English summaries. 14 refs.
Ice drills, Thermal drills, Subglacial observations, Drilling, Glacier beds, Glacier surveys, Hydraulic jets.

47-2205
Minsalt Gotland. The road users' attitude to road salt. [Minsalt Gotland. Trafikanternas inställning till vägsalt],
Gregersen, N.P., *Sweden. Statens väg- och trafikinstitut. VTI meddelande*, 1991, No.654, 39p. + appends., In Swedish with English summary. 4 refs.
Road maintenance, Salting, Road icing, Environmental impact, Health, Safety, Sweden.

47-2206
Snow and avalanches in the Swiss Alps, winter 1990/91. [Schnee und Lawinen in den Schweizer Alpen, Winter 1990/91], *Davos, Switzerland. Eidgenössisches Institut für Schnee- und Lawinenforschung. Spezielle Untersuchungen*, 1992, No.55, 199p., In German. Refs. passim.
Avalanches, Snow accumulation, Snow surveys, Snowfall, Snow depth, Snow cover stability, Accidents, Switzerland.

47-2207
Prudhoe Bay Waterflood Project environmental monitoring program 1987. Final report.
U.S. Army Corps of Engineers. Alaska District, Anchorage, AK, 1993, Var. p., Refs. passim.
Tundra, Environmental impact, Ecosystems, Wetlands, Flooding, Oil recovery, Petroleum industry, Shoreline modification, Shore erosion, Snow cover effect, United States—Alaska—Prudhoe Bay.

47-2208
Aerosol scavenging by ice in supercooled clouds.
Song, N.H., et al, International Conference on Precipitation Scavenging and Atmosphere-Surface Exchange Processes, 5th, Richland, WA, July 15-19, 1991. Proceedings, Vol.1, Washington, D.C., Hemisphere Publishing Corporation, 1992, p.63-74, Includes discussion. 15 refs.
Lamb, D.
DLC QC882.4.P74
Cloud physics, Aerosols, Scavenging, Ice crystal growth, Supercooled clouds, Supersaturation, Cloud chambers, Ice vapor interface.

47-2209
Scavenging of aerosol particles by growing and evaporating ice crystals: assessing the role of competitive processes.
Prodi, F., et al, International Conference on Precipitation Scavenging and Atmosphere-Surface Exchange Processes, 5th, Richland, WA, July 15-19, 1991. Proceedings, Vol.1, Washington, D.C., Hemisphere Publishing Corporation, 1992, p.75-86, Includes discussion. 8 refs.
Oraltay, R.G.
DLC QC882.4.P74
Cloud physics, Aerosols, Scavenging, Ice crystal growth, Ice vapor interface, Simulation, Particles, Thermal conductivity.

47-2210
Comparison between the collection efficiency of aerosol particles by water drops and ice crystals.
Wang, P.K., International Conference on Precipitation Scavenging and Atmosphere-Surface Exchange Processes, 5th, Richland, WA, July 15-19, 1991. Proceedings, Vol.1, Washington, D.C., Hemisphere Publishing Corporation, 1992, p.87-96, Includes discussion. 13 refs.
DLC QC882.4.P74
Cloud physics, Sedimentation, Aerosols, Scavenging, Ice nuclei, Cloud droplets, Correlation, Analysis (mathematics), Ice vapor interface.

47-2211
Effect of internal charge distribution in ice crystals on scavenging of aerosol particles.
Zhang, R.Y., et al, International Conference on Precipitation Scavenging and Atmosphere-Surface Exchange Processes, 5th, Richland, WA, July 15-19, 1991. Proceedings, Vol.1, Washington, D.C., Hemisphere Publishing Corporation, 1992, p.97-108, Includes discussion. 23 refs.
Pitter, R.L.
DLC QC882.4.P74
Cloud physics, Aerosols, Scavenging, Charge transfer, Ice crystal growth, Impurities, Ice vapor interface, Ice crystal collision, Mathematical models.

47-2212
Field instrument for examining in-cloud scavenging mechanisms by snow.
Mitchell, D.L., et al, International Conference on Precipitation Scavenging and Atmosphere-Surface Exchange Processes, 5th, Richland, WA, July 15-19, 1991. Proceedings, Vol.1, Washington, D.C., Hemisphere Publishing Corporation, 1992, p.239-253, Includes discussion. 22 refs.
Borys, R.D.
DLC QC882.4.P74
Measuring instruments, Ice vapor interface, Cloud physics, Scavenging, Falling snow, Snow composition, Velocity measurement, Chemical composition, Accuracy, Ion density (concentration).

47-2213
Investigations of the relationship between cloudwater and precipitation chemistry using Doppler radar.
Collett, J.L., Jr., et al, International Conference on Precipitation Scavenging and Atmosphere-Surface Exchange Processes, 5th, Richland, WA, July 15-19, 1991. Proceedings, Vol.1, Washington, D.C., Hemisphere Publishing Corporation, 1992, p.381-392, Includes discussion. 14 refs.
Steiner, M.
DLC QC882.4.P74
Cloud physics, Precipitation (meteorology), Radar echoes, Ice crystal optics, Chemical composition, Ion density (concentration), Snow pellets.

47-2214
Scavenging ratios: black magic or a useful scientific tool?.
Barrie, L.A., International Conference on Precipitation Scavenging and Atmosphere-Surface Exchange Processes, 5th, Richland, WA, July 15-19, 1991. Proceedings, Vol.1, Washington, D.C., Hemisphere Publishing Corporation, 1992, p.403-419, Includes discussion. 24 refs.
DLC QC882.4.P74
Precipitation (meteorology), Aerosols, Scavenging, Chemical composition, Models, Cloud physics, Accuracy, Air pollution, Sampling, Air water interactions.

47-2215
Scavenging of atmospheric constituents by alpine snow.
Baltensperger, U., et al, International Conference on Precipitation Scavenging and Atmosphere-Surface Exchange Processes, 5th, Richland, WA, July 15-19, 1991. Proceedings, Vol.1, Washington, D.C., Hemisphere Publishing Corporation, 1992, p.483-493, Includes discussion. 29 refs.
Schwikowski, M., Gäggeler, H.W., Jost, D.T.
DLC QC882.4.P74
Cloud physics, Snow composition, Scavenging, Ice vapor interface, Air pollution, Heterogeneous nucleation, Chemical analysis, Sampling, Atmospheric composition.

47-2216
Numerical model of aerosol scavenging, part 1: microphysics parameterization.
Molenkamp, C.R., et al, International Conference on Precipitation Scavenging and Atmosphere-Surface Exchange Processes, 5th, Richland, WA, July 15-19, 1991. Proceedings, Vol.1, Washington, D.C., Hemisphere Publishing Corporation, 1992, p.575-590, Includes discussion. 17 refs.
Bradley, M.M.
DLC QC882.4.P74
Cloud physics, Aerosols, Scavenging, Precipitation (meteorology), Nucleation, Mathematical models, Ice vapor interface, Cloud droplets.

47-2217
Numerical model of aerosol scavenging, part 2: simulation of a large city fire.
Bradley, M.M., et al, International Conference on Precipitation Scavenging and Atmosphere-Surface Exchange Processes, 5th, Richland, WA, July 15-19, 1991. Proceedings, Vol.1, Washington, D.C., Hemisphere Publishing Corporation, 1992, p.591-601, Includes discussion. 8 refs.
Molenkamp, C.R.
DLC QC882.4.P74
Cloud physics, Fires, Aerosols, Scavenging, Nuclear explosions, Heterogeneous nucleation, Precipitation (meteorology), Simulation, Snowfall, Climatic factors.

47-2218
Polar precipitation chemistry.
Delmas, R.J., International Conference on Precipitation Scavenging and Atmosphere-Surface Exchange Processes, 5th, Richland, WA, July 15-19, 1991. Proceedings, Vol.3, Washington, D.C., Hemisphere Publishing Corporation, 1992, p.1669-1691, Includes discussion. Refs. p.1686-1690.
DLC QC882.4.P74
Polar atmospheres, Precipitation (meteorology), Snow composition, Chemical composition, Aerosols, Scavenging, Air pollution, Atmospheric composition.
Satisfactorily balanced ion budgets are now available for antarctic and Greenland precipitation. The records of the two major biogenic sulfur species (sulfate and methanesulfonate ions) in polar ice document the past and present sulfur cycle in remote areas. In particular, it has been proposed recently that El Niño events modulate the concentrations of methanesulfonate in South Pole snow. Volcanos represent sporadic but significant contributors to the polar sulfur budget. Nitrate data is still incompletely interpreted, but a stratospheric source linked with the antarctic ozone hole seems to be likely. For both nitrate and sulfate, the anthropogenic contribution is now significant, at least in Greenland. "New" compounds such as H2O2 and HCHO linked with the oxidation potential of the atmosphere are now easily detectible at ppb levels in polar snow. (Auth. mod.)

47-2219
Sulfate in the air, surface snow and snowpits at Dye 3, Greenland.
Jaffrezo, J.L., et al, International Conference on Precipitation Scavenging and Atmosphere-Surface Exchange Processes, 5th, Richland, WA, July 15-19, 1991. Proceedings, Vol.3, Washington, D.C., Hemisphere Publishing Corporation, 1992, p.1693-1704, Includes discussion. 22 refs.
Davidson, C.I.
DLC QC882.4.P74
Ice sheets, Atmospheric composition, Snow composition, Chemical composition, Aerosols, Sampling, Scavenging, Correlation.

47-2220
Field observations, measurements and preliminary results from a study of wet deposition processes influencing snow and ice chemistry at Summit, Greenland.
Borys, R.D., et al. International Conference on Precipitation Scavenging and Atmosphere-Surface Exchange Processes, 5th, Richland, WA, July 15-19, 1991. Proceedings, Vol.3, Washington, D.C., Hemisphere Publishing Corporation, 1992, p.1705-1718. Includes discussion. 30 refs.
DLC QC882.4.P74
Precipitation (meteorology), Ice sheets, Chemical composition, Snow composition, Mass transfer, Scavenging, Sampling, Atmospheric composition, Boundary layer.

47-2221
Are changes in dust sedimentation to polar regions a sign of dust production due to a climatic sensitive variable or more efficient atmospheric transport? And where does the dust come from.
Gillette, D.A., International Conference on Precipitation Scavenging and Atmosphere-Surface Exchange Processes, 5th, Richland, WA, July 15-19, 1991. Proceedings, Vol.3, Washington, D.C., Hemisphere Publishing Corporation, 1992, p.1719-1732. Includes discussion. 25 refs.
DLC QC882.4.P74
Polar atmospheres, Sedimentation, Aerosols, Dust, Origin, Climatic changes, Ice cores, Seasonal variations, Atmospheric circulation.
Polar region deposition changes may be caused by climate-sensitive changes in the strength of dust sources and of transport. Change of transport sensitivity was tested by finding differences in transport for different seasons of dust input. Sensitivity to climate change of dust source strength was inferred by examining the equations for dust emission. Magnitudes of measured differences of dust sedimentation suggest that change of source strength is a more probable cause of variable ice core concentrations than changes of transport efficiency. (Auth.)

47-2222
Chemical thermodynamics of cation exchange reactions: theoretical and practical considerations.
Grant, S.A., et al. MP 3213, Ion exchange and solvent extraction; a series of advances. Vol.2. Edited by J.A. Marinsky and Y. Marcus, New York, Marcel Dekker Inc., 1993, p.1-108, 106 refs.
Fletcher, P.
Ion exchange, Thermodynamics, Liquid solid interfaces, Solid phases, Chemical properties, Solutions, Liquid phases, Mathematical models.

47-2223
Nature and causes of climate change: assessing the long-term future.
Goodess, C.M., et al. London, Belhaven Press, 1992, 248p., Refs. p.212-241.
Palutikof, J.P., Davies, T.D.
Paleoclimatology, Climatic changes, Global change, Glaciation, Ice age theory, Sea level.

47-2224
Interpretation of aerial and satellite photographs of the glacial landforms in the Baitou Mountain area, Jilin Province.
Li, B.L., *Geological review*, Sep. 1992, 38(5), p.431-438. In Chinese with English summary. 6 refs.
Alpine glaciation, Glacier surveys, Moraines, Mountain glaciers, Outwash, Cirque glaciers, Volcanoes, Aerial surveys, Spaceborne photography, China—Jilin Province.

47-2225
Primer on clothing systems for cold-weather field work.
Denner, J.C., *U.S. Geological Survey. Open-file report*, 1990, No.89-415, 14p., 9 refs.
Clothing, Cold weather survival, Health, Safety.

47-2226
Aerodynamic acceptance testing of aircraft ground de/anti-icing fluids.
Laforte, J.L., et al. *Transport Canada. Publication*, Apr. 1992, TP 11078E, 41p. + appends., With French summary. 11 refs.
Bouchard, G., Louchez, P.R.
Aircraft icing, Chemical ice prevention, Air flow, Cold weather tests, Cold weather performance, Boundary layer, Mathematical models

47-2227
Beaufort Sea ice design features: acquisition of data on EIFs.
Pilkington, G.R., et al. *Canada. Environmental Studies Research Funds. Report*, Oct. 1992, No.115, Var. p., With French summary. 52 refs.
Hill, M.C., Metge, M., McGonigal, D.
Ice surveys, Ice floes, Ice islands, Ice loads, Ice solid interface, Ice reporting, Sea ice distribution, Aerial surveys, Spaceborne photography, Data processing, Statistical analysis, Beaufort Sea.

47-2228
Laboratory and field performance of high alumina cement based grout for piling in permafrost.
Biggar, K.W., et al. Canadian Geotechnical Conference, 44th, Calgary, Alberta, Sep. 29-Oct. 2, 1991. Vol.1, Rexdale, Ontario, Canadian Geotechnical Society, [1991], p.42/1-42/9, 8 refs.
Sego, D.C., Noël, M.M.
Permafrost beneath structures, Piles, Grouting, Pile load tests, Foundations, Cements, Cold weather construction, Frozen ground strength.

47-2229
Field load testing of various pile configurations in saline permafrost and seasonally frozen rock.
Biggar, K.W., et al. Canadian Geotechnical Conference, 42nd, Winnipeg, Manitoba, Oct. 23-25, 1989, Rexdale, Ontario, Canadian Geotechnical Society, [1989], p.304-312. 2 refs.
Sego, D.C.
Permafrost beneath structures, Pile load tests, Grouting, Cold weather construction, Frozen ground strength, Saline soils.

47-2230
Tensile strength of unidirectional fiber composites at low temperatures.
Dutta, P.K., MP 3214, Japan-U.S. Conference on Composite Materials, June 22-24, 1992, [1992], p.782-792, 23 refs.
Composite materials, Polymers, Low temperature tests, Tensile properties, Resins, Cold stress.
Results of a number of tests by others and the author show that the longitudinal tensile strength of unidirectional-fiber-reinforced polymer composites degrades at low temperatures. The reason for this behavior is not obvious. Assuming that, to begin with, the fibers are curved, and when embedded in the resin they continue to maintain the curvature to a certain degree, an examination of the problem at low temperatures is presented. The critical fiber stress of such curved fibers is shown to be temperature dependent. Higher critical stress at lower temperatures is thought to be the possible reason of the strength degradation.

47-2231
Aircraft ground de/anti-icing fluid holdover time field testing program for the 1991-1992 winter.
D'Avirro, J., et al. *Transport Canada. Publication*, Aug. 1992, TP 11454E, 83p. + append., With French summary.
Aircraft icing, Chemical ice prevention, Cold weather tests, Ice detection.

47-2232
Comparison of cartridge and membrane solid-phase extraction with salting-out solvent extraction for preconcentration of nitroaromatic and nitramine explosives from water.
Jenkins, T.F., et al. *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1992, SR 92-25, 31p., ADA-260 177, 32 refs.
Miyares, P.H., Myers, K.F., McCormick, E.F., Strong, A.B.
Explosives, Soil pollution, Chemical analysis, Ground water.
Salting-out solvent extraction (SOE) was compared with cartridge and membrane solid phase extraction (SPE) for preconcentration of nitroaromatic and nitramine explosives from water, prior to reversed-phase high performance liquid chromatographic analysis (RP-HPLC). The procedures were compared initially using reagent grade water fortified with TNT, RDX, HMX and nine other analytes at concentrations below what could be determined without preconcentration, and the results were used to estimate analyte recovery and the low concentration detection capability, as characterized by the Certified Reporting Limit (CRL). CRLs for the three procedures were comparable, with values generally in the range of 0.05 to 0.30 microgram/L. Percentage recoveries for the three procedures were generally greater than 90%, except for those of HMX and RDX obtained by the membrane-SPE procedure. A second comparison among the three procedures was obtained on 58 groundwater samples from the Rockeye site at the Naval Surface Warfare Center, Crane, IN. Results from a direct analysis procedure were compared to those from the three preconcentration techniques to estimate percent recovery of HMX, RDX and TNT for real samples. Recoveries were greater than 80%, except for HMX and RDX by the membrane-SPE method. Both SPE procedures exhibited background interferences, which the authors attribute to matrix interaction with the SPE polymers. Usability of the three procedures in a production-oriented laboratory was evaluated with emphasis on solvent consumption, waste production and sample processing time. The cartridge-SPE was judged to be the least rugged of the three procedures.

47-2233
Algorithm for a numerical solution to the problem of heat transfer during borehole drilling in zones of stable frozen ground. [Algoritim chislennogo resheniia zadachi teploobmena pri burenii skvazhin v zonakh ustoĭchivoĭ merzloty].
Starovoĭtova, E.R., Sovershenstvovanie tekhnologii i tekhniki bureniia razvedochnykh skvazhin; mezhvuzovskiĭ nauchnyĭ tematicheskiĭ sbornik (Developing the technology and equipment for drilling test pits; interuniversity scientific thematic collection). Edited by A.N. Bazhutin, Sverdlovsk, Sverdlovskiĭ gornyĭ institut, 1988, p.120-126, In Russian. 4 refs.
Analysis (mathematics), Boreholes, Drilling, Heat transfer, Frozen ground thermodynamics.

47-2234
Influence of water ice absorption on transmission for a 10.5- to 12.5-micron filter/window.
Jacyszyn, F., et al. *Optical engineering*, Sep. 1992, 31(9), p.1952-1954, 3 refs.
Pellicori, S.F.
Data transmission, Spacecraft, Electronic equipment, Ice cover effect, Infrared radiation, Attenuation, Radiation absorption.

47-2235
Seasonality of methane emissions from five lakes and associated wetlands of the Colorado Rockies.
Smith, L.K., et al. *Global biogeochemical cycles*, Dec. 1992, 6(4), p.323-338, 49 refs.
Lewis, W.M., Jr.
Wetlands, Natural gas, Vapor transfer, Ice cover effect, Alpine landscapes, Climatic factors, Seasonal variations, Limnology, Atmospheric composition.

47-2236
Atmospheric loading of nitrogen to alpine tundra in the Colorado Front Range.
Sievering, H., et al. *Global biogeochemical cycles*, Dec. 1992, 6(4), p.339-346, 26 refs.
Burton, D., Caine, N.
Alpine tundra, Ecosystems, Sedimentation, Soil air interface, Vegetation factors, Nutrient cycle, Snow cover effect, Geochemistry, Climatic changes.

47-2237
Recent microweathering phenomena in southern and central Sweden.
Swantesson, J.O.H., *Permafrost and periglacial processes*, Oct.-Dec. 1992, 3(4), p.275-292, With French summary. 48 refs.
Weathering, Rock properties, Geocryology, Site surveys, Classifications, Surface structure, Thin sections, Geomorphology.

47-2238
Cavity development in ice-rich permafrost, Pangnirtung, Baffin Island, Northwest Territories.
Hyatt, J.A., *Permafrost and periglacial processes*, Oct.-Dec. 1992, 3(4), p.293-313, With French summary. 61 refs.
Permafrost physics, Permafrost structure, Water erosion, Tunnels, Structural analysis, Classifications, Frozen ground strength, Ice lenses, Permafrost thermal properties.

47-2239
Fractal geometry of thermal and chemical time series from the active layer, Alaska.
Outcalt, S.I., et al. *Permafrost and periglacial processes*, Oct.-Dec. 1992, 3(4), p.315-322, With French summary. 14 refs.
Hinkel, K.M.
Active layer, Soil temperature, Permafrost thermal properties, Temperature measurement, Spectra, Analysis (mathematics), Periodic variations, Soil water, Ion density (concentration).

47-2240
Weichselian Upper Pleniglacial aeolian and ice-cored morphology in the southern Netherlands (Noord-Brabant, Groote Peel).
Kasse, K., et al. *Permafrost and periglacial processes*, Oct.-Dec. 1992, 3(4), Symposium on Periglacial Environments in Relation to Climatic Evolution, Maastrict/Amsterdam, Netherlands, May 3-6, 1991, p.327-342, With French summary. 44 refs.
Bohncke, S.
Periglacial processes, Geomorphology, Quaternary deposits, Stratigraphy, Frost mounds, Ground ice, Permafrost indicators, Lithology, Paleoecology.

47-2241
Cryoturbations: a sediment structural analysis.
Vandenberghe, J., *Permafrost and periglacial processes*, Oct.-Dec. 1992, 3(4), Symposium on Periglacial Environments in Relation to Climatic Evolution, Maastrict/Amsterdam, Netherlands, May 3-6, 1991, p.343-352, With French summary. 21 refs.
Periglacial processes, Cryoturbation, Quaternary deposits, Stratigraphy, Deformation, Sediment transport, Structural analysis, Patterned ground.

47-2242
Present-day periglacial microforms in the Lesotho Highlands: implications for present and past climatic conditions.
Hanvey, P.M., et al, *Permafrost and periglacial processes*, Oct.-Dec. 1992, 3(4), Symposium on Periglacial Environments in Relation to Climatic Evolution, Maastrict/Amsterdam, Netherlands, May 3-6, 1991, p.353-361, With French summary. 19 refs.
Marker, M.E.
Periglacial processes, Freeze thaw cycles, Geocryology, Landforms, Mountain soils, Soil patterns, Paleoclimatology, Temperature variations.

47-2243
Periglacial phenomena and Pleistocene environmental conditions in the Netherlands—an overview.
Vandenberghe, J., *Permafrost and periglacial processes*, Oct.-Dec. 1992, 3(4), Symposium on Periglacial Environments in Relation to Climatic Evolution, Maastrict/Amsterdam, Netherlands, May 3-6, 1991, p.363-374, With French summary. 54 refs.
Pleistocene, Periglacial processes, Paleoclimatology, Stratigraphy, Cryogenic structures, Soil surveys, Lithology.

47-2244
Across northern Tien Shan; mountain tourist routes across Zailiyskiy Alatau and Kungey Alatau. [Po severnomu Tian'-Shaniu; gornye turistskie marshruty po Zailiiskomu Alatau i Kungeĭ-Alatau],
Vukolov, V.N., Moscow, Profizdat, 1991, 207p. + 1 fold. map, In Russian.
Glacier surveys, Route surveys, USSR—Tien Shan, USSR—Zailiyskiy Alatau, USSR—Kungey Alatau.

47-2245
Structural characteristics and development of sea ice in the western Ross Sea.
Jeffries, M.O., et al, *Antarctic Science*, Mar. 1993, 5(1), p.63-75, 34 refs.
Weeks, W.F.
Snow ice, Frazil ice, Sea ice, Ice crystals, Ice deformation, Ice structure, Antarctica—Ross Sea.
The internal structure of ice cores from western Ross Sea pack ice floes showed considerable diversity. Snow-ice formation made a small but significant contribution to ice growth. Frazil ice was common, and its growth clearly occurred during both the pancake cycle and deformation events. Congelation ice was also common, in both its crystallographically aligned and non-aligned varieties. Platelet ice was found in only one core next to the Drygalski Ice Tongue, an observation adding to the increasing evidence that this unusual ice type occurs primarily in coastal pack ice near ice tongues and ice shelves. The diverse internal structure of the floes indicates that sea ice development in the Ross Sea is as complex as that in the Weddell Sea and more complex than in the Arctic. The mean ice thickness at the ice core sites varied between 0.71 m and 1.52 m. The thinnest ice generally occurred in the outer pack ice zone. Regardless of latitude, the ice thickness data are further evidence that antarctic sea ice is thinner than arctic sea ice. (Auth.)

47-2246
Lomen water power plant—channel formation over a lake discharge outlet. [Lomensprosjektet—rakdannelse ved utslipp i innsjöer],
Wold, K., *Norges Vassdrags- og Energiverk. Publikasjon*, July 1988, No.11, 98p., In Norwegian.
Water intakes, Lake ice, Ice melting, Ice water interface, Water temperature, Subsurface drainage, Electric power.

47-2247
Plankton primary productivity in an arctic lake; 71.2 deg N—diurnal variations of productivity under the midnight sun. [Planktonisk primaerproduksjon i en arktisk innsjö: 71.2 deg N—produksjonens dögnfordeling under midnattsol],
Berge, D., et al, *Norsk Institutt for Vannforskning. Rapport*, Apr. 4, 1988, 85p., Proj. No.E-87701, In Norwegian. 19 refs.
Traaen, T., Rognerud, S., Högberget, R.
Limnology, Plankton, Biomass, Photosynthesis, Diurnal variations, Light effects.

47-2248
Main project 1991—water balance and a model of drainage in permafrost areas. [Hovudoppgave 1991—vassbalanse og avlaupsmodellar i permafrostomrader],
Bruland, O., Norwegian Institute of Technology, Division of Hydraulic & Sanitary Engineering. Report, Trondheim, University of Trondheim, 1991, Var.p., In Norwegian. 44 refs.
Permafrost hydrology, Permafrost surveys, Water balance, Snowmelt, Runoff, Periodic variations, Watersheds.

47-2249
Expression of a bacterial ice nucleation gene in plants.
Baertlein, D.A., et al, *Plant physiology*, Dec. 1992, 100(4), p.1730-1736, 33 refs.
Plant physiology, Plant tissues, Bacteria, Ice nuclei, Heterogeneous nucleation, Cold tolerance, Temperature effects, Experimentation, Supercooling.

47-2250
Frazil ice formation due to difference in heat and salt exchange across a density interface.
Krylov, A.D., et al, *Journal of marine systems*, Dec. 1992, 3(6), p.497-506, 31 refs.
Zatsepin, A.G.
Sea ice, Frazil ice, Ice formation, Turbulent diffusion, Thermal diffusion, Freezing rate, Simulation, Salinity, Ice water interface.

47-2251
Comparison of cloud microphysics parameterizations for simulation of mesoscale clouds and precipitation.
Lee, I.Y., *Atmospheric environment*, Oct. 1992, 26A(15), International Conference on Atmospheric Sciences and Application to Air Quality, 3rd, Shanghai, P.R.C., Oct. 15-19, 1990, p.2699-2712, 37 refs.
Cloud physics, Ice water interface, Precipitation (meteorology), Ice crystal growth, Mathematical models, Weather forecasting, Snow pellets.

47-2252
Soil catena variation along an alpine climatic transect, northern Peruvian Andes.
Miller, D.C., et al, *Geoderma*, Nov. 1992, 55(3-4), p.211-223, 37 refs.
Birkeland, P.W.
Mountain soils, Alpine landscapes, Moraines, Soil formation, Soil surveys, Physical properties, Climatic factors.

47-2253
Proceedings.
International Conference on Nucleation and Atmospheric Aerosols, 13th, Salt Lake City, UT, Aug. 24-28, 1992, Hampton, VA, A. Deepak Publishing, 1992, 523p., Refs. passim. For selected papers see 47-2254 through 47-2281.
Fukuta, N., ed, Wagner, P.E., ed.
DLC QC921.6.C6 N83
Aerosols, Cloud physics, Scavenging, Nucleation, Ice vapor interface, Ice crystal growth, Atmospheric composition, Ice nuclei.

47-2254
Homogeneous freezing of sulfuric acid droplets. 1. Formation of *H2SO4* x *4H2O (SAT).*
Luo, B.P., et al, International Conference on Nucleation and Atmospheric Aerosols, 13th, Salt Lake City, UT, Aug. 24-28, 1992. Proceedings. Edited by N. Fukuta et al, Hampton, VA, A. Deepak Publishing, 1992, p.225-228, 10 refs.
Peter, T., Crutzen, P.J.
DLC QC921.6.C6 N83
Cloud physics, Cloud droplets, Homogeneous nucleation, Freezing, Chemical properties, Aerosols, Stratosphere, Theory, Vapor pressure.

47-2255
Homogeneous freezing of sulfuric acid droplets. 2. Implications for PSCs and heterogeneous chemistry.
Peter, T., et al, International Conference on Nucleation and Atmospheric Aerosols, 13th, Salt Lake City, UT, Aug. 24-28, 1992. Proceedings. Edited by N. Fukuta et al, Hampton, VA, A. Deepak Publishing, 1992, p.229-232, 5 refs.
Luo, B.P., Crutzen, P.J.
DLC QC921.6.C6 N83
Cloud physics, Homogeneous nucleation, Freezing rate, Aerosols, Chemical properties, Stratosphere, Condensation nuclei.

47-2256
Freezing points of H2SO4 aqueous solutions and formation of polar stratospheric clouds.
Ohtake, T., International Conference on Nucleation and Atmospheric Aerosols, 13th, Salt Lake City, UT, Aug. 24-28, 1992. Proceedings. Edited by N. Fukuta et al, Hampton, VA, A. Deepak Publishing, 1992, p.233-236, 9 refs.
DLC QC921.6.C6 N83
Cloud physics, Simulation, Solutions, Freezing points, Heterogeneous nucleation, Condensation nuclei, Stratosphere, Temperature effects, Chemical properties.
The freezing temperature of H2SO4 aqueous solutions as a function of concentration was measured as a preliminary investigation of the ice nucleation of natural sulfuric acid mixed aerosols. Based on these measurements, it is proposed that the formation of ice crystals in cirrus and polar stratospheric clouds is the result of the condensation of water vapor and subsequent freezing of natural sulfuric acid aerosols. Results are also related to ice crystal formation in the antarctic atmosphere. (Auth. mod.)

47-2257
Ice crystal nucleation scheme applying by 3-D simulation of cirrus clouds.
Levkov, L., et al, International Conference on Nucleation and Atmospheric Aerosols, 13th, Salt Lake City, UT, Aug. 24-28, 1992. Proceedings. Edited by N. Fukuta et al, Hampton, VA, A. Deepak Publishing, 1992, p.237-240, 5 refs.
Rockel, B.
DLC QC921.6.C6 N83
Cloud physics, Ice crystal growth, Homogeneous nucleation, Supersaturation, Mathematical models, Sounding.

47-2258
Ice nucleus concentrations measured with a continuous flow counter, a mixing chamber and by means of a filter technique.
Aksenov, M.IA., et al, International Conference on Nucleation and Atmospheric Aerosols, 13th, Salt Lake City, UT, Aug. 24-28, 1992. Proceedings. Edited by N. Fukuta et al, Hampton, VA, A. Deepak Publishing, 1992, p.241-243, 3 refs.
DLC QC921.6.C6 N83
Cloud physics, Aerosols, Simulation, Ice nuclei, Heterogeneous nucleation, Cloud chambers, Temperature effects, Nucleation counters.

47-2259
Laboratory studies of the ice-forming characteristics of natural aerosol models.
Gorbunov, B.Z., et al, International Conference on Nucleation and Atmospheric Aerosols, 13th, Salt Lake City, UT, Aug. 24-28, 1992. Proceedings. Edited by N. Fukuta et al, Hampton, VA, A. Deepak Publishing, 1992, p.245-247, 8 refs.
Safatov, A.S.
DLC QC921.6.C6 N83
Cloud physics, Simulation, Ice nuclei, Heterogeneous nucleation, Aerosols.

47-2260
On the homogeneous nucleation of water and ice in *the supersaturated water vapour at temperatures* below -41 C.
Merzhanov, K.M., International Conference on Nucleation and Atmospheric Aerosols, 13th, Salt Lake City, UT, Aug. 24-28, 1992. Proceedings. Edited by N. Fukuta et al, Hampton, VA, A. Deepak Publishing, 1992, p.249-254, 8 refs.
DLC QC921.6.C6 N83
Cloud physics, Ice vapor interface, Homogeneous nucleation, Supersaturation, Simulation, Temperature effects.

47-2261
Laboratory investigations of ice-forming properties transformation of crystallizing agent aerosol.
Kerimov, A.M., et al, International Conference on Nucleation and Atmospheric Aerosols, 13th, Salt Lake City, UT, Aug. 24-28, 1992. Proceedings. Edited by N. Fukuta et al, Hampton, VA, A. Deepak Publishing, 1992, p.255-257, 2 refs.
Komalov, A.S., Stepanov, G.V., Tlisov, M.I.
DLC QC921.6.C6 N83
Cloud physics, Aerosols, Heterogeneous nucleation, Ice nuclei, Hail prevention, Simulation.

47-2262
Memory effect in the nucleation of ice on mercuric iodide.
Vali, G., International Conference on Nucleation and Atmospheric Aerosols, 13th, Salt Lake City, UT, Aug. 24-28, 1992. Proceedings. Edited by N. Fukuta et al, Hampton, VA, A. Deepak Publishing, 1992, p.259-262, 5 refs.
DLC QC921.6.C6 N83
Ice nuclei, Heterogeneous nucleation, Surface properties, Ice solid interface, Cloud physics, Simulation, Temperature effects.

47-2263
Mechanistic studies of heterogeneous ice nucleation by AgI-AgCl and AgI-AgCl-4NaCl aerosols.
DeMott, P.J., et al, International Conference on Nucleation and Atmospheric Aerosols, 13th, Salt Lake City, UT, Aug. 24-28, 1992. Proceedings. Edited by N. Fukuta et al, Hampton, VA, A. Deepak Publishing, 1992, p.263-266, 6 refs.
Rogers, D.C., Grant, L.O.
DLC QC921.6.C6 N83
Cloud physics, Silver iodide, Ice nuclei, Aerosols, Heterogeneous nucleation, Cloud seeding, Simulation, Liquid solid interfaces.

47-2264
Ice nucleation studies on AgI-NaCl system.
Radhakrishnan, T., et al, International Conference on Nucleation and Atmospheric Aerosols, 13th, Salt Lake City, UT, Aug. 24-28, 1992. Proceedings. Edited by N. Fukuta et al, Hampton, VA, A. Deepak Publishing, 1992, p.267-270, 9 refs.
Baskar, K., Radhakrishnan, K.R., Ramasamy, P.
DLC QC921.6.C6 N83
Cloud physics, Ice nuclei, Heterogeneous nucleation, Aerosols, Silver iodide, Cloud seeding, Freezing points, Simulation.

47-2265
Ice nucleation or ice crystal formation? An analysis of mechanisms.
Pitter, R.L., et al, International Conference on Nucleation and Atmospheric Aerosols, 13th, Salt Lake City, UT, Aug. 24-28, 1992. Proceedings. Edited by N. Fukuta et al, Hampton, VA, A. Deepak Publishing, 1992, p.271-274, 5 refs.
Finnegan, W.G.
DLC QC921.6.C6 N83
Cloud physics, Ice crystal growth, Aerosols, Condensation nuclei, Silver iodide, Cloud seeding, Chemical analysis.

47-2266
Preliminary study of ice nucleating properties of loess particles.
Feng, D.X., et al, International Conference on Nucleation and Atmospheric Aerosols, 13th, Salt Lake City, UT, Aug. 24-28, 1992. Proceedings. Edited by N. Fukuta et al, Hampton, VA, A. Deepak Publishing, 1992, p.275-277, 4 refs.
Chen, R.Z., Jiang, G.W.
DLC QC921.6.C6 N83
Loess, Ice nuclei, Heterogeneous nucleation, Aerosols, Cloud physics, Simulation, Ice solid interface.

47-2267
Common features of ice nuclei concentration—temperature dependencies.
Kim, N.S., et al, International Conference on Nucleation and Atmospheric Aerosols, 13th, Salt Lake City, UT, Aug. 24-28, 1992. Proceedings. Edited by N. Fukuta et al, Hampton, VA, A. Deepak Publishing, 1992, p.279-281, 1 ref.
Shkodkin, A.V.
DLC QC921.6.C6 N83
Cloud physics, Ice nuclei, Temperature effects, Heterogeneous nucleation, Supercooling, Aerosols.

47-2268
Ice crystal formation in cirrus cloud.
Matsuo, T., et al, International Conference on Nucleation and Atmospheric Aerosols, 13th, Salt Lake City, UT, Aug. 24-28, 1992. Proceedings. Edited by N. Fukuta et al, Hampton, VA, A. Deepak Publishing, 1992, p.283-286, 6 refs.
Mizuno, H., Murakami, M., Yamada, Y.
DLC QC921.6.C6 N83
Cloud physics, Ice crystal growth, Homogeneous nucleation, Cloud droplets, Nucleation rate, Temperature effects.

47-2269
Ice nuclei availability in the higher troposphere: implications of a remote sensing cloud phase climatology.
Sassen, K., International Conference on Nucleation and Atmospheric Aerosols, 13th, Salt Lake City, UT, Aug. 24-28, 1992. Proceedings. Edited by N. Fukuta et al, Hampton, VA, A. Deepak Publishing, 1992, p.287-290, 5 refs.
DLC QC921.6.C6 N83
Cloud physics, Ice nuclei, Climatology, Homogeneous nucleation, Supercooled clouds, Cloud height indicators, Temperature effects.

47-2270
Potential role of heterogeneous nucleation in the cloud element formation at high altitudes.
Hagen, D.E., et al, International Conference on Nucleation and Atmospheric Aerosols, 13th, Salt Lake City, UT, Aug. 24-28, 1992. Proceedings. Edited by N. Fukuta et al, Hampton, VA, A. Deepak Publishing, 1992, p.291-294, 7 refs.
DLC QC921.6.C6 N83
Cloud physics, Heterogeneous nucleation, Aerosols, Phase transformations, Aerial surveys, Sampling, Particle size distribution.

47-2271
Solubility effects on mixed aerosol ice nuclei in the supercooled clouds.
Smorodin, V.E., International Conference on Nucleation and Atmospheric Aerosols, 13th, Salt Lake City, UT, Aug. 24-28, 1992. Proceedings. Edited by N. Fukuta et al, Hampton, VA, A. Deepak Publishing, 1992, p.295-299, 3 refs.
DLC QC921.6.C6 N83
Cloud physics, Supercooled clouds, Ice nuclei, Aerosols, Solubility, Heterogeneous nucleation, Condensation nuclei.

47-2272
Study of ice nuclei in the area of hail suppression operations in Moldavia.
Potapov, E.I., et al, International Conference on Nucleation and Atmospheric Aerosols, 13th, Salt Lake City, UT, Aug. 24-28, 1992. Proceedings. Edited by N. Fukuta et al, Hampton, VA, A. Deepak Publishing, 1992, p.301-303, 2 refs.
Zotov, E.I., Plaude, N.O., Utkina, G.V.
DLC QC921.6.C6 N83
Cloud physics, Heterogeneous nucleation, Ice nuclei, Cloud seeding, Aerosols, Hail prevention.

47-2273
Ice-producing processes in North Dakota clouds.
Detwiler, A.G., et al, International Conference on Nucleation and Atmospheric Aerosols, 13th, Salt Lake City, UT, Aug. 24-28, 1992. Proceedings. Edited by N. Fukuta et al, Hampton, VA, A. Deepak Publishing, 1992, p.305-308, 7 refs.
Smith, P.L., Stith, J.L.
DLC QC921.6.C6 N83
Cloud physics, Radar echoes, Ice detection, Heterogeneous nucleation, Precipitation (meteorology), Temperature effects.

47-2274
Supersaturation spectra of ice nuclei.
Hussain, K., International Conference on Nucleation and Atmospheric Aerosols, 13th, Salt Lake City, UT, Aug. 24-28, 1992. Proceedings. Edited by N. Fukuta et al, Hampton, VA, A. Deepak Publishing, 1992, p.309-312, 11 refs.
DLC QC921.6.C6 N83
Cloud physics, Ice nuclei, Spectra, Supersaturation, Heterogeneous nucleation, Condensation nuclei, Cloud chambers.

47-2275
Ice forming capability of various aerosols under haloid influence.
Kim, N.S., et al, International Conference on Nucleation and Atmospheric Aerosols, 13th, Salt Lake City, UT, Aug. 24-28, 1992. Proceedings. Edited by N. Fukuta et al, Hampton, VA, A. Deepak Publishing, 1992, p.313-315, 3 refs.
Shilin, A.G., Shkodkin, A.V.
DLC QC921.6.C6 N83
Cloud physics, Ice nuclei, Aerosols, Heterogeneous nucleation, Chemical properties, Temperature effects.

47-2276
Increasing of the solubility of the AgI nuclei seeded for hail suppression in rain drops under the complex formation with dominant ions.
Reutova, T.V., et al, International Conference on Nucleation and Atmospheric Aerosols, 13th, Salt Lake City, UT, Aug. 24-28, 1992. Proceedings. Edited by N. Fukuta et al, Hampton, VA, A. Deepak Publishing, 1992, p.317-320, 5 refs.
Zhinzhakova, L.Z., Cherniak, M.M.
DLC QC921.6.C6 N83
Cloud physics, Cloud seeding, Silver iodide, Solubility, Cloud droplets, Chemical properties, Ion exchange.

47-2277
Freezing nucleus spectra in the rain samples and their possible application on cloud conditions.
Dubrovský, M., International Conference on Nucleation and Atmospheric Aerosols, 13th, Salt Lake City, UT, Aug. 24-28, 1992. Proceedings. Edited by N. Fukuta et al, Hampton, VA, A. Deepak Publishing, 1992, p.321-324, 13 refs.
DLC QC921.6.C6 N83
Cloud physics, Precipitation (meteorology), Ice nuclei, Heterogeneous nucleation, Spectra, Temperature effects, Sampling.

47-2278
Analysis of ice nucleus observation over Huhehot area in winter season.
Kong, Y.Y., International Conference on Nucleation and Atmospheric Aerosols, 13th, Salt Lake City, UT, Aug. 24-28, 1992. Proceedings. Edited by N. Fukuta et al, Hampton, VA, A. Deepak Publishing, 1992, p.325-326, 1 ref.
DLC QC921.6.C6 N83
Cloud physics, Ice nuclei, Heterogeneous nucleation, Cloud chambers, Temperature effects.

47-2279
Spot tests for the detection of nitrate and sulfate particles in ice crystals.
Oraltay, R.G., et al, International Conference on Nucleation and Atmospheric Aerosols, 13th, Salt Lake City, UT, Aug. 24-28, 1992. Proceedings. Edited by N. Fukuta et al, Hampton, VA, A. Deepak Publishing, 1992, p.395-398, 3 refs.
Hallett, J., Pueschel, R.F., Prodi, F.
DLC QC921.6.C6 N83
Scavenging, Ice crystal replicas, Ice crystal structure, Ice composition, Simulation, Chemical properties, Aerosols, Cloud physics.

47-2280
Modification of aerosol chemistry by reactions in atmospheric ice crystals.
Finnegan, W.G., et al, International Conference on Nucleation and Atmospheric Aerosols, 13th, Salt Lake City, UT, Aug. 24-28, 1992. Proceedings. Edited by N. Fukuta et al, Hampton, VA, A. Deepak Publishing, 1992, p.399-402, 5 refs.
Pitter, R.L.
DLC QC921.6.C6 N83
Cloud physics, Heterogeneous nucleation, Aerosols, Chemical properties, Ice crystal growth, Ice vapor interface, Ion exchange, Simulation.

47-2281
Peculiarities of vertical distribution of aerosol particles and ice nuclei in cloud atmosphere.
Khorguani, V.G., International Conference on Nucleation and Atmospheric Aerosols, 13th, Salt Lake City, UT, Aug. 24-28, 1992. Proceedings. Edited by N. Fukuta et al, Hampton, VA, A. Deepak Publishing, 1992, p.427-430, 8 refs.
DLC QC921.6.C6 N83
Cloud physics, Aerosols, Condensation nuclei, Ice nuclei, Distribution, Aerial surveys, Particle size distribution, Heterogeneous nucleation.

47-2282
Formation of cryoresistance and hardiness of plants to low temperatures. (Formirovanie kriorezistentnosti i ustoichivosti rastenii k nizkim temperaturam), Manuil'skiĭ, V.D., Kiev, Naukova dumka, 1992, 185p., In Russian. Refs. p.154-163.
Plant physiology, Plants (botany), Plant tissues, Frost resistance.

47-2283
Hydrodynamics of lakes. (Gidrodinamika ozer), Filatov, N.N., St. Petersburg, Nauka, 1991, 196p., In Russian. 150 refs.
Hydrodynamics, Lakes, Lake ice, Ice cover, Mathematical models, Upwelling, USSR—Ladoga, Lake, USSR—Onega Bay, USSR—Sevan Lake, USSR—Balkhash Lake, USSR—Krasnoye, Lake, Canada—Ontario, Lake, Canada—Beaver Lake.

47-2284
Soil formation in mountain boreal forests of Siberia. (Pochvoobrazovanie v gornykh temnokhvoinykh lesakh Sibiri).
Molokov, V.A., et al, Novosibirsk, Nauka, 1991, 151p., In Russian. Refs. p.146-151.
Korsunov, V.M.
Soil formation, Cryogenic soils, Forest soils, Soil classification, Soil analysis.

47-2285
Anomalies in global heat-water exchange; stochastic models. (Anomalii global'nogo teplovlagoobmena; stokhasticheskie modeli).
Dobrovol'skii, S.G., Moscow, Mezhduvedomstvennyi geofizicheskii komitet, 1991, 128p., In Russian with English summary and table of contents. Refs. p.107-126.
Mathematical models, Global change, Global warming, Ice cover, Heat transfer, Air water interactions, Water balance, Heat flux, Water level.

47-2286
Estimating photosynthetically available radiation into open and ice-covered freshwater lakes from surface characteristics; a high transmittance case study.
Bolsenga, S.J., et al, *Hydrobiologia*, Oct 2, 1992, Vol.243/244, 40-Year Jubilee Symposium of the Finnish Limnological Society, Helsinki, Finland, Aug. 6-10, 1990. Proceedings, p.95-104, 15 refs.
Vanderploeg, H.A.
Limnology, Lake ice, Solar radiation, Transmissivity, Photosynthesis, Ice cover effect, Snow cover effect, Ice surveys, Biomass, Wind factors.

47-2287
Plankton ecology in an ice-covered bay of Lake Michigan: utilization of a winter phytoplankton bloom by reproducing copepods.
Vanderploeg, H.A., et al, *Hydrobiologia*, Oct. 2, 1992, Vol.243/244, 40-Year Jubilee Symposium of the Finnish Limnological Society, Helsinki, Finland, Aug. 6-10, 1990. Proceedings, p.175-183, 26 refs.
Limnology, Lake ice, Plankton, Ice cover effect, Growth, Ecology, Photosynthesis, Light effects.

47-2288
Long-term response of an arctic sedge to climate change: a simulation study.
Leadley, P.W., et al, *Ecological applications*, Nov. 1992, 2(4), p.323-340, 62 refs.
Reynolds, J.F.
Plant ecology, Arctic landscapes, Tundra, Climatic changes, Nutrient cycle, Growth, Simulation, Temperature effects, Global warming.

47-2289
Atmospheric CO2 and global warming: a critical review.
Jaworowski, Z., et al, *Norsk Polarinstitutt. Meddelelser*, 1992, No.119, 76p., Second revised edition, with Norwegian summary. Refs. p.65-74.
Segalstad, T.V., Hisdal, V.
Atmospheric composition, Global warming, Climatic changes, Carbon dioxide, Glacier ice, Ice composition, Hydrocarbons, Sampling, Accuracy.

47-2290
Pluto's moon is a giant snowball.
Croswell, K., *New scientist*, Nov. 21, 1992, 136(1848), p.16.
Extraterrestrial ice, Satellites (natural), Remote sensing, Geologic structures.

47-2291
Cold-weather concreting study.
Hover, K.C., *Concrete construction*, June 1992, 37(6), p.458-464.
Cold weather construction, Concrete placing, Winter concreting, Temperature measurement, Monitors, Concrete strength, Research projects, Compressive properties.

47-2292
Freezing earth with seasonal cooling plants.
Buchko, N.A., et al, *Hydrotechnical construction*, Oct. 1992, 26(4), p.258-264, Translated from Gidrotekhnicheskoe stroitel'stvo. 12 refs.
Shiriaev, IU.N., Ursaki, M.K.
Soil freezing, Artificial freezing, Cooling systems, Soil stabilization, Construction equipment, Tunnels, Earth dams.

47-2293
Effects of dispersed particulates on the rheology of water ice at planetary conditions.
Durham, W.B., et al, *Journal of geophysical research*, Dec. 25, 1992, 97(E12), p.20,883-20,897, 34 refs.
Kirby, S.H., Stern, L.A.
Extraterrestrial ice, Satellites (natural), Ice physics, Rheology, Ice solid interface, Impurities, Geologic processes, Grain size, Planetary environments, Viscosity.

47-2294
Dielectric properties of normal supercooled water obtained in alcohol/water mixtures.
Noyel, G.A., et al, *IEEE transactions on electrical insulation*, Dec. 1992, 27(6), p.1136-1143, 25 refs.
Jorat, L.J., Derriche, O., Huck, J.R.
Solutions, Water structure, Molecular structure, Supercooling, Dielectric properties, Temperature effects, Electrical measurement, Low temperature research.

47-2295
Cold acclimation of *Pinus sylvestris* and *Pinus contorta* provenances as measured by freezing tolerance of detached needles.
Lindgren, K., et al, *Scandinavian journal of forest research*, 1992, 7(3), p.309-315, 15 refs.
Nilsson, J.E.
Forestry, Trees (plants), Acclimatization, Cold weather tests, Frost resistance, Plant tissues, Temperature effects.

47-2296
Frost hardiness of dormant *Salix* shoots.
von Fircks, H.A., *Scandinavian journal of forest research*, 1992, 7(3), p.317-323, 20 refs.
Forestry, Trees (plants), Cold weather survival, Frost resistance, Cold weather tests, Plant tissues, Cold stress, Damage.

47-2297
Performance of a kinetic model for intracellular ice formation based on the extent of supercooling.
Pitt, R.E., et al, *Cryobiology*, June 1992, 29(3), p.359-373, 21 refs.
Chandrasekaran, M., Parks, J.E.
Cryobiology, Liquid cooling, Supercooling, Ice formation, Ice forecasting, Thermodynamics, Mathematical models.

47-2298
Production and heat transfer characteristics of liquid ice as new PCM.
Fukusako, S., et al, Oji International Seminar on Advanced Heat Transfer in Manufacturing and Processing of New Materials, Tomakomai, Japan, Oct. 28-31, 1990. Proceedings. Heat and mass transfer in materials processing. Edited by N. Lior et al, Washington, D.C., Hemisphere Publishing Corporation, 1992, p.347-364, 32 refs.
Yamada, M.
DLC TS183.H43
Air conditioning, Ice thermal properties, Solutions, Phase transformations, Freezing, Heat transfer coefficient, Ice melting, Ice solid interface, Thermal analysis.

47-2299
Seed-zone temperature and moisture conditions under conventional and no-tillage in Alaska.
Bidlake, W.R., et al, *Soil Science Society of America. Journal*, Nov.-Dec. 1992, 56(6), p.1904-1910, 23 refs.
Campbell, G.S., Papendick, R.I., Cullum, R.F.
Agriculture, Soil temperature, Soil conservation, Frozen ground thermodynamics, Heat balance, Analysis (mathematics), Surface properties, Temperature variations, Moisture transfer.

47-2300
Aerosol role in the ozone hole. (Atmósfera antártica: alcances sobre el rol de los aerosoles en el agujero de ozono).
Préndez, M., *Boletin antártico chileno*, Oct. 1992, 11(2), p.10-12, In Spanish. 8 refs.
Ozone, Stratosphere, Aerosols, Atmospheric composition.
After reviewing the mechanics of ozone depletion, the author examines theories explaining the phenomenon. It is concluded that the presence of aerosols in the stratosphere, whose origin is attributed partially to volcanic eruptions, is fundamental in accounting for the antarctic ozone hole, and that it is to be expected that the 1991 eruption of the Hudson volcano will contribute significantly to ozone depletion in the Southern Hemisphere over several years.

47-2301
Cracking kinetics and failure on repeated loadings of ice.
Sinha, N.K., International Symposium on Fatigue and Fracture in Steel and Concrete Structures, Madras, India, Dec. 19-21, 1991. Proceedings. Edited by A.G.M. Rao et al, New Delhi, India, Oxford & IBH Publishing Co, 1992, p.137-150, 31 refs.
DLC TA664.I83
Ice mechanics, Ice strength, Loading, Cracking (fracturing), Ice microstructure, Fatigue (materials), Mathematical models, Ice creep, Mechanical properties.

47-2302
Frost heave and the surface melting of ice.
Dash, J.G., NATO Advanced Study Institute and International Course on Phase Transitions in Surface Films, Erice, Italy, June 19-29, 1990. Proceedings. Phase transitions in surface films 2. Edited by H. Taub et al, NATO Advanced Science Institutes, Series B. Physics, Vol.267, New York, Plenum Press, 1991, p.339-356, 58 refs.
DLC QC173.4.S94 N378
Frost heave, Ice melting, Surface properties, Ice solid interface, Soil physics, Unfrozen water content, Analysis (mathematics), Ice lenses, Soil water migration.

47-2303
Freeze-drying under vacuum and in an adsorbing fluidized bed: influence of operating pressure on drying kinetics.
Wolff, E., et al, International Drying Symposium, 7th, Prague, Czechoslovakia, Aug. 1990. Drying '91. Edited by A.S. Mujumdar et al, Amsterdam, Elsevier Science Publishers, 1991, p.237-246, 6 refs.
Gibert, H.
DLC TP363.D793
Freeze drying, Vacuum freezing, Manufacturing, Ice sublimation, Temperature control, Vapor pressure, Performance, Heat transfer.

47-2304
Near-optimum heating profiles in freeze-drying in accordance to the transport parameters and product nature.
Lombraña, J.I., et al, International Drying Symposium, 7th, Prague, Czechoslovakia, Aug. 1990. Drying '91. Edited by A.S. Mujumdar et al, Amsterdam, Elsevier Science Publishers, 1991, p.394-404, 4 refs.
Mijangos, F., Varona, F., Villarán, M.C.
DLC TP363.D793
Freeze drying, Manufacturing, Solutions, Thermal conductivity, Temperature control, Performance, Mathematical models.

47-2305
Mathematical modelling of heat transfer in freeze drying.
Nastaj, J., International Drying Symposium, 7th, Prague, Czechoslovakia, Aug. 1990. Drying '91. Edited by A.S. Mujumdar et al, Amsterdam, Elsevier Science Publishers, 1991, p.405-413, 7 refs.
DLC TP363.D793
Manufacturing, Freeze drying, Heat transfer, Phase transformations, Mathematical models, Boundary value problem.

47-2306
Structure of ice-Ih.
Kuhs, W.F., et al, *Water science reviews*, 1986, Vol.2, p.1-65, 166 refs.
Lehmann, M.S.
Ice physics, Ice crystal structure, Molecular structure, Latticed structures, Ice spectroscopy, Defects.

47-2307
Crack growth stability in saline ice.
DeFranco, S.J., et al, International Colloquium on Mechanics of Creep Brittle Materials 2, Leicester, UK, Sep. 2-4, 1991. Edited by A.C.F. Cocks et al, London, Elsevier Science Publishers, 1991, p.25-36, 14 refs.
Dempsey, J.P.
DLC TA418.22.I55
Salt ice, Ice cracks, Cracking (fracturing), Crack propagation, Ice mechanics, Mechanical tests, Mechanical properties, Temperature effects, Stability.

47-2308
Dislocation movement at crack tip of single crystals of ice.
Wei, Y.C., et al, International Colloquium on Mechanics of Creep Brittle Materials 2, Leicester, UK, Sep. 2-4, 1991. Edited by A.C.F. Cocks et al, London, Elsevier Science Publishers, 1991, p.62-73, 19 refs.
Dempsey, J.P.
DLC TA418.22.I55
Ice crystal structure, Ice cracks, Ice deformation, Ice creep, Crack propagation, Dislocation (materials), Brittleness, Ice microstructure, Microrelief.

47-2309
Relationship between creep and fracture of ice.
Rist, M.A., et al, International Colloquium on Mechanics of Creep Brittle Materials 2, Leicester, UK, Sep. 2-4, 1991. Edited by A.C.F. Cocks et al, London, Elsevier Science Publishers, 1991, p.355-369, 33 refs.
Murrell, S.A.F.
DLC TA418.22.I55
Ice strength, Ice deformation, Ice creep, Cracking (fracturing), Brittleness, Mechanical properties, Temperature effects, Correlation.

47-2310
Notch acuity effects on the CTOD and K(Q) of ice.
Dempsey, J.P., et al, International Conference on Micromechanics of Failure of Quasi-Brittle Materials, Albuquerque, NM, June 6-8, 1990. Edited by S.P. Shah et al, London, Elsevier Science Publishers, 1990, p.333-342, 16 refs.
Wei, Y., DeFranco, S.J.
DLC TA418.16.I57
Cracking (fracturing), Ice microstructure, Ice cracks, Ice strength, Mechanical tests, Laboratory techniques, Correlation, Accuracy.

47-2311
Laboratory observational and theoretical studies of interstellar ices.
Tielens, A.G.G.M., et al, International School of Physics "Enrico Fermi", Varenna, Italy, June 27-July 7, 1989. Proceedings, Course III, Solid-state astrophysics. Edited by E. Bussoletti et al, Amsterdam, North-Holland Elsevier Science Publishers, 1991, p.29-58, 67 refs.
Allamandola, L.J., Sandford, S.A.
DLC QB460.I586
Extraterrestrial ice, Chemical properties, Cosmic dust, Ice composition, Ice spectroscopy, Remote sensing, Simulation, Infrared spectroscopy, Spectra, Correlation.

47-2312
Forecasting meltwater runoff from snow-covered areas and from glacier basins.
Lang, H., River flow modelling and forecasting. Edited by D.A. Kraijenhoff and J.R. Moll, Water Science and Technology Library, Dordrecht, D. Reidel Publishing Co., 1986, p.99-127, Refs. p.125-127.
DLC GB1207.R58
River basins, Runoff forecasting, Glacier melting, Snowmelt, Snow water equivalent, Snow surveys, Heat balance, Analysis (mathematics), Meltwater.

47-2313
Physical and chemical effects induced by fast ions in ices of astrophysical interest.
Pirronello, V., NATO Advanced Study Institute on Chemistry in Space, Erice, Italy, May 10-20, 1989. Proceedings. Edited by J.M. Greenberg et al, NATO Advanced Science Institutes, Series C. Mathematical and Physical Sciences. Vol.323, Dordrecht, Kluwer Academic Publishers, 1991, p.263-303, Refs. p.299-303.
DLC QB450.C54
Extraterrestrial ice, Cosmic dust, Ionization, Radiation absorption, Ice deterioration, Simulation, Phase transformations.

47-2314
Creep law of rock ice with anisotropic fabric inferred from homogenization.
Lliboutry, L.A., International Symposium on Plasticity and Its Current Applications, 3rd, Grenoble, France, Aug. 12-16, 1991. Proceedings. Anisotropy and localization of plastic deformation. Edited by J.P. Boehler et al, London, Elsevier Publishers, 1991, p.242-245, 5 refs.
DLC TA418.14.I57
Ice creep, Ice crystal structure, Anisotropy, Mechanical properties, Shear stress, Defects, Ice sheets, Shear flow, Analysis (mathematics), Stress concentration.

47-2315
Geochemical exploration for hidden deposits in the cryolithozone. [Geokhimicheskie poiski skrytykh mestorozhdenii v kriolitozone].
Makarov, V.N., et al, Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1988, 108p., In Russian. Refs. p.102-107.
Vinokurov, I.P.
Geochemistry, Exploration, Minerals, Loams, Gold, Ice veins, Alluvium, Statistical analysis.

47-2316
Possibility of using nondestructive diagnostic methods to evaluate the condition of the material in the foundations of buildings and structures erected on permafrost: (operational-information material). [K vozmozhnosti primeneniia metodov nerazrushaiushchei diagnostiki dlia otsenki sostoianiia materiala fundamentov zdanii i sooruzhenii, vozvedennykh na vechnomerzlykh gruntakh: (operativno-informatsionnyi material)],
Izotov, V.N., ed, Yakutsk, AN SSSR, 1989, 44p., In Russian. 56 refs.
Foundations, Cold weather tests, Acoustics, Ultrasonic tests, Electromagnetic prospecting, Radiometry, Mechanical tests, Holography, Permafrost beneath structures.

47-2317
Modeling the thermodynamic processes of permafrost. [Modelirovanie termodinamicheskikh protsessov mnogoletnemerzlykh porod],
Mal'kov, IU.K., Yakutsk, IAkutskil nauchnyi tsentr SO AN SSSR, 1990, 155p., In Russian. 214 refs.
Mathematical models, Permafrost thermal properties, Thermodynamics, Frozen cargo, Frozen rocks, Permafrost beneath structures, Freeze thaw cycles, Mine shafts.

47-2318
Energy density of water and ice nucleation. [Comment].
Wilen, L., *Science*, Mar. 5, 1993, 259(5100), p.1469, 7 refs. For paper being commented on see 46-3722.
Ice crystals, Nucleation, Ice electrical properties.

47-2319
Energy density of water and ice nucleation. [Response].
Lahav, M., et al, *Science*, Mar. 5, 1993, 259(5100), p.1469-1470, 6 refs. For paper being responded to see 46-3722.
Eisenstein, M., Leiserowitz, L.
Ice crystals, Ice nuclei, Ice composition, Ice models.

47-2320
Energy cost of level cross-country skiing and the effect of the friction of the ski.
Saibene, F., et al, *European journal of applied physiology*, 1989, Vol.58, p.791-795, 9 refs.
Cortili, G., Roi, G., Colombini, A.
Skis, Physiological effects, Plastics snow friction, Wood snow friction.

47-2321
Winds causing deflation and snow drifting in Kilpisjärvi area. [Tuulten vaikutus deflaatioon ja lumen kinostumiseen Kilpisjärven alueella],
Hellemaa, P., *Terra*, 1991, 103(4), p.309-316, In Finnish with English summary. 27 refs.
Snow air interface, Snowdrifts, Wind erosion, Snow erosion.

47-2322
How Massachusetts cut salt use and costs.
Carr, F.H., Jr., *Better roads*, Jan. 1992, 62(1), p.17-18.
Road maintenance, Salting, Cost analysis, United States—Massachusetts.

47-2323
What makes a quality material spreader. *Better roads*, June 1992, 62(6), p.19.
Road maintenance, Snow removal.

47-2324
How to design and use snow fences. *Better roads*, June 1992, 62(6), p.20-21.
Snow fences, Snowdrifts, Cost analysis.

47-2325
Can you measure the benefits of RWIS. *Better roads*, June 1992, 62(6), p.22-23.
Road maintenance, Weather forecasting, Cost analysis.

47-2326
Washington State OKs six anti-corrosion deicers. *Better roads*, June 1992, 62(6), p.24-25.
Road maintenance, Chemical ice prevention, Salting, Cost analysis, United States—Washington.

47-2327
How to evaluate deicers. *Better roads*, Aug. 1992, 62(8), p.23,25-26.
Road maintenance, Chemical ice prevention, Salting, Cost analysis.

47-2328
Measuring the benefits of RWIS.
Boselly, S.E., III, *Better roads*, Oct. 1992, 62(10), p.18,20.
Road maintenance, Weather forecasting, Cost analysis.

47-2329
How Vancouver uses thermal mapping. *Better roads*, Dec. 1992, 62(12), p.23,25-27.
Road maintenance, Weather forecasting, Infrared mapping, Canada—British Columbia—Vancouver.

47-2330
AMOP—the Arctic and Marine Oilspill Program.
Thornton, D.E., et al, *Spill technology newsletter*, Apr.-June 1992, 17(2), 9p., With French version separately paged.
Fingas, M.F., Whittaker, H., Sergy, G.
Oil spills, Research projects, Canada.

47-2331
Month of July like no other. [Un mois de juillet pas comme les autres],
Brunot, G., *Neige et avalanches*, Dec. 1992, No.60, p.12-13, In French.
Avalanches, Snow cover stability, Accidents, France.

47-2332
Works of the wind. [Les ouvrages à vent],
Sivardiére, F., et al, *Neige et avalanches*, Dec. 1992, No.60, p.16-23, In French. 7 refs.
Castelle, T.
Avalanche engineering, Snow stabilization, Snow retention, Snowdrifts, Windbreaks, Snow fences, Snowsheds.

47-2333
Telemetry of loads on avalanche protection structures. [Télémesure de contraintes sur ouvrages paravalanches],
Bavoux, E., *Neige et avalanches*, Dec. 1992, No.60, p.26-28, In French.
Avalanche engineering, Snow loads, Telemetering equipment, Data transmission.

47-2334
Development of a national directory of Canadian marine oilspill specialists.
Harper, J.R., et al, *Canada. Environmental Studies Research Funds. Report*, Oct. 1991, No.108, 62p., 4 refs.
Oil spills, Research projects, Organizations, Environmental protection, Data processing, Canada.

47-2335
Iceberg trajectory model—real-time verification.
Finlayson, D.J., et al, *Canada. Environmental Studies Research Funds Report*, Mar. 1992, No.113, 47p. + appends., With French summary. 6 refs.
Bobbitt, J., Rudkin, P., Jordaan, I.J.
Icebergs, Drift, Ice forecasting, Ice reporting, Computerized simulation, Canada—Newfoundland—Grand Banks.

47-2336
Snow survey of Great Britain, 1991/92. London, Meteorological Office, Oct. 1992, 24p.
Snow surveys, Snow depth, Snow cover distribution, United Kingdom.

47-2337
Directory of Norwegian polar scientists. *Norsk Polarinstitutt. Rapportserie*, 1991, No.72, 154p.
Research projects, Organizations.

47-2338
Acronyms and abbreviations for the polar science community.
International Arctic Science Committee, Oslo, 1992, 42p.
Dictionaries, Research projects, Terminology, Organizations.

47-2339
High Arctic IRMA (Integrated Research and Monitoring Area) automatic weather station field data 1990-91.
Alt, B.T., et al, *Canada. Geological Survey. Open file*, 1992, No.2562, 54p. + appends., Refs. passim.
Part 1 and 2 bound together, Part 3 bound separately.
Polar atmospheres, Ice air interface, Weather stations, Meteorological data, Weather observations, Meteorological instruments, Air temperature, Wind (meteorology), Snow depth, Ice sheets, Data processing, Canada—Northwest Territories—Queen Elizabeth Islands.

47-2340
ROV and submersible video interpretation of iceberg scour features and glory holes on the northeastern Grand Banks off Newfoundland.
Cameron, G., et al, *Canada. Geological Survey. Open file*, 1992, 44p., 9 refs.
Sonnichsen, G.
Icebergs, Ice scoring, Ocean bottom, Ice erosion, Grounded ice, Bottom topography, Subsurface investigations, Canada—Newfoundland—Grand Banks.

47-2341
Modeling the seasonal variability of a coupled arctic ice-ocean system.
Hakkinen, S., et al, *Journal of geophysical research*, Dec. 15, 1992, 97(C12), p.20,285-20,304, 56 refs.
Mellor, G.L.
Ocean currents, Oceanography, Sea ice distribution, Air ice water interaction, Climatology, Ice models, Thermodynamics, Mathematical models, Seasonal variations, Snow cover effect.

47-2342
Ocean interactions with the base of Amery Ice Shelf, Antarctica.
Hellmer, H.H., et al, *Journal of geophysical research*, Dec. 15, 1992, 97(C12), p.20,305-20,317, 50 refs.
Jacobs, S.S.
Ice shelves, Ice water interface, Glacial hydrology, Subglacial observations, Ice cover thickness, Freezing rate, Ocean currents, Mass balance, Temperature effects, Salinity, Grounded ice, Antarctica—Amery Ice Shelf.
Using a two-dimensional ocean thermohaline circulation model, the authors varied the cavity shape beneath Amery Ice Shelf in an attempt to reproduce the 150 m-thick marine ice layer observed at the "G1" ice core site. Model results showed temperature/salinity gradients similar to observations from beneath other ice shelves where ice is melting into seawater. Modeled outflow characteristics at the ice front are in general agreement with oceanographic data from Prydz Bay. A freshwater flux across the grounding line, derived from melting beneath the grounded ice sheet, would have to be anomalously large to produce the basal marine ice layer and account for the Ice Shelf Water outflow. These results conform with Morgan's inference that the G1 core may have been taken in a basal crevasse filled with marine ice. This ice is formed from water cooled by ocean/ice shelf interactions along the interior ice shelf base. (Auth. mod.)

47-2343
Origin of green icebergs in Antarctica.
Kipfstuhl, J., et al, *Journal of geophysical research*, Dec. 15, 1992, 97(C12), p.20,319-20,324, 30 refs.
Dieckmann, G.S., Oerter, H., Hellmer, H.H., Graf, W.
Sea ice, Icebergs, Colored ice, Ice formation, Ice composition, Ice shelves, Origin, Drift, Ice cores, Antarctica—Ronne Ice Shelf.
A comparison of samples from a translucent green iceberg with a core from the Ronne Ice Shelf revealed an excellent agreement in isotopic composition, crystal structure, and incorporated sediment particles. Marine shelf ice which constitutes the basal portion of some ice shelves is considered to be the source of green icebergs. It most likely results from "ice pump" processes which produce large amounts of ice platelets in the water column beneath ice shelves. These subsequently accumulate and become compacted into bubble-free, desalinated ice. Iceberg and drift-buoy trajectories indicate that green icebergs observed in the Weddell Sea originate from the Amery Ice Shelf rather than from the Ronne Ice Shelf, although the latter ice shelf is also a potential source. (Auth.)

47-2344
Relationship between sea ice freeboard and draft in the Arctic Basin, and implications for ice thickness monitoring.
Wadhams, P., et al, *Journal of geophysical research*, Dec. 15, 1992, 97(C12), MP 3215, p.20,325-20,334, 41 refs.
Tucker, W.B., Krabill, W.B., Swift, R.N., Comiso, J.C., Davis, N.R.
Sea ice, Surface roughness, Pressure ridges, Ice cover thickness, Aerial surveys, Lasers, Snow cover effect, Ice surveys, Correlation, Sensor mapping, Analysis (mathematics).

47-2345
Oceanographic features in the Newfoundland marginal ice zone, March-April 1990.
Tang, C.L., *Atmosphere-ocean*, June 1992, 30(2), p.151-172, With French summary. 22 refs.
Sea ice distribution, Drift, Ice edge, Air ice water interaction, Ocean currents, Oceanographic surveys, Wind factors, Thermodynamics.

47-2346
Automated sea-ice tracking for LIMEX '87 and '89.
Hirose, T., et al, *Atmosphere-ocean*, June 1992, 30(2), p.173-191, With French summary. 12 refs.
McNutt, L., Manore, M.J.
Sea ice distribution, Ice floes, Drift, Radar tracking, Synthetic aperture radar, Image processing, Ice forecasting, Spaceborne photography, Data processing, Correlation.

47-2347
Wave attenuation in the marginal ice zone during LIMEX.
Liu, A.K., et al, *Atmosphere-ocean*, June 1992, 30(2), p.192-206, With French summary. 19 refs.
For another version see 46-4248.
Vachon, P.W., Peng, C.Y., Bhogal, A.S.
Sea ice, Ice edge, Ocean waves, Ice water interface, Wave propagation, Synthetic aperture radar, Ice cover effect, Attenuation, Aerial surveys, Spectra, Image processing.

47-2348
Sea-ice properties off Labrador and Newfoundland during LIMEX '89.
Prinsenberg, S.J., et al, *Atmosphere-ocean*, June 1992, 30(2), p.207-222, With French summary. 24 refs.
Peterson, I.K.
Sea ice distribution, Ice conditions, Ice growth, Air ice water interaction, Snow cover effect, Ice edge, Drift, Degree days, Meteorological factors, Remote sensing.

47-2349
Detection of the Labrador current using ice-floe movement in synthetic aperture radar imagery and ice beacon trajectories.
Ikeda, M., et al, *Atmosphere-ocean*, June 1992, 30(2), p.223-245, With French summary. 25 refs.
Tang, C.L.
Ocean currents, Hydrography, Detection, Ice floes, Drift, Radar tracking, Wind factors, Synthetic aperture radar, Aerial surveys, Air ice water interaction.

47-2350
Ice-floe collisions interpreted from acceleration data during LIMEX '89.
McKenna, R.F., et al, *Atmosphere-ocean*, June 1992, 30(2), p.246-269, With French summary. 7 refs.
Crocker, G.B.
Sea ice distribution, Ice mechanics, Ice floes, Impact, Ice water interface, Drift, Ocean waves, Spectra, Velocity measurement, Ice edge.

47-2351
Simulation of sea-ice motion and distribution off Newfoundland during LIMEX, March 1987.
Tang, C.L., et al, *Atmosphere-ocean*, June 1992, 30(2), p.270-296, With French summary. 35 refs.
Yao, T.
Sea ice distribution, Drift, Ice forecasting, Ice water interface, Wind factors, Ice models, Mathematical models, Ocean currents, Ice edge.

47-2352
Thermal regime of a valley glacier, Erikbreen, northern Spitsbergen.
Ödegard, R.S., et al, *Polar research*, Dec. 1992, 11(2), p.69-79, 25 refs.
Glaciers, Thermal regime, Radio echo soundings, Temperature gradients, Norway—Spitsbergen.

47-2353
Size and frequency of icebergs and bergy bits derived from tidewater glaciers in Kongsfjorden, northwest Spitsbergen.
Dowdeswell, J.A., et al, *Polar research*, Dec. 1992, 11(2), p.81-91, 20 refs.
Forsberg, C.F.
Icebergs, Glaciers, Melting, Sediments, Norway—Spitsbergen.

47-2354
Russian iceberg observations in the Barents Sea, 1933-1990.
Abramov, V.A., *Polar research*, Dec. 1992, 11(2), p.93-97, 13 refs.
Icebergs, Distribution, Seasonal variations, Barents Sea.

47-2355
Heavy metals in water, ice and biological material from Spitsbergen, Svalbard.
Drbal, K., et al, *Polar research*, Dec. 1992, 11(2), p.99-101, 18 refs.
Elster, J., Komárek, J.
Metals, Sea water, Glacier ice, Ecology, Norway—Spitsbergen.

47-2356
Problems in identifying the tundra type of vegetation. [Problemy vydeleniia tundrovogo tipa rastitel'nosti].
Urtsev, B.A., *Botanicheskiĭ zhurnal*, Jan. 1991, 76(1), p.30-41, In Russian with English summary. Refs. p.40-41.
Tundra, Plants (botany), Plant ecology, Vegetation patterns.

47-2357
Phytocatena in the vegetation cover of mountain territories (in the example of the tundra zone of northeastern USSR). [Fitokateny v rastitel'nom pokrove gornykh territoriĭ (na primere tundrovoĭ zony Severo-Vostoka SSSR)].
Kholod, S.S., *Botanicheskiĭ zhurnal*, Jan. 1991, 76(1), p.42-51, In Russian with English summary. 20 refs.
Tundra, Vegetation patterns, Plant ecology, USSR—Chukotskiy Peninsula.

47-2358
Analysis of the composition of cryophyte steppe communities in the middle course of the Amguyema River (Chukotskiy Peninsula) in connection with their classification. [Analiz sostava kriofitno-stepnykh soobshchestv srednego techeniia reki Amguemy (Chukotskiĭ poluostrov) v sviazi s ikh klassifikatsiei].
Slinchenkova, E.IU., *Botanicheskiĭ zhurnal*, Jan. 1991, 76(1), p.52-67, In Russian with English summary. 13 refs.
Plant ecology, Plants (botany), Vegetation patterns, Steppes, USSR—Chukotskiy Peninsula, USSR—Amguyema River.

47-2359
CO2-gas exchange and annual production in plant communities of the Khibiny mountain tundra. [CO2-gazoobmen i godichnaia produktsiia v soobshchestvakh gornoĭ tundry Khibin].
Politova, N.IU., *Botanicheskiĭ zhurnal*, Feb. 1991, 76(2), p.217-225, In Russian with English summary. Refs. p.223-224.
Plant physiology, Plant ecology, Alpine tundra, Carbon dioxide, USSR—Khibiny Mountains.

47-2360
Selecting a current for melting glaze. [O vybore toka plavki gololeda].
Nikitina, L.G., et al, *Elektricheskie stantsii*, Apr. 1992, No.4, p.46-49, In Russian. 3 refs.
Rudakova, R.M.
Glaze, Electricity, Ice melting, Artificial melting.

47-2361
Using cast-in-situ concrete for bored and cast-in-place piles in permafrost soils in the Noril'sk industrial region. [Opyt ispol'zovaniia monolitnogo betona v buronabivnykh svaiakh na vechnomerzlykh gruntakh Noril'skogo promyshlennogo raiona].
Lukina, F.Kh., et al, *Promyshlennoe stroitel'stvo*, Sep. 1991, No.9, p.18-19, In Russian.
Ivanova, O.S.
Concrete piles, Piles, Concretes, Permafrost bases, USSR—Noril'sk.

47-2362
Preprints.
Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, 146p. + joint papers, Refs. passim. Includes joint papers with the 10th Symposium on Turbulence and Diffusion and the 6th Conference on Mountain Meteorology. For selected papers see 47-868, 47-880, and 47-2363 through 47-2423, or 201-47297, F-47945, I-47941 through I-47944, I-47946 through I-47952, I-47954 through I-47957 and J-47953.
Polar atmospheres, Air ice water interaction, Atmospheric circulation, Wind (meteorology), Ice air interface, Ice heat flux, Ice openings, Atmospheric disturbances, Atmospheric pressure, Cloud cover, Boundary layer, Topographic effects, Radiation balance.
This is a collection of papers presented at the 3rd Conference on Polar Meteorology and Oceanography held in Portland, OR, Sep. 29-Oct. 2, 1992. The papers, 17 of which are pertinent to Antarctica, cover all topics of interest in polar meteorology, with special emphasis on katabatic and mountain winds and on polar boundary layers.

47-2363
Polar cloudiness: some results from ISCCP and other cloud climatologies.
Rossow, W.B., Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.1-3, 15 refs.
Polar atmospheres, Cloud cover, Air ice water interaction, Atmospheric circulation, Radiation balance, Spaceborne photography.
The argument is made that in cloud climatologies of the polar regions, there are not only large differences in average cloud amount, there is also no agreement on the sense of the seasonal variations. From tabulated data and a figure showing the comparisons of the ISCCP and SOBS datasets for both poles, together with some re-analyses of the surface observation datasets to correct for difficulties in winter-time cloud observation, it is concluded that there is no accurate indication of the amount and nature of polar cloudiness.

47-2364
Estimates of cloud optical thickness from ground-based measurements of incoming solar radiation in the Arctic.
Leontyeva, E., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.4-6, 12 refs.
Stamnes, K.
Polar atmospheres, Cloud cover, Radiation balance, Solar radiation.

47-2365
Unusual cloud forms in the arctic winter boundary layer.
Byers, C.A., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.7-10, 12 refs.
Stringer, W.J.
Polar atmospheres, Cloud cover, Air ice water interaction, Boundary layer, Radiation balance, Spaceborne photography.

47-2366
Atmospheric longwave radiation spectrum on the antarctic plateau.
Walden, V.P., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.11-12, 5 refs.
Heuberger, R., Warren, S.G., Murcray, F.J.
Polar atmospheres, Radiation balance, Atmospheric circulation, Infrared radiation, Solar radiation, Temperature inversions, Water vapor, Carbon dioxide, Atmospheric composition, Cloud cover, Antarctica—Amundsen-Scott Station.
To establish what controls the longwave radiation budget of Antarctica and to offer data from a cold, dry atmosphere for use in testing spectral radiation models and radiation codes in climate models, the downward infrared spectral radiance from 6 to 17 microns is being measured at the Amundsen-Scott Station throughout the year. Analysis of data and application of datasets to testing general circulation models are discussed.

47-2367
Arctic radiative fluxes and cloud forcing estimated from the ISCCP C2 cloud data set.
Schweiger, A.J., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.13-16, 14 refs.
Key, J.R.
Polar atmospheres, Cloud cover, Radiation balance, Solar radiation, Spaceborne photography.

47-2368
Microphysical processes occurring in ice crystal plumes emanating from arctic leads.
Pinto, J.O., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.17-20, 15 refs.
Curry, J.A., McInnes, K.L.
Polar atmospheres, Air ice water interaction, Ice openings, Marine meteorology, Cloud physics, Ice crystals, Radiation balance.

47-2369
Spectral interactions of radiation and sea ice.
Ebert, E.E., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.21-24, 24 refs.
Curry, J.A.
Polar atmospheres, Air ice water interaction, Radiation balance, Cloud cover, Ice cover effect, Ice heat flux, Snow ice interface, Ponds, Albedo.

47-2370
Improvements to TOVS retrievals over sea ice and their application to estimating arctic energy fluxes.
Francis, J.A., Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.25-28, 10 refs.
Polar atmospheres, Air ice water interaction, Ice heat flux, Radiation balance, Ice cover effect, Snow ice interface, Spaceborne photography, Radiometry, Data processing.

47-2371
Katabatic surges across the Ross Ice Shelf, Antarctica: atmospheric circulation changes and oceanographic impacts.
Bromwich, D.H., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.29-32, 17 refs.
Carrasco, J.F., Liu, Z.
Polar atmospheres, Air ice water interaction, Wind (meteorology), Ice shelves, Polynyas, Atmospheric pressure, Atmospheric circulation, Antarctica—Ross Ice Shelf.
An immediate effect of the northwestward propagation of the katabatic airflow is the formation, enlargement and/or maintenance of the coastal polynya offshore from the Ross Ice Shelf. A figure shows the average northern limit of the polynya for 22 random non-signature days and for all the signature days. The average areal extent of the polynya observed along the entire northern edge of the Ross Ice Shelf for signature days was larger than the average extent for non-signature days. This difference is more pronounced on the west side of the ice shelf, where the polynya on signature days can be almost twice as large as the polynya on non-signature days. The persistence of the polynya just to the northern edge of the Ross Ice Shelf is associated with the south and southeasterly winds blowing offshore from the ice shelf. It is noted that the northward propagation of the katabatic winds from West Antarctica, accompanied by intensification of the airflow coming from East Antarctica, plays an important role in the behavior of the Ross Sea polynya.

47-2372
Case study of the Jan. 9-10, 1992 polar low in the Bering Sea.
Hefner, D.B., Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.33-36, 1 ref.
Polar atmospheres, Atmospheric pressure, Atmospheric circulation, Atmospheric disturbances, Air ice water interaction, Spaceborne photography, Bering Sea.

47-2373
Polar low dynamics.
Montgomery, M.T., Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.37, 4 refs.
Polar atmospheres, Atmospheric pressure, Atmospheric circulation, Atmospheric disturbances.

47-2374
Diagnostic study of the evolution of an intense North American anticyclone during winter 1989.
Tan, Y.C., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.38-41, 4 refs.
Curry, J.A.
Polar atmospheres, Atmospheric disturbances, Atmospheric pressure, Atmospheric circulation.

47-2375
Meteorological surveys in support of ice airfields in Antarctica.
Hogan, A.W., et al, MP 3216, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.42-43, 9 refs.
Stearns, C.R., Weidner, G.A.
Ice runways, Meteorological factors, Site surveys, Ice air interface, Wind factors, Antarctica- Howe, Mount.
Meteorological analysis indicates that katabatic winds, accelerating downslope from the polar plateau, erode snow cover to expose glacial ice at these places. The associated katabatic warming reduces the relative humidity of the near- surface air, facilitates ablation of the ice surface, and maintains dryness. Pebbles of 5 cm diameter are dispersed about the smooth ice surface proposed for use as a runway near Mt. Howe, the site nearest the South Pole. The movement of these rocks from the nearby exposed ground is evidence of occasional strong winds. The authors briefly describe some current observations, analysis of fragmentary data from recent and historic visits to the area, and their analytical approach to establishing the length of meteorological summer in this region.

47-2376
Determining realistic wind stress forcing fields for marine arctic regions.
Davidson, K.L., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.44-47, 19 refs.
Guest, P.S., Glendening, J.W.
Polar atmospheres, Air ice water interaction, Wind (meteorology), Ice edge, Boundary layer.

47-2377
Aircraft measurements of regional air-ice drag coefficients during high wind conditions over the Beaufort Sea.
Walter, B.A., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.48-49, 5 refs.
Overland, J.E.
Ice air interface, Wind (meteorology), Boundary layer, Drift, Ice surface, Polar atmospheres, Aerial surveys, Beaufort Sea.

47-2378
Characteristics of the lower troposphere during LEADEX 92.
Persson, P.O.G., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.50-53, 3 refs.
Ruffieux, D., Davidson, K.
Polar atmospheres, Air ice water interaction, Ice openings, Temperature inversions, Boundary layer, Beaufort Sea.

47-2379
Study of the factors controlling the value of the surface temperature of sea ice.
Guest, P.S., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.54-57, 8 refs.
Davidson, K.L.
Ice temperature, Ice heat flux, Ice air interface, Snow ice interface, Ice surface, Sea ice, Surface temperature, Polar atmospheres, Mathematical models.

47-2380
Mesoscale meteorological modeling support for LEADEX.
Thompson, W.T., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.58-61, 6 refs.
Burk, S.D.
Polar atmospheres, Air ice water interaction, Ice openings, Marine meteorology, Boundary layer, Cloud cover, Beaufort Sea.

47-2381
Meteorological prerequisites for sea ice.
Thorndike, A.S., Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.62-63, 2 refs.
Polar atmospheres, Air ice water interaction, Ice heat flux, Ice growth, Sea ice, Pack ice, Ice models, Global change, Radiation balance.

47-2382
Sea ice deformation in the Beaufort Sea.
Overland, J.E., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.64-67, 4 refs.
Walter, B.A., Davidson, K.L.
Air ice water interaction, Ice openings, Ice deformation, Sea ice, Pack ice, Ice models, Wind (meteorology), Rheology, Beaufort Sea.

47-2383
Seasonal and regional variability of sea ice thickness distribution.
Moritz, R.E., Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.68-71, 10 refs.
Air ice water interaction, Sea ice distribution, Ice cover thickness, Seasonal variations, Pack ice.

47-2384
Surface energy measurements on the arctic ice pack.
Wolfe, D.E., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.72-75, 6 refs.
Fairall, C.W., Ruffieux, D.
Air ice water interaction, Ice heat flux, Pack ice, Ice surface, Surface energy, Radiation balance, Cloud cover.

47-2385
Spatial structure of the surface temperature field of arctic pack ice determined with AVHRR.
Lindsay, R., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.76-79, 13 refs.
Rothrock, D.A.
Ice temperature, Pack ice, Ice air interface, Air ice water interaction, Ice surface, Ice openings, Surface temperature, Radiometry.

47-2386
Self-sustained interdecadal oscillation in the coupled sea ice-thermohaline circulation system.
Yang, J.Y., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.80-82, 19 refs.
Neelin, J.D.
Ice water interface, Ocean currents, Ice cover effect, Air ice water interaction, Sea ice, Salinity, Water temperature, Surface temperature, Global change.

47-2387
Sea ice and salinity variability in the Arctic using a coupled sea ice-ocean model.
Weatherly, J.W., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.83-86, 9 refs.
Walsh, J.E.
Ice water interface, Ocean currents, Sea ice distribution, Air ice water interaction, Ice models, Salinity, Water temperature, Surface temperature.

47-2388
Multivariate sensitivities of a dynamic-thermodynamic sea ice model.
Chapman, W.L., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.87-90, 10 refs.
Welch, W., Bowman, K.P., Sacks, J., Walsh, J.E.
Air ice water interaction, Ice heat flux, Ice models, Sea ice distribution, Ice cover thickness, Ice openings, Drift, Snow ice interface, Statistical analysis.

47-2389
Sensitivity study of a dynamic thermodynamic sea-ice model.
Holland, D.M., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.91-93, 11 refs.
Mysak, L.A., Manak, D.K., Oberhuber, J.M.
Air ice water interaction, Ice heat flux, Ice models, Sea ice distribution, Ice cover thickness, Drift.

47-2390
Sensitivity studies of an ice-ocean coupled model for the Northern Hemisphere.
Cheng, A., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.94-97, 16 refs.
Preller, R.H.
Ice water interface, Sea ice distribution, Ice models, Ice forecasting, Air ice water interaction, Drift.

47-2391
Investigation of the general circulation of the Arctic Ocean with an isopycnal model.
Holland, D.M., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.98-100, 4 refs.
Mysak, L.A., Oberhuber, J.M.
Ice water interface, Ocean currents, Sea ice distribution, Air ice water interaction, Ice models, Drift.

47-2392
Three dimensional pseudovorticity field in the west Spitsbergen current.
Chu, P.C., Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.101-104, 3 refs.
Ocean currents, Air water interactions, Wind (meteorology), Hydrography, Oceanographic surveys, Mathematical models, Greenland Sea.

47-2393
Modeling the interactions of sea ice and climate in the central Arctic.
Moritz, R.E., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.105-108, 9 refs.
Beesley, J.A., Runciman-Moore, K.
Ice air interface, Ice heat flux, Polar atmospheres, Air ice water interaction, Radiation balance, Cloud cover, Atmospheric circulation, Mathematical models.

47-2394
Interactive atmospheric surface-layer modifications for a large-scale sea-ice model.
Stössel, A., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.109-110, 9 refs.
Claussen, M.
Ice air interface, Atmospheric circulation, Polar atmospheres, Sea ice, Air ice water interaction, Boundary layer, Mathematical models, Antarctica.
In sea-ice regions the largest factors controlling the strength of the forcing or coupling between atmosphere and sea ice originate from the extremely heterogeneous horizontal distribution of static stability within the atmospheric surface layer (ASL) and the variations in surface roughness due to variable ice and snow thicknesses, deformations in form of pressure ridges and variable ice coverage. This has to be accounted for as the sea-ice component implemented in large-scale general circulation models (GCMs) becomes more and more sophisticated. One primary question is how to match the different scales of consideration in an appropriate way. The atmospheric forcing being established at a corresponding height, it appears to be reasonable to determine the ASL modifications of the dynamic forcing in terms of "large-scale" or "effective" ASL quantities. These are calculated as functions of the ice concentration, ice freeboard, snow thickness and the local boundary-layer quantities, representing the main issue of this paper. After a short description of the modifications of the ASL formulation due to its large-scale application over heterogeneous terrain, an example of its impact is presented.

47-2395
Climatic differences in Antarctica from automatic weather stations.
Stearns, C.R., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.111-114, 8 refs.
Weidner, G.A.
Polar atmospheres, Weather observations, Weather stations, Ice shelves, Ice sublimation, Air temperature, Wind velocity, Antarctica—Ross Ice Shelf, Antarctica—McMurdo Station.
It is proposed that the climate at McMurdo should not be used to infer the climate at any other nearby location; the air temperature is warmer and the wind speed and direction are strictly local phenomena because of the air flow over the Hut Point Peninsula. On the Ross Ice Shelf there are significant differences in mean air temperature in the horizontal, so the Ross Ice Shelf cannot be described as a uniform climatic region. The annual sublimation of moisture differs significantly in the horizontal. There is a tendency for high sublimation regions to have low annual accumulation which tends to smooth out the annual precipitation. It is suggested that the assumption that annual sublimation and deposition cancel out anywhere in Antarctica should be discarded completely.

47-2396
On the influence of stratospheric stability on lower tropospheric circulations over the South Pole.
Neff, W.D., Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.115-120, 22 refs.
Polar atmospheres, Atmospheric circulation, Stratosphere, Ozone, Wind (meteorology), Cloud cover, Antarctica—Amundsen-Scott Station.
Observations of solar radiation and cloudiness at the South Pole have revealed a significant increase in cloud cover and decrease in solar radiation during Jan. and Feb., beginning in the early 1980s. That this change occurred in concert with extended periods of reduced ozone in the spring stratosphere over Antarctica stimulated the preliminary analyses described here. The rawinsonde data obtained at Amundsen-Scott Station for the period 1961 through 1990 have revealed a 30-yr trend in lower stratospheric lapse rate overlain with a strong interannual variability suggestive of quasi-biennial and longer oscillations.

47-2397
Antarctic pressure and temperature anomalies surrounding the minimum in the southern oscillation index.
Smith, S.R., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.121-124, 7 refs.
Stearns, C.R.
Polar atmospheres, Atmospheric circulation, Atmospheric pressure, Air temperature, Meteorological data, Antarctica—Ross Ice Shelf, Antarctica—Amery Ice Shelf.
It is suggested that there may be a relationship between the Southern Oscillation and meteorological events in Antarctica, and that the areas of interest could be the Ross and Amery Ice Shelves. The following is recommended: automatic weather stations, deployed on the Ross Ice Shelf since 1980, should be continued; the Amery Ice Shelf should have automatic weather stations installed; the katabatic flow from Antarctica should be monitored continuously by automatic weather stations with help from satellites; the possible relationship between the katabatic flow on Antarctica and the SO should be determined; automatic weather stations should be located along the coast of West Antarctica from 180 to 85W to cover part of the meteorological void; and the data from the automatic weather stations should be related to the ENSO as the ENSO events occur.

47-2398
Precipitation variations over the Greenland ice sheet during the last three decades.
Bromwich, D.H., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.125-128, 20 refs.
Robasky, F.M., Keen, R.A.
Ice sheets, Glacier alimentation, Precipitation (meteorology), Glacier oscillation, Polar atmospheres, Climatic changes, Sea level, Greenland.

47-2399
NCAR CCM1 simulation of the modern arctic climate.
Bromwich, D.H., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.129-132, 9 refs.
Tzeng, R.Y., Parish, T.R.
Polar atmospheres, Atmospheric circulation, Atmospheric pressure, Precipitation (meteorology), Computerized simulation.

47-2400
Simulation of the arctic climatology with the NCAR CCM-2.
Battisti, D.S., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.133-136, 8 refs.
Williamson, D.L., Moritz, R.E.
Polar atmospheres, Atmospheric circulation, Air ice water interaction, Atmospheric pressure, Global warming, Computerized simulation.

47-2401
Trend analyses of tropospheric temperatures in the Arctic—is there evidence of greenhouse warming.
Stone, R.S., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.137-140, 14 refs.
Kahl, J.D., Serreze, M.C., Schnell, R.C.
Polar atmospheres, Atmospheric circulation, Air temperature, Climatic changes, Global warming.

47-2402
Lower tropospheric temperature trends over the Arctic Ocean: 1950-1990.
Kahl, J.D., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.141-144, 24 refs.
Charlevoix, D.J., Zaĭtseva, N.A., Schnell, R.C.
Polar atmospheres, Atmospheric circulation, Air temperature, Air ice water interaction, Climatic changes, Global warming.

47-2403
Synoptic climatology of continental polar mesolows over central North America in winter.
Kahrs, J.E., Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.145-146, 9 refs.
Polar atmospheres, Atmospheric circulation, Atmospheric disturbances, Atmospheric pressure, Winter.

47-2404
Mountain effects on the antarctic circulation.
Egger, J., Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.J3-J7, 12 refs. Joint paper with the 6th Conference on Mountain Meteorology.
Polar atmospheres, Atmospheric circulation, Alpine landscapes, Topographic effects, Wind (meteorology), Atmospheric disturbances, Atmospheric pressure, Antarctica.
Like any other major mountain massif on earth, antarctic orography induces atmospheric responses at all scales of motion. There are strong katabatic flows, gravity waves, "lee cyclones" and topographically excited Rossby waves. However, Antarctica is unique in that a strong axisymmetric flow regime is attached to the continent: inversion flows in the boundary layer are downward to the coast almost all around Antarctica with corresponding mean sinking throughout the troposphere in the interior and ascent near the coastline. The idea that the transient waves entering the antarctic domain are modified by the topography, such that they are capable of transporting angular momentum out of Antarctica, is discussed.

47-2405
Generation mechanisms of quasi-stationary waves in the Southern Hemisphere.
Quintanar, A.I., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.J8-J11, 5 refs. Joint paper with the 6th Conference on Mountain Meteorology.
Mechoso, C.R.
Polar atmospheres, Atmospheric circulation, Topographic effects, Atmospheric disturbances, Atmospheric pressure, Ice air interface, Computerized simulation, Antarctica.
The generation mechanisms for planetary waves in the extratropical troposphere of the Southern Hemisphere is investigated, with emphasis on QS-wave 1. Two basic questions are addressed: to what extent is the quasi-stationary wave field sensitive to the orographic elevations, particularly those of Antarctica, and what is the relative influence of forcing by orography and surface conditions other than orography on the structure of the quasi-stationary wave field. To investigate these questions, an atmospheric general circulation model (the UCLA-AGCM) and a barotrophic model on the sphere are used.

47-2406
Modelling of the mean and turbulent structure of the arctic atmospheric boundary layer.
McInnes, K.L., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.J13-J15, 11 refs. Joint paper with the 10th Symposium on Turbulence and Diffusion.
Curry, J.A.
Polar atmospheres, Atmospheric circulation, Turbulent boundary layer, Turbulent diffusion, Cloud cover, Mathematical models.

47-2407
Stratification of the atmospheric boundary layer in the arctic marginal ice zone.
Frederickson, P.A., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.J16-J19, 3 refs. Joint paper with the 10th Symposium on Turbulence and Diffusion.
Davidson, K.L., Guest, P.S.
Polar atmospheres, Air ice water interaction, Ice edge, Wind (meteorology), Temperature inversions, Boundary layer.

47-2408
Boundary-layer structure near an ice edge as a function of wind direction.
Glendening, J.W., Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.J20-J23, 5 refs. Joint paper with the 10th Symposium on Turbulence and Diffusion.
Polar atmospheres, Air ice water interaction, Ice edge, Wind direction, Boundary layer.

47-2409
Synoptic influence on inversion winds at the South Pole.
Neff, W.D., Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.J24-J28, 7 refs. Joint paper with the 10th Symposium on Turbulence and Diffusion.
Polar atmospheres, Atmospheric circulation, Wind (meteorology), Boundary layer, Temperature inversions, Antarctica—Amundsen-Scott Station.
In anticipation of a new study to be carried out in the austral winter of 1993 using 915-MHz radar wind profilers with continuous temperature profiling in the boundary layer, this paper reexamines earlier results from 1977 and 1978 that used acoustic sounding and one-dimensional numerical modeling. In addition, the availability of Amundsen-Scott Station rawinsonde data from 1961 through 1991 has provided an opportunity to view these limited data in the context of long-term changes in the synoptic environment at the South Pole.

47-2410
Acoustic remote sensing study of boundary layer blocking near Ross Island, Antarctica.
Liu, Z., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.J29-J32, 13 refs. Joint paper with the 10th Symposium on Turbulence and Diffusion.
Bromwich, D.H.
Polar atmospheres, Atmospheric circulation, Wind (meteorology), Boundary layer, Topographic effects, Offshore landforms, Acoustic measurement, Antarctica—Ross Island.
Ross I. is located along the northwestern edge of the Ross Ice Shelf. Three peaks of more than 2000 m elevation, Mts. Erebus, Terra Nova and Terror, form a high, steep obstacle to the prevailing southerly winds. Rawinsonde data collected at McMurdo Station are not suitable for detailed study of the planetary boundary layer because of their poor height resolution and inconsistent launches. An acoustic radar, or sodar, overcomes these limitations by providing continuous three-dimensional wind profiles up to an altitude of several hundred meters.

47-2411
Remote sensing of the arctic boundary layer.
Wolfe, D.E., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.J33-J36, 6 refs. Joint paper with the 10th Symposium on Turbulence and Diffusion.
Fairall, C.W., Jordan, J.R., Gregg, D.W.
Polar atmospheres, Atmospheric circulation, Boundary layer, Ice air interface, Ice openings, Meteorological instruments, Weather observations.

47-2412
Turbulence structure of the atmospheric surface layer over arctic ice and near a lead.
Gaynor, J.E., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.J37-J40, 6 refs. Joint paper with the 10th Symposium on Turbulence and Diffusion.
Wolfe, D.E., Ye, J.P.
Polar atmospheres, Air ice water interaction, Ice openings, Turbulent boundary layer, Turbulence.

47-2413
Modelling the horizontally inhomogeneous cloudy boundary layer in the presence of leads.
Alam, A., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.J41-J44, 27 refs. Joint paper with the 10th Symposium on Turbulence and Diffusion.
Curry, J.A.
Polar atmospheres, Air ice water interaction, Ice openings, Turbulent boundary layer, Ice forecasting, Sea ice distribution, Cloud cover, Mathematical models.

47-2414
Strategies for estimating turbulent fluxes in polar ocean boundary layers.
McPhee, M.G., Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.J49-J52, 5 refs. Joint paper with the 10th Symposium on Turbulence and Diffusion.
Ice water interface, Ice heat flux, Ice bottom surface, Turbulent boundary layer, Turbulent exchange, Drift stations, Antarctica—Weddell Sea.
Two methods for indirect estimation of ice/ocean stress and heat flux from unmanned ice buoys are suggested from direct flux measurements made in the under-ice boundary layer. The first infers the interfacial stress from the variance of horizontal velocity, and utilizes the freezing constraint at the ice/ocean interface to express heat flux as proportional to the product of friction velocity and the difference between mixed layer temperature and freezing temperature. This approach is currently being tested with a buoy cluster in the Weddell Sea. The second applies the inertial-dissipation method using vertical velocity and temperature spectra.

47-2415
Spatial variability in mixed layer properties measured under refreezing leads.
Morison, J.H., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.J53-J55, 2 refs. Joint paper with the 10th Symposium on Turbulence and Diffusion.
McPhee, M.G.
Ice water interface, Ice openings, Ice bottom surface, Sea water freezing, Turbulent boundary layer, Drift stations, Salinity, Water temperature.

47-2416
Acoustic Doppler current profiler observations of currents adjacent to refreezing leads.
Muench, R.D., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.J56-J59, 5 refs. Joint paper with the 10th Symposium on Turbulence and Diffusion.
D'Asaro, E.A., Struckman, P., Paulson, C.A.
Ice water interface, Ice openings, Ocean currents, Sea water freezing, Drift, Underwater acoustics, Beaufort Sea.

47-2417
Katabatic wind dynamics at Terra Nova Bay, Antarctica from the satellite image perspective.
Bromwich, D.H., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.J125-J128, 19 refs. Joint paper with the 6th Conference on Mountain Meteorology.
Ganobcik, S.N.
Ice air interface, Wind (meteorology), Ice sheets, Atmospheric disturbances, Atmospheric circulation, Polar atmospheres, Topographic effects, Spaceborne photography, Antarctica—Terra Nova Bay.
During aircraft flights across the Nansen Ice Sheet near Terra Nova Bay, it was found that strong katabatic winds and negatively-buoyant air at the 170 m flight level co-existed with warm thermal infrared satellite signatures. Here these satellite signatures are used to study the dynamics of surface winds in the Terra Nova Bay area during the 1988 winter.

47-2418
Case studies of katabatic wind forced mesoscale cyclogenesis over the southwestern Ross Sea.
Carrasco, J.F., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.J129-J132, 15 refs. Joint paper with the 6th Conference on Mountain Meteorology.
Bromwich, D.H.
Wind (meteorology), Atmospheric disturbances, Atmospheric pressure, Atmospheric circulation, Polar atmospheres, Topographic effects, Antarctica—Ross Sea.
Two katabatic wind cases are discussed. They show that cold katabatic airstreams blowing from Terra Nova Bay into the much warmer and maritime environment over the southwestern Ross Sea often create mesoscale cold fronts which, in conjunction with a weak surface trough, constitute sufficient conditions for mesoscale cyclogenesis. Also, results indicate that near-surface warm air advection over the southwestern Ross Sea by the synoptic-scale circulation may sharpen the mesoscale cold front and be associated with mesoscale cyclogenesis. It is suggested that weak upper-level support associated with the approach of midtropospheric troughs or cyclones seems to be the trigger for the formation of mesoscale vortices. Without this upper-level synoptic support, mesocyclones seem to weaken rapidly once they move away from their point of origin, suggesting that their subsequent development is also determined by midtropospheric troughs that circle the circumpolar vortex over the Ross Sea/Ross Ice Shelf area. The mechanisms that govern the displacement of the mesocyclones are not clearly understood. It seems that they are steered by the initial low-level circulation.

47-2419
Katabatic wind regime in the ablation zone of the Greenland ice sheet during the GIMEX-90 and 91 expeditions: influence on turbulent fluxes near the surface.
Van den Broeke, M.R., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.J133-J136, 14 refs. Joint paper with the 6th Conference on Mountain Meteorology.
Ice air interface, Wind (meteorology), Ice sheets, Ice sublimation, Glacier ablation, Topographic effects, Snow cover effect, Ice edge, Greenland.

47-2420
Numerical simulation of katabatic winds crossing the Siple Coast area of West Antarctica.
Bromwich, D.H., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.J137-J140, 20 refs. Joint paper with the 6th Conference on Mountain Meteorology.
Du, Y., Parish, T.R.
Ice air interface, Wind (meteorology), Ice sheets, Atmospheric disturbances, Atmospheric circulation, Polar atmospheres, Topographic effects, Computerized simulation, Antarctica—Siple Coast.
Numerical simulations of katabatic winds have been conducted using a three-dimensional primitive equation model. Antarctic ice topography at 20 km resolution has been utilized and resolves all the topographically-important terrain features in the model domain. The terrain-induced katabatic winds are well simulated. The model results suggest that the surface wind

pattern over the antarctic interior is little affected by synoptic-scale disturbances centered beyond the ice-sheet margin. The model produces the well-known confluence zones around the antarctic coast. The simulated katabatic surges are in good agreement with the satellite analyses that show the katabatic winds blowing across the flat Ross Ice Shelf with some geostrophic characteristics. The model suggests that the katabatic surges are mainly fed by cold air masses coming from the Siple Coast area of West Antarctica and from the Byrd Glacier part of East Antarctica. This is in agreement with the satellite imagery interpretation.

47-2421
On the interaction between the katabatic wind regime and large-scale tropospheric forcing near Adelie Land, Antarctica.
Parish, T.R., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.J141-J144, 8 refs. Joint paper with the 6th Conference on Mountain Meteorology.
Pettfe, P., Wendler, G.
Wind (meteorology), Atmospheric disturbances, Atmospheric circulation, Topographic effects, Ice sheets, Ice air interface, Atmospheric pressure, Polar atmospheres, Antarctica—Adélie Coast, Antarctica—Dumont d'Urville Station.
In this paper the authors investigate the interaction between the antarctic katabatic wind regime and the large-scale horizontal pressure field, using observational evidence as well as results from a two-dimensional primitive equation model. Results are in agreement with numerous observations which suggest that the katabatic wind is essentially unidirectional.

47-2422
Turbulence structure in stably stratified flow in the wake behind high mountains.
Smedman, A.S., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.J145-J148, 5 refs. Joint paper with the 6th Conference on Mountain Meteorology.
Bergström, H.
Wind (meteorology), Topographic effects, Atmospheric disturbances, Alpine landscapes, Lake ice, Ice air interface, Ice cover effect, Turbulence.

47-2423
Mesoscale blocking ahead of mountain ridges and cold fronts.
Taylor, P., et al, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.J149-J152, 8 refs.
Ayotte, K.
Wind (meteorology), Atmospheric disturbances, Atmospheric circulation, Topographic effects, Alpine landscapes, Fronts (meteorology), Turbulence.

47-2424
Problems in the study of naleds; collected scientific papers. [Problemy naledevedeniia: sbornik nauchnykh trudov].
Alekseev, V.R., ed, Novosibirsk, Nauka, 1991, 238p., In Russian. Refs. passim. For individual papers see 47-2425 through 47-2454.
Naleds, Thermal regime, Water balance, Ice formation, Countermeasures, Ice forecasting, Ground water, Analysis (mathematics).

47-2425
Basic problems in the study of naleds. [Osnovnye problemy naledevedeniia].
Alekseev, V.R., Problemy naledevedeniia; sbornik nauchnykh trudov (Problems in the study of naleds; collected scientific papers). Edited by V.R. Alekseev, Novosibirsk, Nauka, 1991, p.5-23, In Russian. 50 refs.
Naleds, Ice formation, Ice forecasting, Countermeasures, Ice mechanics.

47-2426
Hydrology of naleds: basic results and research tasks. [Gidrologiia naledeĭ: osnovnye itogi i zadachi issledovaniĭ].
Sokolov, B.L., Problemy naledevedeniia; sbornik nauchnykh trudov (Problems in the study of naleds; collected scientific papers). Edited by V.R. Alekseev, Novosibirsk, Nauka, 1991, p.24-40, In Russian. 24 refs.
Naleds, Hydrology.

47-2427
Physical and terrain-indicating bases for satellite monitoring of naleds in ground water. [Fizicheskie i landshaftno-indikatsionnye osnovy aerokosmicheskogo monitoringa naledeĭ podzemnykh vod].
Topchiev, A.G., Problemy naledevedeniia; sbornik nauchnykh trudov (Problems in the study of naleds; collected scientific papers). Edited by V.R. Alekseev, Novosibirsk, Nauka, 1991, p.40-45, In Russian. 7 refs.
Naleds, Spaceborne photography, Ground water, Landscape types.

47-2428
Geochemical processes during naled formation. [Geokhimicheskie protsessy pri naledeobrazovaniĭ].
Ivanov, A.V., Problemy naledevedeniia; sbornik nauchnykh trudov (Problems in the study of naleds; collected scientific papers). Edited by V.R. Alekseev, Novosibirsk, Nauka, 1991, p.45-54, In Russian. 23 refs.
Naleds, Geochemistry, River ice, Ice composition, Ice formation, Snow cover effect.

47-2429
Mechanism of the development of the naled process. [Mekhanizm razvitiia naledogo protsessa].
Rumiantsev, E.A., Problemy naledevedeniia; sbornik nauchnykh trudov (Problems in the study of naleds; collected scientific papers). Edited by V.R. Alekseev, Novosibirsk, Nauka, 1991, p.55-66, In Russian. 20 refs.
Naleds, Ice mechanics, Ice formation, Analysis (mathematics).

47-2430
Naled systems in river basins as a result of the interaction of surface and ground waters. [Nalednye sistemy rechnykh basseĭnov kak rezul'tat vzaimodeĭstviia poverkhnostnykh i podzemnykh vod].
Kravchenko, V.V., et al, Problemy naledevedeniia; sbornik nauchnykh trudov (Problems in the study of naleds; collected scientific papers). Edited by V.R. Alekseev, Novosibirsk, Nauka, 1991, p.66-76, In Russian. 8 refs.
Gizetdinov, A.M., Chernykh, O.A.
Naleds, River basins, Surface waters, Ground water.

47-2431
Heat and water balance of naleds. [Teplovoĭ i vodnyĭ balans naledeĭ].
Deĭkin, B.N., Problemy naledevedeniia; sbornik nauchnykh trudov (Problems in the study of naleds; collected scientific papers). Edited by V.R. Alekseev, Novosibirsk, Nauka, 1991, p.76-89, In Russian. 19 refs.
Naleds, Heat balance, Water balance, Albedo, Radiation balance, Analysis (mathematics).

47-2432
Information analysis in the study of naleds. [Informatsionnyĭ analiz v issledovanii naledeĭ].
Kolotaev, V.N., et al, Problemy naledevedeniia; sbornik nauchnykh trudov (Problems in the study of naleds; collected scientific papers). Edited by V.R. Alekseev, Novosibirsk, Nauka, 1991, p.90-95, In Russian. 7 refs.
Abakumenko, A.E.
Naleds, Analysis (mathematics).

47-2433
Mathematical model for qualitative analysis of naleds. [Matematicheskaia model' kolichestvennoĭ *otsenki naledeĭ*].
Nevskiĭ, S.D., Problemy naledevedeniia; sbornik nauchnykh trudov (Problems in the study of naleds; collected scientific papers). Edited by V.R. Alekseev, Novosibirsk, Nauka, 1991, p.95-103, In Russian. 7 refs.
Naleds, Mathematical models.

47-2434
Annual dynamics of naleds in ground water and methods for calculating them. [Vnutrigodovaia dinamika naledeĭ podzemnykh vod i metody ee rascheta].
Markov, M.L., Problemy naledevedeniia; sbornik nauchnykh trudov (Problems in the study of naleds; collected scientific papers). Edited by V.R. Alekseev, Novosibirsk, Nauka, 1991, p.103-116, In Russian. 24 refs.
Naleds, Ground water, Analysis (mathematics), Hydrography.

47-2435
Stochastic method for forecasting estimated parameters of naleds. [Veroiatnostnyĭ metod prognozirovaniia raschetnykh parametrov naledeĭ].
Dement'ev, V.A., Problemy naledevedeniia; sbornik nauchnykh trudov (Problems in the study of naleds; collected scientific papers). Edited by V.R. Alekseev, Novosibirsk, Nauka, 1991, p.116-123, In Russian. 5 refs.
Naleds, Analysis (mathematics), Ice forecasting.

47-2436
Ways of refining the calculation of naled ice melting. [Puti utochneniia rascheta taianiia naledogo l'da].
Ergin, V.P., Problemy naledevedeniia; sbornik nauchnykh trudov (Problems in the study of naleds; collected scientific papers). Edited by V.R. Alekseev, Novosibirsk, Nauka, 1991, p.123-128, In Russian. 3 refs.
Naleds, Analysis (mathematics), Albedo, Ice cover thickness, Ice melting.

47-2437
Electron-microscopic studies of naled salts. [Elektronno-mikroskopicheskoe issledovanie naledneykh soleĭ].
Ivanov, A.V., et al, Problemy naledevedeniia; sbornik nauchnykh trudov (Problems in the study of naleds; collected scientific papers). Edited by V.R. Alekseev, Novosibirsk, Nauka, 1991, p.128-131, In Russian. 2 refs.
Shevchenko, I.D., Alekseev, V.R., Shesterkina, N.M.
Naleds, Ice salinity, Electron microscopy.

47-2438
Studying naleds to estimate fresh ground water reserves. [Opyt izucheniia naledeĭ dlia otsenki zapasov presnykh podzemnykh vod].
Kulakov, V.V., et al, Problemy na vedeniia; sbornik nauchnykh trudov (Problems in study of naleds; collected scientific papers). Edited by V.R. Alekseev, Novosibirsk, Nauka, 1991, p.131-137, In Russian. 5 refs.
Sidorkin, V.V.
Naleds, Ground water, Water reserves.

47-2439
Study of naleds by skiers with a high level of athletic skill while traversing courses. [Issledovanie naledeĭ pri prokhozhdenii marshrutov lyzhnymi turistami vysokoĭ sportivnoĭ kvalifikatsii].
Deĭkin, B.N., et al, Problemy naledevedeniia; sbornik nauchnykh trudov (Problems in the study of naleds; collected scientific papers). Edited by V.R. Alekseev, Novosibirsk, Nauka, 1991, p.137-145, In Russian. 8 refs.
Nekrasov, V.A.
Naleds, Route surveys.

47-2440
Thermal regime of a naled valley in the BAM zone. [Teplovoĭ rezhim naledneĭ doliny v zone BAM].
Gavrilova, M.K., Problemy naledevedeniia; sbornik nauchnykh trudov (Problems in the study of naleds; collected scientific papers). Edited by V.R. Alekseev, Novosibirsk, Nauka, 1991, p.146-151, In Russian. 5 refs.
Naleds, Thermal regime, Radiation balance, Heat balance, Water balance.

47-2441
Microclimate of the naled valley of the Volkhov stream in Southern Yakutia. [Mikroklimat naledneĭ doliny ruch. Volkhovskogo v IUzhnoĭ IAkutii].
Potapov, A.M., Problemy naledevedeniia; sbornik nauchnykh trudov (Problems in the study of naleds; collected scientific papers). Edited by V.R. Alekseev, Novosibirsk, Nauka, 1991, p.152-157, In Russian. 3 refs.
Naleds, Microclimatology, Valleys, Geothermometry, USSR—Yakutia.

47-2442
Naled formation under reduced moisture conditions (in the example of the Ol'khon Island area). [Naledeobrazovanie v usloviiakh nedostatochnogo uvlazheniia (na primere Priol'khon'ia)].
Pisarskiĭ, B.I., et al, Problemy naledevedeniia; sbornik nauchnykh trudov (Problems in the study of naleds; collected scientific papers). Edited by V.R. Alekseev, Novosibirsk, Nauka, 1991, p.157-162, In Russian. 5 refs.
Vostretsov, V.M.
Naleds, Moisture, Ice formation, USSR—Ol'khon Island.

47-2443
Naleds of the Putorana Plateau and their effect on valley landscapes. [Naledi plato Putorana i ikh vozdeistvie na dolinnye landshafty].
Gienko, A.IA., et al, Problemy naledevedeniia; sbornik nauchnykh trudov (Problems in the study of naleds; collected scientific papers). Edited by V.R. Alekseev, Novosibirsk, Nauka, 1991, p.162-166, In Russian. 6 refs.
[Arysheva, V.V., Volkov, S.S.
Naleds, Landscape development, Valleys, USSR—Putorana Plateau.

47-2444
Naleds in the Altay Mountains. [Naledi v gorakh Altaia].
Sheinkman, V.S., Problemy naledevedeniia; sbornik nauchnykh trudov (Problems in the study of naleds; collected scientific papers). Edited by V.R. Alekseev, Novosibirsk, Nauka, 1991, p.166-176, In Russian. 16 refs.
Naleds, Nivation, Permafrost, USSR—Altai Mountains.

47-2445
River naleds in Kazakhstan. [Rechnye naledi v Kazakhstane].
Beilinson, M.M., Problemy naledevedeniia; sbornik nauchnykh trudov (Problems in the study of naleds; collected scientific papers). Edited by V.R. Alekseev, Novosibirsk, Nauka, 1991, p.176-181, In Russian. 5 refs.
Naleds, Rivers, USSR—Kazakhstan.

47-2446
Naleds in the Kungur cave. [Naledi Kungurskoi peshchery].
Dorofeev, E.P., Problemy naledevedeniia; sbornik nauchnykh trudov (Problems in the study of naleds; collected scientific papers). Edited by V.R. Alekseev, Novosibirsk, Nauka, 1991, p.181-188, In Russian. 4 refs.
Naleds, Ice caves, Water chemistry, Ice composition.

47-2447
Passability of naled areas in river valleys. [Prokhodimost' nalednykh uchastkov rechnykh dolin].
Alekseev, V.R., Problemy naledevedeniia; sbornik nauchnykh trudov (Problems in the study of naleds; collected scientific papers). Edited by V.R. Alekseev, Novosibirsk, Nauka, 1991, p.189-205, In Russian. 15 refs.
Naleds, Valleys, Ground ice, Spaceborne photography.

47-2448
Winter temperature regime of culverts in channels with naleds. [Zimnii temperaturnyi rezhim vodopropusnykh trub na vodotokakh s naledíami].
Kuz'minykh, A.I., et al, Problemy naledevedeniia; sbornik nauchnykh trudov (Problems in the study of naleds; collected scientific papers). Edited by V.R. Alekseev, Novosibirsk, Nauka, 1991, p.205-210, In Russian.
Merkulov, D.M.
Water temperature, Thermal regime, Naleds, Culverts, Channels (waterways).

47-2449
System approach to selecting anti-naled procedures. [Sistemnyi podkhod pri vybore sposobov bor'by s naledíami].
Merkulov, D.M., et al, Problemy naledevedeniia; sbornik nauchnykh trudov (Problems in the study of naleds; collected scientific papers). Edited by V.R. Alekseev, Novosibirsk, Nauka, 1991, p.210-214, In Russian. 5 refs.
Kuz'minykh, A.I.
Naleds, Countermeasures, Analysis (mathematics).

47-2450
Effectiveness of anti-naled measures during road building. [Effektivnost' protivonalednykh meropriiatii pri stroitel'stve dorog].
Nevskii, S.D., Problemy naledevedeniia; sbornik nauchnykh trudov (Problems in the study of naleds; collected scientific papers). Edited by V.R. Alekseev, Novosibirsk, Nauka, 1991, p.214-218, In Russian. 4 refs.
Naleds, Countermeasures, Roads, Analysis (mathematics), Cold weather construction.

47-2451
Naleds and forecasting them on mountain highways in Kirgizia. [Naledi i ikh prognozirovanie na gornykh avtomobil'nykh dorogakh Kirgizii].
Turgunbaev, A.T., Problemy naledevedeniia; sbornik nauchnykh trudov (Problems in the study of naleds; collected scientific papers). Edited by V.R. Alekseev, Novosibirsk, Nauka, 1991, p.219-225, In Russian.
Naleds, Ice forecasting, Roads, USSR—Kirgizia.

47-2452
Creating naleds for water supply and irrigation in valleys of freezing rivers. [O sozdanii naledei dlia vodosnabzheniia i obvodneniia v dolinakh peremerzaiushchikh rek].
Vdovin, IU.I., Problemy naledevedeniia; sbornik nauchnykh trudov (Problems in the study of naleds; collected scientific papers). Edited by V.R. Alekseev, Novosibirsk, Nauka, 1991, p.225-233, In Russian. 15 refs.
Naleds, Irrigation, Water supply, Valleys, Rivers.

47-2453
Artificial naled formation for water storage. [Iskusstvennoe naledeobrazovanie dlia vodoakkumuliatsii].
Krasnov, IU.N., Problemy naledevedeniia; sbornik nauchnykh trudov (Problems in the study of naleds; collected scientific papers). Edited by V.R. Alekseev, Novosibirsk, Nauka, 1991, p.233-235, In Russian. 10 refs.
Naleds, Water storage, Ice (water storage).

47-2454
Using naleds for regulating the flow of mountain rivers in Siberia. [Naledi dlia regulirovaniia stoka gornykh rek Sibiri].
Busygin, V.V., et al, Problemy naledevedeniia; sbornik nauchnykh trudov (Problems in the study of naleds; collected scientific papers). Edited by V.R. Alekseev, Novosibirsk, Nauka, 1991, p.236-238, In Russian. 11 refs.
Krasnov, IU.N., Leont'eva, O.V.
Naleds, River flow, USSR—Siberia.

47-2455
Environmental protection in the North. [Okhrana okruzhaiushchei sredy v zone Severa].
Bondarenko, L.A., et al, Issledovanie razvitiia Severa SSSR: problemy strategii osvoeniia. Sbornik nauchnykh trudov. Vypusk 1. (Study of the development of the North in the USSR: problems in the strategy of management. Collected scientific papers. Volume 1). S.S. Guzner and A.M. Pozdniakov, eds., Novosibirsk, IEiOPP AN SSSR, 1990, p.17-27, In Russian. 1 ref.
Dumova, I.I., Mkrtchian, G.M.
Economic development, Environmental protection.

47-2456
Mathematical modeling of the thermoerosion process and its use in the study of various regions of the cryolithozone. [Matematicheskoe modelirovanie protsessa termoerozii i ego primenenie dlia issledovaniia raznykh raionov kriolitozony].
Baranova, N.A., Ekologicheskie problemy erozii pochv i ruslovykh protsessov (Ecological problems of soil erosion and channel processes). Edited by R.S. Chalov, Moscow, MGU, 1992, p.29-36, In Russian. 7 refs.
Mathematical models, Soil erosion, Temperature effects, Frozen ground mechanics, Frozen ground temperature, Frozen ground thermodynamics, Channels (waterways).

47-2457
Developing the productive energies of Northern USSR. [Razvitie proizvoditel'nykh sil Severa SSSR].
Granberg, A.G., ed, Novosibirsk, Nauka, 1991, 229p., In Russian. Refs. p.226-229.
Bandman, M.K., ed, Pozdniakov, A.M., ed.
Economic development, Land development, Natural resources, Economic analysis.

47-2458
Anomalies of the shock compressibility of water.
Bogdanov, G.E., et al, *Journal of applied mechanics and technical physics*, Mar.-Apr. 1992(Pub. Sep. 92), 33(2), p.162-165, Translated from Prikladnaia mekhanika i tekhnicheskaia fizika. 32 refs.
Rybakov, A.P.
Water, Compressive properties, Shock waves, Ice melting, High pressure ice, Ice physics, Phase transformations.

47-2459
Lower Oligocene ice-rafted debris on the Kerguelen Plateau: evidence for east antarctic continental glaciation.
Breza, J.R., et al, Proceedings of the Ocean Drilling Program, Vol.120. Scientific results. Part 1. Central Kerguelen Plateau, edited by E.M.Barbu, College Station, TX, Texas A and M University, 1992, p.161-178, Refs. p.176-178.
Wise, S.W., Jr.
DLC QE39.T49b
Ice rafting, Glacial deposits, Glaciation, Paleoclimatology, Sea ice, Kerguelen Plateau, Antarctica—East Antarctica.
Appreciable lower Oligocene clastic detritus interpreted to be ice-rafted debris (IRD) was recovered at Ocean Drilling Program Site 748 on the central Kerguelen Plateau. The IRD occurs between 115.45 and 115.77 mbsf within a stratum of siliceous nannofossil ooze in an Oligocene sequence otherwise composed exclusively of nannofossil ooze with foraminifers and siliceous debris. Glauconite and fish skeletal debris (ichthyolith fragments) occur in association with the IRD. According to planktonic foraminifer, diatom, and nannofossil biostratigraphy and magnetostratigraphy, the IRD interval is earliest Oligocene in age (35.8-36.0 Ma). The sedimentation rate throughout this interval was rather low (approximately 6.3 m m.y.). The direct physical evidence of lower Oligocene IRD this far north of the antarctic continent (the lowest latitudinal occurrence known) and the association of the IRD with the globally recognized shift in *delta*O-18 argue strongly for the presence of an earliest Oligocene ice sheet on the antarctic continental. (Auth. mod.)

47-2460
Multiyear surface climatology of a regional atmospheric model over the western United States.
Giorgi, F., et al, *Journal of climate*, Jan. 1993, 6(1), p.75-95, 30 refs.
Bates, G.T., Nieman, S.J.
Climatology, Simulation, Precipitation (meteorology), Climatic changes, Air temperature, Surface temperature, Snow depth, Mathematical models, Topographic effects, Periodic variations, Weather forecasting.

47-2461
Improved real-time global sea surface temperature analysis.
Reynolds, R.W., et al, *Journal of climate*, Jan. 1993, 6(1), p.114-119, 7 refs.
Marsico, D.C.
Oceans, Surface temperature, Climatology, Sea ice distribution, Ice cover effect, Temperature variations, Air ice water interaction, Simulation, Correlation.

47-2462
Extending the antarctic meteorological record using ice-sheet temperature profiles.
Nicholls, K.W., et al, *Journal of climate*, Jan. 1993, 6(1), p.141-150, 22 refs.
Paren, J.G.
Polar atmospheres, Air temperature, Surface temperature, Ice sheets, Ice temperature, Ice cores, Climatology, Temperature variations, Isotope analysis, Ice heat flux.
Two vertical ice temperature profiles from locations in the Antarctic Peninsula unaffected by meltwater are presented. A simple time-dependent heat diffusion-advection model is used to infer broad surface temperature variations in the Antarctic Peninsula over the century prior to the start of local meteorological records. Air temperature records from two representative meteorological stations (Faraday and Halley) are used to determine the ice surface boundary conditions in the later stages of the model runs. Earlier temperature histories are then devised to provide best fits between the modeled and observed ice temperature profiles. Results of the modeling suggest that the surface temperature in the Antarctic Peninsula dropped by 1.6 deg +/- 0.2 C between the beginning of the nineteenth century and the start of the Faraday record in 1944. On time scales of several decades the Faraday air temperature record began during a period colder than the average, and temperatures in the early 1800s were probably very similar to those of today. (Auth. mod.)

47-2463
Shallow ice core drilling project at Byrd Station, Antarctica.
Langway, C.C., Jr., *Antarctic journal of the United States*, 1991, 26(5), p.60-61, 7 refs.
Drill core analysis, Ice cores, Geochemistry, Geochronology, Antarctica—Byrd Station.
An analysis is given of a 1989 ice core at Byrd Station (NBY-89). One goal of the project was to investigate the surface and near-surface layers using state-of-the-art ice-core study techniques to overlap and extend to the surface paleoenvironmental records obtained from the original deep core drilling completed in 1968. One of the top priorities of this project was to establish a new surface reference horizon at Byrd Station and to correlate the new chronology with the ice-core records from 1968 for Byrd Station for several stratigraphic considerations. The top 300 years of the 1,360 year chronology reflect clear changes in the average concentration levels of isotopic oxygen, methane sulfonate, and nonvolcanic excess sulfate (biogenic). The stable isotope ratios show a warming trend; the methanesulfonate curve shows a deep negative dip in concentration

levels and the nonvolcanic portion of the excess sulfate concentration slightly increases. The excess sulfate concentration peaks indicate past volcanic activity. This is verified by high acidity (hydrogen ion) signals. The volcanic layer chronology established for NBY-89 is stratigraphically connected to the Byrd Station 1968 deep ice core in three ways: by the prominent 1259 AD and other volcanic events; regionally with a new (1978) South Pole 111 m deep core; and globally with four other locations in Greenland.

47-2464

Analysis of radar studies on the Siple Coast.

Bentley, C.R., et al, *Antarctic journal of the United States*, 1991, 26(5), p.62-63, 4 refs.

Retzlaff, R.N., Lord, N., Novick, A.N.

Glacier ice, Crevasses, Mapping, Antarctica—Siple Coast.

Four papers describing different aspects of this project were presented at an American Geophysical Union meeting in Dec. 1990 and are summarized here. Referring to ice streams A,B,C, and D, broad topics of the papers were: bed deformation on the ice plain; detection of a large bottom crevasse on the ice plain of stream B, the crevasse being hyperbolic in shape, unsymmetrical, about 12 km long; surface and bed elevation mapping derived from 14,000 km of airborne radar soundings; and dating the shut down of ice stream C at 130 +/- 20 years ago.

47-2465

Analysis of seismic and gravity studies on the Siple Coast.

Bentley, C.R., et al, *Antarctic journal of the United States*, 1991, 26(5), p.63-65, 8 refs.

Atre, S.R., Munson, C.G.

Seismic surveys, Gravity, Glacier ice, Antarctica—Siple Coast.

Accounts of this work on ice stream C were discussed in three papers presented at an American Geophysical Union meeting in Dec. 1990. The papers are summarized here. Some understanding of bed softness was derived from phases of seismic reflections, although a serious, unresolved difficulty arises in the explanation of reversals and non-reversals and ice impedance. Reflection and refraction studies shed some light on seismic anisotropy in the ice. The subglacial crustal structure study showed two layers and provided sufficient data to construct a crustal model of the subsurface profile.

47-2466

Formation of ice-stream rafts by recrystallization.

Alley, R.B., *Antarctic journal of the United States*, 1991, 26(5), p.66-67, 13 refs.

Ice rafting, Glacier ice, Ice deformation, Recrystallization, Antarctica—West Antarctica.

Key factors in ice streaming are basal lubrication and ice softness. Raft formation might be related to an irregular onset of basal lubrication, or to localized switches in ice softness. Field and theoretical studies recently have concentrated on basal lubrication of west antarctic ice streams, but not as much attention has been focused on ice softness. On the other hand, because the rafts are visible at the surface in ice 1,000 m thick, ice conditions almost certainly play a role in their formation, whether or not discontinuous basal lubrication is important. In parallel with other groups working in West Antarctica, first under the auspices of the Siple Coast Project and now as the West Antarctic Ice Sheet Initiative, theoretical studies have been started to learn how important the variations in ice softness might be and what studies might be done to characterize these variations.

47-2467

Glacial flow reorientation in the southwestern Fosdick Mountains, Ford Ranges, Marie Byrd Land.

Richard, S. M., et al, *Antarctic journal of the United States*, 1991, 26(5), p.67-69, 12 refs.

Luyendyk, B.P.

Glacier flow, Rocks, Talus, Antarctica—Fosdick Mountains.

Examination of the glacial striations on the nunataks, clasts, and bedrock formations in the Fosdick Mountains region leads to the conclusion that the principal glacier flow direction in earlier times was from the southeast to the northwest, nearly perpendicular to the present direction of flow.

47-2468

"Taylor Ice-Dome" study: reconnaissance 1990-1991.

Grootes, P.M., et al, *Antarctic journal of the United States*, 1991, 26(5), p.69-71, 5 refs.

Steig, E.J., Massey, C.

Glacier ice, Glacier flow, Ice cores, Snow stratigraphy, Antarctica—Victoria Land.

Taylor Dome is a small ice dome, center above 2,450 m at about 77.6S, 158E separated from a ridge of the main east antarctic ice sheet by a saddle at least 100 m lower. Flowline reconstruction shows this dome as a local center of outflow supplying ice to the glaciers entering the McMurdo Dry Valleys of southern Victoria Land from the west. Climatic changes have been recorded both in the ice accumulating on Taylor Dome and in the glacial geology in the McMurdo Dry Valleys. An ice core retrieved from Taylor Dome thus offers the opportunity to compare the ice-core record of past climatic and environmental changes from an area of simple ice flow with the directly related geological record of past glaciations in the adjacent McMurdo Dry Valleys. From Nov. 29, 1990 to Jan. 28, 1991, two field parties of three members each carried out a joint reconnaissance of Taylor Dome in preparation for the selection of an ice-core drill site.

47-2469

Glacier geophysical studies for an ice core site at "Taylor Dome".

Waddington, E.D., et al, *Antarctic journal of the United States*, 1991, 26(5), p.71-73, 4 refs.

Morse, D., Balise, M.J., Firestone, J.

Glacier ice, Ice cores, Geophysical surveys.

The program for Taylor Dome is arranged as a three-year effort culminating in the extraction of an ice core which, it is anticipated, will provide climate data for the immediate past 20,000 years. Preliminary steps and procedures contributing to site characterization were accomplished in 1990-1991: the setting up of an automatic weather station; the use of a strain net to establish surface topography; and the obtaining of bedrock topography by radar soundings.

47-2470

Oxygen isotope data from the McMurdo Ice Shelf, Antarctica: implications for debris band formation and glacial history.

Kellogg, T.B., et al, *Antarctic journal of the United States*, 1991, 26(5), p.73-76, 16 refs.

Kellogg, D.E., Stuiver, M.

Oxygen isotopes, Ice shelves, Snow composition, Antarctica—McMurdo Ice Shelf.

During the 1989-1990 field season ice was collected from beneath the debris cover for oxygen isotope analysis at 182 sites on McMurdo Ice Shelf. Isotope values range from -51.28 parts per thousand (ppt) to +5.0 ppt. Because the sites are widely distributed and encompass the range of values reported by other investigators, they probably demonstrate the full range of values typical for the McMurdo Ice Shelf. Most McMurdo Ice Shelf sites yield isotopic oxygen values of 0.0 ppt to +3.0 ppt. Because of fractionation, sea water should become slightly enriched in *delta*O-18 relative to the international standard, SMOW (0.0 ppt), during freezing. Such slightly enriched values are therefore diagnostic for ice of pure marine origin; and they dominate throughout the McMurdo Ice Shelf from the end of Minna Bluff to the calving margin. The objective was to obtain ice free of local precipitation to determine the origin of McMurdo Ice Shelf ice. Given the high surface ablation rate, the resultant inversions of surface relief, and the abundance of melt ponds on the McMurdo Ice Shelf surface, it is not surprising that approximately 13% of ice samples represent admixtures of marine and fresh water. The fact that this figure is not larger demonstrates the dominance of basal freezing on the mass balance of the McMurdo Ice Shelf, and suggests that most snow falling in the ablation area blows out to sea, sublimates, or melts and flows down cracks or off the front of the McMurdo Ice Shelf.

47-2471

Radiocarbon dates from the McMurdo Ice Shelf, Antarctica: implications for debris band formation and glacial history.

Kellogg, T.B., et al, *Antarctic journal of the United States*, 1991, 26(5), p.77-79, 20 refs.

Kellogg, D.E., Stuiver, M.

Radioactive age determination, Ice shelves, Marine biology.

During the 1989-1990 field season, carbonate skeletal debris was collected for radiocarbon dating from McMurdo Ice Shelf. Most of the dates presented were obtained from shells of the barnacle *Bathylasma corolliforme* (Hoek), the most abundant and widespread carbonate invertebrate on the McMurdo Ice Shelf. The authors argue that the anchor-ice mechanism is relatively unimportant because it should produce either a pattern of randomly distributed ages, if currents are sporadic or intermittent, or a distinct distribution of ages related to existing current patterns. The distribution of dates clearly shows that all specimens dated less than 2,000 years ago occur close to shorelines. The second conclusion is related to an interpretation of the carbon-14 dates. The complete absence of dates between 7,750 and 20,000 years ago is consistent with the presence of grounded ice of the late Wisconsin Ross Sea Ice Sheet, which filled McMurdo Sound during this period. The older suite of carbon-14 dates (>20,000 years ago) represents organisms that lived in McMurdo Sound or the adjacent Ross Sea prior to the late Wisconsin advance of grounded ice that filled McMurdo Sound. These dates are considered as minimum ages for preglacial marine conditions.

47-2472

Annual ablation rates of the Lewis Cliff ice tongue.

Fori, G., et al, *Antarctic journal of the United States*, 1991, 26(5), p.86-87, 2 refs.

Buchanan, D., Schutt, J.

Glacier tongues, Ablation, Antarctica—Lewis Cliff.

The annual ablation rates of ice in the Lewis Cliff ice tongue were measured on Dec. 7, 1990 using 21 bamboo poles planted in the ice in Jan. 2, 1988. The ablation rates were determined by measuring the lowering of the ice surface at each locality relative to a notch that had been cut into each pole to mark the level of the ice surface at the time of implantation. The lowering of the ice surface was measured with calipers that have a reading error of only 0.00254 cm. The annual ablation rates across the upper Lewis Cliff ice tongue based on six of the seven stations range from 3.4 to 5.6 cm/yr with an average of 4.4 cm/yr. The results derived from the stations across the lower Lewis Cliff ice tongue suggest that the annual ablation rates at this location increase from east, (4.7 cm/yr, 18-7) to west (9.3 cm/yr, 18-1). The increase in the average ablation rate coincides with higher wind speeds along the western side of the ice tongue, but might also reflect the proximity of Mount Achernar, which may cause local warming. The average annual ablation rate of all eight stations along the lower crossline is 5.8 cm/yr.

47-2473

Methanesulfonic acid and non-seasalt sulfate in the Vostok ice core: a glacial/interglacial record of biogenic sulfur emissions from the southern ocean.

Saltzman, E.S., et al, *Antarctic journal of the United States*, 1991, 26(5), p.88-89, 5 refs.

Ice cores, Ice composition, Climatic changes.

Dimethylsulfide (DMS) is produced biologically in the surface of oceans by phytoplankton and emitted into the atmosphere via gas exchange. In the atmosphere, DMS is rapidly oxidized by the hydroxyl ion radical to form methanesulfonic acid (MSA) and sulfur dioxide, which is converted in turn to sulfuric acid. MSA retains one of the methyl groups of its DMS precursor, making it potentially useful as a tracer for biogenic sulfur in marine aerosol and precipitation. Because non-seasalt sulfate is the principal source of fine-particle aerosols and cloud condensation nuclei in the atmosphere, it has been suggested that the atmospheric sulfur cycle may play a role in the long-term control of the radiation budget of the Earth. This article reports on a preliminary record of MSA and non-seasalt sulfate in the 2,500 m ice core from Vostok Station, central East Antarctica. The Vostok ice core has been analyzed to investigate the relationship between oceanic sulfur emissions and climate change. It contains a 160,000 year record covering the last glacial/interglacial climatic cycle.

47-2474

Development of laser ice-cutting apparatus.

Zeller, E.J., et al, *Antarctic journal of the United States*, 1991, 26(5), p.89-91, 1 ref.

Dreschhoff, G.A.M., Laird, C.M.

Ice cutting, Lasers, Instruments, Antarctica—Ross Island, Antarctica—Windless Bight.

During the 1990-1991 field season at Windless Bight near Ross I., a 25-watt continuous infrared carbon dioxide laser was introduced as a field device to cut individual firn cores for sample preparation. The test was successful and permitted this device to be employed on a routine basis in field operations. The advantage of carbon dioxide laser cutting systems is that the beam emits at an infrared wavelength which is strongly absorbed in ice. It was demonstrated conclusively that the laser beam can cut cleanly and rapidly through both firn and ice, and that it can be manipulated efficiently with standard optical systems. In the process of this experiment, it was determined that it would be possible to develop an optical system that would permit the beam to be rotated in a circular path, a motion that could be used for cutting deep ice cores. With minor modifications, this system could be used in fluid-filled holes as well as in open holes.

47-2475

Technological scheme for removing impurities from biogas. [Tekhnologicheskaia skhema ochistki biogaza ot primesei].

Nekrasov, V.G., *Gazovaia promyshlennost'*, 1990, No.10, p.30-31, In Russian.

Dry ice (trademark), Impurities, Natural gas.

47-2476

Improving the effectiveness of drying gas in northern regions. [Povyshenie effektivnosti osushki gaza v severnykh raionakh].

Mukhtarov, K.A., et al, *Gazovaia promyshlennost'*, 1990, No.10, p.42-43, In Russian.

Guseinov, IU.Z.

Natural gas, Drying, Cold weather operation.

47-2477

Multilayered insulation ensuring human activity in extreme climatic conditions. [Mnogosloinaia izoliatsiia, obespechivaiushchaia zhiznedeiatelnost' cheloveka v ekstremal'nykh usloviiakh].

Bosniatskii, G.P., et al, *Gazovaia promyshlennost'*, 1991, No.1, p.33, In Russian. 2 refs.

Shabunia, E.D., Ispirian, R.A., Klinger, A.V.

Cold weather survival, Human factors engineering, Insulation, Clothing.

47-2478

Will northern piles last. [Ustoiat li severnye svai?].

Mikhailov, N.V., et al, *Gazovaia promyshlennost'*, 1991, No.2, p.6-7, In Russian.

Zhil'tsov, IU.M.

Cold weather construction, Cold weather performance, Piles.

47-2479

Ensuring reliable gas supply in Yakutia. [Obespechenie nadezhnosti gazosnabzheniia v usloviiakh IAkutii].

Dement'ev, IU.L., *Gazovaia promyshlennost'*, 1991, No.2, p.24-25, In Russian.

Natural gas, Cold weather operation, Gas production, USSR—Yakutia.

47-2480

Gas field production in an area with permafrost development. [Dobycha gaza usloviiakh shirokogo razvitiia mnogoletnemerzlykh gruntov].

Mikhailov, N.V., *Gazovaia promyshlennost'*, 1991, No.5, p.4-5, In Russian.

Natural gas, Gas production, Cold weather operation.

47-2481
Methods of building in the arctic zone of the country. [Sposoby stroitel'stva v arkticheskoĭ zone strany].
Shemraev, G.A., *Gazovaia promyshlennost'*, 1991, No.5, p.6-7, In Russian.
Cold weather construction.

47-2482
Restoring disturbed soils under conditions in the Far North: basis for design solutions. [Vosstanovlenie narushennykh zemel' v usloviiakh Kraĭnego Severa: obosnovanie proektnykh reshenii].
Bobrova, T.N., et al, *Gazovaia promyshlennost'*, 1991, No.5, p.10-11, In Russian.
Kamyshev, A.P.
Cold weather operation, Revegetation, Environmental impact, Environmental protection.

47-2483
Recultivation in arctic regions. [Rekul'tivatsiia v arkticheskikh raĭonakh].
Masalkin, S.D., *Gazovaia promyshlennost'*, 1991, No.5, p.11, In Russian.
Revegetation, Cold weather operation, Environmental impact, Environmental protection.

47-2484
Yamal: problems in geocryology and hydrology. [Iamal: voprosy geokriologii i gidrologii].
Makhonin, G.I., et al, *Gazovaia promyshlennost'*, 1991, No.5, p.12-13, In Russian.
Griva, G.I.
Geocryology, Hydrology, Gas production, Natural gas, USSR—Yamal Peninsula.

47-2485
American practices in developing arctic resources. [Amerikanskaia praktika osvoeniia resursov Arktiki].
Halley, D., *Gazovaia promyshlennost'*, 1991, No.5, p.16-19, In Russian.
Cold weather operation, Natural resources.

47-2486
Improving the performance of electrical networks under conditions of the Far North. [Povyshenie nadezhnosti elektricheskikh setei v usloviiakh Kraĭnego Severa].
Belousenko, I.V., *Gazovaia promyshlennost'*, 1991, No.7, p.17-19, In Russian.
Cold weather performance, Electric power.

47-2487
Effective method of building foundations for structures on permafrost. [Effektivnyĭ metod stroitel'stva osnovaniĭ sooruzhenii na mnogoletnemerzlykh gruntakh].
Dolgikh, G.M., et al, *Gazovaia promyshlennost'*, 1991, No.9, p.16-17, In Russian.
Baĭkanov, A.V., Nevolainen, N.I., Bizerova, N.IA.
Foundations, Cold weather construction, Permafrost beneath structures.

47-2488
Controlled formation of the temperature field of the bearing ground for a gas pipeline in the southwestern part of Yamal. [Upravliaemoe formirovanie temperaturnogo polia gruntovogo osnovaniia gazoprovoda v iugo-zapadnoĭ chasti IAmala].
Odishariia, G.E., et al, *Gazovaia promyshlennost'*, 1991, No.9, p.30-31, In Russian. 1 ref.
Odishariia, O.E.
Gas pipelines, Permafrost beneath structures, Thermal regime, Frozen ground thermodynamics, USSR—Yamal Peninsula.

47-2489
Solid wastes from the drilling of boreholes in the Far North: means of reduction. [Tverdye otkhody bureniia skvazhin Kraĭnego Severa: puti snizheniia].
Kashkarov, N.G., et al, *Gazovaia promyshlennost'*, 1991, No.11, p.26, In Russian.
Bragina, L.V., Purtov, A.P.
Boreholes, Drilling, Cold weather operation, Wastes.

47-2490
Snow drainage ditch project using sea water—surface maintenance for the snow drainage ditch in Iwanai. [Kaisui o riyo shita ryusetsuko keikaku—Iwanai ryusetsuko no menteki seibi].
Mizuno, E., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1991(Pub. Feb.92), 35(1), p.23-28, In Japanese.
Yamazaki, H., Tomita, M.
Road maintenance, Snow removal, Drains, Sea water, Municipal engineering.

47-2491
Mechanical opening and shutting device for snow removal storm drain openings. [Ryusetsuko, tosetsuko no kikaishiki kaihei sochi ni tsuite].
Fukushi, H., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1991(Pub. Feb.92), 35(1), p.29-34, In Japanese.
Itoh, K., Suzuki, M.
Snow removal, Drains, Road maintenance.

47-2492
Report on improving the accuracy of radar precipitation gages (3rd report). [Reda usetsu ryokei no seido kojo ni kansuru kento hokoku (dai 3 ho)].
Konishi, S., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1991(Pub. Feb.92), 35(1), p.165-170, In Japanese.
Segawa, A., Ito, H.
Precipitation gages, Runoff forecasting, Snowmelt, Snowfall, Meteorological instruments, Radar.

47-2493
Tests on road snow removal (conclusion)—tests on snow removal in urban areas. [Doro josetsu ni kansuru chosa shiken (shuryo)—toshinai josetsu ni kansuru chosa shiken].
Hokkaido Development Bureau, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1991(Pub. Feb.92), 35(1), p.247-262, In Japanese. 6 refs.
Road maintenance, Snow removal, Municipal engineering, Road icing, Streets.

47-2494
Snowplow for removing snow from guard rails. [Bogosaku gaisoku josetsu sochi ni tsuite].
Akiba, K., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1991(Pub. Feb.92), 35(1), p.283-286, In Japanese.
Sugawara, T., Mikuni, K.
Snow fences, Snow removal.

47-2495
Tests on improving the efficiency of fresh snow removal- -tests on snowplows with variable configurations for curved surfaces. [Shinsetsu josetsu no koritsuka ni kansuru chosa shiken—kyokumen kahenkei josetsu purau no kaihatsu ni kansuru chosa shiken].
Kubota, S., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1991(Pub. Feb.92), 35(1), p.287-292, In Japanese.
Matsubara, M., Eido, K.
Snow removal, Road maintenance, Motor vehicles, Equipment, Cold weather performance, Cold weather tests.

47-2496
Tests on preventing pavement cracks in agricultural roads. [Nodo hoso kurakku boshiko shiken ni tsuite].
Tagaino, S., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1990(Pub. Feb.91), 34(4), p.107-112, In Japanese. 5 refs.
Matsuura, N., Takeshita, K.
Road maintenance, Frost protection, Frost forecasting, Frost heave, Frost penetration, Pavements, Cold weather tests.

47-2497
Tests of grooving on the taxiways of the New Chitose Airport. [Shin Chitose kuko yudoro e no gurubingu no shiken shiko ni kansuru chosa ni tsuite].
Sato, H., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1990(Pub. Feb.91), 34(4), p.235-240, In Japanese.
Toyama, T., Chiba, M.
Runways, Road icing, Skid resistance, Traction, Road maintenance, Safety, Cold weather tests.

47-2498
Technical problems of floating type ice barriers. [Futaishiki bohyotei ni kansuru gijutsu kadai].
Mizuno, Y., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1990(Pub. Feb.91), 34(4), p.265-270, In Japanese. 4 refs.
Sugimoto, Y., Hirasawa, M.
Ice control, Floating structures, Ports.

47-2499
Study on icing of marine structures. [Kaiyo kozobutsu no chakuhyo ni kansuru kenkyu].
Hirasawa, M., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1990(Pub. Feb.91), 34(4), p.271-276, In Japanese. 7 refs.
Yano, K., Takahashi, T.
Offshore structures, Ice accretion, Ice loads, Ice solid interface, Icing.

47-2500
Control of sea ice by the air bubble method—effect of installing air bubbling pipes and setting out seawalls. [Eababuru koho ni yori kaihyo seigyo ni tsuite—kiho hasseikan no setchi ichi to ganpeki no haridashi no koka].
Yamanaka, K., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1990(Pub. Feb.91), 34(4), p.277-282, In Japanese. 3 refs.
Sugimoto, Y., Umezawa, N.
Ice control, Bubbling, Ports, Wharves.

47-2501
Development of on-site ice thickness gages during initial freezing. [Shoki keppyo o taisho toshita genchiyo hyokokei no kaihatsu].
Takashima, K., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1990(Pub. Feb.91), 34(4), p.283-286, In Japanese. 5 refs.
Omori, Y., Takeuchi, T.
Ice cover thickness, Thickness gages, Ice formation, Sea water freezing, Ice surveys, Ice water interface, Ports.

47-2502
Study on countermeasures (louvers) against blow-in for tunnels at the New Chitose Airport. [Shin Chitose kuko chikado fukikomi taisaku shisetsu (ruba) chosa ni tsuite].
Suzuki, H., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1991(Pub. Feb.92), 35(4), p.215-220, In Japanese.
Chiba, M., Toyama, T.
Snowsheds, Tunnels, Blowing snow, Airports, Road maintenance, Ventilation.

47-2503
Wave height observations in the Okhotsk Sea in winter. [Toki no ohotsuku kai ni okeru hako kansoku ni tsuite].
Mizuno, Y., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1991(Pub. Feb.92), 35(4), p.331-336, In Japanese. 9 refs.
Sugimoto, Y., Yamamoto, Y.
Ocean waves, Ice cover effect, Ice water interface, Ice control, Water pressure, Underwater acoustics, Acoustic measurement, Mathematical models, Okhotsk Sea.

47-2504
Snow removal channeling operations—battle against snow and ice bars. [Shuryusetsuyo suidonyu jigyo ni tsuite—yukinkori ba sakusen].
Suzuki, K., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1991(Pub. Feb.92), 35(3), p.201-204, In Japanese. 1 ref.
Ueda, M., Kaneko, M.
Snow removal, Drains, Channels (waterways), Flow control.

47-2505
Snow removal channeling operations in Iwamizawa City. [Iwamizawashi shuryusetsuyo suidonyu jigyo ni tsuite].
Hirai, Y., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1991(Pub. Feb.92), 35(3), p.205-208, In Japanese.
Shibagaki, H., Iwami, Y.
Snow removal, Drains, Channels (waterways), Flow control.

47-2506
Introduction of rainwater infiltration facilities in cold regions. [Kanreichi ni okeru usui shinto shisetsu donyu ni tsuite].
Iwami, Y., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1991(Pub. Feb.92), 35(3), p.213-218, In Japanese. 7 refs.
Nakano, Y., Seki, H.
Drainage, Cold weather construction, Drains, Rain, Seepage, Frost heave.

47-2507
Freeze sampling of the riverbed sediment at Chubetsu Dam. [Chubetsu damu kasho taisekiso no toketsu sanpuringu ni tsuite].
Masakuni, Y., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1991(Pub. Feb.92), 35(3), p.329-334, In Japanese. 7 refs.
Komori, T., Kaga, T.
Earth dams, Soil strength, Earth fills, Soil tests, Low temperature tests, Bottom sediment, Artificial freezing, Frozen ground strength, Core samplers.

47-2508
Study on the effects of the popularization of studless tires—2nd report. [Staddoresu taiya no fukyu ni tomonau eikyo chosa—dai 2 ho].
Horita, N., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1991(Pub. Feb.92), 35(2), p.65-72, In Japanese. 6 refs.
Konagai, N., Kurauchi, K.
Tires, Road maintenance, Road icing.

47-2509
Results of installing traffic advisory signs with automatic display for winter. [Tokikan ni okeru jihatsuko shisen yudohyo no setchi koka ni tsuite].
Saito, H., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1991(Pub. Feb.92), 35(2), p.79-84, In Japanese. 3 refs.
Fukuda, M., Okuda, M.
Road maintenance, Safety, Highway planning, Road icing, Warning systems, Cold weather operation.

47-2510
Aiming at lush green roads safe from snow—snowbreak forests along the Nakagawamachi-Kokufu stretch of Route R-40. [Yuki ni tsuyoi midori yutakana michi zukuri o mezashite- -R40 Nakagawamachi Kokufu bosetsurin jigyo].
Ishidoya, S., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1991(Pub. Feb.92), 35(2), p.91-96, In Japanese. 3 refs.
Ueda, K., Ishizuka, T.
Snow retention, Road maintenance, Forest strips, Protective vegetation, Highway planning.

47-2511
Differences in the growing conditions for disaster prevention forests depending on tree species and regions. [Jushu to chiiki ni yoru bosairin seiiku jokyo no chigai].
Notake, T., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1991(Pub. Feb.92), 35(2), p.97-102, In Japanese. 8 refs.
Ishimoto, K.
Snow retention, Road maintenance, Forest strips, Protective vegetation, Snowstorms, Highway planning.

47-2512
Measurement results for snow pressure acting on hanging- shelf avalanche guards. [Nadare boshiyo tsuridana ni sayo suru setsuatsu no keisoku kekka ni tsuite].
Kurokawa, K., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1991(Pub. Feb.92), 35(2), p.103-108, In Japanese. 2 refs.
Meike, T.
Avalanche engineering, Snow fences, Snow loads, Snow stabilization, Snow retention, Road maintenance.

47-2513
Tests on windbreaks, snowbreaks, and obstacles to visibility—wind tunnel experiments on snow countermeasures in the Shiomicho district of Rumoi City on National Highway 232. [Bofu bosetsu oyobi shitei shogai ni kansuru chosa shiken—ippan kokudo 232 go Rumoishi Shiomicho chiku bosetsu taisaku no fudo jikken].
Sasaki, M., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1991(Pub. Feb.92), 35(2), p.109-114, In Japanese.
Takabe, N.
Snow fences, Road maintenance, Snowdrifts, Blowing snow, Windbreaks, Wind tunnels.

47-2514
Study on road heating systems in Hokkaido. [Hokkaido ni okeru rodo hiteingu shisutemu no ikkosatsu].
Miyamoto, S., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1991(Pub. Feb.92), 35(2), p.143-148, In Japanese. 5 refs.
Konagai, N., Asano, M.
Road maintenance, Road icing, Ice prevention, Artificial melting, Heating.

47-2515
Study on sidewalk frost heave countermeasures (second report). [Hodo no tojo taisaku chosa ni tsuite (dai ni ho)].
Nohara, T., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1991(Pub. Feb.92), 35(2), p.149-154, In Japanese. 6 refs.
Kawamura, K., Mizushima, T.
Sidewalks, Frost protection, Frost heave, Road maintenance, Road icing.

47-2516
Test characteristics of admixtures compounded with antifreezes—crack rate, various characteristics, and chloride solution content. [Toketsu yokuseizai o haigo shita kongobutsu no shiken seijo—kugekiritsu to shoseijo oyobi enkabutsu yoshutsuryo].
Ninomiya, H., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1991(Pub. Feb.92), 35(2), p.155-160, In Japanese.
Kawamura, K., Sawada, S.
Pavements, Antifreezes, Frost protection, Cold weather tests, Road maintenance, Road icing, Salting, Chemical ice prevention.

47-2517
Freeze retardants admixed to asphalt pavements. [Toketsu chienzai konnyu asufuaruto hoso ni tsuite].
Sanjo, K., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1991(Pub. Feb.92), 35(2), p.161-166, In Japanese. 3 refs.
Watanabe, M., Tanaka, K.
Pavements, Antifreezes, Frost protection, Road maintenance, Road icing, Bitumens.

47-2518
Report on the water shortage of 1990. [Heisei 2 nendo kassui hokoku ni tsuite].
Satoh, T., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1990(Pub. Feb.91), 34(3), p.55-60, In Japanese.
Kyoshi, H., Shimamiya, M.
Water supply, Snowfall, Water reserves, Snow accumulation, Snowmelt, Japan—Hokkaido.

47-2519
Snow removal equipment with an emergency water pump. [Kyukyunai mizu ponpu o katsuyo shita shoryusetsu shisetsu ni tsuite].
Hoshino, J., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1990(Pub. Feb.91), 34(3), p.145-150, In Japanese.
Nakano, Y., Shibagaki, H.
Snow removal, Municipal engineering, Road maintenance, Drains, Equipment, Pumps.

47-2520
Report on improving the accuracy of radar precipitation gages (Part 2)—study on using radar for runoff forecasting. [Reda usetsu ryokei no seido kojo ni kansuru kento hokoku (sono 2)—reda o riyo shita ryushutsu yosoku ni kansuru ikkosatsu].
Shinme, R., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1990(Pub. Feb.91), 34(1), p.109-114, In Japanese. 1 ref.
Yokoyama, K., Ito, H.
Precipitation gages, Runoff forecasting, Snowmelt, Snowfall, Meteorological instruments, Radar.

47-2521
Correspondence between radar precipitation gage output and ground weather observation data for blowing snow (Part 1). [Fubuki toki no reda usetsu ryokei shutsuryoku to chijo kisho kansoku deta no taio ni tsuite (1)].
Isobe, K., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1990(Pub. Feb.91), 34(1), p.121-124, In Japanese. 2 refs.
Ishimoto, K., Fukuzawa, Y.
Blowing snow, Precipitation gages, Weather observations, Meteorological instruments, Radar.

47-2522
Tests on road snow removal (continuation)—tests on snow removal in urban areas. [Doro josetsu ni kansuru chosa shiken (keizoku)—toshinai josetsu ni kansuru chosa shiken].
Hokkaido Development Bureau, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1990(Pub. Feb.91), 34(1), p.159-178, In Japanese. 5 refs.
Road maintenance, Snow removal, Municipal engineering, Road icing, Streets.

47-2523
Performance tests on a rotary snowplow (with a single loading operation). [Rotari josetsusha (isshasen tsumikomi kata) no seino ni kansuru chosa shiken].
Sawaguchi, S., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1990(Pub. Feb.91), 34(1), p.199-204, In Japanese.
Sasaki, C., Horikawa, R.
Snow removal, Road maintenance, Motor vehicles, Equipment, Cold weather performance, Cold weather tests.

47-2524
Tests on improving the efficiency of snow removal equipment on snow removal trucks. [Josetsu torakku no josetsu sochi no koritsuka ni kansuru chosa shiken].
Nakajima, J., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1990(Pub. Feb.91), 34(1), p.205-210, In Japanese.
Ushiki, S., Kurita, I.
Snow removal, Road maintenance, Motor vehicles, Equipment, Cold weather performance, Cold weather tests.

47-2525
Tests on snowbreaks, windbreaks and obstacles to visibility—wind tunnel experiments on snow countermeasures between Numanoue and Old Mombetsu in the city of Mombetsu on National Highway 238. [Bosetsu bofu oyobi shitei shogai ni kansuru chosa shiken—ippan kokudo 238 go Monbetsushi Numanoue moto Monbetsukan bosetsu taisaku ni kansuru fudo jikken].
Takabe, N., et al. *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries).* 1990(Pub. Feb.91), 34(1), p.211-214, In Japanese.
Katano, K.
Snow retention, Road maintenance, Snowdrifts, Blowing snow, Forest strips, Protective vegetation, Windbreaks, Wind tunnels.

47-2526
Airborne ice nuclei concentrations measured aboard a helicopter using a mixing chamber. [Vertoletnye izmereniia kontsentratsii ledianykh iader kameroi smesheniia na territorii Moldavii].
Vychuzhanina, M.V., et al. *Moscow. Tsentral'naia aerologicheskaia observatoriia. Trudy*, 1992, Vol.177, p.135-143, In Russian with English summary. 4 refs.
Ice nuclei, Test chambers, Aerosols.

47-2527
Study of the spatial distribution of ice nuclei in a mountainous region. [Issledovanie prostranstvennogo raspredeleniia ledianykh iader v gornom raione].
Vlasiuk, M.P., et al. *Moscow. Tsentral'naia aerologicheskaia observatoriia. Trudy*, 1992, Vol.177, p.143-159, In Russian with English summary. 10 refs.
Vychuzhanina, M.V., Parshutkina, I.P.
Ice nuclei, Aerosols.

47-2528
Study of the kinetics of the activation of natural and man-made ice nuclei in the Salya cloud chamber. [Issledovanie kinetiki proiavleniia prirodnykh i iskusstvennykh ledianykh iader v kamere Salia].
Vychuzhanina, M.V., *Moscow. Tsentral'naia aerologicheskaia observatoriia. Trudy*, 1992, Vol.177, p.159-167, In Russian with English summary. 4 refs.
Ice nuclei, Aerosols, Cloud chambers.

47-2529
Study of the ice nucleating properties of various polymers. [Issledovanie l'doobrazuiushchikh svoistv nekotorykh polimerov].
Sosnikova, E.V., *Moscow. Tsentral'naia aerologicheskaia observatoriia. Trudy*, 1992, Vol.177, p.168-172, In Russian with English summary. 7 refs.
Ice nuclei, Polymers, Aerosols, Nucleating agents, Artificial nucleation.

47-2530
Study on road construction for the 21st century in snowy and cold regions. [Sekisetsu kanreichi ni okeru 21 seiki no doro kozo nado ni kansuru kenkyu].
Hokkaido Development Bureau. *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries).* 1990(Pub. Feb.91), 34(2), p.5-24, In Japanese.
Highway planning, Cold weather construction, Regional planning, Road maintenance, Japan.

47-2531
Study on the effects of the popularization of studless tires—1st report. [Staddoresu taiya no fukyu ni tomonau eikyo chosa—dai 1 ho].
Koizumi, S., et al. *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries).* 1990(Pub. Feb.91), 34(2), p.33-38, In Japanese. 6 refs.
Konagai, N., Kurauchi, K.
Tires, Road maintenance, Road icing.

47-2532
Traffic in mountainous areas of snowy and cold regions. [Sekisetsu kanreichi ni okeru sanchibu no kotsu ni tsuite].
Hirasawa, M., et al. *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries).* 1990(Pub. Feb.91), 34(2), p.39-44, In Japanese. 3 refs.
Konagai, N., Yagi, K.
Road maintenance, Safety, Highway planning, Road icing, Accidents, Cold weather operation, Japan.

47-2533
Recycling of scrap wood for cold region asphalt pavements—subgrade stabilization by the central plant method. [Kanreichi asufuaruto hoso haizai no saisei riyo—chuo puranto hoshiki ni yoru kiso antei shori shikorei].
Takami, K., et al. *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries).* 1990(Pub. Feb.91), 34(2), p.51-56, In Japanese. 4 refs.
Takahara, A., Nakamura, M.
Pavements, Road maintenance, Cold weather construction, Bitumens, Composite materials, Wood, Wastes, Waste treatment.

47-2534
Study on sidewalk frost heave countermeasures—studies under different environmental conditions. [Hodo no tojo taisaku chosa ni tsuite—kankyo joken no koto naru kasho de no chosa].
Nohara, T., et al. *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries).* 1990(Pub. Feb.91), 34(2), p.79-84, In Japanese. 5 refs.
Kawamura, K., Mizushima, T.
Sidewalks, Frost protection, Frost heave, Thermal insulation, Snow removal, Ice removal, Frost penetration, Road maintenance, Road icing.

47-2535
Improving laboratory freezing tests. [Shitsunai tojo shiken no kairyo ni tsuite].
Saito, T., et al. *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries).* 1990(Pub. Feb.91), 34(2), p.85-90, In Japanese. 5 refs.
Kawamura, K., Mizushima, T.
Pavements, Frost resistance, Cold weather tests, Road icing, Laboratory techniques.

47-2536
Test characteristics of asphalts with antifreeze admixtures. [Toketsu yokuseizai o konnyu shita asufuaruto kongobutsu no shiken seijo ni tsuite].
Ninomiya, H., et al. *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries).* 1990(Pub. Feb.91), 34(2), p.91-96, In Japanese.
Kawamura, K., Sawada, S.
Pavements, Antifreezes, Frost protection, Cold weather tests, Road maintenance, Road icing, Bitumens.

47-2537
Measures to prevent freezing of water intakes for snow drainage ditches in severe cold regions—experimental results of the Kasen snow drainage ditch as an example. [Genkanchi ni okeru ryusetsuko no shusuiko toketsu boshi taisaku ni tsuite—Kasen ryusetsuko no jikken kekka o rei toshite].
Takeuchi, T., et al. *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries).* 1990(Pub. Feb.91), 34(2), p.97-102, In Japanese.
Goto, T., Goto, Y.
Water intakes, Ice prevention, Snow removal, Ice control, Drains, Municipal engineering.

47-2538
Practical examples with a personal computer for road management data. [Doro kanri deta no pasokon ni yoru yuko katsuyorei].
Chiba, T., *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries).* 1990(Pub. Feb.91), 34(2), p.121-124, In Japanese. 3 refs.
Road maintenance, Safety, Highway planning, Blowing snow, Snowstorms, Accidents, Cold weather operation, Computer applications, Data processing, Japan.

47-2539
Numerical simulation to estimate the wind- and snowbreak efficiency of snowbreak forests. [Bosetsurin no bofu koka to bosetsu koka no suitei no suchi shimyureshon].
Yano, S., et al. *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries).* 1990(Pub. Feb.91), 34(2), p.125-130, In Japanese. 9 refs.
Toyoda, H., Ishidoya, S.
Snow retention, Road maintenance, Snowdrifts, Blowing snow, Forest strips, Protective vegetation, Windbreaks, Mathematical models.

47-2540
Application of chemicals for snowy and icy road surfaces in Hokkaido. [Hokkaido ni okeru seppyo romenyo yakuzai no unyo ni tsuite].
Miyamoto, S., et al. *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries).* 1990(Pub. Feb.91), 34(2), p.131-136, In Japanese. 8 refs.
Konagai, N., Yagi, K.
Road maintenance, Chemical ice prevention, Road icing, Japan—Hokkaido.

47-2541
Winter road management, testing and research trends in Europe and the United States. [O-Bei ni okeru toki romen kanri to chosa kenkyu no doko].
Kajiya, Y., *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries).* 1990(Pub. Feb.91), 34(2), p.137-140, In Japanese. 5 refs.
Road maintenance, Road icing, Highway planning, Safety, Winter maintenance, Cold weather operation, Research projects.

47-2542
Measures to prevent freezing of the Hakucho Bridge drain pipes. [Hakucho ohashi haisuikan no toketsu boshi taisaku].
Yoneta, Y., et al. *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries).* 1990(Pub. Feb.91), 34(2), p.209-214, In Japanese.
Koga, S.
Pipeline freezing, Ice prevention, Ice control, Water pipelines, Drains, Bridges.

47-2543
Use of radar measurements to investigate hail formation in clouds.
Alvazian, G.M., *Akademiia nauk SSSR. Izvestiya. Atmospheric and oceanic physics*, Oct. 1991, 27(3), p.208-217, Translated from Izvestiia. Fizika atmosfery i okeana. 39 refs.
Hail clouds, Ice detection, Radar echoes, Attenuation, Ice formation, Ice optics, Ice water interface, Analysis (mathematics).

47-2544
Measurements of airborne carbonaceous aerosols in the eastern Arctic.
Hansen, A.D.A., et al. *Akademiia nauk SSSR. Izvestiya. Atmospheric and oceanic physics*, Jan. 1992, 27(6), p.429-433, Translated from Izvestiia. Fizika atmosfery i okeana. 8 refs.
Kapustin, V.N., Polissar, A.V.
Polar atmospheres, Atmospheric composition, Air pollution, Aerosols, Hydrocarbons, Sampling, Chemical analysis, Correlation.

47-2545
Hydraulic conductivity of compacted clay frozen and thawed *in situ*.
Benson, C.H., et al. *Journal of geotechnical engineering*, Feb. 1993, 119(2), p.276-294, 22 refs.
Othman, M.A.
Clay soils, Soil freezing, Soil structure, Soil water migration, Cracking (fracturing), Linings, Soil mechanics, Design criteria.

47-2546
Comparative study of latex-modified concretes and normal concretes subjected to freezing and thawing in the presence of a deicer salt solution.
Bordeleau, D., et al. *ACI materials journal*, Nov.-Dec. 1992, 89(6), p.547-553, 10 refs.
Pigeon, M., Banthia, N.
Concrete durability, Concrete admixtures, Freeze thaw tests, Air entrainment, Salt water, Polymers, Deterioration, Surface properties, Weathering.

47-2547
Tests on arch-shaped ice-resisting walls for offshore structures.
Ellis, R.M., et al. *ACI structural journal*, Jan. 1993, 90(1), p.42-51, 12 refs.
MacGregor, J.G.
Offshore structures, Concrete strength, Concrete structures, Ice loads, Ice solid interface, Reinforced concretes, Walls, Mechanical tests, Simulation, Design criteria, Sea ice.

47-2548
Freeze-thaw durability of lightweight carbon fiber reinforced cement composites.
Soroushian, P., et al. *ACI materials journal*, Sep.-Oct. 1992, 89(5), p.491-494, 6 refs.
Nagi, M., Okwuegbu, A.
Cement admixtures, Concrete durability, Freeze thaw tests, Concrete aggregates, Physical properties, Cold weather performance, Reinforced concretes, Composite materials.

47-2549
Freeze/thaw characteristics of a copper/water heat pipe: effects of noncondensible gas charge.
Ochterbeck, J.M., et al. *Journal of thermophysics and heat transfer*, Jan.-Mar. 1993, 7(1), p.127-132, 16 refs.
Peterson, G.P.
Heat pipes, Water pipes, Vapor pressure, Vapor transfer, Freeze thaw tests, Heat transfer, Performance, Fluid dynamics, Ice vapor interface.

47-2550
Experimental study of freezing of binary solutions.
Zampino, M.A., et al. *Journal of thermophysics and heat transfer*, Jan.-Mar. 1993, 7(1), p.133-138, 14 refs.
Chellaiah, S., Waters, R.A.
Solutions, Salt water, Solidification, Convection, Liquid solid interfaces, Freezing rate, Thermal diffusion, Fluid dynamics.

47-2551
Prediction of spatial and temporal distributions of frost growth on a flat plate under forced convection.
Tao, Y.X., et al. *Journal of heat transfer*, Feb. 1993, 115(1), p.278-281, 18 refs.
Besant, R.W.
Frost, Ice growth, Ice solid interface, Convection, Forecasting, Mathematical models, Ice cover thickness, Mass transfer.

47-2552
Combined system for observations of tropospheric and stratospheric thin clouds.
Adriani, A., et al. *Journal of atmospheric and oceanic technology*, Feb. 1993, 10(1), p.34-40, 14 refs.
Gobbi, G.P., Viterbini, M., Ugazio, S.
Polar atmospheres, Cloud physics, Stratosphere, Sounding, Meteorological instruments, Design, Imaging, Aerosols.
A balloonborne sonde and a polarization lidar have been developed to make combined observations of thin tropospheric and stratospheric clouds. In their first application these instruments have been used in a campaign to study antarctic polar stratospheric clouds (PSCs), which are implicated in the process of ozone depletion. The sonde collects cloud particles larger than 4 microns in diameter on a transparent impactor and observes them by means of a CCD (charge coupled device) camera microscope. Images are transmitted in real time to the ground station for recording and analysis. Shape, dimension, and size distribution of the particles are obtained from these frames. The lidar provides complementary information about the cloud optical depth, backscattering, depolarization, vertical distribution, and temporal evolution. Characteristics of both instruments are described. The experiments performed during the 1990 spring campaign at McMurdo Station are discussed, and some results are reported to show the capabilities of the combined system. (Auth. mod.)

47-2553
Reflectance of antarctic surfaces from multispectral radiometers: the correction of atmospheric effects.
Zibordi, G., et al. *Remote sensing of environment*, Jan. 1993, 43(1), p.11-21, 28 refs.
Maracci, G.
Ice sheets, Remote sensing, Radiometry, Reflectivity, Radiance, Light scattering, Mathematical models, Accuracy, Water vapor, Surface properties.
An atmospheric correction model, accounting for surface and sensor altitudes above sea level, is described and validated through data detected over antarctic surfaces with a Barnes Modular Multispectral Radiometer having bands overlapping those of the Landsat Thematic Mapper. The model is also applied in a sensitivity analysis to investigate error induced in reflectance obtained from satellite data by indeterminacy in optical parameters of atmospheric constituents. Results show that indeterminacy in the atmospheric water vapor optical thickness is the main source of errors in the retrieval of surface reflectance from data remotely sensed over antarctic regions. (Auth. mod.)

47-2554
Interpretation of SAR imagery of the Greenland ice sheet using coregistered TM imagery.
Bindschadler, R.A., et al. *Remote sensing of environment*, Dec. 1992, 42(3), p.167-175, 14 refs.
Vornberger, P.
Ice sheets, Spaceborne photography, Radar echoes, Synthetic aperture radar, Image processing, Surface properties, Snow line, Correlation, LANDSAT.

47-2555
Application of image cross-correlation to the measurement of glacier velocity using satellite image data.
Scambos, T.A., et al. *Remote sensing of environment*, Dec. 1992, 42(3), p.177-186, 15 refs.
Dutkiewicz, M.J., Wilson, J.C., Bindschadler, R.A.
Glacier flow, Photogrammetry, Velocity measurement, Spaceborne photography, Image processing, Correlation, Accuracy, Glacier mass balance, Antarctica—West Antarctica.
Image-to-image cross-correlation software is applied to pairs of digital satellite images to map the velocity field of moving ice. This technique uses small-scale glacial surface features, such as crevasse scars and snow dunes, as markers on the surface of the moving ice. Applications of this procedure are demonstrated, using Ice Stream D and Ice Stream E in West Antarctica as test areas. A high-resolution map of the velocity field of the central portion of Ice Stream E, generated by the displacement-measuring technique, is presented. The use of cross- correlation software is a significant improvement over previous manually-based photogrammetric methods for velocity measurement, and is far more cost-effective than *in situ* methods in remote polar areas. (Auth. mod.)

47-2556
Study on phase changes of heterogeneous composite materials: effects of parameters on solidification process.
Hirasawa, Y., et al. ASME/JSME Thermal Engineering Joint Conference, 3rd, Reno, NV, Mar. 17-22, 1991. Proceedings, Vol.1. Edited by J.R. Lloyd et al, New York, American Society of Mechanical Engineers, 1991, p.225-230, 6 refs.
Takegoshi, E., Saito, A., Imura, S.
DLC TJ260.A78
Composite materials, Phase transformations, Liquid solid interfaces, Ice formation, Thermal conductivity, Mathematical models, Physical properties.

47-2557
Experimental study of melting of ice about horizontal cylinders.
Torikoshi, K., et al. ASME/JSME Thermal Engineering Joint Conference, 3rd, Reno, NV, Mar. 17-22, 1991. Proceedings, Vol.1. Edited by J.R. Lloyd et al, New York, American Society of Mechanical Engineers, 1991, p.269-274, 3 refs. For another version see 43-4198.
Yamashita, H., Nakazawa, Y.
DLC TJ260.A78
Ice solid interface, Ice water interface, Heat transfer coefficient, Ice melting, Temperature effects, Pipes (tubes), Heat recovery.

47-2558
Freezing characteristics of aqueous solution on a horizontal downward facing cooled plate.
Yamada, M., et al. ASME/JSME Thermal Engineering Joint Conference, 3rd, Reno, NV, Mar. 17-22, 1991. Proceedings, Vol.1. Edited by J.R. Lloyd et al, New York, American Society of Mechanical Engineers, 1991, p.285-290, 10 refs.
Fukusako, S., Tago, M.
DLC TJ260.A78
Solutions, Liquid solid interfaces, Ice formation, Liquid cooling, Convection, Orientation, Cooling rate.

47-2559
Thermal modeling of freezing in biological tissue.
Eto, T.K., et al. ASME/JSME Thermal Engineering Joint Conference, 3rd, Reno, NV, Mar. 17-22, 1991. Proceedings, Vol.1. Edited by J.R. Lloyd et al, New York, American Society of Mechanical Engineers, 1991, p.291-298, 18 refs.
Rubinsky, B.
DLC TJ260.A78
Cryobiology, Freezing, Damage, Thermal expansion, Structural analysis, Mathematical models.

47-2560
Fundamental research on supercooling phenomenon on heat transfer surface: investigation of freezing phenomenon of supercooled water droplet and its relationship with the effect of heat transfer surface.
Saito, A., et al. ASME/JSME Thermal Engineering Joint Conference, 3rd, Reno, NV, Mar. 17-22, 1991. Proceedings, Vol.3. Edited by J.R. Lloyd et al, New York, American Society of Mechanical Engineers, 1991, p.319-326, 18 refs.
Okawa, S., Koganezawa, S.
DLC TJ260.A78
Liquid solid interfaces, Water temperature, Supercooling, Ice formation, Heat transfer, Temperature effects, Analysis (mathematics), Temperature distribution, Cooling systems.

47-2561
Melting process of packed beds of ice particles by water flow.
Okada, M., et al. ASME/JSME Thermal Engineering Joint Conference, 3rd, Reno, NV, Mar. 17-22, 1991. Proceedings, Vol.3. Edited by J.R. Lloyd et al, New York, American Society of Mechanical Engineers, 1991, p.327-333, 4 refs.
Hashimoto, K., Ohta, I.
DLC TJ260.A78
Ice water interface, Ice melting, Heat transfer coefficient, Water temperature, Analysis (mathematics), Forecasting, Temperature variations, Cooling systems.

47-2562
Heat transfer characteristics of ice capsules for encapsulated cool storage systems.
Arnold, D., ASME/JSME Thermal Engineering Joint Conference, 3rd, Reno, NV, Mar. 17-22, 1991. Proceedings, Vol.3. Edited by J.R. Lloyd et al, New York, American Society of Mechanical Engineers, 1991, p.335-342, 13 refs.
DLC TJ260.A78
Heat transfer, Porous materials, Ice water interface, Temperature effects, Ice formation, Ice melting, Cooling systems, Analysis (mathematics).

47-2563
Measurement and visualization of cooling and freezing processes of water between the horizontal concentric cylinders.
Narumi, A., et al. ASME/JSME Thermal Engineering Joint Conference, 3rd, Reno, NV, Mar. 17-22, 1991. Proceedings, Vol.3. Edited by J.R. Lloyd et al, New York, American Society of Mechanical Engineers, 1991, p.391-398, 8 refs.
Kashiwagi, T.
DLC TJ260.A78
Ice formation, Supercooling, Liquid solid interfaces, Cooling rate, Heat transfer, Cooling systems, Laboratory techniques.

47-2564
Thermal conductivity measurements for liquids at low temperatures.
Eftekhar, J.G., ASME/JSME Thermal Engineering Joint Conference, 3rd, Reno, NV, Mar. 17-22, 1991. Proceedings, Vol.3. Edited by J.R. Lloyd et al, New York, American Society of Mechanical Engineers, 1991, p.451-455, 8 refs.
DLC TJ260.A78
Liquids, Thermal conductivity, Cryogenics, Temperature measurement, Measuring instruments, Low temperature research, Design, Performance.

47-2565
Concurrent freezing and sublimation of a liquid-saturated porous slab.
Vaidyanathan, N., et al. ASME/JSME Thermal Engineering Joint Conference, 3rd, Reno, NV, Mar. 17-22, 1991. Proceedings, Vol.4. Edited by J.R. Lloyd et al, New York, American Society of Mechanical Engineers, 1991, p.251-259, 12 refs.
Shamsundar, N.
DLC TJ260.A78
Porous materials, Phase transformations, Heat transfer, Saturation, Ice sublimation, Liquid solid interfaces, Analysis (mathematics), Mass transfer.

47-2566
Characteristics of heat pump system operating with frost formation.
Aoki, K., et al. ASME/JSME Thermal Engineering Joint Conference, 3rd, Reno, NV, Mar. 17-22, 1991. Proceedings, Vol.4. Edited by J.R. Lloyd et al, New York, American Society of Mechanical Engineers, 1991, p.391-396, 14 refs.
Hattori, M., Edayoshi, A.
DLC TJ260.A78
Heating, Pipes (tubes), Frost, Ice cover effect, Performance, Heat transfer, Analysis (mathematics), Ice air interface.

47-2567
Report for the period 1 Apr. 1991 to 31 Mar. 1992 (but reporting the full antarctic field season).
British Antarctic Survey, Cambridge, Natural Environment Research Council, 111p., Pubs. p.88-101.
Research projects, Glaciology.
General remarks are made concerning staff changes and activities in various divisions at BAS stations; personnel awards are announced; distinguished visitors and British and international meetings attended are listed. Logistic and operational activities are reviewed, including ship and air operations. A science strategy plan is presented; 5 principal and 2 minor "Science Themes" provide a framework for 14 research programs which are reviewed in detail and consist of the following: pattern and change in the physical environment of Antarctica; geological evolution of West Antarctica; dynamics of antarctic terrestrial

and freshwater ecosystems; structure and dynamics of the southern ocean ecosystem; physics of solar-terrestrial phenomena from Antarctica; humans in isolated polar communities; and antarctic geographic information and mapping. Included are 4 appendices providing BAS' financial background, and lists of 1991 publications and staff at various locations, divisions and ships.

47-2568
Geology and geohydrology at CRREL, Hanover, New Hampshire: relationship to subsurface contamination.
Shoop, S.A., et al. *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Nov. 1992, SR 92-24, 83p., ADA-260 140, 55 refs.
Gatto, L.W.
Geology, Ground water, Hydrology, Wells, Environmental impact, Water pollution, Soil pollution.
Trichloroethylene (TCE) was discovered in three of the industrial wells at CRREL, as well as in two domestic wells in bedrock across the river. This report describes the geohydrology of the CRREL vicinity and the subsurface behavior of TCE as part of the preliminary assessment of the CRREL site. There are three hydrologic units near CRREL - a high permeability esker deposit, lower permeability lake sediments and fractured bedrock. The esker is a high-yield sand aquifer paralleling the river that provides industrial water to CRREL from four wells. The pumping of these wells may induce groundwater recharge from the river. The lake deposits consist of fine-grained silt and sand with some clay, and these cover the esker deposit. These sediments lie above the fractured, folded and metamorphosed volcanics (schist and phyllite) of the Orfordville formation. The free surface water table shows very little hydraulic gradient and appears to be continuous through these units, indicating that they are hydraulically connected. TCE can migrate in the vapor phase, as a soluble component moving along with the groundwater, and as a separate or free phase. Small spills of TCE in the fine-grained soils at CRREL may not have exceeded the retention capacity of the soils and may remain within the soil pores, with a soluble component reaching the groundwater through infiltration. Larger spills may have passed through the saturated soil zone seeking bedrock lows, continuing their downward movement along bedrock fractures. Since the CRREL wells may induce recharge from the river, the possibility of the contamination coming from that direction should not be overlooked.

47-2569
Characteristics of the seasonal thawing of permafrost in Mongolia.
Babinski, Z., et al. *Polish Academy of Sciences. Bulletin. Earth sciences*, 1991, 39(3), p.223-229, 10 refs.
Glazik, R.
Seasonal freeze thaw, Active layer, Permafrost thickness, Mongolia.

47-2570
Sandstones and conglomerates formed by precipitation of CaCO3 under stagnant ice sheet.
Drozdowski, E., *Polish Academy of Sciences. Bulletin. Earth sciences*, 1991, 39(3), p.253-266, 35 refs.
Quaternary deposits, Carbon dioxide, Subglacial observations, Meltwater, Glacial deposits.

47-2571
On the new and rare in the W_st Siberian arctic species of the genus *Carex (Cyperaceae)*. [O novykh i redkikh dlia zapadnosibirskoĭ Arktiki vidakh roda *Carex (Cyperaceae)*],
Rebristaia, O.V., *Botanicheskiĭ zhurnal*, Dec. 1991, No.12, p.1772-1775, In Russian. 5 refs.
Plants (botany), Plant physiology, Biogeography, USSR—Siberia.

47-2572
Study of the morphological variability of *Poa argunensis (Poaceae)* in the territory of Southern Siberia. [K izucheniiu morfologicheskoĭ izmenchivosti *Poa argunensis (Poaceae)* na territorii IUzhnoĭ Sibiri],
Olonova, M.V., *Botanicheskiĭ zhurnal*, Apr. 1992, No.4, p.76-85, In Russian. 12 refs.
Plants (botany), Plant physiology, Biogeography, USSR—Siberia.

47-2573
Influence of immersion vibration on the void system of air entrained concrete.
Simon, M.J., et al, G.M. Idorn International Symposium on Durability of Concrete, Toronto, Canada, Mar. 1990. Edited by J. Holm et al, Detroit, MI, American Concrete Institute, 1992, p.99-126, ACI SP-131, 15 refs.
Jenkins, R.B., Hover, K.C.
DLC TA683.D866
Concrete durability, Concrete curing, Air entrainment, Vibration, Frost resistance, Freeze thaw tests, Sampling, Specifications.

47-2574
Controlled cement hydration: its effect on durability of concrete.
Senbetta, E., et al, G.M. Idorn International Symposium on Durability of Concrete, Toronto, Canada, Mar. 1990. Edited by J. Holm et al, Detroit, MI, American Concrete Institute, 1992, p.179-194, ACI SP-131, 6 refs.
Bury, M.A.
DLC TA683.D866
Concrete durability, Concrete curing, Concrete strength, Freeze thaw tests, Mechanical tests, Physical properties.

47-2575
New method for assessing frost damage in non-air entrained hydraulic structures.
Hooton, R.D., et al, G.M. Idorn International Symposium on Durability of Concrete, Toronto, Canada, Mar. 1990. Edited by J. Holm et al, Detroit, MI, American Concrete Institute, 1992, p.339-355, ACI SP-131, 2 refs.
Sato, J.A., Mukherjee, P.K.
DLC TA683.D866
Hydraulic structures, Concrete durability, Damage, Freeze thaw tests, Saturation, Substrates, Moisture migration, Dams.

47-2576
Durability of concrete in Iceland.
Kristjánsson, R., et al, G.M. Idorn International Symposium on Durability of Concrete, Toronto, Canada, Mar. 1990. Edited by J. Holm et al, Detroit, MI, American Concrete Institute, 1992, p.381-392, ACI SP-131, 19 refs.
Ólafsson, H.
DLC TA683.D866
Concrete durability, Frost resistance, Damage, Freeze thaw cycles, Concrete structures, Research projects, Climatic factors.

47-2577
Hydrology of four headwater basins in the Sierra Nevada.
Kattelmann, R., Symposium on Headwaters Hydrology, June, 1989. Proceedings. Edited by W.W. Woessner, et al, Bethesda, MD, American Water Resources Association, 1989, p.141-147, TPS-89-1, 3 refs.
DLC GB980.S96
Hydrology, Watersheds, Stream flow, Snowmelt, Forest land, Water supply, Mountains.

47-2578
Recent trends in glaciers and glacier runoff, Wind River Range, Wyoming.
Marston, R.A., et al, Symposium on Headwaters Hydrology, June, 1989. Proceedings. Edited by W.W. Woessner, et al, Bethesda, MD, American Water Resources Association, 1989, p.159-169, TPS-89-1, 21 refs.
Pochop, L.O., Kerr, G.L., Varuska, M.L.
DLC GB980.S96
Glacial hydrology, Mountain glaciers, Glacier melting, Runoff, Watersheds, Water supply, Glacier oscillation, Climatic changes, Glacier surveys.

47-2579
Hydrologic analysis of the Gulkana National Wild River, Alaska.
Ellerbroek, D.A., et al, Symposium on Headwaters Hydrology, June, 1989. Proceedings. Edited by W.W. Woessner, et al, Bethesda, MD, American Water Resources Association, 1989, p.331-340, TPS-89-1, 8 refs.
Jackson, W.A., Van Haveren, B.P.
DLC GB980.S96
Hydrology, River flow, Snowmelt, Hydrography, Runoff, Flooding, Permafrost hydrology.

47-2580
Groundwater contributions in an alpine basin in the Sierra Nevada.
Kattelmann, R., Symposium on Headwaters Hydrology, June, 1989. Proceedings. Edited by W.W. Woessner, et al, Bethesda, MD, American Water Resources Association, 1989, p.361-369, TPS-89-1, 23 refs.
DLC GB980.S96
Alpine landscapes, Hydrology, Watersheds, Ground water, Stream flow, Subsurface drainage, Bedrock, Water storage.

47-2581
Spatial and seasonal patterns of streambed water temperatures in an Alaskan subarctic stream.
Irons, J.G., III, et al, Symposium on Headwaters Hydrology, June, 1989. Proceedings. Edited by W.W. Woessner, et al, Bethesda, MD, American Water Resources Association, 1989, p.381-390, TPS-89-1, 46 refs.
Ray, S.R., Miller, L.K., Oswood, M.W.
DLC GB980.S96
Subarctic landscapes, Stream flow, Water temperature, Hydrology, Bottom sediment, Ground water, Temperature variations, Temperature measurement.

47-2582
Validation and sensitivity analysis of the stream network temperature model on small watersheds in northeast Oregon.
Mattax, B.L., et al, Symposium on Headwaters Hydrology, June, 1989. Proceedings. Edited by W.W. Woessner, et al, Bethesda, MD, American Water Resources Association, 1989, p.391-400, TPS-89-1, 13 refs.
Quigley, T.M.
DLC GB980.S96
Watersheds, Hydrology, Stream flow, Water temperature, Forecasting, Snowmelt, Mathematical models, Air temperature.

47-2583
Ice load measurements on board the MS *Kemira*, winter 1991.
Muhonen, A., *Helsinki University of Technology. Laboratory of Naval Architecture and Marine Engineering. Report*, 1992, M-121, 26p. + append., PB93-122802, 7 refs.
Ice navigation, Ice loads, Tanker ships, Ice solid interface, Ice pressure, Metal ice friction, Ice conditions, Finland.

47-2584
Low energy small house 50%. Experimental house research. [Matalaenergiapientalo 50%. Koetalotutkimus],
Nieminen, J., et al, *ETRR-tutkimusohjelma raportti (ETRR Research Program. Report)*, 1992, No.18, 39p. + append., In Finnish with English summary. 11 refs.
Kouhia, I., Heimonen, I.
Houses, Heating, Thermal insulation, Cold weather performance.

47-2585
Studies of the arctic aerosol in Greenland. [Studier af den arktiske aerosol i Grönland],
Heidam, N.Z., Copenhagen, 1990, 116p., In Danish with English summary. Refs. p.110-116.
Polar atmospheres, Aerosols, Air pollution, Atmospheric composition, Atmospheric circulation, Haze, Ice cores, Greenland.

47-2586
Alpha Jet surface icing at different flight velocities; the results. [Ergebnisse von Vereisungsflügen mit dem Alpha Jet bei unterschiedlichen Geschwindigkeiten],
Hoffmann, H.E., et al, *Bundesminister der Verteidigung. Forschungsbericht aus der Wehrtechnik*, 1992, BMVg-FBWT 92-2, 61p., In German with English summary. 41 refs.
Demmel, J.
Aircraft icing, Ice accretion, Ice loads, Ice air interface, Air flow, Cloud droplets.

47-2587
Field measurements of northern Baltic pressure ridges.
Reynolds, E., et al, *Helsinki University of Technology. Arctic Offshore Research Centre. Memorandum*, 1992, M-19, 21p. + append., 5 refs.
Lindholm, J.E.
Pressure ridges, Ice surveys, Ice cover strength, Ice navigation, Ice loads, Ice solid interface, Ice pressure, Bothnia, Bay.

47-2588
Development of fracture energy of FRC materials. Freeze-thaw resistance of FRC materials.
Larsen, E.S., *Danish Building Research Institute (Statens Byggeforskningsinstitut). SBI bulletin*, 1992, No.95, 39p., With Danish summary. 20 refs. Two papers presented at the 4th RILEM International Symposium on Fibre Reinforced Cement and Concrete, Sheffield, England, July 20-23, 1992.
Concrete durability, Frost resistance, Reinforced concretes, Composite materials, Concrete freezing, Freeze thaw tests.

47-2589
Frozen ground. *International Permafrost Association. News Bulletin*, Dec. 1992, No.12, 24p.
Research projects, Organizations, Meetings.

47-2590
Thermal analysis of buildings—verification and further development of the TASE program.
Kalema, T., *Tampere, Finland. University of Technology. Publications*, 1992, No.87, 185p., Ph.D. thesis to be defended at Helsinki University of Technology. 65 refs.
Buildings, Radiant heating, Thermal insulation, Thermal analysis, Heat balance, Cold weather performance, Houses, Computer programs, Mathematical models.

47-2591
Laboratory indentation tests with thick freshwater ice. Volume II.
Muhonen, A., et al, *Helsinki University of Technology. Laboratory of Naval Architecture and Marine Engineering. Report*, 1992, M-122, 397p.
Ice cover strength, Ice solid interface, Ice loads, Ice pressure, Artificial ice, Penetration tests, Strain tests.

47-2592
Climate change 1992. The supplementary report to the IPCC scientific assessment.
Houghton, J.T., ed, Cambridge, England, University Press, 1992, 200p., Refs. passim. Published for the Intergovernmental Panel on Climate Change of the World Meteorological Organization and United Nations Environment Programme.
Callander, B.A., ed, Varney, S.K., ed.
Global warming, Atmospheric composition, Atmospheric circulation, Climatic changes.

47-2593
Text and references to accompany "Map showing the thickness and character of Quaternary sediments in the glaciated United States east of the Rocky Mountains".
Soller, D.R., *U.S. Geological Survey. Bulletin*, 1992, No.1921, 54p., Refs. passim.
Quaternary deposits, Glaciation, Geological surveys, Geological maps, Glacial deposits, Glacial geology, Stratigraphy, United States.

47-2594
Influence of salinity and temperature covariation on the photophysical characteristics of antarctic sea ice microalgae.
Arrigo, K.R., et al, *Journal of phycology*, Dec. 1992, 28(6), p.745-756, 50 refs.
Sullivan, C.W.
Sea ice, Algae, Photosynthesis, Water temperature, Salinity, Antarctica—McMurdo Sound.
The response of sea ice microalgae to variation in ambient irradiance, temperature, and salinity were tested to determine whether these variables act independently or in concert to influence rates of microalgal photosynthesis. The photosynthetic efficiency and maximum photosynthetic rate for sea ice microalgae increased as a function of incubation temperature between -6 and +6 C. Furthermore, photosynthetic efficiency, maximum photosynthetic rate, and quantum yield were greatest at salinities between 30 and 50 ppt. In contrast, the mean specific absorption coefficients were lowest near seawater salinities, and the saturating irradiance appeared to be inversely proportional to salinity. Results also suggest that the effects of salinity on the growth of sea ice microalgae are independent of those elicited by temperature or light, and that the functional relationship between salinity and light or temperature is multiplicative. This information is essential to the proper formulation of algorithms used to describe algal growth in environments where light, temperature, and salinity are changing simultaneously, such as within sea ice or within the water column at the marginal ice edge zone. (Auth.)

47-2595
On the stationarity of the ozone layer in Norway and U.S.S.R.
Henriksen, K., et al, *Journal of atmospheric and terrestrial physics*, Feb. 1993, 55(2), p.145-154, 14 refs.
Ozone, Norway, USSR.

47-2596
Thermal maturity and source-rock potential of the sedimentary succession from the Drake field, Sverdrup Basin, arctic Canada.
Gentzis, T., et al, *Journal of petroleum geology*, Jan. 1993, 16(1), p.33-54, 29 refs.
Goodarzi, F.
Geologic structures, Sediments, Hydrocarbons, Exploration, Drill core analysis, Petroleum industry, Offshore drilling.

47-2597
Clues to causes of deformation features in coastal sea ice.
Kozo, T.L., et al, *Eos*, Sep. 8, 1992, 73(36), MP 3217, p.385,388-389, 19 refs.
Fett, R.W., Farmer, L.D., Sodhi, D.S.
Sea ice distribution, Remote sensing, Radiometry, Ice deformation, Drift, Stress concentration, Ice mechanics, Ice floes, Air ice water interaction.

47-2598
Hudson Bay free-air gravity anomaly and glacial rebound.
James, T.S., *Geophysical research letters*, May 4, 1992, 19(9), p.861-864, 17 refs.
Gravity anomalies, Isostasy, Ice models, Pleistocene, Correlation, Ice loads, Analysis (mathematics).

47-2599
Kaltag fault, northern Yukon, Canada: constraints on evolution of arctic Alaska.
Lane, L.S., *Geology*, July 1992, 20(7), p.653-656, 36 refs.
Geologic structures, Geologic processes, Tectonics, Magnetic anomalies, Geophysical surveys.

47-2600
Using a nuclear submarine for arctic research.
Keigwin, L.D., et al, *Eos*, May 12, 1992, 73(19), p.209,220-221, 18 refs.
Johnson, G.L.
Oceanography, Exploration, Submarines, Nuclear power, Subglacial observations, Research projects, Air ice water interaction, Design.

47-2601
Arctic ozone loss declines.
Bush, S., *Eos*, May 12, 1992, 73(19), p.210.
Polar atmospheres, Atmospheric density, Ozone, Periodic variations, Chemical properties.

47-2602
Meltwater and tidal currents: controls on circulation in a small glacial fjord.
Cowan, E.A., *Estuarine, coastal and shelf science*, Apr. 1992, 34(4), p.381-392, 23 refs.
Estuaries, Glacial hydrology, Glacier melting, Tidal currents, Upwelling, Sedimentation, Subglacial drainage, Meltwater, Ice water interface, Glacier tongues.

47-2603
Environmental-geomorphological study on the Holocene mire development in the Daisetsuzan Mountains, central Hokkaido, Northern Japan.
Takahashi, N., *Environmental science, Hokkaido University*, June 1990, 13(1), p.93-156, Refs. p.153-156.
Alpine landscapes, Mountain soils, Landscape development, Swamps, Geomorphology, Palynology, Quaternary deposits, Sampling, Age determination, Periglacial processes, Paleobotany.

47-2604
Of measured risks: the environmental impacts of the Prudhoe Bay, Alaska oil field.
Maki, A.W., *Environmental toxicology and chemistry*, Dec. 1992, 11(12), p.1691-1707, 54 refs.
Arctic landscapes, Petroleum industry, Pipelines, Environmental impact, Ecology, Monitors, Standards, Surveys.

47-2605
Novel differential scanning calorimetric studies of supercooled organic liquids.
Murthy, S.S.N., et al, *Chemical Society, London. Faraday transactions*, Feb. 7, 1993, 89(3), p.509-514, 26 refs.
Nayak, G., Nayak, S.K.
Liquid cooling, Supercooling, Temperature measurement, Phase transformations, Molecular structure, Temperature effects, Chemical analysis, Thermodynamic properties.

47-2606
Parametric analysis for thawing frozen spheroidal (prolate and oblate) or finitely cylindrical food.
Sheen, S., et al, *Journal of food science*, Jan.-Feb. 1992, 57(1), p.236-240, 13 refs.
Hayakawa, K.I.
Frozen liquids, Freeze thaw tests, Thawing rate, Heat transfer coefficient, Physical properties, Wind tunnels, Analysis (mathematics), Temperature effects, Air flow.

47-2607
On the use of electrical resistance and temperature as measures of the solid fraction in a mushy layer.
Shirtcliffe, T.G.L., et al, *Journal of crystal growth*, Dec. 1992, 125(3-4), p.495-501, 11 refs.
Kerr, R.C.
Solutions, Solidification, Electrical resistivity, Electrical measurement, Freezing front, Solid phases, Ice formation indicators, Fluid dynamics.

47-2608
Mathematical model for predicting the densification and growth of frost on a flat plate.
Tao, Y.X., et al, *International journal of heat and mass transfer*, Jan. 1993, 36(2), p.353-363, 23 refs.
Besant, R.W., Rezkallah, K.S.
Ice solid interface, Frost, Ice growth, Ice density, Ice forecasting, Mass transfer, Mathematical models, Snow physics, Vapor diffusion.

47-2609
Adaptive finite element analysis of axisymmetric freezing.
Sutanto, E., et al, *International journal of heat and mass transfer*, Dec. 1992, 35(12), p.3301-3312, 24 refs.
Davis, H.T., Scriven, L.E.
Freezing, Liquid solid interfaces, Freezing front, Phase transformations, Stefan problem, Thermal conductivity, Mathematical models, Liquid phases, Solid phases, Temperature effects.

47-2610
2.5-kVA arctic ground fault detector, final report.
Fries, J.M., et al, *U.S. Naval Civil Engineering Laboratory. NCEL technical note*, Feb. 1993, TN-1853, 18p. + appends., 7 refs.
Tsumura, R., Sugiyama, Y.
Electrical grounding, Cold weather performance, Safety, Electrical measurement, Electric equipment, Cold weather tests, Monitors, Military equipment, Military research, Military operation.

47-2611
Prototype climate information system.
Jarrett, T.K., *U.S. Naval Research Laboratory. Formal report*, Jan. 1993, NRL/FR/7541-92-9405, 71p., 74 refs.
Meteorological data, Data processing, Weather observations, Weather forecasting, Marine meteorology, Ice reporting, Military operation, Military research.

47-2612
Analysis of freeze-thaw cycles and rainfall on frozen soil at seven Canadian locations.
Hayhoe, H.N., et al, *Canadian agricultural engineering*, Apr./May/June 1992, 34(2), p.135-142, With French summary. 20 refs.
Pelletier, R.G., Moggridge, S.
Soil erosion, Frozen ground strength, Frost weathering, Freeze thaw cycles, Rain.

47-2613
Laboratory measurement of freeze/thaw, compaction, residue and slope effects on rill erosion.
Frame, P.A., et al, *Canadian agricultural engineering*, Apr./May/June 1992, 34(2), p.143-149, With French summary. 12 refs.
Burney, J.R., Edwards, L.
Soil erosion, Soil stabilization, Soil conservation, Frost weathering, Frozen ground strength, Freeze thaw cycles, Slope processes, Water erosion.

47-2614
Hard rock tunneling machine characteristics.
Mellor, M., et al, MP 3218, Rapid Excavation and Tunneling Conference, Chicago, June 5-7, 1972. Proceedings. Vol.2, 1972, p.1149-1158, 8 refs.
Hawkes, I.
Tunneling (excavation), Rock drilling, Rock excavation, Construction equipment, Machinery.

47-2615
Meteorological trends in the Italian Alps during the 1991-92 winter season. [L'andamento meteorologico sulle Alpi italiane durante la stagione invernale 1991-92],
Kerkmann, J., et al, *Neve e valanghe*, Nov. 1992, No.17, p.8-19, In Italian.
Pasquali, S.
Snowstorms, Atmospheric disturbances, Atmospheric circulation, Atmospheric pressure, Snow depth, Wind (meteorology), Air temperature, Meteorological data, Italy.

47-2616
Evolution of the snow cover and avalanche events in the Italian Alps during the 1991-92 winter season. [L'evoluzione del manto nevoso e l'attività valanghiva sulle Alpi italiane durante la stagione invernale 1991-92], *Neve e valanghe*, Nov. 1992, No.17, p.20-63, In Italian.
Avalanches, Snow cover stability, Snow depth, Snow surveys, Avalanche forecasting, Accidents, Italy.

47-2617
Environmental and health effects of the use of studded tires. Literature review. (Miljö- och hälsoeffekter av dubbdäcksanvändning. Litteraturöversikt).
Folkeson, L., *Sweden. Statens väg- och trafikinstitut. VTI meddelande*, 1992, No.694, 36p., In Swedish with English summary. 81 refs.
Road maintenance, Environmental impact, Air pollution, Health, Physiological effects, Tires.

47-2618
Geochemical profile and burial history of Aurora 890 No.1 OCS Y-0943 well offshore of the ANWR 1002 area, northeast Alaska.
Banet, A.C., Jr., *U.S. Bureau of Land Management. Alaska State Office. BLM-Alaska technical report*, Jan. 1993, No.16, 51p. + maps., 40 refs.
Exploration, Bottom sediment, Offshore drilling, Well logging, Geochemistry, Stratigraphy, Hydrocarbons, Ocean bottom, United States—Alaska—Arctic National Wildlife Refuge.

47-2619
Field investigation of water and salt movement in permafrost and the active layer. Final report.
Osterkamp, T.E., Fairbanks, University of Alaska, Geophysical Institute, Feb. 1993, Var. p., Refs. passim.
Subsea permafrost, Active layer, Saline soils, Permafrost distribution, Permafrost thermal properties, Frozen ground chemistry, Frozen ground strength, Soil water migration, Salinity.

47-2620
Geological investigations of proposed pipeline channel crossings in the vicinity of Taglu and Niglintgak islands, Mackenzie Delta, NWT.
Traynor, S., et al, *Canada. Environmental Studies Research Funds. Report*, May 1992, No.116, 90p. + append., With French summary. 40 refs.
Dallimore, S.R.
Pipelines, Permafrost beneath structures, Permafrost beneath rivers, Channel stabilization, Permafrost beneath lakes, River crossings, Geological surveys, Site surveys, Route surveys, Ice conditions, Canada—Northwest Territories—Mackenzie River Delta.

47-2621
Considerations in the design of effects monitoring strategies: Beaufort Sea case study.
Thomas, D.J., *Canada. Environmental Studies Research Funds. Report*, Jan. 1992, No.118, 54p. + append., With French summary. 36 refs.
Petroleum industry, Environmental impact, Offshore drilling, Exploration, Regional planning, Beaufort Sea.

47-2622
Beaufort Sea extreme waves study.
Eid, B.M., et al, *Canada. Environmental Studies Research Funds. Report*, Mar. 1992, No.114, Var. p., With French summary. 43 refs.
Cardone, V.J.
Ocean waves, Ice edge, Ice cover effect, Air ice water interaction, Weather forecasting, Storms, Sea states, Wind (meteorology), Records (extremes), Statistical analysis, Beaufort Sea.

47-2623
Beaufort Region Environmental Assessment and Monitoring Program (BREAM). Final report for 1991/1992. *Canada. Department of Indian and Northern Affairs. Environmental studies*, Dec. 1992, No.69, 359p. + appends., With French summary. Refs. passim.
Petroleum industry, Environmental impact, Oil spills, Economic development, Pollution, Regional planning, Global warming, Research projects, Canada.

47-2624
Solvent/water partitioning of dimethylmethylphosphonate (DMMP) as a probe of solvent acidity.
Leggett, D.C., *Journal of solution chemistry*, 1993, 22(3), MP 3219, p.289-296, 17 refs.
Solutions, Solubility, Salt water, Chemical composition, Chemical analysis, Probes, Chemical properties, Analysis (mathematics).
Experimentally determined partition coefficients for DMMP between NaCl-saturated water and 20 solvents were correlated using solvatochromic parameters. An inverted linear solvation energy relationship (LSER) was then used to predict the alpha scale for 7 additional solvents. The partition method appears to be a useful adjunct to solvatochromic techniques in refining and extending the alpha scale of solvent acidity, and could be used to rationalize solvent selection in extraction processes.

47-2625
Coastal zone color scanner pigment concentrations in the southern ocean and relationships to geophysical surface features.
Comiso, J.C., et al, *Journal of geophysical research*, Feb. 15, 1993, 98(C2), p.2419-2451, 66 refs.
McClain, C.R., Sullivan, C.W., Ryan, J.P., Leonard, C.L.
Plankton, Distribution, Biomass, Remote sensing, Biomass, Radiometry, Sea ice distribution, Ice edge.
This study evaluates the large-scale spatial, seasonal and interannual distributions of pigment concentrations in the entire southern ocean using all available data derived from the coastal zone color scanner (CZCS) (1978-1986 [Feldman et al., 1989]). The influence of geophysical parameters in the ocean on spatial distributions of pigment also is studied using monthly mean pigment fields generated from the data and mapped onto a polar grid common with those of ancillary surface data sets. Results from regression analyses between pigment and ancillary data over the entire region as well as subregions, and an assessment of the quality of the pigment data, are presented. (Auth. mod.)

47-2626
Sensitivity study of a dynamic thermodynamic sea ice model.
Holland, D.M., et al, *Journal of geophysical research*, Feb. 15, 1993, 98(C2), p.2561-2586, 31 refs.
Mysak, L.A., Manak, D.K., Oberhuber, J.M.
Sea ice distribution, Ice cover thickness, Ice models, Air ice water interaction, Thermodynamics, Mathematical models, Seasonal variations, Climatic factors, Ice heat flux.

47-2627
Descriptions of sediments recovered by the USCGC *Glacier*, USARP Operation Deep Freeze 1985: South Orkney Plateau, South Shetland Shelf, Bransfield Strait, Marguerite Bay, Pine Island Bay.
Bryan, J.R., ed, *Florida State University. Sediment Research Laboratory. Contribution*, Aug. 1992, No.54, 179p., Refs. p.175-179.
Bottom sediment, Drill core analysis, Antarctica—West Antarctica.
This volume contains descriptions of sediments obtained during the 1984-1985 austral summer cruise of the U.S. Coast Guard icebreaker *Glacier*, which surveyed the western margin of the South Orkney Plateau, portions of the Bransfield Strait and the adjacent continental shelf of the South Shetland Is., Marguerite Bay, and Pine Island Bay. This is the 6th published volume of sediment descriptions of material collected by the *Glacier* in antarctic waters since 1968. These are designed to serve the general geologic community by providing descriptive information of shallow sediments surrounding the continent of Antarctica, and also to assist geoscientists wishing to pursue more detailed studies by serving as a guide for sediment sampling. Included are: a summary of the scientific objectives of the 1984-1985 cruise of the *Glacier*; a discussion of core and grab sample recovery and processing; a table and maps of station locations; an explanation of laboratory descriptive procedures; and lithologic descriptions of piston and trigger cores, bagged samples from them, and grab samples.

47-2628
Use of falling weight deflectometer (FWD) to characterize seasonal variation in pavement response.
Janoo, V.C., et al, MP 3220, Road Engineering Association of Asia and Australasia, 7th Conference, Singapore, June 22-26, 1992. Vol.2, 1992, p.395-404, 8 refs.
Berg, R.L., Bigl, S., Tomita, H.
Pavements, Frost action, Thaw weakening, Road icing, Runways, Frost resistance, Cold weather performance, Road maintenance, Trafficability, Freeze thaw tests.
In the northern U.S., pavements are subjected to several freeze-thaw cycles each year. During thawing periods, the pavement structure may become saturated from the thawing ice lenses or from infiltration of water from the pavement surface. If the pavement structure has inadequate drainage, undrained conditions can exist when loads are applied to the pavement. It has been reported that up to 90% of the damage to the pavement structure occurs during these thaw-weakened periods. The thaw-weakened periods in the U.S. may be considered analogous to periods during and after the rainy seasons in Asia and Australia. Essentially during the thaw or rainy season period, the moisture content in the pavement structure increases. The methods developed for the thaw-weakening period can be applied in areas where pavement strength variations are caused by periodic changes in rainfall. The Corps of Engineers and the Federal Aviation Administration are conducting research to characterize the pavement response during thaw-weakening periods. The falling weight deflectometer has been used for this purpose. Falling weight deflection testing has been conducted on full-scale test sections under environmentally controlled conditions and in the field under natural conditions. Both roadway and airport pavements have been studied. The results show that the deflection data can be used to describe the pavement performance during the thaw (wet) periods. This paper presents an overview of the results from falling weight deflectometer testing in areas experiencing freeze-thaw cycles. Some of the parameters that may be used to characterize pavement performance during wet periods will be presented. A mechanistic pavement evaluation procedure for pavements in seasonal frost areas is being developed at CRREL. The results from this evaluation procedure are also presented.

47-2629
Effect of multiple freeze-thaw cycles on long-term performance of asphalt concrete treated with anti-stripping agents.
Ping, W.V., et al, Road Engineering Association of Asia and Australasia, 7th Conference, Singapore, June 22-26, 1992. Vol.2, 1992, p.512-520, 6 refs.
Kennedy, T.W.
Concrete pavements, Road maintenance, Frost protection, Frost resistance, Road icing, Concrete admixtures, Cold weather performance, Freeze thaw tests, Waterproofing.

47-2630
Environmental geology and geochemistry at the Windy Craggy massive sulphide deposit, northwestern British Columbia.
Claridge, P.G., et al, *CIM bulletin*, Jan. 1993, 86(966), p.50-57, 7 refs.
Downing, B.W.
Mining, Environmental impact, Exploration, Glacial hydrology, Water pollution, Geochemistry, Geologic structures, Subglacial drainage.

47-2631
Detrital carbonate-rich sediments, northwestern Labrador Sea: implications for ice-sheet dynamics and iceberg rafting (Heinrich) events in the North Atlantic.
Andrews, J.T., et al, *Geology*, Dec. 1992, 20(12), p.1087-1090, 45 refs.
Tedesco, K.
Pleistocene, Marine deposits, Glacial deposits, Bottom sediment, Ice rafting, Glacier oscillation, Drill core analysis, Icebergs, Mineralogy.

47-2632
Carbonate chemistry of the wintertime Bering Sea marginal ice zone.
Chen, C.T.A., *Continental shelf research*, Jan. 1993, 13(1), p.67-87, 47 refs.
Sea water, Chemical composition, Ice water interface, Ice edge, Carbon dioxide, Runoff, Water chemistry, Oceanographic surveys, Seasonal variations.

47-2633
Beach profile modification and sediment transport by ice: an overlooked process on Lake Michigan.
Barnes, P.W., et al, *Journal of coastal research*, 1993, 9(1), p.65-86, 54 refs.
Shore erosion, Lake ice, Sediment transport, Ice rafting, Shoreline modification, Ice composition, Ice cores, Ice water interface, Ice surveys.

47-2634
Role of permafrost and seasonal frost in the hydrology of northern wetlands in North America.
Woo, M.K., et al, *Journal of hydrology*, Jan. 1993, 141(1-4), International Geological Congress Symposium on the Hydrogeology of Wetlands, Washington, D.C., July 1989, p.5-31, 53 refs.
Winter, T.C.
Wetlands, Hydrogeology, Permafrost hydrology, Seasonal freeze thaw, Runoff, Seepage, Frozen ground mechanics, Climatic factors, Water table, Evapotranspiration.

47-2635
Application of a coupled water-balance-salinity model to evaluate the sensitivity of a lake dominated by groundwater to climatic variability.
Crowe, A.S., *Journal of hydrology*, Jan. 1993, 141(1-4), International Geological Congress Symposium on the Hydrogeology of Wetlands, Washington, D.C., July 1989, p.33-73, 58 refs.
Limnology, Ground water, Water balance, Climatic changes, Hydrology, Watersheds, Water level, Salinity, Seepage, Mathematical models.

47-2636
Perturbations in the fields of meteorological parameters caused by artificial crystallization of clouds.
Shmeter, S.M., *Soviet meteorology and hydrology*, 1991, No.10, p.29-33, Translated from Meteorologiia i gidrologiia. 19 refs.
Cloud seeding, Weather modification, Cloud physics, Air temperature, Temperature variations, Meteorology (precipitation).

47-2637
Freezing system plugs pipeline segments for repair. *Oil & gas journal*, Nov. 30, 1992, 90(48), p.64.
Gas pipelines, Leakage, Pipeline freezing, Artificial freezing, Liquefied gases, Construction equipment.

47-2638
Melting of ice in pure and saline water inside a square cavity.
Schulz, W., et al, *Chemical engineering and processing*, Oct. 1992, 31(5), p.311-319, 11 refs.
Beer, H.
Ice melting, Laminar flow, Salinity, Ice water interface, Heat transfer, Temperature effects, Analysis (mathematics), Fluid dynamics.

47-2639
Structure of ice layers on electrical transmission cables with Raman microprobe spectroscopy.
Somwalkar, N., et al, *Applied spectroscopy*, Dec. 1992, 46(12), p.1869-1873, 17 refs.
Shyam Sunder, S., Sharma, S.K.
Transmission lines, Ice accretion, Ice physics, Ice spectroscopy, Molecular structure, Ice solid interface, Layers, Defects, Simulation, Temperature effects.

47-2640
Pressure of crushed ice as Mohr-Coulomb material against flat, axisymmetric indentor.
Duthinh, D., *Journal of cold regions engineering*, Dec. 1992, 6(4), p.139-151, 15 refs.
Ice mechanics, Ice pressure, Ice solid interface, Stress concentration, Mathematical models, Floating ice, Offshore structures, Ice breaking.

47-2641
Estimating thaw-strain settlement of frozen fill.
Crowther, G.S., *Journal of cold regions engineering*, Dec. 1992, 6(4), p.152-159, 4 refs.
Construction materials, Soil tests, Soil aggregates, Frozen ground settling, Thaw weakening, Frozen ground strength, Ice melting, Strains, Density (mass/volume), Soil compaction.

47-2642
Design of piles in permafrost under combined lateral and axial load—discussion and reply.
Budkowska, B.B., et al, *Journal of cold regions engineering*, Dec. 1992, 6(4), p.162-166, 8 refs. For article under discussion see 46-379.
Szymczak, C., Foriero, A., Ladanyi, B.
Piles, Permafrost beneath structures, Design criteria, Stability, Analysis (mathematics), Accuracy.

47-2643
Snowdrift around buildings for antarctic environment.
Kwok, K.C.S., et al, *Journal of wind engineering and industrial aerodynamics*, Oct. 1992, Vol.44, International Conference on Wind Engineering, 8th, Ontario, Canada, July 8-12, 1991. Proceedings, Pt.4, p.2797-2808, 13 refs.
Kim, D.H., Smedley, D.J., Rohde, H.F.
Buildings, Snow accumulation, Snowdrifts, Simulation, Design criteria, Wind factors, Analysis (mathematics), Fluid mechanics, Correlation.
Based on the comparison of experimental results with field study results, the relevance and significance of various similitude parameters for snowdrift/building modelling is discussed. A series of wind tunnel model tests were carried out on a single building and groups of buildings, both on-ground and aboveground. Results of snowdrift profiles and volumes are presented. These results should augment the development of design criteria for buildings intended to survive the antarctic environment. (Auth. mod.)

47-2644
Numerical modelling of the temperature distribution in tabular icebergs.
Løset, S., *Cold regions science and technology*, Jan. 1993, 21(2), p.103-115, 30 refs.
Icebergs, Ice temperature, Temperature distribution, Ice water interface, Ice deterioration, Ice heat flux, Ice melting, Mathematical models, Freezing points.

47-2645
Interaction of rising frazil with suspended particles: tank experiments with applications to nature.
Reimnitz, E., et al, *Cold regions science and technology*, Jan. 1993, 21(2), p.117-135, 46 refs.
Frazil ice, Suspended sediments, Turbidity, Sediment transport, Scavenging, Slush, Ice water interface, Simulation, Ice composition, Sea water freezing, Ice cover strength.

47-2646
Interactions of frazil and anchor ice with sedimentary particles in a flume.
Kempema, E.W., et al, *Cold regions science and technology*, Jan. 1993, 21(2), p.137-149, 33 refs.
Reimnitz, E., Clayton, J.R., Jr., Payne, J.R.
Frazil ice, Bottom ice, Ice formation, Suspended sediments, Sediment transport, Hydrodynamics, Ice solid interface, Supercooling, Ice composition, Simulation, Phase transformations, Ice adhesion.

47-2647
Submerged warm water jet discharge in an ice-covered reservoir or lake.
Gu, R.C., et al, *Cold regions science and technology*, Jan. 1993, 21(2), p.151-168, 22 refs.
Stefan, H.G.
Hydraulic jets, Lake water, Water temperature, Ice cover effect, Ice water interface, Turbulent flow, Heat transfer, Mathematical models, Temperature distribution, Buoyancy, Reservoirs.

47-2648
Local contact pressures in ship/ice and structure/ice interactions.
Masterson, D.M., et al, *Cold regions science and technology*, Jan. 1993, 21(2), p.169-185, 31 refs.
Frederking, R.M.W.
Floating ice, Ice solid interface, Ice pressure, Ice loads, Ships, Offshore structures, Impact strength, Design criteria, Mechanical tests, Ice cover strength.

47-2649
Bore-hole survey at Camp Century, 1989.
Gundestrup, N.S., et al, *Cold regions science and technology*, Jan. 1993, 21(2), p.187-193, 14 refs.
Dahl-Jensen, D., Hansen, B.L., Kelty, J.
Ice sheets, Glacier flow, Boreholes, Ice deformation, Velocity measurement, Glacier surveys, Ice temperature, Antarctica—Byrd Station.
A combination of the directional surveys of the Camp Century borehole from 1966, 1967, 1969 and 1989 has revealed a deformation pattern similar to that measured at Dye-3, South Greenland and Byrd Station, Antarctica, showing high deformation rate for Wisconsin ice. When compared to the Dye-3 profile, the deformation shows the same pattern even in details. The surface velocity obtained by integrating the borehole deformation is in agreement with that obtained from satellite measurements.

47-2650
On development of fibre-ice composites.
Vasil'ev, N.K., *Cold regions science and technology*, Jan. 1993, 21(2), p.195-199, 12 refs.
Ice (construction material), Composite materials, Ice strength, Ice structure, Compressive properties, Mechanical tests, Cold weather construction.

47-2651
Seismic characteristics of an airgun fired over snow.
King, E.C., et al, *Cold regions science and technology*, Jan. 1993, 21(2), p.201-207, 6 refs.
Jarvis, E.P., Mowse, E.A.
Seismic surveys, Glacier surveys, Seismic reflection, Explosion effects, Sound waves, Snow cover effect, Glacier thickness, Performance, Instruments.
An alternative seismic source was investigated in an experiment conducted near Rothera Station, Antarctic Peninsula. The source was an airgun fired above the snow surface. Comparison shots using explosive and hammer sources were also recorded. A clear reflection was obtained from the ice/bedrock interface 300 m beneath the site on the unprocessed airgun record. On the explosive and hammer records the reflection could only be seen after frequency-wavenumber filtering had attenuated shearwaves and ground roll. The technique has potential use in profiling ice shelf thickness and seabed depth using a single small airgun.

47-2652
Observed climate variations and change.
Folland, C.K., et al, Intergovernmental Panel on Climate Change. Working Group 1 Final Report. Climate change: the IPCC scientific assessment. Edited by J.T. Houghton et al, World Meteorological Organization, 1990, p.198-238, Refs. p.233-238.
Climatic changes, Global warming, Air temperature, Atmospheric circulation, Glacier melting, Meteorological factors, Temperature variations, Precipitation (meteorology), Cloud cover.

47-2653
Efficient numerical solution for the multidimensional solidification (or melting) problem using a microcomputer.
Rabin, Y., et al, *International journal of heat and mass transfer*, Feb. 1993, 36(3), p.673-683, 10 refs.
Korin, E.
Liquid solid interfaces, Solidification, Heat transfer, Phase transformations, Boundary value problems, Computerized simulation, Mathematical models, Liquid phases, Solid phases.

47-2654
Ice-formation phenomena for water flow inside a cooled parallel plate channel: an experimental and theoretical investigation of wavy ice layers.
Weigand, B., et al, *International journal of heat and mass transfer*, Feb. 1993, 36(3), p.685-693, 22 refs.
Beer, H.
Water flow, Laminar flow, Ice formation, Ice water interface, Layers, Heat transfer, Mathematical models, Turbulent flow, Surface structure.

47-2655
Comments on "Analysis of close-contact melting for octadecane and ice inside isothermally heated horizontal rectangular capsule".
Bejan, A., *International journal of heat and mass transfer*, Feb. 1993, 36(3), p.832, 2 refs. For paper under discussion see 46-2189.
Ice melting, Porous materials, Ice solid interface, Analysis (mathematics), Heat transfer.

47-2656
Structural stability in cloud physics using parameterized microphysics.
Wacker, U., *Contributions to atmospheric physics*, Aug. 1992, 65(3), p.231-242, 7 refs.
Cloud physics, Precipitation (meteorology), Ice formation, Homogeneous nucleation, Cloud droplets, Mathematical models, Stability.

47-2657
Fate and effects of dispersed crude oil under icy conditions simulated in mesocosms.
Siron, R., et al, *Marine environmental research*, 1993, 35(3), p.273-302, Refs. p.299-302.
Pelletier, E., Delille, D., Roy, S.
Oil spills, Environmental tests, Water pollution, Ice cover effect, Marine biology, Water pollution, Environmental impact, Crude oil, Simulation, Degradation, Ice water interface.

47-2658
Cryoprotective properties of water in the earth cryolithosphere and its role in exobiology.
Gilichinskii, D.A., et al, *Origins of life and evolution of the biosphere*, Feb. 1993, 23(1), p.65-75, 12 refs.
Soina, V.S., Petrova, M.A.
Survival, Geocryology, Cryobiology, Permafrost structure, Microbiology, Protection, Water films, Unfrozen water content, Permafrost surveys.

47-2659
Geochemistry of Quebec North Shore salmon rivers during snowmelt: organic acid pulse and aluminum mobilization.
Campbell, P.G.C., et al, *Canadian journal of fisheries and aquatic sciences*, Sep. 1992, 49(9), p.1938-1952, With French summary. 61 refs.
Hansen, H.J., Dubreuil, B., Nelson, W.O.
Rivers, Sampling, Geochemistry, Water chemistry, Snowmelt, Chemical properties, Seasonal variations, Environmental impact, Ecology.

47-2660
Characteristics of the bed of the lower Columbia Glacier, Alaska.
Humphrey, N.F., et al, *Journal of geophysical research*, Jan. 10, 1993, 98(B1), p.837-846, 18 refs.
Kamb, B., Fahnestock, M.A., Engelhardt, H.
Glacier beds, Glacier flow, Glacial erosion, Basal sliding, Ice solid interface, Sediment transport, Boreholes, Subglacial drainage, Shear stress.

47-2661
SPOT multispectral data and digital terrain model for the analysis of ice-snow fields on arctic glaciers.
Parrot, J.F., et al, *International journal of remote sensing*, Feb. 1993, 14(3), p.425-440, 26 refs.
Lyberis, N., Lefauconnier, B., Manby, G.
Glacier surveys, Spaceborne photography, Glacier surfaces, Photogrammetric surveys, Radiometry, Topographic effects, Image processing, Surface properties, Glacier mass balance, Topographic maps, Accuracy.

47-2662
Interpretation of Bhaskara-II satellite microwave radiometer data in terms of land features.
Rao, K.S., et al, *International journal of remote sensing*, Feb. 1993, 14(3), p.451-465, 17 refs.
Remote sensing, Radiometry, Microwaves, Brightness, Soil surveys, Snow cover, Terrain identification, Vegetation patterns, Surface structure.

47-2663
Independent measurement of extinction and backscatter profiles in cirrus clouds by using a combined Raman elastic-backscatter lidar.
Ansmann, A., et al, *Applied optics*, Nov. 20, 1992, 31(33), p.7113-7131, 47 refs.
Cloud physics, Ice crystal optics, Lidar, Backscattering, Optical properties, Attenuation, Analysis (mathematics), Accuracy, Remote sensing.

47-2664
Cloud clearing with a CO2 laser in a cirrus cloud simulation facility.
Waggoner, A.P., et al, *Applied optics*, Sep. 20, 1992, 31(27), p.5871-5877, 17 refs.
Radke, L.F., Buonadonna, V., Dowling, D.R.
Cloud dissipation, Cloud physics, Lasers, Ice crystal optics, Radiation absorption, Ice melting, Simulation, Condensation, Ice water interface.

47-2665
Frost-related performance of heated shallow foundation thermal insulation. [Performance au gel de stratégies d'isolation thermique des fondations superficielles de bâtiments].
Duquennoi, C., *Annales des ponts et chaussées*, 1992, No.62, p.3-19, In French with English summary. 20 refs.
Foundations, Cold weather construction, Thermal insulation, Soil freezing, Frost protection, Design criteria, Frozen ground mechanics, Freezing front, Performance, Mathematical models.

47-2666
Active rock glaciers in central northern Tian Shan. [Aktive Blockgletscher im zentralen Teil des nördlichen Tienschan].
Schröder, H., *Petermanns Geographische Mitteilungen*, 1992, 136(2-3), p.109-119, In German with English and Russian summaries. 38 refs.
Rock glaciers, Geomorphology, Periglacial processes, Mountains, Mass transfer, Geophysical surveys, Snow line, Geologic structures.

47-2667
Evaluation of FCAW consumables for offshore and arctic structure fabrication.
Bala, S.R., et al, *Journal of offshore mechanics and arctic engineering*, Feb. 1993, 115(1), p.76-82, 19 refs.
Malik, L., Braid, J.E.M.
Offshore structures, Metals, Welding, Construction materials, Microstructure, Cold weather performance, Chemical composition, Brittleness, Joints (junctions), Temperature effects.

47-2668
Probabilistic analysis of local ice pressures.
Jordaan, I.J., et al, *Journal of offshore mechanics and arctic engineering*, Feb. 1993, 115(1), p.83-89, 23 refs.
Maes, M.A., Brown, P.W., Hermans, I.P.
Floating ice, Ice solid interface, Ice pressure, Ice loads, Ships, Impact, Analysis (mathematics), Design criteria, Offshore structures, Stress concentration.

47-2669
Simulations of the general circulation of the Martian atmosphere. 2. Seasonal pressure variations.
Pollack, J.B., et al, *Journal of geophysical research*, Feb. 25, 1993, 98(E2), p.3149-3181, 34 refs.
Mars (planet), Atmospheric physics, Atmospheric circulation, Atmospheric pressure, Carbon dioxide, Ice sheets, Climatic factors, Heat balance, Seasonal variations, Mathematical models.

47-2670
Coupled subsurface-boundary layer model of water on Mars.
Zent, A.P., et al, *Journal of geophysical research*, Feb. 25, 1993, 98(E2), p.3319-3337, 32 refs.
Haberle, R.M., Houben, H.C., Jakosky, B.M.
Mars (planet), Planetary environments, Hydrologic cycle, Regolith, Atmospheric composition, Diurnal variations, Turbulent boundary layer, Water vapor, Mathematical models, Soil air interface, Turbulent exchange.

47-2671
Hemispherical asymmetry in the Martian polar caps.
Lindner, B.L., *Journal of geophysical research*, Feb. 25, 1993, 98(E2), p.3339-3344, 57 refs.
Mars (planet), Ice sheets, Carbon dioxide, Insolation, Albedo, Radiation absorption, Heat balance, Mathematical models, Seasonal variations, Climatology.

47-2672
Geographic variations in the thermal and diffusive stability of ground ice on Mars.
Mellon, M.T., et al, *Journal of geophysical research*, Feb. 25, 1993, 98(E2), p.3345-3364, 75 refs.
Jakosky, B.M.
Mars (planet), Ground ice, Ice formation, Regolith, Stability, Soil air interface, Vapor diffusion, Heat balance, Temperature variations, Mathematical models, Water vapor, Geomorphology.

47-2673
On the thermodynamic stability of clathrate hydrate. I.
Tanaka, H., et al, *Journal of chemical physics*, Mar. 1, 1993, 98(5), p.4098-4109, 34 refs.
Kiyohara, K.
Clathrates, Hydrates, Stability, Thermodynamic properties, Molecular energy levels, Natural gas, Ice physics, Latticed structures, Water structure, Analysis (mathematics).

47-2674
Preferential adsorption of ortho-H2 with respect to para-H2 on the amorphous ice surface.
Buch, V., et al, *Journal of chemical physics*, Mar. 1, 1993, 98(5), p.4195-4206, 31 refs.
Devlin, J.P.
Ice physics, Amorphous ice, Hydrogen, Adsorption, Molecular energy levels, Low temperature research, Mathematical models, Anisotropy, Molecular structure.

47-2675
Structural study of water confined in porous glass by neutron scattering.
Bellissent-Funel, M.C., et al, *Journal of chemical physics*, Mar. 1, 1993, 98(5), p.4246-4252, 25 refs.
Lal, J., Bosio, L.
Water structure, Porous materials, Liquid solid interfaces, Neutron scattering, Supercooling, Ice formation, Temperature effects, Thermodynamics, Spectra, Cubic ice.

47-2676
Snow avalanche and rock fall mapping projects and experiences. [Sno- og steinskred kartlegging og erfaringer].
Lied, K., *Norges Geotekniske Institutt. Publikasjon*, 1992, No.183, p.1-19, Reprinted from Fjellsprengningsteknikk-Bergmekanikk-Geoteknikk, Oslo, 1989, p.22.1-22.22. In Norwegian with English summary. 7 refs.
Avalanches, Avalanche forecasting, Topographic effects.

47-2677
Experience with the performance of load-controlled cone penetration tests in permafrost and ice.
Ladanyi, B., et al, *Norges Geotekniske Institutt. Publikasjon*, 1992, No.186, p.1-8, Reprinted from Canadian Geotechnical Conference, Proceedings, 44th, Calgary, Sep./Oct. 1991, Vol.1. 15 refs.
Lunne, T., Winsor, W.
Penetration tests, Soil profiles, Frozen ground, Sea ice.

47-2678
Last interglacial-glacial transition in North America.
Clark, P.U., ed, *Geological Society of America. Special paper*, 1992, No.270, 317p., Refs. passim. For individual papers see 47-2679 through 47-2699.
Lea, P.D., ed.
Glaciation, Paleoclimatology, Quaternary deposits, Stratigraphy, Geochronology, Pleistocene, Ice age theory, Ice sheets, Glacier oscillation, Glacial deposits, Marine deposits, Lacustrine deposits.

47-2679
Last interglacial-glacial transition in North America: introduction.
Clark, P.U., *Geological Society of America. Special paper*, 1992, No.270, Last interglacial-glacial transition in North America. Edited by P.U. Clark and P.D. Lea, p.1-11, 87 refs.
Ice sheets, Glacier oscillation, Paleoclimatology, Glaciation, Pleistocene, Ice age theory, Geochronology, Stratigraphy, Quaternary deposits.

47-2680
Historical overview of early Wisconsin glaciation.
Goldthwait, R.P., *Geological Society of America. Special paper*, 1992, No.270, Last interglacial-glacial transition in North America. Edited by P.U. Clark and P.D. Lea, p.13-18, 60 refs.
Glaciation, Stratigraphy, Quaternary deposits, Paleoclimatology, Geochronology, Glacial deposits, Pleistocene, Glacier oscillation, Ice sheets, Soil dating.

47-2681
Marine oxygen isotope record: constraints on timing and extent of ice-growth events (120-65 ka).
Mix, A.C., *Geological Society of America. Special paper*, 1992, No.270, Last interglacial-glacial transition in North America. Edited by P.U. Clark and P.D. Lea, p.19-30, 53 refs.
Paleoclimatology, Geochronology, Glaciation, Ice growth, Pleistocene, Bottom sediment, Isotope analysis, Oxygen isotopes, Ice volume, Air ice water interaction.

47-2682
Last interglacial-glacial transition in North America: evidence from uranium-series dating of coastal deposits.
Muhs, D.R., *Geological Society of America. Special paper*, 1992, No.270, Last interglacial-glacial transition in North America. Edited by P.U. Clark and P.D. Lea, p.31-51, 104 refs.
Paleoclimatology, Geochronology, Glaciation, Marine deposits, Soil dating, Ice age theory, Sea level, Isotope analysis, Radioactive age determination.

47-2683
Wisconsinan ice-sheet initiation: Milankovitch forcing, paleoclimatic data, and global climate modeling.
Peteet, D.M., et al, *Geological Society of America. Special paper*, 1992, No.270, Last interglacial-glacial transition in North America. Edited by P.U. Clark and P.D. Lea, p.53-69, 85 refs.
Rind, D., Kukla, G.J.
Paleoclimatology, Glaciation, Ice age theory, Ice sheets, Glacier oscillation, Geochronology, Global change, Air ice water interaction, Snow cover effect, Solar radiation.

47-2684
Last interglacial-glacial transition in Illinois: 123-25 ka.
Curry, B.B., et al, *Geological Society of America. Special paper*, 1992, No.270, Last interglacial-glacial transition in North America. Edited by P.U. Clark and P.D. Lea, p.71-88, 74 refs.
Follmer, L.R.
Glaciation, Paleoclimatology, Quaternary deposits, Stratigraphy, Geochronology, Pleistocene, Glacial deposits, Fossils, Pollen, United States—Illinois.

47-2685
Ages of the Whitewater and Fairhaven tills in southwestern Ohio and southeastern Indiana.
Miller, B.B., et al, *Geological Society of America. Special paper*, 1992, No.270, Last interglacial-glacial transition in North America. Edited by P.U. Clark and P.D. Lea, p.89-98, 24 refs.
McCoy, W.D., Wayne, W.J., Brockman, C.S.
Glaciation, Paleoclimatology, Quaternary deposits, Stratigraphy, Geochronology, Pleistocene, Glacial deposits, United States—Ohio, United States—Indiana.

47-2686
Reevaluation of early Wisconsinan stratigraphy of northern Ohio.
Szabo, J.P., *Geological Society of America. Special paper*, 1992, No.270, Last interglacial-glacial transition in North America. Edited by P.U. Clark and P.D. Lea, p.99-107, 39 refs.
Glaciation, Paleoclimatology, Quaternary deposits, Stratigraphy, Geochronology, Pleistocene, Glacial deposits, United States—Ohio.

47-2687
Early Wisconsinan in the north-central part of the Lake Erie basin: a new interpretation.
Dreimanis, A., *Geological Society of America. Special paper*, 1992, No.270, Last interglacial-glacial transition in North America. Edited by P.U. Clark and P.D. Lea, p.109-118, 44 refs.
Glaciation, Paleoclimatology, Quaternary deposits, Stratigraphy, Geochronology, Pleistocene, Glacial deposits, Great Lakes.

47-2688
Sedimentary and biological record of the last interglacial-glacial transition at Toronto, Canada.
Eyles, N., et al, *Geological Society of America. Special paper*, 1992, No.270, Last interglacial-glacial transition in North America. Edited by P.U. Clark and P.D. Lea, p.119-137, 76 refs.
Williams, N.E.
Glaciation, Paleoclimatology, Quaternary deposits, Stratigraphy, Geochronology, Pleistocene, Glacial deposits, Fossils, Canada—Ontario—Toronto.

47-2689
Sunnybrook drift in the Toronto area, Canada: reinvestigation and reinterpretation.
Hicock, S.R., et al, *Geological Society of America. Special paper*, 1992, No.270, Last interglacial-glacial transition in North America. Edited by P.U. Clark and P.D. Lea, p.139-161, 91 refs.
Dreimanis, A.
Glaciation, Paleoclimatology, Quaternary deposits, Stratigraphy, Geochronology, Pleistocene, Glacial deposits, Lacustrine deposits, Canada—Ontario—Toronto.

47-2690
On the age of the penultimate full glaciation of New England.
Oldale, R.N., et al, *Geological Society of America. Special paper*, 1992, No.270, Last interglacial-glacial transition in North America. Edited by P.U. Clark and P.D. Lea, p.163-170, 50 refs.
Colman, S.M.
Glaciation, Paleoclimatology, Quaternary deposits, Stratigraphy, Geochronology, Pleistocene, Glacial deposits, Marine deposits, United States—New England.

47-2691
Sangamonian and early Wisconsinan events in the St. Lawrence lowland and Appalachians of southern Quebec, Canada.
Lamothe, M., et al, *Geological Society of America. Special paper*, 1992, No.270, Last interglacial-glacial transition in North America. Edited by P.U. Clark and P.D. Lea, p.171-184, 43 refs.
Parent, M., Shilts, W.W.
Glaciation, Paleoclimatology, Quaternary deposits, Stratigraphy, Geochronology, Pleistocene, Glacial deposits, Marine deposits, Lacustrine deposits, Canada—Quebec.

47-2692
Pre-late Wisconsinan chronology of Nova Scotia, Canada.
Stea, R.R., et al, *Geological Society of America. Special paper*, 1992, No.270, Last interglacial-glacial transition in North America. Edited by P.U. Clark and P.D. Lea, p.185-206, 81 refs.
Mott, R.J., Belknap, D.F., Radtke, U.
Glaciation, Paleoclimatology, Quaternary deposits, Stratigraphy, Geochronology, Pleistocene, Glacial deposits, Marine deposits, Canada—Nova Scotia.

47-2693
Hudson Bay lowland Quaternary stratigraphy: evidence for early Wisconsinan glaciation centered in Quebec.
Thorleifson, L.H., et al, *Geological Society of America. Special paper*, 1992, No.270, Last interglacial-glacial transition in North America. Edited by P.U. Clark and P.D. Lea, p.207-221, 78 refs.
Wyatt, P.H., Shilts, W.W., Nielsen, E.
Glaciation, Paleoclimatology, Quaternary deposits, Stratigraphy, Geochronology, Pleistocene, Glacial deposits, Marine deposits, Lacustrine deposits, Canada—Hudson Bay.

47-2694
Timing and character of the last interglacial-glacial transition in the eastern Canadian Arctic and northwest Greenland.
Miller, G.H., et al, *Geological Society of America. Special paper*, 1992, No.270, Last interglacial-glacial transition in North America. Edited by P.U. Clark and P.D. Lea, p.223-231, 49 refs.
Funder, S., De Vernal, A., Andrews, J.T.
Glaciation, Paleoclimatology, Quaternary deposits, Stratigraphy, Geochronology, Pleistocene, Glacial deposits, Marine deposits, Ice sheets, Glacier oscillation, Baffin Bay.

47-2695
Sangamonian and early Wisconsinan glacial record in the western Canadian Arctic.
Vincent, J.S., *Geological Society of America. Special paper*, 1992, No.270, Last interglacial-glacial transition in North America. Edited by P.U. Clark and P.D. Lea, p.233-252, 45 refs.
Glaciation, Paleoclimatology, Quaternary deposits, Stratigraphy, Geochronology, Pleistocene, Glacial deposits, Marine deposits, Ice sheets, Glacier oscillation, Canada—Arctic Archipelago, Canada—Northwest Territories—Mackenzie River Delta.

47-2696
Sangamonian and early Wisconsinan stages in western Canada and northwestern United States.
Clague, J.J., et al, *Geological Society of America. Special paper*, 1992, No.270, Last interglacial-glacial transition in North America. Edited by P.U. Clark and P.D. Lea, p.253-268, 89 refs.
Easterbrook, D.J., Hughes, O.L., Matthews, J.V., Jr.
Glaciation, Paleoclimatology, Quaternary deposits, Stratigraphy, Geochronology, Pleistocene, Glacial deposits, Ice sheets, Glacier oscillation, Canada—*Yukon Territory, Canada—British Columbia.*

47-2697
Varied records of early Wisconsinan alpine glaciation in the western United States derived from weathering-rind thicknesses.
Colman, S.M., et al, *Geological Society of America. Special paper*, 1992, No.270, Last interglacial-glacial transition in North America. Edited by P.U. Clark and P.D. Lea, p.269-278, 35 refs.
Pierce, K.L.
Alpine glaciation, Paleoclimatology, Quaternary deposits, Stratigraphy, Geochronology, Pleistocene, Glacial deposits, Glacier oscillation, Weathering, United States.

47-2698
Early Wisconsin lakes and glaciers in the Great Basin, U.S.A.
Oviatt, C.G., et al, *Geological Society of America. Special paper*, 1992, No.270, Last interglacial-glacial transition in North America. Edited by P.U. Clark and P.D. Lea, p.279-287, 78 refs.
McCoy, W.D.
Glaciation, Paleoclimatology, Quaternary deposits, Stratigraphy, Geochronology, Pleistocene, Glacial deposits, Lacustrine deposits, Glacier oscillation, United States.

47-2699
Pre-late Wisconsin paleolimnologic record from the Estancia Valley, central New Mexico.
Bachhuber, F.W., *Geological Society of America. Special paper*, 1992, No.270, Last interglacial-glacial transition in North America. Edited by P.U. Clark and P.D. Lea, p.289-307, 42 refs.
Paleoclimatology, Quaternary deposits, Stratigraphy, Lacustrine deposits, Geochronology, Pleistocene, Fossils, Limnology, Lakes, United States—New Mexico.

47-2700
Glacial history of the Ellsworth Mountains, West Antarctica.
Denton, G.H., et al, *Geological Society of America. Memoir*, 1992, No.170, Geology and paleontology of the Ellsworth Mountains, West Antarctica, edited by G.F.Webers, C. Craddock and J.F. Splettstoesser, p.403-432, Refs. p.431-432.
Bockheim, J.G., Rutford, R.H., Andersen, B.G.
Glacial erosion, Ice sheets, Glacier flow, Alpine glaciation, Ice models, Glacial geology, Striations, Antarctica—Ellsworth Mountains.
The West Antarctic Ice Sheet flows seaward around and through the Ellsworth Mountains to feed the Filchner-Ronne Ice Shelf. A high ice-sheet surface, featuring a major inland divide, abuts the western mountain flank. The present-day grounding line of the Filchner-Ronne Ice Shelf is near the eastern mountain flank. Two major erosion glacial features characterize the Ellsworth Mountains. First, the exposed mountains show classic features of alpine glacier erosion. These are best developed in the Sentinel Range of the northern Ellsworth Mountains where cirque erosion has left horns, arêtes, and sharp spurs. Second, a glacial trimline is etched into alpine ridges and spurs throughout the Ellsworth Mountains. Elevations of this trimline show a remarkably consistent pattern. Bedrock ridges above the trimline are serrated, whereas those below the trimline lack serrations, and some show glacial polish and striations. Drift patches and erratics occur below the trimline. It is inferred that substantial grounding of West Antarctic ice occurred in the Weddell Sea embayment when the West Antarctic Ice Sheet stood at the trimline. Two widely opposing age models for ice-sheet expansion to the trimline are proposed. In one model the expansion is late Wisconsin/Holocene in age. In the other model the expansion is pre-late Quaternary, and perhaps Tertiary, in age. (Auth. mod.)

47-2701
Polar stratospheric clouds at the South Pole in 1990: lidar observations and analysis.
Collins, R.L., et al, *Journal of geophysical research*, Jan. 20, 1993, 98(D1), p.1001-1010, 24 refs.
Bowman, K.P., Gardner, C.S.
Cloud physics, Stratosphere, Aerosols, Temperature effects, Antarctica—Amundsen-Scott Station.
Polar stratospheric clouds (PSCs) were first observed in late May at about 20 km. As the lower stratosphere cooled further, PSCs were observed throughout the 12-27 km altitude region, and remained there from mid-June until late Aug. Observations in early Sep. detected no PSCs above 21 km. An isolated cloud was observed in mid-Oct. Throughout the winter the clouds had small backscatter ratios (< 10). Observations made at two wavelengths in July show that the clouds are predominantly composed of nitric acid trihydrate with associated angstrom coefficients between 0.2 and 3.7. Comparison of the lidar data and balloon-borne frost point measurements in late Aug. indicate that the nitric acid mixing ratio was less than 1.5 ppbv. Observations over periods of several hours show downward motions in the cloud layers similar to the phase progressions of upwardly-propagating gravity waves. The vertical phase velocities of these features are significantly faster than the expected settling velocities of the cloud particles. Both the backscatter ratio profiles and the radiosonde horizontal wind profiles show 1-4 km vertical structures. This suggests that the kilometer-scale vertical structure of the PSCs is maintained by low-frequency gravity waves propagating through the cloud layers. (Auth. mod.)

47-2702
Paleoclimatic tracers: an investigation using an atmospheric general circulation model under ice age conditions. 1. Desert dust.
Joussaume, S., *Journal of geophysical research*, Feb. 20, 1993, 98(D2), p.2767-2805, 73 refs.
Paleoclimatology, Ice cores, Atmospheric circulation, Models.
Many studies with atmospheric general circulation models (AGCMs) have demonstrated their usefulness in reconstructing past climates. In a new approach, the author used an AGCM to investigate the link between tracer cycles and climate. Considered in this paper are the atmospheric cycle of windblown dust material from desertic areas and in part 2 the water isotope cycles. Studies from ice cores have shown a strong increase of dust deposits during glacial periods, both over East Antarctica and Greenland. It is not known, however, whether this past increase is global or just a local feature; where the dust came from; and what are the mechanisms yielding this increase. Answers to these questions are sought by using an AGCM including a model for the desert dust cycle to simulate the present-day and Last Glacial Maximum climates for Feb. and Aug. The model simulates only a weak increase of the global atmospheric dust content. Stronger variations are obtained at a regional scale and are in good agreement with observations from deep-sea sediments. However, the model does not reproduce the great increase of dust concentration in snow that has been observed in ice cores. Several model deficiencies can induce this model-data discrepancy, as for example inaccuracies of the circulation patterns or of the dust model. However, most likely the model fails to simulate the actual sources of dust. (Auth.)

47-2703
Age of the air in the firn and the ice at Summit, Greenland.
Schwander, J., et al, *Journal of geophysical research*, Feb. 20, 1993, 98(D2), p.2831-2838, 26 refs.
Ice cores, Firn, Geochronology, Greenland.

47-2704
Boulder streams, debris fans, and Pleistocene climate change in the Blue Ridge Mountains of central Virginia.
Whittecar, G.R., et al, *Journal of geology*, July 1992, 100(4), p.487-494, 40 refs.
Ryter, D.W.
Mountains, Rock streams, Pleistocene, Periglacial processes, Geomorphology, Climatic changes, Slope processes, Landforms, Soil profiles.

47-2705
Cloud chemistry at Mt. Rigi, Switzerland: dependence on drop size and relationship to precipitation chemistry.
Collett, J.L., Jr., et al, *Atmospheric environment*, Jan. 1993, 27A(1), p.33-42, 39 refs.
Oberholzer, B., Staehelin, J.
Cloud physics, Precipitation (meteorology), Cloud droplets, Chemical composition, Air pollution, Snow crystal nuclei, Heterogeneous nucleation, Ion density (concentration), Sampling, Aerosols.

47-2706
Investigations of runoff and fluvial sediment transport of Jökulsá Vestri and Eystri, central Iceland. Contribution to the hydrology of periglacial regions. [Untersuchungen zum Abflussverhalten und fluvialen Feststofftransport der Jökulsá Vestri und Jökulsá Eystri, Zentral-Island. Ein Beitrag zur Hydrologie des Periglazialraumes].
Kiel, A., *Göttinger Geographische Abhandlungen*, 1989, Vol.85, 128p., In German with English summary. Refs. p.115-121.
River basins, Glacial hydrology, Runoff, Periglacial processes, Sediment transport, Water erosion, Suspended sediments, Periodic variations, Meteorological factors.

47-2707
Present-day antarctic climatology of the NCAR Community Climate Model Version 1.
Tzeng, R.Y., et al, *Journal of climate*, Feb. 1993, 6(2), p.205-226, 51 refs.
Bromwich, D.H., Parish, T.R.
Climatology, Polar atmospheres, Models, Climatic factors, Seasonal variations, Simulation, Accuracy, Snow accumulation, Moisture transfer.
Five-year seasonal cycle output produced by the NCAR Community Climate Model Version 1 (CCM1) is used to evaluate the ability of the model to simulate the present-day climate of Antarctica. The model results are compared with observed horizontal syntheses and point data. (Auth. mod.)

47-2708
Freeze risk to Florida citrus. Part 2: Temperature variability and circulation patterns.
Downton, M.W., et al, *Journal of climate*, Feb. 1993, 6(2), p.364-372, 27 refs.
Miller, K.A.
Agriculture, Freezing, Frost forecasting, Air temperature, Atmospheric circulation, Temperature variations, Climatic factors, Climatic changes, Periodic variations.

47-2709
Hail occurrences in India.
Nizamuddin, S., *Weather*, Mar. 1993, 48(3), p.90-92, 4 refs.
Weather observations, Hail, Precipitation (meteorology), Distribution, Seasonal variations, Meteorological data.

47-2710
Environmental effects on CO2 efflux from riparian tundra in the northern foothills of the Brooks Range, Alaska, USA.
Oberbauer, S.F., et al. *Oecologia*. Dec. 11, 1992, 92(4), p.568-577, 28 refs.
Tundra, Carbon dioxide, Soil air interface, Vapor transfer, Ecosystems, Water table, Soil temperature, Biomass, Thaw depth, Seasonal variations, Decomposition.

47-2711
Adaptive significance of nitrogen storage in *Bistorta bistortoides*, an alpine herb.
Jaeger, C.H., et al. *Oecologia*. Dec. 11, 1992, 92(4), p.578-585, 18 refs.
Monson, R.K.
Plant ecology, Alpine landscapes, Nutrient cycle, Snow cover effect, Phenology, Growth, Soil analysis, Site surveys, Seasonal variations.

47-2712
Atmospheric water-vapour transport to Antarctica inferred from radiosonde data.
Connolley, W.M., et al. *Royal Meteorological Society. Quarterly journal B*. Jan. 1993, 119(510), p.325-342, 34 refs.
King, J.C.
Polar atmospheres, Atmospheric composition, Water vapor, Sounding, Moisture transfer, Precipitation (meteorology), Wind factors, Glacier mass balance, Periodic variations.
Data from 16 radiosonde stations are used to study the transport of water vapor in the antarctic atmosphere. Total column moisture (TCM), winds and moisture flux measurements are presented, together with an analysis of their reliability. Annual TCM values are similar at all stations around the coast of East Antarctica, but are much smaller on the East Antarctic Plateau. Over a period of 6 years the interannual variation (standard deviation) of the TCM is about 10% of the mean value. From the data a water-vapor budget for East Antarctica is computed. The annual accumulation rate obtained approximates glaciological estimates. However, the uncertainties are considerable as a result of measurement errors and the representativity of the stations available. The conclusion is that the data are more suitable for evaluating the regional performance of circulation models from which systematic budget estimates may be derived. (Auth. mod.)

47-2713
Mathematical modeling of ice and thermal regime of water bodies under heavy thermal load.
Aleksandrov, I.IA., et al. *Soviet meteorology and hydrology*. 1992, No.2, p.55-61, Translated from Meteorologiia i gidrologiia. 4 refs.
Kvon, V.I., Filatova, T.N., Zhukovskaia, O.P.
Reservoirs, Waste disposal, Thermal regime, Water temperature, Hydrodynamics, Ice formation, Air ice water interaction, Mathematical models, Meteorological factors.

47-2714
Causes of variability of ice appearance dates in the lower reaches of the Volga.
Soldatova, I.I., *Soviet meteorology and hydrology*. 1992, No.2, p.62-66, Translated from Meteorologiia i gidrologiia. 9 refs.
River flow, River ice, Channels (waterways), Ice formation, Climatic factors, Flow control, Periodic variations, Global warming, Correlation.

47-2715
In-slab hydronic heating systems warm rooms indoors, melt snow and ice outdoors.
Smith, A., *Aberdeen's concrete construction*. Oct. 1990, 35(10), p.851-856.
Cold weather construction, Concrete slabs, Concrete heating, Subsurface structures, Radiant heating, Pipes (tubes), Design, Snow melting.

47-2716
Enclosures keep workers warm and more productive in cold weather.
Smith, A., *Aberdeen's concrete construction*. Oct. 1990, 35(10), p.857-862, 3 refs.
Cold weather construction, Cold weather performance, Construction materials, Human factors, Protection, Panels.

47-2717
Using heaters safely during cold weather concreting.
Owens, F., *Aberdeen's concrete construction*. Oct. 1990, 35(10), p.878-881, 1 ref.
Cold weather construction, Winter concreting, Heating, Safety, Ventilation.

47-2718
Designing cold weather concrete mixes.
Suprenant, B.A., *Aberdeen's concrete construction*. Oct. 1990, 35(10), p.882-884, 4 refs.
Cold weather construction, Winter concreting, Concrete admixtures, Concrete curing, Design criteria, Frost protection, Concrete strength, Temperature control.

47-2719
Non-chloride accelerating admixture for Class CF fly ash.
Brook, J.W., et al, *Concrete international*, Oct. 1990, 12(10), p.51-54, 4 refs.
Berkey, R.A., Farzam, H.
Concrete admixtures, Concrete hardening, Concrete strength, Performance, Mechanical properties, Winter concreting, Standards.

47-2720
Non-chloride accelerating admixtures for early compressive strength.
Rear, K., et al, *Concrete international*, Oct. 1990, 12(10), p.55-58, 5 refs.
Chin, D.
Concrete admixtures, Concrete hardening, Concrete strength, Compressive properties, Mechanical tests, Winter concreting.

47-2721
Managing water resources during global change.
Herrmann, R., ed, Bethesda, MD, American Water Resources Association, 1992, 860p., Refs. passim.
Proceedings of the AWRA 28th Annual Conference and International Symposium, Reno, NV, Nov. 1-5, 1992. For selected papers see 47-2722 through 47-2750.
Snowmelt, Runoff forecasting, Snow hydrology, Global warming, Water reserves, Precipitation (meteorology), Stream flow, Alpine landscapes, Atmospheric circulation, Forest ecosystems, River basins.

47-2722
Experience with probabilistic forecasts for cumulative stochastic optimization.
Howard, C.D.D., Managing water resources during global change. Edited by R. Herrmann, Bethesda, MD, American Water Resources Association, 1992, p.119-128, 1 ref.
Snowmelt, Runoff forecasting, Snow hydrology, Reservoirs, Water reserves, Electric power, Computerized simulation, Data processing, Statistical analysis, Canada—British Columbia.

47-2723
Hydrometeorologic forecasting at Salt River Project.
Reigle, D., et al, Managing water resources during global change. Edited by R. Herrmann, Bethesda, MD, American Water Resources Association, 1992, p.137-142.
Skindlov, J., Ester, C.
Snowmelt, Runoff forecasting, Snow hydrology, Reservoirs, Water reserves, Computerized simulation, Data processing, United States—Arizona.

47-2724
Operational runoff forecasting and scheduling Pacific Gas and Electric's hydro electric system.
Freeman, G.J., Managing water resources during global change. Edited by R. Herrmann, Bethesda, MD, American Water Resources Association, 1992, p.143-152, 5 refs.
Snowmelt, Runoff forecasting, Snow hydrology, Water reserves, Electric power, Computerized simulation, Data processing, Regional planning, United States—California.

47-2725
Verification of the National Weather Service extended streamflow prediction procedure.
Day, G.N., et al, Managing water resources during global change. Edited by R. Herrmann, Bethesda, MD, American Water Resources Association, 1992, p.163-172, 4 refs.
Brazil, L.E., McCarthy, C.S., Laurine, D.P.
Snowmelt, Runoff forecasting, Stream flow, Snow hydrology, Water reserves, Computerized simulation, Data processing, Statistical analysis.

47-2726
Effects of climate change on monthly river runoff.
Miller, J.R., et al, Managing water resources during global change. Edited by R. Herrmann, Bethesda, MD, American Water Resources Association, 1992, p.175-178, 10 refs.
Russell, G.L., Van Blarcum, S.C.
Snowmelt, Runoff forecasting, Snow hydrology, River flow, Global warming, Computerized simulation, Data processing, Statistical analysis, USSR—Lena River.

47-2727
Effects of climate changes on water supplies.
Cooley, K.R., et al, Managing water resources during global change. Edited by R. Herrmann, Bethesda, MD, American Water Resources Association, 1992, p.185-194, 22 refs.
Flerchinger, G.N., Wight, J.R., Hanson, C.L.
Snowmelt, Runoff forecasting, Snow hydrology, Stream flow, Water reserves, Global warming, Evapotranspiration, Vegetation factors, Computerized simulation, Data processing, Statistical analysis, United States—Montana.

47-2728
Rainfall-snowmelt peaks in a warmer climate.
Martinec, J., et al, Managing water resources during global change. Edited by R. Herrmann, Bethesda, MD, American Water Resources Association, 1992, p.195-202, 4 refs.
Rango, A., Roberts, R.
Snowmelt, Snow hydrology, Flood forecasting, Runoff forecasting, Rain, Global warming, Computerized simulation, Data processing, Statistical analysis, Canada—Rocky Mountains.

47-2729
Modeling watershed management for water augmentation.
Combs, S.T., et al, Managing water resources during global change. Edited by R. Herrmann, Bethesda, MD, American Water Resources Association, 1992, p.221-229, 18 refs.
Lindquist, D.S.
Snowmelt, Runoff forecasting, Snow hydrology, Water reserves, Regional planning, Watersheds, Computerized simulation, Data processing, United States—California—Sierra Nevada.

47-2730
Climate change impacts on Great Lakes water supplies.
Croley, T.E., II, Managing water resources during global change. Edited by R. Herrmann, Bethesda, MD, American Water Resources Association, 1992, p.241-250, 8 refs.
Snowmelt, Runoff forecasting, Snow hydrology, Water reserves, Global warming, Precipitation (meteorology), Computerized simulation, Data processing, Great Lakes.

47-2731
Effect of climate change on C:N pools in a boreal watershed ecosystem.
Stottlemyer, R., Managing water resources during global change. Edited by R. Herrmann, Bethesda, MD, American Water Resources Association, 1992, p.451-460, 21 refs.
Forest ecosystems, Nutrient cycle, Taiga, Global warming, Watersheds, Great Lakes.

47-2732
Influence of beaver and bogs on greenhouse gases at Voyageurs National Park.
Johnston, C.A., et al, Managing water resources during global change. Edited by R. Herrmann, Bethesda, MD, American Water Resources Association, 1992, p.471-479, 27 refs.
Updegraff, K., Bridgham, S., Pastor, J.
Forest ecosystems, Nutrient cycle, Taiga, Wetlands, Peat, Global warming, Soil air interface, Atmospheric composition, United States—Minnesota.

47-2733
Dynamics of plant communities related to global changes of climate.
Puzachenko, IU.G., Managing water resources during global change. Edited by R. Herrmann, Bethesda, MD, American Water Resources Association, 1992, p.481-487, 1 ref.
Forest ecosystems, Plant ecology, Global warming, Ground water, Vegetation patterns, Precipitation (meteorology), Environmental protection, USSR.

47-2734
Changes in glacier runoff due to climate change in the North Cascades, Washington.
Pelto, M.S., Managing water resources during global change. Edited by R. Herrmann, Bethesda, MD, American Water Resources Association, 1992, p.489-496, 10 refs.
Meltwater, Glacial hydrology, Runoff forecasting, Water reserves, Ice (water storage), Global warming, United States—Washington—Cascade Mountains.

47-2735
Acid deposition and global change research in Sequoia National Park: a case study of interagency cooperation.
Tonnessen, K.A., Managing water resources during global change. Edited by R. Herrmann, Bethesda, MD, American Water Resources Association, 1992, p.497-507, 32 refs.
Snowmelt, Snow hydrology, Hydrogeochemistry, Water chemistry, Air pollution, Water pollution, Global warming, Watersheds, United States—California - Sequoia National Park.

47-2736
Smoky futures, blurred visions: fire, boreal forests, and global warming forecasts.
Kadonaga, L., Managing water resources during global change. Edited by R. Herrmann, Bethesda, MD, American Water Resources Association, 1992, p.517-525, 41 refs.
Forest ecosystems, Global warming, Forest fires, Plant ecology, Taiga.

47-2737
Hydroclimate response to climate change in the Lake Tahoe basin.
Shelton, M.L., Managing water resources during global change. Edited by R. Herrmann, Bethesda, MD, American Water Resources Association, 1992, p.557-566, 15 refs.
Snowmelt, Global warming, Water balance, Snow hydrology, Runoff forecasting, Water pollution, United States—Tahoe, Lake.

47-2738
Influence of recent climate patterns on runoff in the Missinaibi River.
Camacho, F., et al, Managing water resources during global change. Edited by R. Herrmann, Bethesda, MD, American Water Resources Association, 1992, p.567-577, 6 refs.
Zielinski, P.A., Vascotto, G.L.
Runoff forecasting, Water reserves, Snowmelt, Snow hydrology, Global warming, River flow, Precipitation (meteorology), Computerized simulation, Statistical analysis, Canada—Ontario.

47-2739
Accumulation and melt characteristics of northeastern Sierra Nevada snowpacks.
Reece, B., et al, Managing water resources during global change. Edited by R. Herrmann, Bethesda, MD, American Water Resources Association, 1992, p.631-640, 10 refs.
Aguado, E.
Snowmelt, Snow hydrology, Snow accumulation, Snow surveys, Runoff forecasting, Water reserves, Stream flow, Global warming, United States—Sierra Nevada.

47-2740
Snow water content as a predictor of streamflow in the Sierra Nevada and Coast Ranges of California.
Riddle, L., et al, Managing water resources during global change. Edited by R. Herrmann, Bethesda, MD, American Water Resources Association, 1992, p.641-650, 14 refs.
Cayan, D.R., Aguado, E.
Snowmelt, Snow hydrology, Runoff forecasting, Snow surveys, Snow water content, Water reserves, Stream flow, Statistical analysis, United States—California.

47-2741
Simulation of precipitation in the Gunnison River basin using an orographic-precipitation model.
Hay, L.E., et al, Managing water resources during global change. Edited by R. Herrmann, Bethesda, MD, American Water Resources Association, 1992, p.651-660, 9 refs.
Branson, M.D., Leavesley, G.H.
Snowfall, Snow hydrology, Runoff forecasting, Precipitation (meteorology), Snow surveys, Alpine landscapes, Topographic effects, River basins, Water reserves, Computerized simulation, Data processing, United States—Colorado.

47-2742
Simulation of winter precipitation in western mountain watersheds with a local-scale model.
Medina, J.G., Managing water resources during global change. Edited by R. Herrmann, Bethesda, MD, American Water Resources Association, 1992, p.661-670, 17 refs.
Runoff forecasting, Precipitation (meteorology), Alpine landscapes, Topographic effects, River basins, Water reserves, Global warming, Atmospheric circulation, Computerized simulation, Data processing, Statistical analysis, United States—Colorado.

47-2743
Use of nested models to simulate regional orographic precipitation.
Matthews, D.A., et al, Managing water resources during global change. Edited by R. Herrmann, Bethesda, MD, American Water Resources Association, 1992, p.671-680, 14 refs.
Bates, G.T., Giorgi, F.
Runoff forecasting, Precipitation (meteorology), Alpine landscapes, Topographic effects, River basins, Water reserves, Global warming, Atmospheric circulation, Computerized simulation, Data processing, Statistical analysis, United States—Colorado.

47-2744
Climate-change scenarios for the Sierra Nevada, California, based on winter atmospheric-circulation patterns.
Dettinger, M.D., et al, Managing water resources during global change. Edited by R. Herrmann, Bethesda, MD, American Water Resources Association, 1992, p.681-690, 25 refs.
Cayan, D.R.
Precipitation (meteorology), Atmospheric circulation, Global warming, Runoff forecasting, River basins, Water reserves, Computerized simulation, Data processing, Statistical analysis, United States—Sierra Nevada.

47-2745
Using coupled atmospheric and hydrologic models to investigate the effects of climate change in mountainous regions.
Leavesley, G.H., et al, Managing water resources during global change. Edited by R. Herrmann, Bethesda, MD, American Water Resources Association, 1992, p.691-700, 13 refs.
Branson, M.D., Hay, L.E.
Runoff forecasting, Precipitation (meteorology), Alpine landscapes, Topographic effects, River basins, Water reserves, Global warming, Atmospheric circulation, Computerized simulation, Data processing, Statistical analysis.

47-2746
Evaluation of trends in runoff in the western United States.
Wahl, K.L., Managing water resources during global change. Edited by R. Herrmann, Bethesda, MD, American Water Resources Association, 1992, p.701-710, 14 refs.
Snowmelt, Snow hydrology, Runoff forecasting, Water reserves, Stream flow, Climatic changes, Data processing, Statistical analysis, United States.

47-2747
Atmospheric circulation and precipitation in the Sierra Nevada.
Cayan, D.R., et al, Managing water resources during global change. Edited by R. Herrmann, Bethesda, MD, American Water Resources Association, 1992, p.711-720, 23 refs.
Riddle, L.
Precipitation (meteorology), Atmospheric circulation, Runoff forecasting, Snowmelt, Snow hydrology, Water reserves, Stream flow, Global warming, Storms, Data processing, Statistical analysis, United States—Sierra Nevada.

47-2748
Use of regression models to estimate effects of climate change on seasonal streamflow in the American and Carson river basins, California-Nevada.
Duell, L.F.W., Jr., Managing water resources during global change. Edited by R. Herrmann, Bethesda, MD, American Water Resources Association, 1992, p.731-740, 7 refs.
Precipitation (meteorology), Runoff forecasting, Stream flow, Snowmelt, Snow hydrology, Water reserves, Global warming, River basins, Data processing, Statistical analysis, United States—Sierra Nevada.

47-2749
Transfer of watershed-model-parameter values to noncalibrated basins in the Gunnison River basin, Colorado.
Kuhn, G., et al, Managing water resources during global change. Edited by R. Herrmann, Bethesda, MD, American Water Resources Association, 1992, p.741-750, 8 refs.
Parker, R.S.
Precipitation (meteorology), Runoff forecasting, Stream flow, Snowmelt, Snow hydrology, Water reserves, Global warming, River basins, Watersheds, Computerized simulation, Data processing, Statistical analysis, United States—Colorado.

47-2750
Potential climate-change effects on bed-material entrainment, the Gunnison Gorge, Colorado.
Elliot, J.G., et al, Managing water resources during global change. Edited by R. Herrmann, Bethesda, MD, American Water Resources Association, 1992, p.751-759, 7 refs.
Parker, R.S.
Stream flow, Sediment transport, Alluvium, Water erosion, Flood forecasting, Snowmelt, Snow hydrology, Climatic changes, United States—Colorado.

47-2751
Subaru-Isuzu assembly plant floors.
Ayers, C., et al, *Concrete international*, June 1989, 11(6), P.23-27.
Bruce, R., Patel, K.P.
Winter concreting, Cold weather construction, Concrete placing, Performance, Concrete slabs, Floors, Design criteria.

47-2752
Quantitative analysis of sea ice remote sensing imagery.
Korsnes, R., *International journal of remote sensing*, Jan. 20, 1993, 14(2), p.295-311, 11 refs.
Sea ice distribution, Ice floes, Ice detection, Remote sensing, Data processing, Image processing, Analysis (mathematics), Ice conditions.

47-2753
Mathematical approach to the segmentation of sea-ice SAR images.
Korsnes, R., *International journal of remote sensing*, Jan. 20, 1993, 14(2), p.313-332, 17 refs.
Sea ice distribution, Ice conditions, Classifications, Spaceborne photography, Synthetic aperture radar, Image processing, Ice floes, Analysis (mathematics), Ice edge.

47-2754
Characterization of spatial statistics of distributed targets in SAR data.
Rignot, E.J., et al, *International journal of remote sensing*, Jan. 20, 1993, 14(2), p.345-363, 24 refs.
Kwok, R.
Remote sensing, Synthetic aperture radar, Sea ice distribution, Data processing, Statistical analysis, Image processing, Surface structure, Analysis (mathematics), Backscattering, Classifications.

47-2755
Optimization of an analytical method for determining white phosphorus in contaminated sediments.
Taylor, S., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, Dec. 1992, CR 92-21, 13p., ADA-261 333, 1 ref.
Walsh, M.E.
Laboratory techniques, Sediments, Soil pollution, Military operation.
An analytical method was optimized to determine the concentration of white phosphorus (WP) in sediments contaminated by smoke munitions. The method uses isooctane as the extractant and a gas chromatograph as the determinative instrument. Both field-contaminated samples and spiked sediments were analyzed and results on the spiked samples indicate that the method has a better than 80% recovery rate for WP. The detection limit for the method is 0.88 microg/kg of soil. The WP recovery is sensitive to the water content of the sediments and to prolonged shaking. Fluidizing the wet sediments by adding water to saturated soil greatly increases WP recovery. Since field samples are contaminated with WP particles of various sizes, subsamples may not accurately represent the concentration of the sample as a whole.

47-2756
Unsurfaced road maintenance management.
Eaton, R.A., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1992, SR 92-26, Var. p., ADA-262 015, 11 refs.
Beaucham, R.E.
Road maintenance, Military facilities.
This draft manual describes an unsurfaced road maintenance management system for use on military installations. This system is available in either a manual or computerized model (Micro PAVER). The maintenance standards prescribed should protect Government property with an economical and effective expenditure of maintenance funds commensurate with the functional requirements and the planned future use of the facilities. Because of limited maintenance funds, timely and rational determination of maintenance and repair (M&R) needs and priorities are very important factors. These factors can be determined by using the system as described in this draft manual. The use of the unsurfaced road maintenance management system by personnel who have the responsibility for unsurfaced road maintenance should assure uniform, economical, and satisfactory unsurfaced area maintenance and repair.

47-2757
Development of an airborne MMW FM-CW radar for mapping river ice.
Yankielun, N.E., et al. *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, Jan. 1993, CR 93-01, 10p., 17 refs.
Ferrick, M.G., Weyrick, P.B.
River ice, Remote sensing, Airborne radar, Ice cover thickness, Mapping, Ice spectroscopy.
Analyses of a river's freezeup ice cover stability and its breakup rely on detailed knowledge of the cover's thickness and the variability of that thickness. A high-resolution millimeter wave (26.5- to 40 GHz) Frequency Modulated-Continuous Wave radar with real-time data acquisition and digital signal processing and display capability was deployed from a low-flying (3-10 cm) helicopter to continuously acquire, process and display data during an ice thickness profiling survey of a 24 km study reach. A nominal sheet ice thickness of 50 cm, occasional areas of new ice sheet as thin as 5 cm, open leads, and massive ice accumulations of the order of 5 m thick were encountered. Radar profiling data agreed with ground truth from borehole measurements of the sheet ice, and provided a more detailed view of the ice conditions than that obtained from a low altitude video survey. The radar system provided rapid, safe and accurate data acquisition, allowing detailed mapping of the ice conditions throughout the reach.

47-2758
Geochemistry of soils of Spitsbergen.
Dobrovol'skiĭ, V.V., *Soviet soil science*, 1990(Pub. Mar. 91), 22(6), p.1-15, Translated from Pochvovedenie. 18 refs.
Geochemistry, Soil chemistry, Soil profiles, Cryogenic soils, Frozen ground chemistry, Peat, Meadow soils, Norway—Spitsbergen.

47-2759
Investigation of the effect of the freezing of a foundation on the bearing capacity of a rigid airfield pavement. [Issledovanie vliianiia promerzaniia gruntovogo osnovaniia na nesushchuiu sposobnost' zhestkikh aerodromnykh pokrytiĭ],
Onopa, I.A., et al, *Izvestiia vysshikh uchebnykh zavedeniĭ. Stroitel'stvo i arkhitektura*, Sep. 1990, No.9, p.96-101, In Russian. 10 refs.
Kul'chitskiĭ, V.A., Bychkov, V.R.
Bearing strength, Foundations, Airports, Pavement bases, Cold weather performance.

47-2760
Low temperature tests of unshaped truss joints with T-belts and a crossed grate of single angles. [Nizkotemperaturnye ispytaniia besfasonochnykh uzlov ferm s poiasami iz tavrov i perekrestnoĭ reshetkoĭ i odinochnykh ugolkov],
Volkov, V.V., *Izvestiia vysshikh uchebnykh zavedeniĭ. Stroitel'stvo i arkhitektura*, Sep. 1990, No.9, p.122-125, In Russian. 7 refs.
Low temperature tests, Joints (junctions).

47-2761
Theoretical basis for calculating the control of concrete curing in cold weather. [Teoreticheskie osnovy metodov rascheta rezhimov vyderzhivaniia betona v zimnikh usloviiakh],
Zubkov, V.I., *Izvestiia vysshikh uchebnykh zavedeniĭ. Stroitel'stvo i arkhitektura*, Oct. 1990, No.10, p.70-77, In Russian. 6 refs.
Analysis (mathematics), Concrete curing, Winter concreting.

47-2762
Analysis of stress losses in reinforcement depending on temperature drop. [Utochnenie poter' napriazheniia v armature ot temperaturnogo perepada],
Artym, I.T., *Izvestiia vysshikh uchebnykh zavedeniĭ. Stroitel'stvo i arkhitektura*, June 1990, No.6, p.115-117, In Russian. 3 refs.
Cold weather construction, Temperature effects, Reinforced concretes, Cold stress, Winter concreting.

47-2763
Investigation of antarctic sea ice concentration by means of selected algorithms.
Lomax, A.S., *U.S. Naval Academy. Report*, May 8, 1992, USNA TSPR-188, 102p., ADA-257 132, 40 refs.
Sea ice, Models, Polynyas, Temperature variations.
Changes in areal extent and concentration of sea ice around Antarctica may serve as sensitive indicators of global warming. A comparison study was conducted between the outputs of the three main algorithms currently in use (NASA Team, Comisco, and NORSEX) and a sea-ice model (Fine Resolution Antarctic Model). Data from the DMSP Special Sensor Microwave/Imager (SSM/I) were used as input algorithms for the time frame July 1987 to June 1990. Large disparities are apparent when comparing the NASA algorithm with the Comisco and NORSEX algorithms. Very large differences, some higher than 30%, exist in the marginal ice zones, along the coast, and in the Weddell and Ross Seas. Heat fluxes through recurring polynyas were calculated to quantify further differences in the algorithms; however, no conclusive patterns were apparent. No significant change in the extent or area of the ice pack occurred from July 1987 through June 1990. (Auth.)

47-2764
Snow versus rain: looking beyond the "magic" numbers.
Heppner, P.O.G., *Weather and forecasting*, Dec. 1992, 7(4), p.683-691, 17 refs.
Precipitation (meteorology), Synoptic meteorology, Weather forecasting, Atmospheric density, Static stability, Snowfall, Rain, Temperature effects, Meteorological factors, Accuracy.

47-2765
Snow: a skimpy year.
Ludlum, D.M., *Weatherwise*, Feb.-Mar. 1993, 46(1), p.38-41.
Weather observations, Snowfall, Snow accumulation, Seasonal variations, Meteorological data.

47-2766
Temperature extremes.
Hickcox, D.H., *Weatherwise*, Feb.-Mar. 1993, 46(1), p.42-46.
Weather observations, Air temperature, Temperature variations, Seasonal variations, Records (extremes), Meteorological data.

47-2767
Comparison of correlations to describe natural convection heat transfer to a melting ice object.
Jakubowski, G.S., et al, Winter Meeting of the American Society of Mechanical Engineers, Atlanta, GA, Dec. 1-6, 1991. Fundamentals of forced and mixed convection and transport phenomena. Edited by M.A. Ebadian et al, New York, American Society of Mechanical Engineers, 1991, p.41-48, HTD-Vol.180, 17 refs.
Janna, W.S.
DLC TH260.A415
Ice melting, Ice air interface, Convection, Heat transfer coefficient, Ice volume, Analysis (mathematics), Correlation.

47-2768
Comparison of in-cloud measurements obtained with six PMS 2D-C probes.
Gayet, J.F., et al, *Journal of atmospheric and oceanic technology*, Apr. 1993, 10(2), p.180-194, 22 refs.
Brown, P.R.A., Albers, F.
Aerial surveys, Clouds (meteorology), Probes, Sampling, Ice crystals, Performance, Correlation, Particle size distribution, Accuracy, Atmospheric composition.

47-2769
Outline of stratigraphy of the Pleistocene and the Holocene in south and central Spitsbergen.
Lindner, L., et al, *Polish Academy of Sciences. Bulletin. Earth sciences*, 1991, 39(2), p.165-172, 36 refs.
Marks, L.
Quaternary deposits, Stratigraphy, Glacial deposits, Marine deposits, Marine geology, Age determination, Glaciation, Pleistocene, Glacier oscillation.

47-2770
Narew Gorge near Łomża and its role as fragment of the Warsaw-Berlin ice-marginal valley (north-eastern Poland).
Musiał, A., et al, *Polish Academy of Sciences. Bulletin. Earth sciences*, 1987, 35(2), p.97-109, With Russian summary. 38 refs.
Straszewska, K.
Glacial geology, Glacial erosion, Valleys, Pleistocene, Geomorphology, Soil analysis.

47-2771
Ozone depletion over the polar caps caused by solar protons.
Stephenson, J.A.E., et al, *Geophysical research letters*, Dec. 24, 1992, 12(24), p.2425-2428, 11 refs.
Scourfield, M.W.J.
Ozone, Solar activity, Atmospheric composition, Polar regions.
Energetic solar protons are a natural source of ozone depletion due to the nitric oxides they produce in the earth's atmosphere. In Mar. 1989, following a period of intense solar activity, the TOMS instrument aboard the Nimbus 7 satellite recorded very similar ozone losses over both polar caps for areas extending from 90 to 70 degs. Ozone depletions of 7.4 G kg for the south polar cap and 8.0 G kg for the north polar cap indicate the degree of symmetry over the polar caps. (Auth.)

47-2772
On the dielectric properties of dry snow in the 800 MHz to 13 GHz range.
Nyfors, E., *Helsinki University of Technology. Radio Laboratory. Report*, 1982, S-135, 17p., 10 refs.
Snow surveys, Snow electrical properties, Dielectric properties, Snow density, Snow temperature, Snow water content, Mathematical models.

47-2773
Diatoms from ice-rafted sediment collected from the Beaufort Sea, arctic Alaska.
Barron, J.A., *U.S. Geological Survey. Open-file report*, 1992, No.92-439, 16p., 17 refs.
Ice rafting, Bottom sediment, Ocean bottom, Marine deposits, Plankton, Algae, Beaufort Sea.

47-2774
Iceberg production in the Prince William Sound area.
Long, W.E., *Alaska. Division of Geological and Geophysical Surveys. Public-data file*, Sep. 1992, No.92-20, 5p., 9 refs.
Icebergs, Calving, Ice volume, United States—Alaska—Prince William Sound.

47-2775
New approach to shale compaction and stratigraphic restoration, Beaufort-Mackenzie basin and Mackenzie corridor, northern Canada.
Issler, D.R., *American Association of Petroleum Geologists. Bulletin*, Aug. 1992, 76(8), p.1170-1189, 61 refs.
Clays, Stratigraphy, Exploration, Well logging, Sedimentation, Soil dating, Soil erosion, Soil pressure, Porosity, Alluvium, Marine deposits, Sound transmission, Canada—Northwest Territories—Mackenzie River Delta, Canada—Northwest Territories—Fort Norman.

47-2776
Water resources data for Alaska, water year 1991.
Lamke, R.D., et al, *U.S. Geological Survey. Water-data report*, 1992, AK-91-1, 415p., PB93-132512, Refs. passim.
Kemnitz, R.T., Carr, M.R., Thomas, D.S., Novcaski, K.M.
Water reserves, Runoff, Hydrology, River flow, Water level, Water chemistry, Surface waters, Ground water, Suspended sediments, Flow rate, United States—Alaska.

47-2777
Guidelines for determining flood flow frequency. *U.S. Geological Survey. Interagency Advisory Committee on Water Data. Hydrology Subcommittee. Bulletin*, 1982, No.17B, 28p. + appends., PB86-157278, 43 refs.
Flood forecasting, Watersheds, Floodplains, Hydrology, River flow, Data processing, Statistical analysis.

47-2778
New England's disastrous weather.
Watson, B., ed, Emmaus, PA, Yankee Books, 1990, 228p.
Snowstorms, History, Storms, Records (extremes), Floods, Accidents, United States—New England.

47-2779
Ecological aspects in the design of low-rise housing in Siberia. [Ekologicheskie aspekty proektirovaniia maloetazhnoĭ zastroĭki v Sibiri],
Baklanova, E.I., *Izvestiia vysshikh uchebnykh zavedeniĭ. Stroitel'stvo*, Nov.-Dec. 1992, No.11-12, p.125-131, In Russian. 5 refs.
Ecology, Houses, Design criteria, Cold weather construction, USSR—Siberia.

47-2780
Optimization of deicer application zone based on industrial wastes. [Optimizatsiia zon primeneniia protivogololednykh materialov na osnove otkhodov promyshlennosti],
Prusenko, E.D., *Izvestiia vysshikh uchebnykh zavedeniĭ. Stroitel'stvo*, Sep.-Oct. 1992, No.9-10, p.96-100, In Russian. 2 refs.
Ice removal, Ice prevention, Analysis (mathematics), Wastes.

47-2781
Formation of snow cover on roofs of industrial buildings in Yakutia. [Formirovanie snegovogo pokrova na pokrytiiakh promyshlennykh zdaniĭ IAkutii],
Filippov, V.V., et al, *Izvestiia vysshikh uchebykh zavedeniĭ. Stroitel'stvo*, Sep.-Oct. 1992, No.9-10, p.136-138, In Russian.
Kornilov, T.A., Kopylov, A.T.
Snow cover effect, Industrial buildings, Roofs, Snow loads, USSR—Yakutia.

47-2782
Ice sheet glaciations in Northern Eurasia and their role in the history of the ocean. [Pokrovnye oledeneniia Severnoĭ Evrazii i ikh rol' v istorii okeana],
Grosval'd, M.G., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, 1991, Vol.71, p.3-15, In Russian with English summary. 36 refs.
Glebova, L.N.
Pleistocene, Ice shelves, Ice cover, Oceanography, Glaciation, Arctic Ocean.

47-2783
Asymptotic analysis of the flow of ice sheets. [Asimptoticheskiĭ analiz techeniia lednikovykh shchitov].
Mazo, A.B., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanìi*, 1991, Vol.71, p.17-22. In Russian with English summary. 12 refs.
Mathematical models, Ice cover, Ice mechanics, Ice shelves, Glacier flow.

47-2784
Studies of the relationship of thermophysical properties of ice to hydrostatic pressure and temperature. [Issledovaniia zavisimosti teplofizicheskikh kharakteristik l'da ot gidrostaticheskogo davleniia i temperatury].
Zotikov, I.A., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanìi*, 1991, Vol.71, p.22-27. In Russian with English summary. 7 refs.
Nikolenko, A.V.
Ice temperature, Ice thermal properties, Boreholes, Thermal conductivity, Antarctica—Vostok Station.
The results of experimental studies on thermophysical properties of ice obtained from deep boreholes of Vostok Station are presented. The temperature conductivity of snow was determined by the "regular regime" method, with the use of cylindrical calorimeters, making it possible to create high hydrostatic pressure in the studied ice samples. The experiments were conducted under pressures of 0 to -9.8 MPa at temperatures of -30 and -35 C. It is shown that thermal conductivity of ice increases with pressure. The first experimental formulae relating thermal conductivity of glacier ice to pressure and temperature have been obtained. (Auth.)

47-2785
Evaporation of snow under isothermal conditions. [Isparenie snega v izotermicheskikh usloviiakh].
Golubev, V.N., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanìi*, 1991, Vol.71, p.27-32. In Russian with English summary. 19 refs.
Sokratov, S.A.
Snow evaporation, Ice sublimation, Water vapor, Saturation, Cold chambers.

47-2786
Estimating glacier-derived runoff from mountain rivers in model predictions. [Otsenka lednikovogo stoka gornykh rek v zadache prognoza na osnove modeliĭ].
Shentsis, I.D., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanìi*, 1991, Vol.71, p.32-40. In Russian with English summary. 10 refs.
Runoff forecasting, Glacial rivers, Mathematical models, Snow line, Glacier melting, Snowmelt, Meltwater, Water supply.

47-2787
Volumetric hydrothermal state and regime of Spitsbergen glaciers based on data from airborne radio echo sounding. [Ob'emnoe gidrotermicheskoe sostoianie i rezhim lednikov Shpitsbergena po dannym aeroradiozondirovaniia].
Macheret, IU.IA., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanìi*, 1991, Vol.71, p.40-53. In Russian with English summary. 25 refs.
Bobrova, L.I., Sankina, L.V.
Glacier surveys, Hydrothermal processes, Thermal regime, Glacier thickness, Glacier surges, Radio echo soundings, Airborne radar, Norway—Spitsbergen, Norway—Svalbard.

47-2788
Reflection of 20th-century climatic warming in the glacier cores of Nordauslandet. [Otrazhenie potepleniia klimata v XX veke v kernakh lednikov na Severo-Vostochnoĭ Zemle].
Sin'kevich, S.A., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanìi*, 1991, Vol.71, p.53-59. In Russian with English summary. 22 refs.
Climatic changes, Global change, Global warming, Ice cores, Air temperature, Norway—Svalbard.

47-2789
Erosive-accumulative activity of glaciers of northern Tien Shan during the Little Ice Age. [Erozionno-akkumuliativnaia deiatel'nost' lednikov Severnogo Tian'-Shania v malom lednikovom periode].
Orlov, A.V., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanìi*, 1991, Vol.71, p.59-65. In Russian with English summary. 8 refs.
Glacier ablation, Glacier alimentation, Glacial erosion, Glacier oscillation, USSR—Tien Shan.

47-2790
Submarine cryolithogenesis in the Arctic. [Submarinnyĭ kriolitogenez v Arktike].
Shpolianskaia, N.A., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanìi*, 1991, Vol.71, p.65-70. In Russian with English summary. 19 refs.
Bottom sediment, Ocean bottom, Geocryology, Marine geology, Ice formation.

47-2791
Mass balance fluctuations of the Sary-Tor Glacier in inner Tien Shan and its reconstruction for 1930-1988. [Kolebaniia balansa massy lednika Sary-Tor vo vnutrennem Tian'-Shane i ego rekonstruktsiia za 1930-1988 gg.].
Ushnurtsev, S.N., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanìi*, 1991, Vol.71, p.70-80. In Russian with English summary. 12 refs.
Glacier mass balance, Glacier oscillation, Glacier ablation, USSR—Tien Shan.

47-2792
Reconstruction of humidification conditions of eastern Issyk-Kul' areas for the last 390 years from dendrochronological data. [Rekonstruktsiia usloviĭ uvlazheniia vostochnogo priissykkul'ia za poslednie 390 let po dendrokhronologicheskim dannym].
Mel'nikova, N.G., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanìi*, 1991, Vol.71, p.80-86. In Russian with English summary. 13 refs.
Solomina, O.N.
Humidity, Age determination, Glacier oscillation, USSR—Issyk-Kul'.

47-2793
Estimating avalanche hazard in the territory of Afghanistan. [Otsenka lavinnoĭ opasnosti territorii Afganistana].
Kravtsova, V.I., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanìi*, 1991, Vol.71, p.86-93. In Russian with English summary. 10 refs.
Bondareva, T.A.
Avalanche formation, Avalanche forecasting, Mapping, Snow water equivalent, Snow depth, Snow cover, Afghanistan.

47-2794
Water-snow flows in the Khibiny Mountains. [Vodosnezhnye potoki v Khibinakh].
Sapunov, V.N., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanìi*, 1991, Vol.71, p.94-99. In Russian with English summary. 10 refs.
Snowmelt, Meltwater, Water flow, Mudflows, Countermeasures, USSR—Khibiny Mountains.

47-2795
Characteristics of climate and glacier ablation in the intertropical Andes. [Osobennosti klimata i abliatsii lednikov vnutritropicheskikh And].
Kadomtseva, T.G., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanìi*, 1991, Vol.71, p.99-107. In Russian with English summary. 28 refs.
Lebedeva, I.M.
Glacier ablation, Glacier mass balance, Glacier alimentation, Analysis (mathematics), Climatic factors, Andes.

47-2796
Isotopic pleiad of oxygen in atmospheric precipitation in the polar regions. [Izotopnaia pleiada kisloroda v atmosfernykh osadkakh poliarnykh].
Nikolaev, V.I., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanìi*, 1991, Vol.71, p.109-112. In Russian with English summary. 14 refs.
Strizhov, V.P., Velivetskaia, T.A.
Oxygen isotopes, Ocean currents, Precipitation (meteorology), Firn, Ice composition, Snow composition, USSR—Severnaya Zemlya, Greenland, USSR.
Studies of isotope composition of the *delta*O-17 and *delta*O-18 oxygen in snow, firn and ice of Antarctica, Greenland and Severnaya Zemlya have been conducted. The tests characterize atmospheric precipitation in high latitudes of the present time, as well as of the Little Ice Age, the Early Holocene thermic optimum, the boundaries of the Pleistocene and Holocene, the Late Ice Age, the Last Interglaciation Period and the maximum of the Pleistocene Glaciation. The experimental data correspond to the theoretical straight line *delta*O-17 = 0.52 *delta*O-18, and testify to the absence of mass-independent fractioning of oxygen isotopes in the global circulation of water. (Auth. mod.)

47-2797
Non-linear model of the structural transformations of a snow sequence. [Nelineĭnaia model' strukturnykh preobrazovaniĭ snezhnoĭ tolshchi].
Samolliuk, V.I., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanìi*, 1991, Vol.71, p.112-115. In Russian with English summary. 5 refs.
Parpura, V.A.
Mathematical models, Snow cover structure, Avalanche forecasting, Avalanche formation.

47-2798
Thermal nonequilibrium of freezing bodies of water with the environment. [Teplovaia neravnovesnost' zamerzaiushchikh vodoemov i vneshneĭ sredy].
Faĭko, L.I., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanìi*, 1991, Vol.71, p.115-118. In Russian with English summary. 8 refs.
Water temperature, Floating ice, Ice water interface, Heat transfer, Heat balance, Phase transformations, Permafrost heat balance, Permafrost heat transfer.

47-2799
Air inclusions as an index of ice formation conditions on polar glaciers. [Vozdushnye vkliucheniia kak pokazatel' usloviĭ l'doobrazovaniia na poliarnykh lednikakh].
Samoĭlov, O.IU., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanìi*, 1991, Vol.71, p.118-121. In Russian with English summary. 8 refs.
Glacier ice, Ice formation indicators, Bubbles, Firn, Glacier ablation, Ice formation, Temperature effects, Air temperature, Paleoclimatology, Norway—Spitsbergen.
The results of infiltration ice studies in the firn sequences of Spitsbergen glaciers have shown that texture peculiarities of this type of ice are caused by the effect of temperature gradients occurring in the glacier sequence in periods of ablation. The interrelations between the values of temperature gradients in snow-firn sequences and changes in the mean winter and mean annual temperatures of the air near the glacier surface are analyzed at the hypothetical level. Analytical expressions are given for the relation of autogenous air inclusions in infiltration ice to the mean annual temperature of the air and the temperature at the lower boundary of the active layer of glaciers, which can be used for paleoclimatic reconstructions. (Auth.)

47-2800
Characteristics of the spatial structure of subsurface ice in the vicinity of Vostok Station, Antarctica. [Osobennosti prostranstvennogo stroeniia glubinnogo l'da v raĭone stantsii Vostok, Antarktida].
Chashchinov, IU.M., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanìi*, 1991, Vol.71, p.121-125. In Russian with English summary. 16 refs.
Rakhmanov, A.E.
Ground ice, Subsurface investigations, Ice structure, Ice deformation, Ice physics, Antarctica—Vostok Station.
Investigations of the orientation of optical axes of ice grains in the area of Vostok Station have been analyzed from the point of view of symmetry. It is concluded that processes of plastic deformation and recrystallization develop in the interval of 0-650 m, while the process of plastic deformation, caused by the strained state of the shift proper, dominate at greater depths. Analysis of the changes in structural-tectonic parameters of ice, with due regard to empirical rules of metallurgy, makes it possible to obtain information on physical processes developing in the body of glaciers, and consequently, to predict physical properties of materials. (Auth.)

47-2801
Current tendencies of anthropogenic changes in physical-mechanical properties of natural ice. [Sovremennye tendentsii antropogennykh izmeneniĭ fiziko-mekhanicheskikh svoĭstv prirodnykh l'dov].
Paniushkin, A.V., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanìi*, 1991, Vol.71, p.126-129. In Russian with English summary. 12 refs.
Kytin, IU.A., Sergacheva, N.A.
Ice strength, Ice mechanics, Ice physics, Impurities, Water pollution, Lake ice, River ice, USSR—Neva River, USSR—Ladoga, Lake, Finland, Gulf.

47-2802
Chemical composition of snow cover on drifting ice in the Arctic. [O khimicheskom sostave snezhnogo pokrova dreĭfuiushchikh l'dov Arktiki].
Bardin, V.I., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanìi*, 1991, Vol.71, p.129-135. In Russian with English summary. 7 refs.
Snow composition, Snow cover, Snow ice interface, Geochemistry, Sea ice, Arctic Ocean.

47-2803
Interrelation between the altitude of the equilibrium line, air temperature, and runoff in the Sary-Tor Glacier, inner Tien Shan. [Sviaz' vysoty granits pitaniia, temperatury vozdukha i stoka v basefne lednika Sary-tor, vnutrennii Tian'-Shan'].
Diurgerov, M.B., et al. *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, 1991, Vol.71, p.136-139, In Russian with English summary. 9 refs.
Ushnurtsev, S.N., Chichagov, A.V.
Air temperature, Glacier mass balance, Glacier melting, Runoff, Mountain glaciers, Glacier ablation, USSR—Tien Shan.

47-2804
Using structural-petrographic analysis for studying glacier movement. [Ispol'zovanie strukturno-petrograficheskogo analiza dlia izucheniia dvizheniia lednikov].
Golubev, V.N., et al. *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, 1991, Vol.71, p.139-143, In Russian with English summary. 8 refs.
Sazonov, A.V., Fedorova, L.E., Kunin, I.V.
Glacier oscillation, Glacier ablation, Glacier alimentation, Moraines.

47-2805
Studies of the tidewater Hansbreen Glacier on Spitsbergen. [Issledovaniia prilivnogo lednika Khansa na Shpitsbergene].
Glazovskii, A.F., et al. *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, 1991, Vol.71, p.143-149, In Russian with English summary. 9 refs.
Kolondra, L., Moskalevskii, M.IU., IAniia, IA.
Glacier ablation, Glacier mass balance, Glacial hydrology, Geodetic surveys, Norway—Spitsbergen.

47-2806
Southern boundary of the last Kara ice sheet. [O iuzhnoi granitse poslednego Karskogo lednikovogo shchita].
Grosval'd, M.G., et al. *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, 1991, Vol.71, p.154-159, In Russian with English summary. 13 refs.
Goncharov, S.V.
Pleistocene, Moraines, Glacial deposits, Geomorphology, Glaciers.

47-2807
Dendro-indication of climatic conditions in the areas of glaciation in the polar Urals and southern Tien-Shan. [Dendroindikatsiia klimaticheskikh uslovii v raionakh oledeneniia Poliarnogo Urala i iuzhnogo Tian'- Shania].
Adamenko, V.N., et al. *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, 1991, Vol.71, p.159-164, In Russian with English summary. 10 refs.
IUrchenko, IU.A.
Age determination, Paleoclimatology, Climatic changes.

47-2808
Drilling boreholes in glacial and subglacial rocks, with core selection by an electromechanical drill on a load- bearing cable. [Burenie skvazhin s otborom kerna elektromekhanicheskim snariadom na gruzonesushchem kabele v lednikovykh i podlednikovykh porodakh].
Kudriashov, B.B., et al. *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, 1991, Vol.71, p.165-170, In Russian with English summary. 12 refs.
Chistiakov, V.K., Vasil'ev, N.I., Talalai, P.G.
Boreholes, Rock drilling, Ice coring drills, Frozen rock temperature, Ice cores, Rock glaciers, Glacier beds, Electric equipment, USSR—Severnaya Zemlya.

47-2809
Using field methods to determine strength properties of snow. [K ispol'zovaniiu metodov polevogo opredeleniia prochnostnykh kharakteristik snega].
Samoilov, R.S., et al. *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, 1991, Vol.71, p.170-177, In Russian with English summary. 21 refs.
Ermakov, K.K.
Snow strength, Nomographs, Snow density, Snow depth.

47-2810
Evaluating the cost of anti-avalanche measures. [Otsenka zatrat na protivolavinnye meropriiatiia].
Blagoveshchenskii, V.P., et al. *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, 1991, Vol.71, p.179-186, In Russian with English summary. 7 refs.
Severskii, I.V.
Countermeasures, Avalanche forecasting, Construction, Cost analysis, Mapping.

47-2811
Glaciological examination—a necessary phase of developing arctic and subarctic regions. [Gliatsiologicheskaia ekspertiza—neobkhodimyi etap osvoeniia gornykh arkticheskikh i subarkticheskikh regionov].
Il'ina, E.A., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, 1991, Vol.71, p.186-190, In Russian with English summary. 16 refs.
Economic development, Nival relief, Spaceborne photography, Data processing, Models.

47-2812
Studying the friction and adhesive properties of snow. [K issledovaniiu friktsionnykh i adgezionnykh svoistv snega].
Ermakov, K.K., et al. *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, 1991, Vol.71, p.191-195, In Russian with English summary. 8 refs.
Samoilov, R.S.
Snow mechanics, Plastics snow friction, Adhesion, Polymers, Skis, Sleds.

47-2813
Mapping avalanche hazard areas in the USSR. [Kartografirovanie lavinoopasnosti v SSSR].
Kanaev, L.A., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, 1991, Vol.71, p.196-210, In Russian with English summary. 24 refs.
Avalanche forecasting, Mapping, Avalanche formation.

47-2814
Mass balance and fluctuations of glaciers in the USSR, 1985-1987. [Balans massy i kolebaniia lednikov v SSSR v 1985-1987 gg.], *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, 1991, Vol.71, p.211-222, In Russian.
Glacier mass balance, Glacier oscillation, Glacier surveys.

47-2815
Working session and seminar of the Glaciology Section, autumn 1990. [Rabochee soveshchanie i shkola-seminar sektsii gliatsiologii osen'iu 1990 g.],
Ushakov, A.I., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, 1991, Vol.71, p.223-230, In Russian.
Glaciology, Research projects, Meetings.

47-2816
Fourteenth session of the Editorial Board of the "Atlas of Snow and Ice Resources of the World". [Chetyrnadtsatoe zasedanie redkollegii Atlasa snezhno-ledovykh resursov mira],
Dreier, N.N., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, 1991, Vol.71, p.231-232, In Russian.
Meetings, Maps.

47-2817
[Response of authors to commentary on their "Reconstruction of the Holocene climate from the results of ice core studies on the Vavilov Dome, Severnaya Zemlya"].
Barkov, N.I., et al. *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, 1991, Vol.71, p.233-236, In Russian. 16 refs. See 45-1043 for original article. See Materialy gliatsiologicheskikh issledovanii, vol.70, p.242 for commentary.
Nikolaev, V.I.
Ice cores, Climatology, Moisture, Glaciation, USSR—Severnaya Zemlya.

47-2818
Yukon Territory snow survey bulletin and water supply forecast, March 1, 1993.
Canada. Indian and Northern Affairs. Water Resources Division, Whitehorse, 1993, 27p.
Snow surveys, Runoff forecasting, Snow depth, Snow water equivalent, Stream flow, Canada—Yukon Territory.

47-2819
My old friends—avalanches (part 3).
Roch, A., *Avalanche review*, Feb. 1993, 11(4), p.2-3, 5 refs.
Avalanche mechanics, Avalanche triggering, Avalanche forecasting, Snow cover stability, Accidents.

47-2820
Effects of explosives on the mountain snowpack.
Ueland, J., *Avalanche review*, Feb. 1993, 11(4), p.4-5, 2 refs.
Avalanche triggering, Blasting, Snow cover stability, Explosives, Explosion effects, Detonation waves.

47-2821
"Ice" beneath the deep sea: studies of methane hydrate layers beneath the continental slope off Vancouver Island.
Hyndman, R.D., *Geoscience Canada*, Mar. 1992, 19(1), p.21-26, 26 refs.
Bottom sediment, Hydrates, Natural gas, Ocean bottom, Mud, Clathrates, Hydrocarbons, Fuels, Global warming, Seismic reflection.

47-2822
Gardermoen Project, 1992-94. Introductory report. Literature review and project catalogue.
Englund, J.O., ed, Research programme "Miljö i Grunnen." The environment of the subsurface. Part I. Oslo, Norwegian National Committee for Hydrology, 1992, Var. p., Refs. passim. For selected papers see 47-2823 through 47-2828.
Moseid, T., ed.
Ground water, Soil pollution, Environmental impact, Hydrogeology, Chemical ice prevention, Airports, Research projects, Norway.

47-2823
Hydrogeology at Romerike.
Jörgensen, P., et al, Gardermoen Project, 1992-94, Oslo, Norwegian National Committee for Hydrology, 1992, p.3/1-3/10, 13 refs.
Östmo, S.R.
Ground water, Hydrogeology, Snowmelt, Water balance, Seepage, Evapotranspiration, Norway.

47-2824
Geologic modeling of glacial fan deltas.
Tuttle, K.J., Gardermoen Project, 1992-94, Oslo, Norwegian National Committee for Hydrology, 1992, p.4/1-4/13, 30 refs.
Glacial deposits, Outwash, Alluvium, Sediment transport, Subglacial drainage, Glacial rivers, Deltas.

47-2825
Contaminants in the Gardermoen areal.
Snekkerbakken, A.M., Gardermoen Project, 1992-94, Oslo, Norwegian National Committee for Hydrology, 1992, p.6/1-6/5, 8 refs.
Soil pollution, Chemical ice prevention, Airports, Ground water, Environmental impact, Norway.

47-2826
Contaminants which will be studied in this project.
Breedveld, G.D., et al, Gardermoen Project, 1992-94, Oslo, Norwegian National Committee for Hydrology, 1992, p.7/1-7/14, 35 refs.
Laake, M., Englund, J.O.
Soil pollution, Chemical ice prevention, Airports, Ground water, Environmental impact.

47-2827
Biodegradation of organic pollutants in soil and groundwater.
Breedveld, G.D., et al, Gardermoen Project, 1992-94, Oslo, Norwegian National Committee for Hydrology, 1992, p.15/1-15/13, 25 refs.
Laake, M.
Soil pollution, Ground water, Chemical ice prevention, Airports, Soil microbiology, Waste treatment, Environmental impact.

47-2828
Modeling of contaminant transport.
Englund, J.O., et al, Gardermoen Project, 1992-94, Oslo, Norwegian National Committee for Hydrology, 1992, p.17/1-17/12, 31 refs.
Leijnse, A.
Soil pollution, Ground water, Chemical ice prevention, Soil chemistry, Airports, Environmental impact.

47-2829
Landsat Thematic Mapper (TM) derived reflectance from a mountainous watershed during the snow melt season.
Winther, J.G., *Nordic hydrology*, 1992, Vol.23, p.273-290, 27 refs. For another version see 47-1979.
Snow surveys, Snow cover distribution, Snow surface, Albedo, Alpine landscapes, Watersheds, Terrain identification, Spaceborne photography, Photointerpretation.

47-2830
Use of digital geographical databases in hydrological modelling.
Nordic Workshop, Linköping, Sweden, Nov. 9-10, 1992. Nordic Hydrological Programme. NHP report, No.32, Oslo, 1993, 158p., In English, Swedish, and Danish. Refs. passim.
Andersson, L., ed, Hassel, K.A., ed.
Data processing, Organizations, Hydrology, Water reserves, Regional planning, Research projects.

47-2831
Start of a glacial.
Kukla, G.J., ed, NATO Advanced Science Institutes, ASI Series I, Global Environmental Change, Vol.3, Berlin, Springer-Verlag, 1992, 353p., Refs. passim.
Proceedings of the NATO Advanced Research Workshop on Correlating Records of the Past, Cabo Blanco, Mallorca, Spain, Apr. 4-10, 1991. For selected papers see 47-2832 through 47-2842.
Went, E., ed.
Paleoclimatology, Glaciation, Global change, Geochronology, Pleistocene, Bottom sediment, Marine deposits, Quaternary deposits, Ocean bottom, Ice age theory, Ice sheets, Glacier oscillation.

47-2832
Interglacial-glacial transitions.
Kukla, G.J., et al, Start of a glacial. Edited by G.J. Kukla and E. Went, Berlin, Springer-Verlag, 1992, p.1-13, Refs. p.7-12.
Paleoclimatology, Glaciation, Pleistocene, Geochronology, Glacier oscillation, Global change.

47-2833
Interglacial to glacial climatic change: observations from selected Colombian pollen records.
Hooghiemstra, H., et al, Start of a glacial. Edited by G.J. Kukla and E. Went, Berlin, Springer-Verlag, 1992, p.71-84, 11 refs.
Ran, E.T.H.
Paleoclimatology, Alpine glaciation, Lacustrine deposits, Pollen, Forest lines, Pleistocene, Quaternary deposits, Colombia.

47-2834
Marine palynology of interglacial-glacial transitions.
Dupont, L.M., Start of a glacial. Edited by G.J. Kukla and E. Went, Berlin, Springer-Verlag, 1992, p.137-155, 57 refs.
Paleoclimatology, Marine deposits, Bottom sediment, Global change, Pollen, Pleistocene, Ocean bottom, Quaternary deposits, Drill core analysis, Geochronology, Glaciation.

47-2835
Norwegian Sea record of the last interglacial to glacial transition.
Duplessy, J.C., et al, Start of a glacial. Edited by G.J. Kukla and E. Went, Berlin, Springer-Verlag, 1992, p.173-183, 26 refs.
Labeyrie, L.
Paleoclimatology, Marine deposits, Bottom sediment, Quaternary deposits, Pleistocene, Ocean bottom, Drill core analysis, Isotope analysis, Geochronology, Glaciation, Glacier oscillation, Norwegian Sea.

47-2836
Abrupt color changes in isotope stage 5 in North Atlantic deep sea cores: implications for rapid change of climate-driven events.
Bond, G., et al, Start of a glacial. Edited by G.J. Kukla and E. Went, Berlin, Springer-Verlag, 1992, p.185-205, 12 refs.
Broecker, W.S., Lotti, R., McManus, J.
Paleoclimatology, Marine deposits, Bottom sediment, Global change, Quaternary deposits, Pleistocene, Ocean bottom, Drill core analysis, Isotope analysis, Geochronology, Glaciation, Glacier oscillation.

47-2837
Global climate change: a three million year perspective.
Raymo, M.E., Start of a glacial. Edited by G.J. Kukla and E. Went, Berlin, Springer-Verlag, 1992, p.207-223, 48 refs.
Paleoclimatology, Marine deposits, Bottom sediment, Global change, Pleistocene, Ocean bottom, Drill core analysis, Isotope analysis, Geochronology, Glaciation, Glacier oscillation.

47-2838
Transition from the Sangamon interglaciation to the Wisconsin glaciation along the southeastern margin of the Laurentide ice sheet, North America.
Dreimanis, A., Start of a glacial. Edited by G.J. Kukla and E. Went, Berlin, Springer-Verlag, 1992, p.225-251, 53 refs.
Paleoclimatology, Glaciation, Global change, Quaternary deposits, Stratigraphy, Geochronology, Pleistocene, Ice sheets, Glacier oscillation.

47-2839
Caspian transgression as an indicator of the interglacial-glacial transition.
Zubakov, V.A., Start of a glacial. Edited by G.J. Kukla and E. Went, Berlin, Springer-Verlag, 1992, p.253-271, 39 refs.
Paleoclimatology, Glaciation, Global change, Sea level, Marine deposits, Stratigraphy, Geochronology, Ice sheets, Glacier oscillation, Caspian Sea, Black Sea.

47-2840
Working hypotheses for glaciation/deglaciation mechanisms.
Oeschger, H., Start of a glacial. Edited by G.J. Kukla and E. Went, Berlin, Springer-Verlag, 1992, p.273-289, 17 refs.
Paleoclimatology, Glaciation, Global change, Ice age theory, Geochronology, Ocean currents, Ice cores, Ice sheets, Glacier oscillation.
Ice cores from Greenland and from Vostok and Byrd stations in Antarctica for the last 150,000 years indicate that a cold climate state occurs when North Atlantic deep water formation (NADWF) is turned off and a mild climate state when NADWF is turned on. In both Antarctica and Greenland, the latest initial warming trend began about 13,000 years ago, but fewer and less abrupt oscillations appear in the antarctic cores than in the Greenland cores. Variations in CO2, CH4, and temperature closely parallel each other. The main deglaciations in Antarctica, 145-135,000 years B.P. and 15-10,000 years B.P., show a rise in CO2 from 220-240 ppm to 260-280 ppm.

47-2841
Recent temperature trends: are they reinforced by insolation shifts.
Kukla, G.J., et al, Start of a glacial. Edited by G.J. Kukla and E. Went, Berlin, Springer-Verlag, 1992, p.291-305, 37 refs.
Knight, R.W., Gavin, J., Karl, T.R.
Global change, Air temperature, Insolation, Atmospheric circulation, Surface temperature.

47-2842
Insolation regime of the warm to cold transitions.
Kukla, G.J., et al, Start of a glacial. Edited by G.J. Kukla and E. Went, Berlin, Springer-Verlag, 1992, p.307-339, 47 refs.
Gavin, J.
Paleoclimatology, Glaciation, Global change, Ice age theory, Insolation, Ocean currents, Atmospheric circulation, Geochronology, Ice cores, Ice sheets, Glacier oscillation.

47-2843
Empirical linkages between arctic sea ice extents and northern hemisphere mid-latitude column ozone levels.
Marko, J.R., et al, *Geophysical research letters*, Jan. 8, 1993, 20(1), p.37-40, 19 refs.
Fissel, D.B.
Sea ice distribution, Atmospheric composition, Ozone, Stratosphere, Ice air interface, Solar radiation, Correlation, Periodic variations.

47-2844
Arctic sea ice albedo: a comparison of two satellite-derived data sets.
Schweiger, A.J., et al, *Geophysical research letters*, Jan. 8, 1993, 20(1), p.41-44, 11 refs.
Serreze, M.C., Key, J.R.
Sea ice distribution, Pack ice, Spaceborne photography, Albedo, Snow cover effect, Correlation, Accuracy, Periodic variations, Data processing.

47-2845
Water soluble organic constituents in arctic aerosols and snow pack.
Li, S.M., et al, *Geophysical research letters*, Jan. 8, 1993, 20(1), p.45-48, 18 refs.
Winchester, J.W.
Polar atmospheres, Atmospheric composition, Aerosols, Snow impurities, Air pollution, Solubility, Sampling, Ion density (concentration), Organic nuclei.

47-2846
Aircraft observations of the origin and growth of very large snowflakes.
Lawson, R.P., et al, *Geophysical research letters*, Jan. 8, 1993, 20(1), p.53-56, 18 refs.
Stewart, R.E., Strapp, J.W., Isaac, G.A.
Meteorological instruments, Aerial surveys, Precipitation (meteorology), Snowflakes, Probes, Imaging, Snow crystal growth, Snow crystal structure, Scattering.

47-2847
Surface ozone concentration at the Molodezhnaya and Mirnyy antarctic stations based on measurements conducted in Spring 1987 through Fall 1988.
Gruzdev, A.N., et al, *Izvestiya. Atmospheric and oceanic physics*, Aug. 1992, 28(1), p.41-47, Translated from Izvestiia. Fizika atmosfery i okeana. 29 refs.
Elokhov, A.S.
Polar atmospheres, Atmospheric composition, Ozone, Seasonal variations, Sampling, Turbulent exchange, Antarctica—Mirnyy Station, Antarctica—Molodezhnaya Station.
Results of surface ozone concentration measurements conducted at the Molodezhnaya and Mirnyy stations from spring 1987 through fall 1988 are reported and discussed together with results from airborne ozone measurements in the surface layer along the Mirnyy-Vostok-Mirnyy route (a single overflight). Daily, day-to-day, and annual ozone variability mechanisms are examined. Specifically, it is determined that the ground level of ozone positively correlates with temperature above the boundary layer in the synoptically active period as well as with the surface katabatic wind direction in the synoptically quiescent period.

47-2848
Late Quaternary coccoliths at the North Pole: evidence of ice-free conditions and rapid sedimentation in the central Arctic Ocean.
Gard, G., *Geology*, Mar. 1993, 21(3), p.227-230, 15 refs.
Marine geology, Ice cover effect, Marine deposits, Quaternary deposits, Bottom sediment, Sedimentation, Ice melting, Drill core analysis, Stratigraphy, Periodic variations.

47-2849
Late Cenozoic uplift and volcanism on Spitsbergen: caused by mantle convection?.
Vagnes, E., et al, *Geology*, Mar. 1993, 21(3), p.251-254, 49 refs.
Amundsen, H.E.F.
Subpolar regions, Marine geology, Tectonics, Geothermy, Convection, Volcanoes, Geologic structures, Regolith.

47-2850
Nitrate transport in subalpine streams, Lake Tahoe Basin, California-Nevada, U.S.A.
Coats, R., et al, *Applied geochemistry*, Jan. 1993, Suppl.2, International Symposium on Environmental Geochemistry, 2nd, Uppsala, Sweden, Sep. 16-19, 1991. Selected papers, p.17-21, 22 refs.
Goldman, C.
Stream flow, Limnology, Hydrogeochemistry, Watersheds, Snowmelt, Nutrient cycle, Mathematical models, Lake water, Water pollution, Forecasting.

47-2851
Sulfate sources in the Glacier Lakes catchment, Snowy Range, Wyoming, U.S.A.
Finley, J.B., et al, *Applied geochemistry*, Jan. 1993, Suppl.2, International Symposium on Environmental Geochemistry, 2nd, Uppsala, Sweden, Sep. 16-19, 1991. Selected papers, p.185-188, 19 refs.
Drever, J.I.
Watersheds, Alpine landscapes, Hydrogeochemistry, Bedrock, Snowmelt, Surface waters, Isotope analysis, Chemical properties, Seasonal variations, Soil microbiology.

47-2852
Distribution of block fields in Scandinavia. [Blockhavens utbredning i Skandinavien].
Malmström, B., *Svensk geografisk arsbok*, 1991, No.67, p.110-113, In Swedish with English summary. 8 refs.
Periglacial processes, Landforms, Rock streams, Distribution, Remote sensing, Geological maps.

47-2853
Periglacial features in the Söderasen canyons, south Sweden.
Nyberg, R., *Svensk geografisk arsbok*, 1991, No.67, p.145-156, 23 refs.
Periglacial processes, Geomorphology, Valleys, Slope processes, Geological surveys, Age determination, Nivation, Talus.

47-2854
Aspects on the significance of climatic changes for the periglacial environment in northern Sweden.
Akerman, H.J., *Svensk geografisk arsbok*, 1991, No.67, p.176-187, 43 refs.
Climatic changes, Global warming, Periglacial processes, Permafrost transformation, Permafrost distribution, Geomorphology, Permafrost surveys, Snow cover effect.

47-2855
Shifts in ice sheet temperatures.
Colbeck, S.C., *Journal of geophysical research*, Mar. 20, 1993, 98(D3), MP 3221, p.5115-5120, 23 refs.
Ice sheets, Ice temperature, Temperature variations, Snow cover effect, Radiation absorption, Subsurface investigations, Ice heat flux, Snow air interface, Analysis (mathematics), Glacier heat balance.
This paper examines the phenomenon through which the entire temperature gradient in an ice sheet can be shifted by processes that occur just below the surface. Energy absorbed close to the surface flows back to the surface, which steepens the average temperature gradient near the surface and shifts the entire temperature profile to higher values. Various sources are considered, as are density profiles and transients. While some sources can increase the 10 m temperature in ice sheets, air currents flowing through snow can either heat or cool the snow at depth and can dominate all other processes. The relative contributions of the different mechanisms must be evaluated for any particular site. (Auth. mod.)

47-2856
Reassessment of Crete (Greenland) ice core acidity/-volcanism link to climate change.
Crowley, T.J., et al, *Geophysical research letters*, Feb. 5, 1993, 20(3), p.209-212, 24 refs.
Criste, T.A., Smith, N.R.
Climatic changes, Volcanic ash, Ice sheets, Ice cores, Drill core analysis, Correlation, Periodic variations, Global warming, Chemical properties.

47-2857
Laboratory measurements of the loss of ClO on Pyrex, ice and NAT at 183 K.
Kenner, R.D., et al, *Geophysical research letters*, Feb. 5, 1993, 20(3), p.193-196, 17 refs.
Plumb, I.C., Ryan, K.R.
Stratosphere, Cloud physics, Atmospheric composition, Ice vapor interface, Heterogeneous nucleation, Aerosols, Ozone, Simulation, Chemical properties, Air pollution.
The rate of loss of ClO on Pyrex, water ice and nitric acid trihydrate (NAT) surfaces at 183 K was measured in a flow reactor sampled by a mass spectrometer. Upper limits for the rates of loss of ClO on Pyrex at 295 K, Cl2 on ice at 183 K and O3 on Pyrex, ice and NAT surfaces at 183 K have also been determined. In all cases the probability of loss of the species from the gas-phase upon collision with the surface is less than .0001. These small vales make it probable that heterogeneous reactions involving these species are unimportant in the winter polar stratosphere. (Auth. mod.)

47-2858
Spring measurements of tropospheric bromine at Barrow, Alaska.
Sturges, W.T., et al, *Geophysical research letters*, Feb. 5, 1993, 20(2), p.201-204, 9 refs.
Polar atmospheres, Aerosols, Atmospheric composition, Chemical composition, Photochemical reactions, Diurnal variations, Ozone, Sampling.

47-2859
Sea-ice interaction with the thermohaline circulation.
Yang, J.Y., et al, *Geophysical research letters*, Feb. 5, 1993, 20(2), p.217-220, 25 refs.
Neelin, J.D.
Sea ice distribution, Ice cover effect, Ice water interface, Ocean currents, Salinity, Phase transformations, Climatic changes, Periodic variations, Mathematical models, Heat transfer.

47-2860
Transport phenomena in frozen porous media.
Perfect, E., et al, NATO Advanced Study Institute on Transport Processes in Porous Media, Pullman, WA, July 9-19, 1989. Proceedings. Edited by J. Bear et al, NATO Advanced Science Institutes, Series E. Applied Sciences. Vol.202, Dordrecht, Kluwer Academic Publishers, 1991, p.243-270, Refs. p.261-270.
Groenevelt, P.H., Kay, B.D.
DLC TC176.T73
Porous materials, Frozen ground mechanics, Frozen ground thermodynamics, Mass transfer, Heat transfer, Frost heave, Analysis (mathematics), Soil water migration, Temperature effects.

47-2861
Solidification of a binary mixture saturating a bed of glass spheres.
Cao, W.Z., et al, NATO Advanced Study Institute on Convective Heat and Mass Transfer in Porous Media, Cesme, Turkey, Aug. 6-17, 1990. Proceedings. Edited by S. Kacak et al, NATO Advanced Science Institutes, Series E. Applied Sciences. Vol.196, Dordrecht, Kluwer Academic Publishers, 1991, p.725-737, 18 refs.
Poulikakos, D.
DLC TJ260.N364
Solutions, Porous materials, Freezing, Liquid solid interfaces, Liquid phases, Solid phases, Heat transfer, Temperature effects, Phase transformations.

47-2862
Some geophysical problems involving convection in porous media.
Nield, D.A., NATO Advanced Study Institute on Convective Heat and Mass Transfer in Porous Media, Cesme, Turkey, Aug. 6-17, 1990. Proceedings. Edited by S. Kacak et al, NATO Advanced Science Institutes, Series E. Applied Sciences. Vol.196, Dordrecht, Kluwer Academic Publishers, 1991, p.985-1006, Refs. p.1002-1005.
DLC TJ260.N364
Porous materials, Convection, Snow thermal properties, Snow air interface, Patterned ground, Permafrost transformation, Analysis (mathematics), Phase transformations.

47-2863
On flow model dating of stable isotope records from Greenland ice cores.
Johnsen, S.J., et al, Last deglaciation: absolute and radiocarbon chronologies, edited by E. Bard and W.S. Broeker. Proceedings of the NATO Advanced Research Workshop, Erice, Sicily, Dec. 1990, Berlin, Heidelberg, Springer-Verlag, 1992, p.13-24, 30 refs.
Dansgaard, W.
DLC QE697.L292 1992
Ice cores, Models, Flow rate, Age determination, Greenland.

47-2864
Be-10 deposition at Vostok, Antarctica during the last 50,000 years and its relationship to possible cosmogenic production variations during this period.
Raisbeck, G.M., et al, Last deglaciation: absolute and radiocarbon chronologies, edited by E. Bard and W.S. Broeker. Proceedings of the NATO Advanced Research Workshop, Erice, Sicily, Dec. 1990, Berlin, Heidelberg, Springer-Verlag, 1992, p.127-139, 26 refs.
DLC QE697.L292 1992
Ice cores, Geochemistry, Isotopes, Antarctica—Vostok Station.
Using measured concentrations of Be-10 in ice cores from Vostok Station, and assuming that past ice accumulation rates in these cores can be calculated from their stable isotope ratio *delta*H2, the authors give the Be-10 deposition rate at this location for the past 50,000 years. The Be-10 flux appears to have been relatively constant during this period, except for a 1000-2000 year interval 35,000 years ago, when it increased by a factor of 2. On the basis of these data it is unlikely that primary cosmic ray or solar modulation-induced cosmogenic production rate changes can completely account for the C-14/C-12 changes in the atmosphere during the late glacial period implied by earlier coral results. No similar conclusions regarding possible production variations due to geomagnetic field variations can be made at the present time, because it is not known how these will be reflected in Be-10 deposition over polar regions. It is also shown that the discrepancies in the U-Th and C-14 ages of corals for the period 10,000-20,000 years ago cannot be related to the Be-10 "peak" at 35,000 B.P. unless the latter is due to some solar mechanism which produces much larger production rate changes in C-14 than in Be-10.

47-2865
Be-10 peaks as time markers in polar ice cores.
Beer, J., et al, Last deglaciation: absolute and radiocarbon chronologies, edited by E. Bard and W.S. Broeker. Proceedings of the NATO Advanced Research Workshop, Erice, Sicily, Dec. 1990, Berlin, Heidelberg, Springer-Verlag, 1992, p.141-153, 18 refs.
DLC QE697.L292 1992
Ice cores, Geochemistry, Isotopes, Antarctica—Byrd Station, Greenland.
Be-10 concentration peaks observed in the ice cores from Vostok (around 35 ka B.P. and 60 ka B.P.) and Dome C (around 35 ka B.P.) offer the possibility of synchronizing the Southern and Northern Hemisphere ice core records, provided that these peaks are of global extent. A search in the Be-10 ice core records of Byrd Station and Camp Century, Greenland revealed the following results: the 35 ka B.P. peak is clearly present in the Byrd core. Despite the coarse time resolution and missing data there is a good indication that the peak is also present in the Camp Century record. Comparisons with *delta*O-18 and SO4 suggest that the peak is caused by a higher production rate of cosmogenic radionuclides rather than by climatic effects. The 60 ka B.P. peak could not be found in either of these two cores. At present it is not known whether this is due to inadequate sampling or to a non-production origin of the 60 ka peak at Vostok. (Auth.)

47-2866
Last deglaciation in Antarctica: further evidence of a "Younger Dryas" type climatic event.
Jouzel, J., et al, Last deglaciation: absolute and radiocarbon chronologies, edited by E. Bard and W.S. Broeker. Proceedings of the NATO Advanced Research Workshop, Erice, Sicily, Dec. 1990, Berlin, Heidelberg, Springer-Verlag, 1992, p.229-266, Refs. p.257-266.
DLC QE697.L292 1992
Ice cores, Geochronology, Ice composition, Climatic changes, Antarctica—Dome C, Antarctica—Vostok Station, Antarctica—Byrd Station, Antarctica—Komsomolskaya Station.
Dome C results have shown that the last climatic transition was, in this antarctic ice core, a two-step process with two warming trend periods interrupted by a slightly colder period estimated to have taken place from about 12.8 to 13.6 kyr B.P. New results show that this cooling event is also well recorded in the Vostok record and probably in a new east antarctic core drilled at Komsomolskaia. Although apparently preceding the Younger Dryas dated from 11.0 to 10.2 kyr B.P. (C-14 ages), it is possible that the antarctic cold reversal is a Southern Hemisphere counterpart of the well-documented Northern Hemisphere cold event 1) because the accuracy of ice core absolute dating is no better than 10%, and 2) because the dating of the Younger Dryas itself may require a correction of up to 2 kyr. Recent measurements of methane concentrations in the Vostok core should provide useful information for linking Northern and Southern Hemisphere observations. Additional information concerning this period also includes the CO2 record and the changes in dust concentration, with data now available both for Dome C and Vostok cores. (Auth.)

47-2867
Contributions to antarctic research III.
Elliot, D.H., ed, *American Geophysical Union. Antarctic research series*, 1992, Vol.57, 155p., Refs. passim. For individual papers see 47-2868 through 47-2874 or B-48123, E-48125 through E-48128, F-48124 and F-48129.
Paleoclimatology, Marine deposits, Bottom sediment, Glacial deposits, Ocean bottom, Ice shelves, Glaciation, Glacier oscillation, Geochronology, Pleistocene.
This is the 3rd issue of "Contributions to Antarctic Research" of the Antarctic Research Series, which is designed to make results of antarctic fieldwork available. It consists of 7 papers dealing with irradiance measurements in perennially ice covered lakes, oxygen isotope study of ice fields in East Antarctica, antarctic nearshore marine hydrochemical variability, reconstruction of Late Pleistocene grounded ice sheet on the Ross Sea continental shelf, Late Quaternary glacial history of the Antarctic Peninsula, Pliocene-Pleistocene seismic stratigraphy of the Ross Sea, and gravity measurements on the Ross Ice Shelf.

47-2868
Spectral irradiance and bio-optical properties in perennially ice-covered lakes of the dry valleys (McMurdo Sound, Antarctica).
Lizotte, M.P., et al, *American Geophysical Union. Antarctic research series*, 1992, Vol.57, Contributions to antarctic research III. Edited by D.H. Elliot, p.1-14, 38 refs.
Priscu, J.C.
Frozen lakes, Ice cover effect, Ice optics, Light transmission, Lake water, Cryobiology, Photosynthesis, Plankton, Chlorophylls, Antarctica—Bonney, Lake, Antarctica—Hoare, Lake, Antarctica—Fryxell, Lake.
Lakes of the dry valley region near McMurdo Sound which are perennially ice-covered (approximately 4 m thick) and contain only microorganisms in the plankton were studied. Profiles of the flux and spectral distribution of photosynthetically available radiation (400-700 nm) and the optical properties of suspended particulate material were measured for Lake Bonney and Lake Fryxell. The spectral quality of light immediately beneath the ice was similar in both lakes; irradiance was always less than 50 micromol photons/sq m/s. However, the concentration and vertical distribution of phytoplankton biomass (i.e., chlorophyll) differed greatly among the three lakes, and was similar to the trend in light attenuation of Lake Fryxell>>Lake Hoare>Lake Bonney. The same relationship between chlorophyll and light attenuation was observed as chlorophyll concentrations increased over the growth season in Lake Bonney. An analysis of absorption due to water, phytoplankton, detritus and, by difference, gilvin (dissolved materials) showed that water was the dominant absorber (38-75% of the total absorption coefficient) but that phytoplankton was usually the most important of the variable components (11-47%). In terms of the relative importance of light-absorbing components, the dry valley lakes appear to be most similar to oligotrophic seas and would be defined as case 1 waters. (Auth. mod.)

47-2869
Oxygen isotope study of the ice fields surrounding the Reckling Moraine on the East Antarctic ice sheet.
Faure, G., et al. *American Geophysical Union. Antarctic research series*, 1992, Vol.57, Contributions to antarctic research III. Edited by D.H. Elliot, p.15-26, 16 refs.
Grootes, P.M., Buchanan, D., Hagen, E.H.
Fossil ice, Ice sheets, Ice dating, Paleoclimatology, Geochronology, Pleistocene, Ice sampling, Isotope analysis, Oxygen isotopes, Antarctica—Victoria Land.
The model that has been proposed for the accumulation of meteorite specimens on ice fields of the East Antarctica ice sheet suggests that partial stratigraphic sections of the ice sheet are exposed at such locations. In order to verify this hypothesis, isotope compositions of oxygen were determined in ice samples collected along three survey lines across the Reckling Moraine. The *delta*O-18 values of the ice vary from -37.9 to -51.2 per mill relative to standard mean ocean water. The strongly O-18 depleted ice is identified as basal ice that formed during the glacial stages of the Pleistocene epoch. However, the large number of apparent transitions from glacial to interglacial ice revealed by the data suggests that the stratigraphy of the ice, and hence the climatic record it contains, may have been disturbed locally by the structural deformation of the ice sheet. Large exposures of ice that appear to lack the variations in *delta* O-18 which characterize most of the ice in this area were discovered within and adjacent to the Reckling Moraine, but the cause for this phenomenon remains to be determined. (Auth.)

47-2870
Scallop shell mineralogy and crystalline characteristics: proxy records for interpreting antarctic nearshore marine hydrochemical variability.
Berkman, P.A., et al. *American Geophysical Union. Antarctic research series*, 1992, Vol.57, Contributions to antarctic research III. Edited by D.H. Elliot, p.27-38, 66 refs.
Foreman, D.W., Mitchell, J.C., Liptak, R.J.
Ice sheets, Paleoclimatology, Marine deposits, Bottom sediment, Meltwater, Marine biology, Geochronology, Glacier oscillation, Mineralogy, Water chemistry, Antarctica—McMurdo Sound.
Trace element concentrations in modern antarctic scallop shells, collected across a nearshore depth gradient adjacent to a summer glacial meltwater stream in west McMurdo Sound, significantly decreased with depth. These antarctic scallop shells, as with bay scallop and sea scallop shells, reveal that isomorphous substituents with atomic radii larger than that of calcium are substituted into the intracrystalline lattice sites of the unit cells. Divalent cations with smaller atomic radii, even if they reflect nearshore environmental variation today, may occur outside of the unit cells in intercrystalline spaces that would be susceptible to diagenesis over time. Significant differences between the crystalline characteristics and the mineralogy of the upper and lower scallop valves also indicate that the shell valves cannot be indiscriminately used to assess environmental variation. Future mineralogical analyses of antarctic scallop shells, and other coastal marine species that have fossils around the continent, should focus on the relatively stable compositional characteristics of the unit cells to interpret Holocene environmental variability associated with the ice sheet margins. (Auth. mod.)

47-2871
Evidence for a grounded ice sheet on the Ross Sea continental shelf during the Late Pleistocene and preliminary paleodrainage reconstruction.
Anderson, J.B., et al. *American Geophysical Union. Antarctic research series*, 1992, Vol.57, Contributions to antarctic research III. Edited by D.H. Elliot, p.39-62, 62 refs.
Shipp, S.S., Bartek, L.R., Reid, D.E.
Paleoclimatology, Marine deposits, Bottom sediment, Glacial deposits, Grounded ice, Ice shelves, Geochronology, Ocean bottom, Drill core analysis, Glacier oscillation, Glaciation, Pleistocene, Antarctica—Ross Sea.
The Ross Sea exhibits north-south oriented troughs associated with modern ice streams and outlet glaciers. Seismic reflection profiles across the troughs show evidence that they were glacially eroded. Seismic records show morphologic features interpreted as till tongues, morainal banks and possibly glacial deltas formed near the grounding line of the former marine ice sheet. Piston cores from the continental shelf penetrated diamictons whose origin and age are problematic. Detailed petrographic analyses of the minerals and rocks comprising these diamictons were conducted to determine subglacial versus glacial marine origin and to reconstruct the glacial setting of the Ross Sea during the most recent glacial maximum. The most detailed work was conducted in the western Ross Sea. The results show that diamictons do occur in distinct petrologic provinces. This is consistent with deposition from the basal debris zone of either an ice sheet or an ice shelf. The data demonstrate that the East Antarctica ice sheet and West Antarctica ice sheet grounded on the continental shelf during the last glacial maximum. In the western Ross Sea the grounding line existed near the shelf break. Diamictons from the central and eastern portion of the continental shelf contain stable mineral and rock fragments, indicating considerable recycling of these particles. (Auth. mod.)

47-2872
Late Quaternary glacial history of the northern Antarctic Peninsula's western continental shelf: evidence from the marine record.
Pope, P.G., et al. *American Geophysical Union. Antarctic research series*, 1992, Vol.57, Contributions to antarctic research III. Edited by D.H. Elliot, p.63-91, 37 refs.
Anderson, J.B.
Paleoclimatology, Marine deposits, Bottom sediment, Glacial deposits, Quaternary deposits, Ice shelves, Ocean bottom, Geochronology, Glacier oscillation, Glaciation, Drill core analysis, Antarctica—Antarctic Peninsula.
Piston and gravity cores and bottom profiler records from the northern Antarctic Peninsula's western continental shelf were examined to reconstruct the glacial setting of this region during the last glacial maximum. The precision depth records (PDR) reveal evidence of subglacial scouring within Marguerite Bay and the inner portions of the continental shelf, with the exception of Biscoe Trough, whose bed is scoured partially onto the outer shelf. Piston cores reflect a modern depositional setting typical of the antarctic continental shelf: terrigenous sediments are deposited as ice-rafted debris (IRD) in a marine environment where currents sweep fine sediments from the shallow banks of the shelf, leaving sandy lags, and deposit these fines in shelf depressions. Piston cores recovered basal till only from the inner shelf and from the floor of Biscoe Trough. Transitional glacial marine sediments are most prevalent in the southern portion of the study area near Marguerite Bay. Reconstruction for the last glacial maximum places a marine ice sheet in Marguerite Bay and on the inner shelf. Glacial ice retreated rapidly from the northern regions. Concurrently, offshore of Marguerite Bay an ice tongue (or small ice shelf) and associated pack ice canopy slowly retreated, yielding to open marine sedimentation during the early Holocene. Carbon 14 data indicate that the ice shelf retreated from Marguerite Bay sometime after 12,430 years B.P. (Auth. mod.)

47-2873
Pliocene-Pleistocene seismic stratigraphy of the Ross Sea: evidence for multiple ice sheet grounding episodes.
Alonso, B., et al. *American Geophysical Union. Antarctic research series*, 1992, Vol.57, Contributions to antarctic research III. Edited by D.H. Elliot, p.93-103, 33 refs.
Anderson, J.B., Díaz, J.I., Bartek, L.R.
Paleoclimatology, Marine deposits, Bottom sediment, Glacial deposits, Grounded ice, Ice shelves, Ocean bottom, Stratigraphy, Glacier oscillation, Glaciation, Pleistocene, Seismic surveys, Antarctica—Ross Sea.
The distribution, morphology and thickness of Pliocene-Pleistocene deposits on the Ross Sea continental shelf were mapped using high-resolution seismic reflection data acquired during the U.S. Antarctic Program 1990 cruise. Chronostratigraphic control is provided by Deep Sea Drilling Project (DSDP) leg 28 drill sites on the shelf. In the western Ross Sea, the Pliocene-Pleistocene section is relatively thin and is restricted mainly to the outer shelf. However, the Eastern Basin contains a relatively thick (up to 600 ms) and widespread Pliocene-Pleistocene section that has been subdivided into 7 seismic units. On the basis of the original biostratigraphic work on cores from DSDP site 271, the 3 lower units are Pliocene in age, and the youngest unit is Pleistocene in age. The age of the three middle units was not determined; the aggradational stacking pattern of these units indicates a Pleistocene age. The 7 units reflect multiple ice sheet grounding events during which the ice sheet extended to the shelf break, followed by retreat from the shelf. These fluctuations in grounding line position indicate extreme variations in the antarctic climate and sea level. Ice sheet grounding events do not require a polar climate; they could reflect subpolar to temperate shifts in climate. (Auth. mod.)

47-2874
Analysis of gravity measurements on the Ross Ice Shelf, Antarctica.
Greischar, L.L., et al. *American Geophysical Union. Antarctic research series*, 1992, Vol.57, Contributions to antarctic research III. Edited by D.H. Elliot, p.105-155 + 1 microfiche, 71 refs.
Bentley, C.R., Whiting, L.R.
Ice shelves, Bottom topography, Paleoclimatology, Ocean bottom, Subglacial observations, Ice surveys, Glacier oscillation, Glaciation, Tectonics, Gravity anomalies, Isostasy, Antarctica—Ross Ice Shelf.
During the Ross Ice Shelf Geophysical and Glaciological Survey field program, between 1973 and 1978, gravity measurements were made at 181 sites on a 55 km grid covering the Ross Ice Shelf and along 350 km of profile lines at base camps. Marine gravity data, which have been approximately adjusted to the new datum and reference system, were used to extend coverage to the edge of the Ross Sea continental shelf. Free-air, Bouguer, and Airy isostatic anomaly maps reveal linear anomalies paralleling the Transantarctic Mountains as a dominant feature. Block faulting due to extension between East Antarctica and West Antarctica is a likely tectonic source for these features. Modeling of local gravity observations made at 5 base camps revealed probable faulting at every camp. The correspondence of modeled local structures to regional trends suggests that they are the result of regional tectonic activity. A spectral analysis technique applied to the free-air anomaly, Bouguer anomaly, and bathymetry maps of the Ross embayment revealed that relatively short wavelength (< 500 km) topographic loads appear isostatically uncompensated. A simple exponential model of crustal rebound has been used to derive isochrons of ice retreat. The result generally agrees both spatially and temporally with retreat models based on ice sheet dynamics. (Auth. mod.)

47-2875
Critical cooling rates for aqueous cryoprotectants in the presence of sugars and polysaccharides.
Sutton, R.L., *Cryobiology*, Oct. 1992, 29(5), p.585-598, 36 refs.
Cryobiology, Preserving, Liquid cooling, Cooling rate, Solutions, Chemical ice prevention, Temperature measurement, Chemical composition.

47-2876
Tropospheric low-level temperature inversions in the Canadian Arctic.
Kahl, J.D., et al. *Atmosphere-ocean*, Dec. 1992, 30(4), p.511-529, With French summary. 30 refs.
Serreze, M.C., Schnell, R.C.
Air temperature, Temperature inversions, Climatology, Periodic variations, Snow cover effect, Cloud cover, Sounding, Radiation balance, Subpolar regions, Boundary layer.

47-2877
Long-term variations in the turbidity of the arctic atmosphere in Russia.
Radionov, V.F., et al. *Atmosphere-ocean*, Dec. 1992, 30(4), p.531-549, With French summary. 31 refs.
Marshunova, M.S.
Atmospheric composition, Aerosols, Radiation absorption, Turbidity, Haze, Light transmission, Periodic variations, Air pollution, Climatic factors, Solar radiation, Optical properties.

47-2878
On the interannual variability of arctic sea-level pressure and sea ice.
Power, S.B., et al. *Atmosphere-ocean*, Dec. 1992, 30(4), p.551-577, With French summary. 46 refs.
Mysak, L.A.
Sea ice distribution, Atmospheric pressure, Atmospheric physics, Air ice water interaction, Drift, Climatology, Ice cover effect, Correlation, Wind factors, Seasonal variations.

47-2879
Sea ice and wind: effects on primary productivity in the Barents Sea.
Sakshaug, E., et al. *Atmosphere-ocean*, Dec. 1992, 30(4), p.579-591, With French summary. 59 refs.
Slagstad, D.
Marine biology, Biomass, Ecosystems, Ice cover effect, Wind factors, Seasonal variations, Plankton, Ice melting, Nutrient cycle.

47-2880
Propagation of coastal-trapped waves under an ice cover in Hudson Bay.
Reynaud, T., et al. *Atmosphere-ocean*, Dec. 1992, 30(4), p.593-620, With French summary. 34 refs.
Ingram, R.G., Freeland, H.J., Weaver, A.J.
Ocean currents, Spectra, Ice cover effect, Ice air interface, Wave propagation, Subglacial observations, Topographic effects, Bottom topography, Stratification, Atmospheric pressure.

47-2881
Examination of several ice control mechanisms in a coupled ice-ocean numerical model of the Arctic.
Fleming, G.H., *Atmosphere-ocean*, Sep. 1992, 30(3), p.479-499, With French summary. 20 refs.
Sea ice distribution, Ice cover thickness, Ice cover strength, Ice models, Ice water interface, Ice control, Heat flux, Mathematical models, Simulation, Periodic variations, Thermodynamics.

47-2882
Simulation and design of heating profiles in heat controlled freeze-drying of pharmaceuticals in vials by the application of a sublimation cylindrical model.
Lombraña, J.I., et al. *Drying technology*, 1993, 11(1), p.85-102, 14 refs.
De Elvira, C., Villarán, M.C.
Freeze drying, Manufacturing, Solutions, Ice sublimation, Mass transfer, Heating, Temperature control, Mathematical models, Temperature profiles, Phase transformations.

47-2883
Anomalous behavior of ice in solutions of ice-binding arabinoxylans.
Williams, R.J., *Thermochimica acta*, Dec. 21, 1992, Vol.212, North American Thermal Analysis Society Conference, 20th, Minneapolis, MN, Sep. 20-26, 1991. Collected papers. Edited by A.T. Riga et al, p.105-113, 15 refs.
Polymers, Solutions, Ice melting, Melting points, Temperature measurement, Ice water interface, Superheated ice, Plant physiology, Cold tolerance, Thermal analysis.

47-2884
Thermomechanical analysis and viscometric properties of motor oils at low temperature.
Riga, A.T., *Thermochimica acta*, Dec. 21, 1992, Vol.212, North American Thermal Analysis Society Conference, 20th, Minneapolis, MN, Sep. 20-26, 1991. Collected papers. Edited by A.T. Riga et al, p.227-242, 22 refs.
Lubricants, Performance, Solidification, Low temperature research, Viscosity, Crystal growth, Thermal analysis, Temperature effects, Mechanical properties, Rheology.

47-2885
Protective modification of freeze stress in plant tissue.
Olien, R., *Thermochimica acta*, Dec. 21, 1992, Vol.212, North American Thermal Analysis Society Conference, 20th, Minneapolis, MN, Sep. 20-26, 1991. Collected papers. Edited by A.T. Riga et al, p.255-260, 19 refs.
Plant tissues, Cold stress, Polymers, Ice prevention, Ice crystal adhesion, Thermal analysis, Latent heat, Ice water interface, Temperature effects, Cold tolerance.

47-2886
Using Landsat-5 Thematic Mapper and digital elevation data to determine the net radiation field of a *mountain glacier*.
Gratton, D.J., et al, *Remote sensing of environment*, Mar. 1993, 43(3), p.315-331, 31 refs.
Howarth, P.J., Marceau, D.J.
Mountain glaciers, Glacier surfaces, Radiation balance, Albedo, Spaceborne photography, Topographic effects, Radiometry, Photogrammetry, Radiation absorption, Glacier heat balance.

47-2887
Some measurements of the spatial and temporal characteristics of internal waves in an ice-covered high-latitude basin.
Pisarev, S.P., *Oceanology*, Aug 1991, 31(1), p.42-46, Translated from Okeanologiia. 18 refs.
Ocean currents, Flow measurement, Wave propagation, Spectra, Ice cover effect, Subglacial observations, Oceanography, Drift stations, Attenuation.

47-2888
Paleogeographic investigation of bottom sediments of the central Arctic Ocean (Mendeleyev Ridge).
Danilov, I.D., et al, *Oceanology*, Aug. 1991, 31(1), p.77-82, Translated from Okeanologiia. 10 refs.
Marine geology, Ocean bottom, Bottom sediment, Lithology, Pleistocene, Oceanographic surveys, Drill core analysis, Stratigraphy, Marine deposits.

47-2889
Statistical properties of sea ice surface topography in the Baltic Sea.
Lewis, J.E., et al, *Tellus*, Mar. 1993, 45A(2), p.127-142, 25 refs.
Leppäranta, M., Granberg, H.B.
Sea ice, Surface roughness, Measuring instruments, Baltic Sea.

47-2890
On the formation of ice on deep weakly stratified water.
Wahn, G., *Tellus*, Mar. 1993, 45A(2), p.143-157, 24 refs.
Ice formation, Turbulent flow, Melting, Fresh water, Antarctica—Weddell Sea.
Making use of the simplest possible model, the author analyzes the formation of ice on top of a weakly stratified ocean. Interest is concentrated on the consumption of freshwater associated with ice formation and the dynamics of the system when the cooling continues beyond the point where further ice formation would destroy the stability of the system. After an initial stage of ice formation the system will not overturn, but go into a stage of development which may be called "freeze melting". This stage is characterized by increasing mixed layer depth, slowly decreasing ice thickness and small but finite stability. If the freeze melting continues for a sufficiently long time, considerably longer than required for the initial ice formation, the ice cover may be removed altogether, whereupon the stratification overturns and the fresh-water in the top layer gets lost. It is suggested that if this happens one year it will contribute to preconditioning the system for ice-free conditions the following year. An essential condition for the analyses, which may be put in question, is the presence of at least some wind-generated turbulence and that competing mixing processes, e.g., those associated with cabbeling, do not become dominating. Observations from the Weddell Sea support the conclusion that late winter conditions in this area may be well described in terms of a freeze melting stage of development. (Auth.)

47-2891
Isotopic evidence for the source of lead in Greenland snows since the late 1960s.
Rosman, K.J.R., et al, *Nature*, Mar. 25, 1993, 362(6418), p.333-335, 17 refs.
Snow impurities, Isotopes, Air pollution, Greenland.

47-2892
Abrupt increase in Greenland snow accumulation at the end of the Younger Dryas event.
Alley, R.B., et al, *Nature*, Apr. 8, 1993, 362(6420), MP 3222, p.527-529, 27 refs.
Snow accumulation, Ice cores, Climatic changes, Models, Greenland.
Results are presented from a new Greenland ice core (GISP2) showing that snow accumulation doubled rapidly from the Younger Dryas event to the subsequent Preboreal interval, possibly in one to three years. It is also found that the accumulation-rate change from the Oldest Dryas to the Bölling/Alleröd warm period was large and abrupt. The extreme rapidity of these changes in a variable that directly represents regional climate implies that the events at the end of the last glaciation may have been responses to some kind of threshold or trigger in the North Atlantic climate system. (Auth. mod.)

47-2893
Geotechnical properties of siliceous sediments from the Voring Plateau, Norwegian Sea and the Kerguelen Plateau, southern ocean.
Pittenger, R.A., College Station, TX, Texas A and M University, 1992, 163p., University Microfilms order No. 93-00495, Ph.D. thesis. Refs. p.117-122.
Marine geology, Sediments, Geochemistry.
Cores retrieved from Ocean Drilling Program Legs 104 and 119 reveal that siliceous sediments have relatively high porosities and permeabilities. As expected, undrained shear strengths in siliceous sections are relatively low and largely dependent on the abundance and mineralogy of accessory clays. These characteristics imply that siliceous sediments should be especially prone to slope failures. Determination of plastic limits provides a simple and fairly accurate means of determining biogenic silica content in these sediments. Although siliceous sediments are very compressible in laboratory consolidation tests, they appear to undergo very little *in-situ* consolidation. As a result, siliceous sediments probably play an important role in the structural development of pelagic-dominated convergent plate margins, characterized by underconsolidated sediments, by maintaining high sediment pore pressures. On the Voring and Kerguelen Plateaus, consolidation state is a function of sedimentation rate and is a useful stratigraphic tool for identifying the presence and nature of unconformities. In conformable sections, siliceous sediments are increasingly underconsolidated with depth. (Auth. mod.)

47-2894
Application of equilibrium climate models to questions of glaciation at high latitudes.
Oglesby, R.J., New Haven, CT, Yale University, 1990, 243p., University Microfilms order No. 90-34229, Ph.D. thesis. Refs. p.205-219.
Models, Temperature effects, Paleoclimatology, Glaciation, Snow cover effect.
In this thesis an evaluation was made of the capabilities of the ECM to provide useful results when applied to paleoclimatic questions concerning glaciation. In the first case study the statistical dynamical model (SDM) was used to examine the implications of a warmer deep ocean for the maintenance of ice-free conditions during the Cretaceous. It was found that when deep ocean temperatures to values indicated for the Cretaceous were described, the model yielded warm mid-to-high latitude surface conditions in agreement with the geologic record. In the second case study the CCM1 was used to examine mechanisms potentially important for the initiation of antarctic glaciation which occurred no later than 38-40 Ma. The most fundamental result of this study is the difficulty of establishing an ice-free Antarctic in CCM1 even under extreme imposed conditions. In the third and final case study CCM1 was used to examine the initiation of Northern Hemisphere glaciation, such as occurred around 2.4 Ma. The role of snowcover as an initial condition was emphasized. It was determined that CCM1 may be used to qualitatively evaluate mechanisms potentially important in determining glacial versus nonglacial conditions; may in some cases be used to provide a quantitative computation of the net snow accumulation that in turn is used to support a qualitative conclusion regarding the sign of the net accumulation; but cannot be used to provide a determination of the magnitude of net snow accumulation reliable enough to permit either implicit or explicit long-term integration. (Auth. mod.)

47-2895
Three-dimensional atmospheric circulation model with a comprehensive description of physical processes and simplified dynamics.
Kislov, A.V., *Akademiia nauk SSSR. Izvestiya. Atmospheric and oceanic physics*, 1991(Pub. Nov. 91), 27(4), p.241-246, Translated from Akademiia nauk SSSR. Izvestiia. Fizika atmosfery i okeana. 16 refs.
Atmospheric circulation, Simulation, Mathematical models, Climatology, Ice cover effect, Snow cover effect.

47-2896
Tropospheric aerosol and climate: results from numerical experiments employing a three-dimensional seasonal energy-balance model.
Kolomeev, M.P., et al, *Akademiia nauk SSSR. Izvestiya. Atmospheric and oceanic physics*, 1991(Pub. Nov. 91), 27(4), p.253-257, Translated from Akademiia nauk SSSR. Izvestiia. Fizika atmosfery i okeana. 19 refs.
Malyshev, S.L., Nikonov, S.A.
Aerosols, Atmospheric physics, Sea ice, Ice cover effect, Climate, Polar atmospheres, Mathematical models, Temperature variations.

47-2897
Anomalies in the intra-annual ozone variability in polar regions from ozone sounding area: Resolute and Amundsen-Scott stations.
Gruzdev, A.N., et al, *Akademiia nauk SSSR. Izvestiya. Atmospheric and oceanic physics*, 1991(Pub. Nov. 91), 27(4), p.272-279, Translated from Akademiia nauk SSSR. Izvestiia. Fizika atmosfery i okeana. 31 refs.
Sitnov, S.A.
Ozone, Polar atmospheres, Atmospheric physics, Atmospheric circulation, Canada—Northwest Territories—Resolute, Antarctica—Amundsen-Scott Station.
The intra-annual ozone variability in the northern and southern polar regions is analyzed from ozone sounding data at Resolute and Amundsen-Scott Stations. Specifically, anomalies associated with winter stratospheric warmings, stratospheric-tropospheric exchange, and the isolated evolution of surface ozone have been identified for the Arctic. Isolated ozone evolutionary regimes in different atmospheric layers, including the O3 maximum layer and the troposphere, are characteristic of Antarctica. Such regimes are manifested as a springtime ozone "hole" and in an antiphase annual progression of lower-tropospheric and upper-tropospheric O3. Correlations between the ozone level and temperature are investigated in different seasons, which make it possible in many cases to specify the mechanisms behind ozone variability. (Auth.)

47-2898
Effect of cabbeling in the mixing of sea water and its seasonal manifestation on the Pacific Ocean Subarctic Front.
Kil'matov, T.R., et al, *Akademiia nauk SSSR. Izvestiya. Atmospheric and oceanic physics*, 1991(Pub. Mar. 92), 27(8), p.628-631, Translated from Akademiia nauk SSSR. Izvestiia. Fizika atmosfery i okeana. 11 refs.
Kuz'min, V.A.
Sea water, Salinity, Water temperature, Seasonal variations.

47-2899
Nuclear-powered submarine transport for the Arctic. [Atomnye podvodnye transportnye suda dlia Arktiki].
Dronov, B.F., et al, *Sudostroenie*, Jan. 1992, No.1, p.3-7, In Russian.
Submarines, Marine transportation, Design, Ice navigation, Nuclear power.

47-2900
New technical solution for the reliable anchoring of an underground pipeline in frost-heaving ground. [Novoe tekhnicheskoe reshenie dlia nadezhnogo zakrepleniia podzemnogo truboprovoda v puchinistykh gruntakh].
Kharionovskiĭ, V.V., et al, *Stroitel'stvo truboprovodov*, Nov. 1992, No.11, p.20-22, In Russian.
Sonninskiĭ, A.V.
Anchors, Underground pipelines, Frost heave.

47-2901
Determining the design values for the depth of seasonal thawing of permafrost for pile foundations of various structures. [Opredelenie raschetnykh znacheniĭ glubin sezonnogo ottaivaniia vechnomerzlykh gruntov svaĭnykh osnovaniĭ razlichnykh konstruktsiĭ].
Tsurikov, A.S., et al, *Stroitel'stvo truboprovodov*, Nov. 1992, No.11, p.22-25, In Russian. 9 refs.
Balygin, I.S.
Analysis (mathematics), Pile structures, Foundations, Design criteria, Thaw depth, Permafrost beneath structures.

47-2902
Elastic shield to protect road culverts from naleds. [Uprugii shchit dlia zashchity dorozhnykh trub ot naledei].
Dement'eva, O.V., *Transportnoe stroitel'stvo*, Sep.-Oct. 1992, No.9-10, p.13, In Russian.
Countermeasures, Naleds, Roads, Culverts.

47-2903
Mathematical modelling of the thawing of permafrost beneath a pipeline. [Matematicheskoe modelirovanie protaivaniia vechnomerzlogo grunta pod nefteprovodom].
Semerikov, A.V., et al, *Stroitel'stvo truboprovodov*, Oct. 1992, No.10, p.23-24, In Russian. 4 refs.
Birillo, I.N.
Permafrost beneath structures, Ground thawing, Mathematical models, Pipelines.

47-2904
Last "Terra incognita". [Posledniaia "Terra incognita"].
Pasetskii, V., *Morskoi flot*, 1992, No.1, p.49-50, In Russian.
Ice navigation, History.

47-2905
Novorossiysk bora. [Novorossiiskaia bora].
Basevich, V., *Morskoi flot*, 1992, No.1, p.51-53, In Russian.
Ice navigation, History.

47-2906
Modernization of icebreakers. [Modernizatsiia ledokolov].
Petrakov, E., *Morskoi flot*, 1992, No.2/3, p.23-25, In Russian.
Icebreakers, Design.

47-2907
Katabatic wind intensity and direction over Antarctica derived from scatterometer data.
Remy, F., et al, *Geophysical research letters*, May 22, 1992, 19(10), p.1021-1024, 17 refs.
Ledroit, M., Minster, J.F.
Wind direction, Wind (meteorology), Sastrugi, Ice sheets, Velocity measurement.
Although satellite radar scatterometers are initially designed to measure ocean surface wind speed and direction, they also provide important observations over continental ice sheets. Data from the Seasat scatterometer analyzed over a sector of Antarctica show that the signal is strongly dependent on the incidence angle of observation, but that it also depends on azimuth. The minimum values of the backscatter coefficient (the ratio of backscattered versus incident power) are always observed in the direction of katabatic winds. A theoretical analysis shows that the backscatter coefficient must be very sensitive to the sastrugi slopes and orientations, which are streamlined features formed on the snow surface in the wind direction. Satellite scatterometers can thus map the characteristics of sastrugis, of importance for the interpretation of microwave measurements above ice sheets; this indirectly provides the intensity and direction of these very persistent and strong winds, which play an important role in the behavior of the atmosphere and ocean in high southern latitudes. (Auth.)

47-2908
Intensification of freezing earth hydraulic structures by natural cold.
Panteleev, V.G., et al, *Hydrotechnical construction*, Nov. 1991(Pub. May 92), 25(11), p.691-694, Translated from Gidrotekhnicheskoe stroitel'stvo. 4 refs.
Sobol', S.V., Ogarkov, A.A.
Hydraulic structures, Freezing, Thermal regime, Earth dams.

47-2909
Okhotsk Sea water anomaly: implications for ventilation in the North Pacific.
Talley, L.D., *Deep-sea research*, 1991, 38(1A), p.S171-S190, Refs. p.S188-S190.
Ocean currents, Sea water, Salinity, Anomalous water, Ice cover effect, Okhotsk Sea.

47-2910
Remote sensing of snow using radar methods. [Distantsionnoe zondirovanie snega radiolokatsionnymi metodami].
Kulemin, G.P., et al, Khar'kov, Institut radiofiziki i elektroniki AN Ukrainy, 1992, 36p., Preprint 92-8, In Russian. 46 refs.
Kharchenko, T.N., Tatsevich, S.E.
Remote sensing, Snow physics, Dielectric properties, Snow depth, Radio waves, Scattering, Mathematical models, Radar.

47-2911
Fundamentals of amplitude-phase measurements using induced polarization. [Osnovy amplitudno-fazovykh izmerenii vyzvannoi poliarizatsii].
Mel'nikov, V.P., et al, Yakutsk, IAkutskoe knizhnoe izdatel'stvo, 1974, 222p., In Russian. 156 refs.
Electrical properties, Chemical properties, Rock mechanics, Rock properties, Frozen rocks, Polarization (charge separation), Electromagnetic prospecting.

47-2912
Meteorological research using a high mast on an antarctic ice shelf.
Belitz, H.-J., et al, *Marine technology*, 1987, 18(1), p.5-10, With German summary. 13 refs.
Kottmeier, C.
Meteorological instruments, Meteorological data, Boundary layer, Temperature measurement, Measuring instruments, Antarctica—Georg von Neumayer Station.
In Jan. 1983 a meteorological mast 45 m in height was erected at the Georg von Neumayer Station to study processes in the atmospheric boundary layer. The scientific objectives and the layout of the measuring system are presented. Basic difficulties in erecting and anchoring the mast are discussed. The investigation of two specific processes is described in order to demonstrate the capabilities of the measuring system. (Auth. mod.)

47-2913
Icebreaking trials with the polar research vessel *Polarstern*.
Schwarz, J., *Marine technology*, 1985, 16(4), p.131-133, With German summary.
Icebreakers, Oceanographic ships, Ice breaking, Expeditions.

47-2914
Canada's offshore technology meets the arctic challenges. *Marine technology*, 1985, 16(4), p.133-135.
Offshore drilling, Offshore structures, Cold weather operation, Acoustic measurement.

47-2915
Arctic supply ship *Ivan Papanin*. [Arkticheskii snabzhenets *Ivan Papanin*].
Nikonov, V., *Morskoi flot*, June-July 1992, No.6/7, p.26-30, In Russian.
Ships, Design, Logistics, Human factors engineering.

47-2916
Floating nuclear power stations for the Far North. [Atomnye plavuchie energobloki dlia Krainego Severa].
Tarasov, V.K., et al, *Sudostroenie*, Nov.-Dec. 1992, No.11-12, p.3-6, In Russian.
Starshinov, V.A., Okishev, V.V.
Nuclear power, Design, Floating structures, USSR—Far North.

47-2917
Effect of the bow form of ships on ice-navigability. [Vliianie formy nosovykh obvodov sudna na ledoprokhodimost'].
Titov, I.A., et al, *Sudostroenie*, Nov.-Dec. 1992, No.11-12, p.6-8, In Russian. 3 refs.
Simonov, IU.A., Klimashevskii, S.N.
Ships, Icebreakers, Ice navigation, Design.

47-2918
Additional resistance of ice-navigating ships to regular head waves. [Dopolnitel'noe soprotivlenie sudov ledovogo plavaniia na vstrechnom reguliarnom volnenii].
Savin, S.S., et al, *Sudostroenie*, Nov.-Dec. 1992, No.11-12, p.9-12, In Russian. 6 refs.
Zhinkin, V.B.
Ships, Icebreakers, Tanker ships, Ocean waves, Mathematical models.

47-2919
Analysis of the dynamic characteristics of the shaft line and main thrust bearing of the "Arctic" type icebreaker. [Analiz dinamicheskikh kharakteristik valoprovoda i glavnogo upornogo podshipnika ledokolov tipa "Arktika"].
Basalygin, G.M., et al, *Sudostroenie*, Nov.-Dec. 1992, No.11-12, p.15-19, In Russian. 5 refs.
Kagan, I.M.
Icebreakers, Ships, Design, Mathematical models.

47-2920
Statistical studies of wear on the hull plating of ice-navigating ships. [Statisticheskie issledovaniia iznosa obshivki korpusov sudov ledovogo plavaniia].
Shemendiuk, G.P., et al, *Sudostroenie*, Aug.-Sep. 1992, No.8-9, p.28-31, In Russian. 3 refs.
Babtsev, V.A., Chetyrbotskii, A.N.
Metal ice friction, Statistical analysis, Ice navigation, Ships, Icebreakers, Corrosion.

47-2921
First ice-navigating ships for the Far East. [Pervye suda ledovogo plavaniia dlia Dal'nego Vostoka].
Smirnov, K.D., *Sudostroenie*, Aug.-Sep. 1992, No.8-9, p.49-51, In Russian. 5 refs.
Ships, Ice navigation, History, Design, USSR - Far East.

47-2922
Estimating icing in the design of seagoing ships. [Uchet obledeneniia pri proektirovanii morskogo sudna].
Pavliuchenko, IU.N., *Sudostroenie*, May 1992, No.5, p.9-11, In Russian. 6 refs.
Ship icing, Ships, Ice navigation, Ice accretion, Design criteria.

47-2923
Numerical simulation of systems of multitudinous polygonal blocks.
Hopkins, M.A., *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, Dec. 1992, CR 92-22, 69p., ADA-262 556, 16 refs.
Ice mechanics, Pressure ridges, Ice pressure, Computerized simulation, Ice models.

47-2924
Ship superstructure icing: data collection and instrument performance on USCGC *Midgett* research cruise.
Ryerson, C.C., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, Dec. 1992, CR 92-23, 133p., ADA-262 557, 30 refs.
Longo, P.D.
Ship icing, Sea spray, Ice models, Accuracy, Data processing, Bering Sea.
Spray generated by the collision of a ship's bow with waves freezes on decks, bulkheads and ship's components. It is most common on smaller vessels, where it has been known to cause sinking, typically by capsizing. Superstructure icing may also reduce the operating efficiency or mission performance of larger vessels. The ability to predict the environmental conditions under which icing may occur, the location of icing on a vessel under those conditions, and the rate at which ice will accrete may allow vessels to avoid hazardous conditions or operate in a manner so as to minimize the accretion of ice. This report describes how spray delivery and superstructure icing were measured during a research cruise on the U.S. Coast Guard Cutter *Midgett*, operating in the Gulf of Alaska and Bering Sea in Feb.-Mar. 1990, to support the validation and calibration of a numerically based icing prediction model being developed for the U.S. Navy. This research cruise represents the first such measurements on a vessel significantly larger than fishing trawlers, the basis for prior work. Development of the instrumentation, its placement on the *Midgett*, and ancillary equipment used to supplement the principal measurements are discussed. Data collection and problems encountered in the process are covered extensively. Finally, measurement error is discussed, with conclusions drawn concerning corrections to the data and their validity.

47-2925
Bearing capacity tests on ice reinforced with Geogrid.
Haynes, F.D., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1992, SR 92-28, 12p., ADA-262 715, 22 refs.
Collins, C.M., Olson, W.W.
Bearing tests, Ice cover strength, Ice crossings, Geotextiles.
Laboratory tests were conducted on floating freshwater ice sheets, reinforced with a high-strength polymeric mesh (Geogrid). The mesh was frozen into the ice sheets. Bearing capacity tests were conducted on each ice sheet, whose thickness varied from 3 to 13 cm, while the dynamic loads varied from 1.3 to 23 kN. Comparisons to tests on ice without reinforcement were made: Geogrid reinforcement increased the bearing capacity of thin (49 mm) ice up to 38% and of thicker ice (96 mm) about 10-15%. Failure of the ice with Geogrid reinforcement was local, whereas failure of the ice without Geogrid was over a large area. Displacement of the ice is compared to theory for plates on an elastic foundation. Field tests were conducted at Fort Wainwright, AK. A small unit support vehicle (Hagglunds BV 206) was used for loading a reinforced ice sheet that was 53 cm thick. The Geogrid, even though it was frozen into the top 7.6 cm of the ice sheet, reduced the deflection of the ice sheet.

47-2926
Studies on the characteristics of meteorological phenomena and cold wave at King Sejong Station, Antarctica.
Lee, B.Y., et al, *Korean journal of polar research*, Dec. 1992, 3(1/2), p.1-16, In Korean with English summary. 6 refs.
Chang, I.S.
Meteorological data, Seasonal variations, Snowfall, Snowstorms, Meteorological charts, Antarctica—King Sejong Station.
Meteorological observations carried out at King Sejong Station since 1988 are reported. Data obtained during 1991 are presented in tables and include the following: monthly averages and highest and lowest values for atmospheric temperature and pressure, wind speed and direction (m/s), relative humidity (%), cloudiness, dewpoint temperature, snowfall (cm), and number

of Hazards' Surface analysis weather charts for Aug. 1991, when a record low temperature of -28.7C was recorded since [illegible] meteorological observations began on King George I., are presented.

47-2927
Glacio-isostatic crustal movements caused by historical volume change of the Vatnajökull Ice Cap, Iceland.
Sigmundsson, F., et al. *Geophysical research letters*, Nov. 3, 1992, 19(21), p.2123-2126, 21 refs.
Einarsson, P.
Ice sheets, Ice volume, Earth crust, Iceland.

47-2928
Revised equation and table for determining the freezing point depression of H2O-NaCl solutions.
Bodnar, R.J., *Geochimica et cosmochimica acta*, Feb. 1993, 57(3), p.683-684, 2 refs.
Analysis (mathematics), Freezing points, Salinity, Solutions.

47-2929
Influence of latitudinal and longitudinal variations of ozone and water vapour on the solar semidiurnal tide.
Sivkov, A.M., et al, *Journal of atmospheric and terrestrial physics*, May 1993, 55(6), p.815-826, 36 refs.
Shved, G.M.
Ozone, Solar activity, Water vapor, Models.
A new tidal source model, based on climatological global ozone and water vapor distributions, has been obtained for Jan., Apr., July and Oct. The source model is used for modeling the solar semidiurnal tide in the lower thermosphere within the framework of classical tidal theory. The observed phase quasibimodality of the semidiurnal tide at mid-latitudes is possibly formed, to a great extent, by two types of hemispheric asymmetry (changing sharply near the equinox) of the ozone distribution. Near 95 km at mid-latitudes, the ozone and water vapor distribution nonzonality yields typical values of about 2 m/s for maximum longitudinal variations of the zonal and meridional wind amplitudes, and a range about 0.2-0.5 h for maximum longitudinal phase variations in the Northern Hemisphere, while they can reach about 10 m/s and about 1.5 h in the Southern Hemisphere. The hemispheric asymmetry is mainly caused by the effect of the water vapor tidal source. (Auth.)

47-2930
Dynamics of the antarctic and arctic mesosphere and lower thermosphere regions, I. The prevailing wind.
Portniagin, IU.I., et al, *Journal of atmospheric and terrestrial physics*, May 1993, 55(6), p.827-841, 27 refs.
Wind (meteorology), Atmospheric circulation, Antarctica--Scott Base, Antarctica--Mawson Station, Antarctica--Molodezhnaya Station, United States--Alaska--Poker Flat, USSR--Franz Josef Land.
The dynamics of the antarctic and arctic mesopause regions (ca. 95 +/- 15 km) are investigated through comparative analyses of winds measured by radars at the Scott Base, Molodezhnaya, and Mawson stations in the Antarctic, and the near-conjugate stations of Heiss I. and Poker Flat in the arctic region. The data were analyzed specifically to delineate hemispheric differences in mean monthly prevailing wind climatologies, and show the circulation systems in the arctic and antarctic mesosphere and lower thermospheres to exhibit significant asymmetries. These asymmetries may be attributable to hemispheric differences in dynamical forcing due to one or more of the following: insolation absorption by ozone, other mesospheric heat sources such as exothermic chemical reactions, tropospheric forcing of vertically or obliquely propagating gravity waves which engage in mesospheric mean-flow interactions, and dissipation of planetary waves which find ducting channels through the middle atmosphere. Interannual variability is also examined in the Molodezhnaya and Heiss I. data, which cover the periods 1967-1986 and 1968-1985, respectively. Accompanying significant year-to-year variability, eastward winds at 95 km over the Antarctic (Molodezhnaya Station) exhibit a trend of decreasing amplitude from 1968 to 1977 that is not reflected in the arctic data (Heiss I.). The annual mean winds at Molodezhnaya remained at the 4-8 m/s level from 1977 to 1986. (Auth. mod.)

47-2931
Dynamics of the antarctic and arctic mesosphere and the lower thermosphere regions, II. The semidiurnal tide.
Portniagin, IU.I., et al, *Journal of atmospheric and terrestrial physics*, May 1993, p.8 3-855, 13 refs.
Solar activity, Wind (meteorology), Models, Antarctica--Scott Base, Antarctica--Mawson Station, Antarctica--Molodezhnaya Station, United States--Alaska--Poker Flat, USSR--Franz Josef Land.
The semidiurnal tidal dynamics of the antarctic and arctic mesopause regions (95 +/- 15 km) are investigated through comparative analyses of monthly mean tidal wind fields determined from radar measurements at Scott Base, Molodezhnaya, and Mawson stations in the Antarctic, and the near-conjugate stations of Heiss I. and Poker Flat in the arctic region. The main feature common to all stations is the fall equinoctial maximum in amplitude (10-20 m/s), which is also reproduced by the most recent numerical tidal model. However, the wintertime amplitude growth with height and the shorter vertical wavelengths characterizing the model are features not reflected in the data. There is also a spring equinoctial maximum in the antarctic data which the model does not reproduce. The mean zonal wind maintains some degree of year-to-year variability superimposed on apparent long-term decreases of order 0.3-0.5 m/s in the Southern Hemisphere semidiurnal tidal amplitudes. Numerical simulations presented herein indicate that changes of this magnitude cannot even be induced (via mode coupling) by a change in the mean zonal wind field of order 30%, and are more plausibly explained by a secular change in the tidal forcing by ozone insolation absorption. However, in contrast to Part I, the annual mean tidal amplitude is not characterized by any significant secular trend, remaining at about 10.0 m/s throughout the 1970-1986 period. (Auth. mod.)

47-2932
New Finnish-built icebreaker for the Soviet Union.
Maclennan, G., *Maritime defence*, May 1988, No.5, p.182-183.
Icebreakers, Design, Ships.

47-2933
New class of arctic supply ship for the Soviet Union.
Maritime defence, Apr. 1988, No.4, p.141.
Ships, Design, Icebreakers.

47-2934
Oil from beneath the ice. [Neft' iz-podo l'da].
Kamenshchikov, L., *Inzhener*, July 1992, No.7, p.9-11, In Russian.
Oil recovery, Ice cover, Offshore drilling, Offshore structures.

47-2935
Ice spillways; construction and analytical-experimental bases. [Ledovye vodosbrosy; konstruktsii i raschetno-eksperimental'nye obosnovaniia].
Finagenov, O.M., et al, St. Petersburg, VNIIG, 1992, 47p., In Russian. 41 refs.
Khor'kov, V.I., Shul'man, S.G.
Spillways, Ice (construction material), Heat transfer coefficient, Ice melting.

47-2936
Bitumen-vermiculite as thermal insulation beneath a roll roof. [Bitumovermikulit kak uteplitel' pod rulonnuiu krovliu].
Antsiferov, IU.M., et al, Teploizoliatsionnye materialy i izdeliia na osnove vermikulita, mineral'noi vaty i iacheistogo betona. Sbornik nauchnykh trudov (Thermal insulation materials and products based on vermiculite, mineral wool and cellular concrete. Collected scientific papers). Edited by G.B. Gemmerling et al, Cheliabinsk, UralNIIstromproekt, 1991, p.82-85, In Russian.
Ananina, L.V.
Thermal insulation, Roofs, Bitumens, Cold weather operation, Clay minerals.

47-2937
Economic effectiveness of the production and use of lignovermiculite as thermal insulation products. [Ekonomicheskaia effektivnost' proizvodstva i primeneniia lignovermikulitovykh teploizoliatsionnykh izdelii].
Rabcheniuk, G.P., et al, Teploizoliatsionnye materialy i izdeliia na osnove vermikulita, mineral'noi vaty i iacheistogo betona. Sbornik nauchnykh trudov (Thermal insulation materials and products based on vermiculite, mineral wool and cellular concrete. Collected scientific papers). Edited by G.B. Gemmerling et al, Cheliabinsk, UralNIIstromproekt, 1991, p.85-95, In Russian. 3 refs.
Spirina, V.S., Pankratov, V.A.
Thermal insulation, Cold weather construction, Heat transfer coefficient, Cost analysis, Economic analysis, Clay minerals.

47-2938
Eroded chernozems in southern Western Siberia. [Erodirovannye chernozemy iuga Zapadnoi Sibiri].
Tanasienko, A.A., Novosibirsk, Nauka, 1992, 150p., In Russian. Refs. p.143-150.
Chernozem, Soil erosion, Cryogenic soils, Soil physics, Snowmelt, Moisture, USSR--Siberia.

47-2939
Temperature: its measurement and control in science and industry. Volume 6.
Schooley, J.F., ed, New York, American Institute of Physics, 1992, 1269p. (2 parts), Refs. passim. Proceedings of the 7th International Temperature Symposium, Toronto, Ontario, Apr. 28-May 1, 1992. For selected papers see 47-2940 through 47-2999.
Low temperature research, Cryogenics, Temperature measurement, Resistance thermometers, Thermodynamics, Phase transformations, Liquid phases, Liquefied gases, Vapor pressure, Superconductivity, Standards.

47-2940
From the IPTS-68 to the ITS-90.
Swenson, C.A., Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.1-7, 33 refs.
Low temperature research, Cryogenics, Temperature measurement, Standards.

47-2941
Noise thermometry, He-3 melting pressures and superconductive transition temperatures between 0.4 K and 0.09 K.
Bremer, J., et al, Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.15-20, 6 refs.
Durieux, M.
Low temperature research, Cryogenics, Temperature measurement, Phase transformations, Liquid phases, Liquefied gases, Superconductivity, Standards.

47-2942
Measurements on a dielectric constant gas thermometer between 3 K and 84 K.
Grohmann, K., et al, Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.21-26, 14 refs.
Luther, H.
Low temperature research, Cryogenics, Temperature measurement, Resistance thermometers, Thermodynamics, Dielectric properties, Phase transformations, Liquid phases, Liquefied gases, Vapor pressure, Standards, Mathematical models.

47-2943
NPL total radiation thermometer; extension of its range to 450 C.
Martin, J.E., et al, Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.31-35, 10 refs.
Quinn, T.J.
Low temperature research, Cryogenics, Temperature measurement, Liquefied gases, Phase transformations, Liquid phases, Thermal radiation, Radiometry, Standards.

47-2944
Temperature measurements in radiometry.
Sapritskiĭ, V.I., et al, Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.37-39, 12 refs.
Morozova, S.P., Khlevnoĭ, B.B.
Low temperature research, Cryogenics, Temperature measurement, Thermal radiation, Radiometry, Standards.

47-2945
Absolute spectral radiation thermometry at the National Physical Laboratory.
Fox, N.P., et al, Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.41-45, 18 refs.
Martin, J.E., Nettleton, D.H.
Low temperature research, Cryogenics, Temperature measurement, Thermal radiation, Lasers, Radiometry, Standards.

47-2946
International temperature scale of 1990: Part I.
Preston-Thomas, H., et al, Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.63-67, 2 refs.
Quinn, T.J.
Low temperature research, Cryogenics, Temperature measurement, Resistance thermometers, Standards.

47-2947
International temperature scale of 1990: Part II.
Preston-Thomas, H., et al, Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.69-74.
Quinn, T.J.
Low temperature research, Cryogenics, Temperature measurement, Standards.

47-2948
Computational and statistical analysis of the thermodynamic data which form the basis of the ITS-90 between 13.8 K and 273.16 K. I. Computational basis.
Ciarlini, P., et al, Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.75-78, 21 refs.
Pavese, F.
Low temperature research, Cryogenics, Temperature measurement, Thermodynamics, Standards, Mathematical models, Statistical analysis.

47-2949
Computational and statistical analysis of the thermodynamic data which form the basis of the ITS-90 between 13.8 K and 273.16 K. II. Results.
Pavese, F., et al, Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.79-83, 6 refs.
Ciarlini, P.
Low temperature research, Cryogenics, Temperature measurement, Thermodynamics, Standards, Mathematical models, Statistical analysis.

47-2950
ITS-90 below 1 K: how accurate is it.
Fogle, W.E., et al, Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.85-90, 23 refs.
Soulen, R.J., Jr., Colwell, J.H.
Low temperature research, Cryogenics, Temperature measurement, Thermodynamics, Resistance thermometers, Superconductivity, Standards.

47-2951
New cryogenic temperature scale from 6.3 to 650 mK.
Fogle, W.E., et al, Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.91-96, 19 refs.
Soulen, R.J., Jr., Colwell, J.H.
Low temperature research, Cryogenics, Temperature measurement, Thermodynamics, Phase transformations, Liquid phases, Liquefied gases, Vapor pressure, Resistance thermometers, Superconductivity, Standards.

47-2952
Extrapolation of ITS-90 to lower temperatures.
Schuster, G., et al, Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.97-100, 15 refs.
Hechtfischer, D.
Low temperature research, Cryogenics, Temperature measurement, Thermodynamics, Phase transformations, Liquid phases, Liquefied gases, Vapor pressure, Resistance thermometers, Superconductivity, Standards.

47-2953
He-3 melting curve thermometer as a universal temperature transfer standard.
Colwell, J.H., et al, Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.101-106, 13 refs.
Fogle, W.E., Soulen, R.J., Jr.
Low temperature research, Cryogenics, Temperature measurement, Thermodynamics, Phase transformations, Liquid phases, Liquefied gases, Vapor pressure, Superconductivity, Standards.

47-2954
Parasitic temperature-dependence in platinum NMR thermometry.
Hechtfischer, D., et al, Temperature: its measurement and control in science and industry. Vol.6, Part 1 Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.107-111, 17 refs.
Schuster, G.
Low temperature research, Cryogenics, Temperature measurement, Nuclear magnetic resonance, Standards.

47-2955
High-resolution He-4 melting-pressure thermometer for use near 2 K.
Goldner, L.S., et al, Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.113-116, 20 refs.
Mulders, N., Ahlers, G.
Low temperature research, Cryogenics, Temperature measurement, Thermodynamics, Phase transformations, Liquid phases, Liquefied gases, Vapor pressure, Standards, Mathematical models.

47-2956
Thermodynamic consistency of the He-4 and He-3 vapour pressure vs. temperature relations in ITS-90.
Reesink, A.L., et al, Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.117-120, 24 refs.
Durieux, M.
Low temperature research, Cryogenics, Temperature measurement, Thermodynamics, Phase transformations, Liquid phases, Liquefied gases, Vapor pressure, Standards, Mathematical models.

47-2957
He-3 gas thermometry at IMGC.
Steur, P.P.M., et al, Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.121-125, 18 refs.
Pavese, F.
Low temperature research, Cryogenics, Temperature measurement, Thermodynamics, Phase transformations, Liquid phases, Liquefied gases, Vapor pressure, Standards.

47-2958
Practical interpolation gas thermometer for a secondary realization of the ITS-90.
Sakurai, H., Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.127-131, 10 refs.
Low temperature research, Cryogenics, Temperature measurement, Thermodynamics, Phase transformations, Liquid phases, Liquefied gases, Vapor pressure, Standards.

47-2959
Gas dependence of the effective area of the piston gage to be used for the NIST realization of the ITS-90.
Meyer, C.W., et al, Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.133-138, 15 refs.
Reilly, M.L.
Low temperature research, Cryogenics, Temperature measurement, Thermodynamics, Phase transformations, Liquid phases, Liquefied gases, Vapor pressure, Standards, Mathematical models.

47-2960
Development of the ITS-90 interpolation equations for the platinum resistance thermometer.
Crovini, L., Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.139-144, 19 refs.
Low temperature research, Cryogenics, Temperature measurement, Resistance thermometers, Standards, Mathematical models.

47-2961
On designing the temperature scale in the range 13.8 K to 273.16 K.
Ling, S.K., et al, Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.145-150, 19 refs.
Wang, W., Dai, L.S.
Low temperature research, Cryogenics, Temperature measurement, Resistance thermometers, Standards, Mathematical models.

47-2962
Some ancillary equations for the ITS-90.
Rusby, R.L., et al, Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.151-154, 8 refs.
Chu, B.
Low temperature research, Cryogenics, Temperature measurement, Standards, Mathematical models.

47-2963
Realization of the ITS-90 below 83.8 K at the National Institute of Standards and Technology.
Pfeiffer, E.R., Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.155-160, 20 refs.
Low temperature research, Cryogenics, Temperature measurement, Resistance thermometers, Standards.

47-2964
Implementation of the ITS-90 below 0 C at NPL.
Head, D.I., et al, Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.161-163, 7 refs.
Rusby, R.L.
Low temperature research, Cryogenics, Temperature measurement, Resistance thermometers, Standards.

47-2965
ITS-90 traceability with non-ITS-90 equations.
Jump, B.E., Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.203-208, 8 refs.
Low temperature research, Cryogenics, Temperature measurement, Resistance thermometers, Standards, Mathematical models.

47-2966
Temperature fixed-points using high-purity superconductors.
Fellmuth, B., Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.233-238, 11 refs.
Low temperature research, Cryogenics, Temperature measurement, Superconductivity, Phase transformations, Solid phases, Standards, Mathematical models.

47-2967
Study of superconductive transition temperatures for thermometric fixed points.
Li, Z.R., et al, Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.239-242, 7 refs.
Xia, Y.J., Huang, S.K.
Low temperature research, Cryogenics, Temperature measurement, Superconductivity, Phase transformations, Solid phases, Standards.

47-2968
Sealed He-4 superfluid-transition fixed-point device.
Duncan, R.V., et al, Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.243-245, 24 refs.
Ahlers, G.
Low temperature research, Cryogenics, Temperature measurement, Phase transformations, Liquid phases, Liquefied gases, Vapor pressure, Standards.

47-2969
Triple point of pure equilibrium deuterium using Gd2O3 spin catalyst.
Head, D.I., et al, Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.247-249, 16 refs.
Rusby, R.L., Pavese, F.
Low temperature research, Cryogenics, Temperature measurement, Phase transformations, Liquid phases, Liquefied gases, Vapor pressure, Standards.

47-2970
Long-term stability of permanent realizations of the triple point of gases in metal sealed cells.
Pavese, F., et al, Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.251-256, 17 refs.
Ferri, D., Giraudi, D., Steur, P.P.M.
Low temperature research, Cryogenics, Temperature measurement, Phase transformations, Liquid phases, Liquefied gases, Vapor pressure, Standards.

47-2971
Study of the preparation of sealed cells for thermometry.
Liu, F.H., et al, Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.257-260, 9 refs.
Yang, W.Q., Huang, N.S.
Low temperature research, Cryogenics, Temperature measurement, Phase transformations, Liquid phases, Liquefied gases, Vapor pressure, Standards, Mathematical models.

47-2972
Realization and intercomparison of cryogenic triple points by means of sealed cells.
Guo, N.N., et al. Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.261-263, 4 refs.
Mao, W., Cai, B.F., Ren, M.
Low temperature research, Cryogenics, Temperature measurement, Phase transformations, Liquid phases, Liquefied gases, Vapor pressure, Standards.

47-2973
Argon triple point apparatus with multiple thermometer wells.
Furukawa, G.T., Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.265-269, 13 refs.
Low temperature research, Cryogenics, Temperature measurement, Phase transformations, Liquid phases, Liquefied gases, Vapor pressure, Resistance thermometers, Standards.

47-2974
Realization of the triple point of xenon.
Pfeiffer, E.R., et al. Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.271-275, 23 refs.
Reilly, M.L., Ancsin, J.
Low temperature research, Cryogenics, Temperature measurement, Phase transformations, Liquid phases, Liquefied gases, Vapor pressure, Resistance thermometers, Standards.

47-2975
Triple-point of trichlorofluoromethane.
Méndez-Lango, E., et al. Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.277-279, 9 refs.
Chávez, M.L., Guzmán, F.
Low temperature research, Cryogenics, Temperature measurement, Phase transformations, Liquid phases, Liquefied gases, Vapor pressure, Resistance thermometers, Standards.

47-2976
Realization of the mercury triple point.
Furukawa, G.T., Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.281-285, 11 refs.
Low temperature research, Cryogenics, Temperature measurement, Phase transformations, Solid phases, Liquid phases, Standards.

47-2977
Mercury point realization: estimate of some uncertainties.
Hermier, Y., et al. Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.287-291, 1 ref.
Bonnier, G.
Low temperature research, Cryogenics, Temperature measurement, Phase transformations, Solid phases, Liquid phases, Standards.

47-2978
Platinum resistance thermometer for exploration of the Titan atmosphere.
Ruffino, G., et al. Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.409-413, 10 refs.
Coppa, P., De Santoli, L., Castelli, A., Cornaro, C.
Low temperature research, Cryogenics, Temperature measurement, Resistance thermometers, Planetary environments, Satellites (natural), Spacecraft.

47-2979
R-T relationship and tolerances of China-made industrial platinum resistance thermometers in the temperature range from -200 to 0 C.
Mao, Y.Z., et al. Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.423-425, 1 ref.
Lin, P., Zhang, Q.G., Yue, Y., Yao, Q.F., Zhang, J.P.
Low temperature research, Cryogenics, Temperature measurement, Resistance thermometers, Standards.

47-2980
Low-temperature characteristics of some industrial-grade platinum resistance thermometers.
Tamura, O., et al. Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.443-448, 11 refs.
Sakurai, H., Nakajima, T.
Low temperature research, Cryogenics, Temperature measurement, Resistance thermometers, Standards.

47-2981
Temperature measurement with rhodium-iron resistors below 0.5 K.
Schuster, G., Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.449-451, 7 refs.
Low temperature research, Cryogenics, Temperature measurement, Resistance thermometers, Standards.

47-2982
Study of Chinese standard rhodium-iron resistance thermometers.
Mao, Y.Z., et al. Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.453-456, 8 refs.
Lin, P., Zhang, Q.G., Yue, Y.
Low temperature research, Cryogenics, Temperature measurement, Resistance thermometers, Standards.

47-2983
Fabrication and practical use of two types of rhodium-iron resistance thermometers.
Tamura, O., et al. Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.457-460, 5 refs.
Sakurai, H.
Low temperature research, Cryogenics, Temperature measurement, Resistance thermometers, Standards.

47-2984
R-T relationship and stability of ceramic rhodium-iron resistance thermometers.
Yao, Q.F., et al. Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.461-465, 8 refs.
Zhang, J.P., Fan, K., Mao, Y.Z., Lin, P.
Low temperature research, Cryogenics, Temperature measurement, Resistance thermometers, Standards.

47-2985
Rhodium-iron resistance thermometer for practical use.
Mao, Y.Z., et al. Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.467-470, 6 refs.
Low temperature research, Cryogenics, Temperature measurement, Resistance thermometers, Standards.

47-2986
Resistance thermometers with fast response for use in rapidly oscillating gas flows.
Rawlins, W., et al. Temperature: its measurement and control in science and industry. Vol.6, Part 1. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.471-474, 3 refs.
Timmerhaus, K.D., Radebaugh, R.
Low temperature research, Cryogenics, Temperature measurement, Refrigeration, Resistance thermometers, Standards.

47-2987
Low temperature system for advanced thermal control.
Lipa, J.A., et al. Temperature: its measurement and control in science and industry. Vol.6, Part 2. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.949-952, 9 refs.
Chui, T.C.P., Nissen, J.A., Swanson, D.R.
Low temperature research, Cryogenics, Temperature measurement, Temperature control, Phase transformations, Liquid phases, Liquefied gases.

47-2988
Self-tuning temperature controller for a dilution refrigerator.
Schuster, G., Temperature: its measurement and control in science and industry. Vol.6, Part 2. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.953-954, 2 refs.
Low temperature research, Cryogenics, Temperature measurement, Temperature control, Refrigeration.

47-2989
Decade of absolute noise thermometry at NIST using a resistive SQUID.
Soulen, R.J., Jr. et al. Temperature: its measurement and control in science and industry. Vol.6, Part 2. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.983-988, 17 refs.
Fogle, W.E., Colwell, J.H.
Low temperature research, Cryogenics, Temperature measurement, Superconductivity, Resistance thermometers, Standards, Mathematical models.

47-2990
Signal filtering in SQUID noise thermometers.
Nawrocki, W., Temperature: its measurement and control in science and industry. Vol.6, Part 2. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.989-991, 6 refs.
Low temperature research, Cryogenics, Temperature measurement, Superconductivity, Resistance thermometers, Standards, Mathematical models.

47-2991
Self-balancing bridge for precise susceptibility thermometry.
Schuster, G., Temperature: its measurement and control in science and industry. Vol.6, Part 2. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.1009-1011, 4 refs.
Low temperature research, Cryogenics, Temperature measurement, Resistance thermometers, Standards.

47-2992
Nuclear quadrupole resonance spectroscopy for ultra-low- temperature thermometry.
Andersen, P.M., et al. Temperature: its measurement and control in science and industry. Vol.6, Part 2. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.1013-1015, 5 refs.
Sullivan, N.S., Andraka, B.
Low temperature research, Cryogenics, Temperature measurement, Nuclear magnetic resonance, Standards.

47-2993
Cryogenic thermometer calibration system based on triple points from D2 to H2O.
Levine, P.D., et al. Temperature: its measurement and control in science and industry. Vol.6, Part 2. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.1067-1069, 4 refs.
Mellons, B.
Low temperature research, Cryogenics, Temperature measurement, Phase transformations, Liquid phases, Liquefied gases, Vapor pressure, Resistance thermometers, Standards.

47-2994
Application of mini-refrigerator in temperature measurement.
Guo, N.N., et al. Temperature: its measurement and control in science and industry. Vol.6, Part 2. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.1071-1072, 1 ref.
Cai, B.F., Ren, M.
Low temperature research, Cryogenics, Temperature measurement, Phase transformations, Liquid phases, Liquefied gases, Vapor pressure, Refrigeration, Standards.

47-2995
ITS-90 algorithms for long stem SPRT's.
Cermak, M.A., Temperature: its measurement and control in science and industry. Vol.6, Part 2. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.1087-1091, 9 refs.
Low temperature research, Cryogenics, Temperature measurement, Resistance thermometers, Standards, Computer programs, Mathematical models.

47-2996
Thermometry in the thermodynamic limit.
Chui, T.C.P., et al. Temperature: its measurement and control in science and industry. Vol.6, Part 2. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.1213-1218, 19 refs.
Swanson, D.R., Adriaans, M.J., Nissen, J.A., Lipa, J.A.
Low temperature research, Cryogenics, Temperature measurement, Thermodynamics, Phase transformations, Liquid phases, Liquefied gases, Standards.

47-2997
Low temperature glass capacitance thermometry.
Strehlow, P., et al, Temperature: its measurement and control in science and industry. Vol.6, Part 2. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.1219-1224, 36 refs.
Zitzmann, P.
Low temperature research, Cryogenics, Temperature measurement, Thermodynamics, Dielectric properties, Phase transformations, Superconductivity, Resistance thermometers, Standards, Mathematical models.

47-2998
Resolution and accuracy of cryogenic temperature measurements.
Holmes, D.S., et al, Temperature: its measurement and control in science and industry. Vol.6, Part 2. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.1225-1230, 8 refs.
Courts, S.S.
Low temperature research, Cryogenics, Temperature measurement, Standards.

47-2999
Neutron and gamma radiation effects on cryogenic temperature sensors.
Courts, S.S., et al, Temperature: its measurement and control in science and industry. Vol.6, Part 2. Edited by J.F. Schooley, New York, American Institute of Physics, 1992, p.1237-1242, 8 refs.
Holmes, D.S., Swinehart, P.R.
Low temperature research, Cryogenics, Temperature measurement, Neutron irradiation, Gamma irradiation, Standards.

47-3000
Proceedings of the NIPR Symposium on Polar Meteorology and Glaciology, No.6.
Kawaguchi, S., ed, Tokyo, National Institute of Polar Research, 1992, 167p., Refs. passim. For individual papers see 47-3001 through 47-3013 or F-48180, F-48181, F-48185, F-48187, F-48188, I-48182 through I-48184 and J-48186.
NIPR Symposium on Polar Meteorology and Glaciology, 14th, Tokyo, July 9-10, 1991.
Sea ice, Ice sheets, Albedo, Radiometry, Meteorological factors, Snow.
This is a collection of papers presented at the 14th Symposium on Polar Meteorology and Glaciology held on July 9-10, 1991, in Tokyo. It consists of 13 full-length papers, of which 9 are pertinent to Antarctica, and 19 abstracts; the former are arranged in the order of scientific areas of meteorology, glaciology, and physical oceanography.

47-3001
Estimation of surface albedo distribution in Lützow-Holm Bay and its neighborhood with NOAA-/AVHRR data.
Nakagawa, K., NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1992, p.1-15, 17 refs.
Albedo, Ice sheets, Radiometry, Sea ice, Spaceborne photography, Data processing, Mapping, Antarctica—Lützow-Holm Bay.
A method has been developed for estimating the filtered narrow band surface albedo with NOAA/AVHRR data, and was applied to analysis of the surface albedo distribution in Lützow-Holm bay and its neighborhood in 1990. As a result, 16 maps of the surface albedo distribution have been drawn. From a comparison of the albedos inferred from satellite data with those actually observed in Ongul Strait, the satellite-inferred, filtered narrow band albedos agree well with the daily means of ground-observed, unfiltered broad band albedo, despite systematic errors of about -4%. There is a characteristic pattern of surface albedo distribution in this area; the open sea has very low albedo (less than 5%), whereas most of the compact pack ice and fast ice has high albedo (more than 60%). The albedo is lower in the eastern part of Lützow-Holm Bay than in the western part. Off the Sôya Coast it is less than 40%. The ice sheet of Antarctica has remarkably high albedo (more than 80%). (Auth.)

47-3002
Microwave signature of polar firn and sea ice in the Antarctic from airborne observation.
Yamanouchi, T., et al, NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1992, p.16-35, Refs. p.34-35.
Wada, M.
Sea ice distribution, Firn, Infrared radiation, Microwaves, Spaceborne photography, Radiometry, Antarctica—Mizuho Plateau, Antarctica—Showa Station.
Airborne observations of 19.35 GHz microwave radiation were taken over the sea ice and firn cover of the antarctic ice sheet. Microwave brightness temperature was analyzed to explain satellite observations. Brightness temperature of the firn over the ice sheet varied greatly from the coast to the interior, which noticeably corresponded to the mean annual accumulation obtained at the surface. Also found was the variation of brightness temperature on a small scale of about 1-10 km, which became extreme in the sastrugi/glazed surface zone (Z route). Satellite passive microwave observations were of very low resolution, making it difficult to show these small-scale variations corresponding to the surface accumulation. In the sea ice area, the brightness temperatures were similar to the results from the satellite, being low for multi-year ice and high for first year ice. From the flight across the Riiser-Larsen Peninsula, smooth variation up to 225 K was seen over the central part of the peninsula. Also along the flight, it was easy to distinguish the ice shelf and sea ice, even when covered with snow, by microwave brightness temperature measurement. (Auth. mod.)

47-3003
Moisture budget in the antarctic atmosphere.
Yamazaki, K., NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1992, p.36-45, 8 refs.
Moisture transfer, Precipitation (meteorology), Moisture detection, Analysis (mathematics), Seasonal variations, Antarctica—Showa Station.
Climatologies of moisture flux, its convergence and accumulation rate for the antarctic region are derived from the 5-year (1986-1990) twice-daily U.S. NMC (National Meteorological Center) objective analysis data. Over the southern ocean, eastward moisture flux is dominant, while westward flux exists along the antarctic coastline. The annual mean moisture flux convergence (accumulation rate) is positive along the coastline; the maximum of 3 mm/day is found on the west coast of the Antarctic Peninsula, while it is small inland. The estimated annual accumulation over Antarctica is 135 +/- 18 mm. As for the seasonal variation, the accumulation is large in winter along the coast and over Antarctica as a whole, while it is large in summer in the inland elevated region. (Auth.)

47-3004
Results of ozonesonde observations at Syowa Station in 1990.
Shibata, S., et al, NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1992, p.46-52, 6 refs.
Morimoto, M.
Ozone, Stratosphere, Clouds (meteorology), Antarctica—Showa Station.
Ozonesonde observations carried out at Showa Station in 1990 revealed that the ozone continued to decrease rapidly from Aug. to Oct. and was destroyed almost completely, between 80 and 100 mb, during the first 10 days of Oct. The monthly mean of total ozone amount was the lowest ever observed at Showa Station in Aug. and Sep. The severe ozone depletion in 1990 was close to that of 1987 and 1989. Polar stratospheric clouds (PSCs) were observed at Showa Station in winter; their height was estimated from the angle between bright PSC edges and the sun to be between 15 and 20 km. When the PSCs appeared an extreme cold region (below -83 C) where type 2 PSCs occur was observed by stratospheric soundings. (Auth. mod.)

47-3005
On the vertical profiles of long wave radiation at Syowa Station in Antarctica.
Miyauchi, M., et al, NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1992, p.53-70, 16 refs.
Ohkawara, N.
Radiation, Radiation measuring instruments, Meteorological data, Radiometry, Antarctica—Showa Station.
Vertical profiles of long wave radiation were obtained, with 6 radiometersonde types which are basically the same, at Showa Station from 1966 to 1988. Data are analyzed for cloudless, overcast and all other conditions. The downward fluxes show good agreement with each other on average, but there are discrepancies in the upward flux. It can be inferred that the discrepancies might be caused by setting the ground surface temperature equal to the surface air temperature in calculation, and by the temperature change of the ground surface over the area that the radiometersonde observed. The upward fluxes at the 100 mb and 850 mb levels, and the downward fluxes at those levels in each month, as well as the budgets of radiative flux in the atmosphere and at the ground surface for all three conditions, are discussed. (Auth. mod.)

47-3006
Measurement of falling motion of snowflakes using CCD camera.
Muramoto, K., et al, NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1992, p.71-76, 12 refs.
Measuring instruments, Falling snow, Snowflakes, Image processing.

47-3007
Multiple scattering model for the atmosphere-snow system.
Aoki, T., NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1992, p.77-83, 8 refs.
Snow optics, Albedo, Models, Grain size, Solar radiation.

47-3008
Vertical profile of Pb-210 in an ice core from the Höghetta ice dome in Spitsbergen.
Suzuki, T., et al, NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1992, p.84-87, 8 refs.
Fujii, Y.
Radioactivity, Ice cores, Radioactive age determination, Norway—Spitsbergen.

47-3009
Atmospheric conditions reflected in chemical components in snow over east Queen Maud Land, Antarctica.
Kamiyama, K., et al, NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1992, p.88-98, 14 refs.
Watanabe, O., Nakayama, E.
Snow composition, Seasonal variations, Photochemical reactions, Atmospheric physics, Atmospheric composition, Antarctica—Queen Maud Land.
The precise vertical distribution of H2O2 in the surface snow layer at three different sites in the inland region of Antarctica was measured. The seasonal variation, traced from the vertical distribution of snow cover, reflects photochemical processes in the atmosphere and coincides with that of *delta*O-18. The values of pH and the concentration of microparticles are also discussed in regard to photochemical and migration processes in the atmosphere. Almost all substances occurring in snow have unique origins; some of them reflect physical and chemical processes in the atmosphere. (Auth.)

47-3010
Vertical profiles of total organic carbon and polar organic compounds in the ice core from Site-J, Greenland.
Kawamura, K., et al, NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1992, p.99-105, 12 refs.
Yokoyama, K., Fujii, Y.
Ice cores, Ice composition, Chemical analysis, Seasonal variations.

47-3011
Preliminary results of hydrography under fast ice in Lützow-Holm Bay, Antarctica in 1990.
Takizawa, T., et al, NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1992, p.106-125, 13 refs.
Ice water interface, Oceanographic surveys, Ice conditions, Fast ice, Sea water, Antarctica—Lützow-Holm Bay.
Seasonal variations in water structure under fast ice in Lützow-Holm Bay were observed from Apr. to Dec., 1990. Two warm and oxygen-poor waters were observed. One shows temperatures higher than 0 C, salinities of more than 34.6 and oxygen less than 6 ml/l, and is found in the bottom layer, below 700 m, in the Shirase Submarine Valley. The other is found in the upper layer, with temperatures of -1.4 C, salinities of around 34.2 and oxygen of 6.3-6.9 ml/l. The origin of both waters is a blob of the Circumpolar Deep Water (CDW) drawn from offshore, and they are admixtures of CDW with overlying Winter Water in various proportions. Due to high density, the former is confined to the bottom layers of deep troughs; the latter, with low density, migrates to the upper layer with the water circulation in the bay. In spring a cold and oxygen-rich water ($T<1.6$ C, $O2>7.2$ ml/l) was observed at the intermediate depth of about 250-350 m near the top of the downslope of the submarine valley. It is probable that this water was formed by sea ice processes during winter. (Auth.)

47-3012
Analysis of sea ice compactness by image processing.
Muramoto, K., et al, NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1992, p.126-131, 5 refs.
Sea ice distribution, Seasonal variations, Ice conditions, Image processing, Data processing.
Variations of sea ice extent, especially in the Antarctic, have long been thought to influence global climate. A new system, which measures the ice compactness and ice shape by means of processing video images, is described. Using the system, sea ice characteristics in the Antarctic were analyzed from images obtained on board the *Shirase* between Fremantle and Showa Station in 1988 by members of the 30th Japanese Antarctic Research Expedition.

47-3013
Interannual fluctuations of sea ice extent in the Antarctic and associated atmospheric conditions.
Enomoto, H., et al, NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1992, p.132-142, 16 refs.
Tian, S.F., Yamanouchi, T.
Sea ice distribution, Ice air interface, Ice volume, Seasonal variations, Meteorological factors.

This paper focuses on possible atmospheric driving forces causing sea ice fluctuations. It is seen from synoptic correlation maps that, in the case of larger sea ice extent, the circumpolar trough is located in the lower latitudes in Oct. A significant relationship is found also between temperature rise over Antarctica and increase of sea ice area. The implication is that the mean wind field changes due to the northward shift of the trough. An outburst of cold air from the continent seems to strengthen the advection of ice pack to lower latitudes and freezing in specific sectors. The temperature rise observed in East Antarctica is due to the advection of warm air. The variations of the circumpolar trough are important for changes in sea ice extent. Long-term fluctuations of the pressure and wind fields in the Southern Hemisphere are described. (Auth. mod.)

47-3014
Microwave remote sensing of sea ice.
Carsey, F.D., ed, *American Geophysical Union. Geophysical monograph series*, 1992, No.68, 462p., Refs. passim. For individual papers see 47-3015 through 47-3040 or F-48190 through F-48196.
Ice surveys, Sea ice distribution, Ice electrical properties, Remote sensing, Ice edge, Ice cover thickness, Ice surface, Air ice water interaction, Snow ice interface, Ice detection, Ice salinity, Spaceborne photography, Microwaves, Radiometry.
This volume contains a collection of papers structured in 27 integrated chapters, 7 of which are pertinent to Antarctica. It is intended to provide an orderly progression from basic observations, through modeling, to geophysical interpretation, and on to the use of the data in simulations of the roles and responses of ice in the global climate system. The book covers several areas of interest in microwave remote sensing of sea ice. The individual chapters cover sea ice, its behavior, predictive models and algorithms, products, and technology.

47-3015
Introduction.
Carsey, F.D., et al, *American Geophysical Union. Geophysical monograph series*, 1992, No.68, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.1-7, 15 refs.
Barry, R.G., Weeks, W.F.
Ice surveys, Sea ice distribution, Air ice water interaction, Ice electrical properties, Ice edge, Ice cover thickness, Spaceborne photography, Remote sensing, Microwaves, Radiometry.
This introductory chapter to "Microwave remote sensing of sea ice" reviews the sea ice and its variables, extent, its microwave properties and the developing techniques for monitoring ice conditions with microwave instruments.

47-3016
Physical properties of sea ice relevant to remote sensing.
Tucker, W.B., et al, *American Geophysical Union. Geophysical monograph series*, 1992, No.68, MP 3223, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.9-28, 73 refs.
Perovich, D.K., Gow, A.J., Weeks, W.F., Drinkwater, M.R.
Ice surveys, Ice electrical properties, Sea water freezing, Ice structure, Sea ice, Ice surface, Ice density, Ice growth, Ice crystal structure, Ice salinity, Ice cover thickness, Snow ice interface, Remote sensing.
In this chapter, the authors have attempted to illuminate aspects of sea ice that are believed to affect microwave remote sensing. In doing so, it was necessary to delve in some detail into certain processes, such as ice growth and its dynamic and thermal modifications. This was done primarily to provide a brief background useful in understanding the state of the ice at various stages in its history. Although the physical properties of sea ice have been studied for many years, they have recently taken on new significance due largely to increased remote sensing of the polar regions. While the emphasis has been to characterize and understand properties important to remote sensing, the increased attention to ice properties has enabled one to better understand properties and processes in their own right. This process is expected to continue as sensors are continually refined. (Auth. mod.)

47-3017
Physical basis for sea ice remote sensing.
Hallikainen, M., et al, *American Geophysical Union. Geophysical monograph series*, 1992, No.68, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.29-46, 47 refs.
Winebrenner, D.P.
Ice surveys, Ice electrical properties, Ice salinity, Snow ice interface, Ice temperature, Sea ice, Dielectric properties, Remote sensing, Microwaves, Radiometry, Wave propagation, Mathematical models.

47-3018
Passive microwave signatures of sea ice.
Eppler, D.T., et al, *American Geophysical Union. Geophysical monograph series*, 1992, No.68, MP 3224, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.47-71, 78 refs.
Farmer, L.D., Lohanick, A.W., Melloh, R.A.
Ice surveys, Ice electrical properties, Ice surface, Sea ice distribution, Snow ice interface, Ice openings, Polynyas, Ice detection, Remote sensing, Microwaves, Radiometry.

47-3019
SAR and scatterometer signatures of sea ice.
Onstott, R.G., *American Geophysical Union. Geophysical monograph series*, 1992, No.68, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.73-104, 52 refs.
Ice surveys, Ice electrical properties, Sea ice distribution, Ice cover thickness, Ice surface, Ice edge, Remote sensing, Microwaves, Backscattering, Synthetic aperture radar.

47-3020
Digital SAR image formation.
Wackerman, C.C., *American Geophysical Union. Geophysical monograph series*, 1992, No.68, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.105-110, 27 refs.
Ice surveys, Ice surface, Sea ice distribution, Synthetic aperture radar, Image processing, Data processing.

47-3021
Sea ice altimetry.
Fetterer, F.M., et al, *American Geophysical Union. Geophysical monograph series*, 1992, No.68, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.111-135, 48 refs.
Drinkwater, M.R., Jezek, K.C., Laxon, S.W.C., Onstott, R.G., Ulander, L.M.H.
Ice surveys, Sea ice distribution, Ice edge, Ice surface, Ice detection, Height finding, Remote sensing, Backscattering, Spaceborne photography, Radar echoes, Image processing, Mathematical models.
Potential users of radar altimetry will find sources for data from past, present, and future missions listed in Massom [1991], with a treatment of the applicability of the data to polar studies. Methods for extracting various ice parameters from the data record have been suggested in this chapter. Additional parameters and alternative ways of deriving parameters can be found in the literature. Generally, ice parameters are arrived at by first retracking and editing the altimeter data record and then deriving waveform parameters that are linked to the desired ice parameters. The processing required to derive a waveform parameter and the strength of theory linking it to an ice parameter vary. With the exception of ice edge, it has not been demonstrated that any ice parameter can be reliably retrieved from altimetry on more than a case study basis. The research reported here strongly indicates that this will change. The best hope for progress in this direction may lie in seeking an empirical connection between waveform parameters and ice conditions using global satellite data sets. (Auth. mod.)

47-3022
Microwave sea ice signature modeling.
Winebrenner, D.P., et al, *American Geophysical Union. Geophysical monograph series*, 1992, No.68, MP 3225, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.137-175, 70 refs.
Gow, A.J., Perovich, D.K.
Ice surveys, Sea ice distribution, Ice electrical properties, Ice surface, Ice cover thickness, Ice salinity, Ice density, Snow ice interface, Ice models, Remote sensing, Microwaves, Backscattering, Mathematical models.

47-3023
Laboratory investigations of the electromagnetic properties of artificial sea ice.
Swift, C.T., et al, *American Geophysical Union. Geophysical monograph series*, 1992, No.68, MP 3226, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.177-200, 21 refs.
St. Germain, K.M., Jezek, K.C., Gogineni, S.P., Gow, A.J., Perovich, D.K., Grenfell, T.C., Onstott, R.G.
Ice surveys, Ice electrical properties, Sea water freezing, Ice structure, Sea ice, Artificial ice, Young ice, Ice growth, Ice salinity, Snow ice interface, Ice cover thickness, Ice surface, Laboratory techniques.

47-3024
Estimation of geophysical parameters using passive microwave algorithms.
Steffen, K., et al, *American Geophysical Union. Geophysical monograph series*, 1992, No.68, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.201-231, 45 refs.
Ice surveys, Sea ice distribution, Ice electrical properties, Ice temperature, Ice edge, Ice detection, Air ice water interaction, Spaceborne photography, Remote sensing, Microwaves, Radiometry, Mathematical models.

47-3025
Validation of geophysical products using multisensor data.
Cavalieri, D.J., *American Geophysical Union. Geophysical monograph series*, 1992, No.68, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.233-242, 32 refs.
Ice surveys, Sea ice distribution, Ice electrical properties, Ice edge, Ice detection, Spaceborne photography, Remote sensing, Microwaves, Radiometry, Data processing.

47-3026
Microwave remote sensing of the southern ocean ice cover.
Comiso, J.C., et al, *American Geophysical Union. Geophysical monograph series*, 1992, No.68, MP 3227, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.243-259, 44 refs.
Grenfell, T.C., Lange, M.A., Lohanick, A.W., Moore, R.K., Wadhams, P.
Ice surveys, Sea ice distribution, Ice electrical properties, Ice edge, Ice salinity, Ice temperature, Ice cover thickness, Ice surface, Snow ice interface, Spaceborne photography, Remote sensing, Microwaves, Radiometry, Antarctica.
The physical and radiative characteristics of sea ice in the antarctic region have not been as extensively studied as in the arctic, because the former is generally more inaccessible. However, there have been some antarctic programs, mostly in the Weddell Sea, with good *in-situ* measurements, that have been used to advance the knowledge of the microwave characteristics of antarctic sea ice. In this chapter, the basic physical, radiative and backscatter properties of sea ice in the southern ocean are presented. Also, techniques used to derive geophysical parameters, including ice extent and concentration from space-based systems, are evaluated.

47-3027
Microwave study programs of air-ice-ocean interactive processes in the seasonal ice zone of the Greenland and Barents seas.
Johannessen, O.M., et al, *American Geophysical Union. Geophysical monograph series*, 1992, No.68, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.261-289, 80 refs.
Ice surveys, Sea ice distribution, Ice edge, Air ice water interaction, Ice electrical properties, Seasonal variations, Spaceborne photography, Remote sensing, Microwaves, Radiometry, Greenland Sea, Barents Sea.

47-3028
Considerations for microwave remote sensing of thin sea ice.
Grenfell, T.C., et al, *American Geophysical Union. Geophysical monograph series*, 1992, No.68, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.291-301, 36 refs.
Ice surveys, Sea ice distribution, Ice cover thickness, Air ice water interaction, Ice electrical properties, Young ice, Ice edge, Ice detection, Seasonal variations, Spaceborne photography, Remote sensing, Microwaves, Radiometry.
Surface-based radiometric results and principal component analysis indicate that some thin ice types can be resolved under favorable circumstances. Mixtures of thick ice and open water, however, can still give rise to ambiguities in ice type identification in available satellite data. In the Antarctic and in the northern marginal ice zones, there is often greater divergence and even more open water and thin ice than in the central Arctic. Initial comparisons of concurrent radiometric and radar data show the potential to improve discrimination of thin ice on the basis of emitted and backscattered intensities. It is expected that the ability to distinguish thin ice using satellite imagery will improve considerably with the combination of Special Sensor Microwave/Imager (SSM/I) data, high-resolution results from the First European Remote Sensing Satellite (ERS-1), and microwave models of the ice.

47-3029
Microwave remote sensing of polynyas.
Martin, S., et al, *American Geophysical Union. Geophysical monograph series*, 1992, No.68, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.303-311, 22 refs.
Steffen, K., Comiso, J.C., Cavalieri, D.J., Drinkwater, M.R., Holt, B.
Ice surveys, Sea ice distribution, Polynyas, Ice detection, Ice electrical properties, Spaceborne photography, Remote sensing, Microwaves, Radiometry.
A polynya is a large region of open water and thin ice that occurs within much thicker pack ice. The World Meteorological Organization [1970] states that a polynya consists of open water and an associated area of thin ice with thicknesses up to 0.3 m. Whereas a lead is a long linear feature, a polynya has a rectangular or oval aspect ratio and is surrounded by large floes and thick ice. Although polynyas occur in both winter and summer, this chapter is restricted to the winter case. The region of open water or reduced ice concentration that makes up the polynya persists for periods of several days, so that the polynya is the site of large exchanges of heat between the atmosphere and ocean. The systematic study of polynyas began with the advent of passive microwave satellites; in particular, the observation from the Electrically Scanning Microwave Radiometer (ESMR) of the large Weddell Sea polynya was one of the ESMR's most intriguing discoveries. As this chapter shows, a major advantage of passive microwave is that the observations provide frequent data on ice concentrations for polynya regions.

47-3030
Characterization of snow on floating ice and case studies of brightness temperature changes during the onset of melt.
Garrity, C., *American Geophysical Union. Geophysical monograph series*, 1992, No.68, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.313-328, 37 refs.
Ice surveys, Snow surface, Snow ice interface, Snow surveys, Snow water content, Ice electrical properties, Snow electrical properties, Snow density, Snow depth, Metamorphism (snow), Remote sensing, Microwaves, Radiometry, Antarctica—Weddell Sea.
Significant changes in the physical properties of snow on sea ice occur during the onset of melt in the Arctic and Antarctic. These changes have been quantified for the Arctic (Greenland and Barents Seas) and Antarctic (Weddell Sea) based on 318 snow pit measurements. Using a surface-based dual-polarized 37 GHz radiometer and the Special Sensor Microwave/Imager (SSM/I), changes in brightness temperature of sea ice have been observed for increases in snow depth, wetness, stratification, and slush at the snow-ice interface. A representative model for the passive microwave response to snow metamorphism shows changes in brightness temperature due to increases in snow wetness.

47-3031
Effects of freeze-up and melt processes on microwave signatures.
Gogineni, S.P., et al, *American Geophysical Union. Geophysical monograph series*, 1992, No.68, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.329-341, 18 refs.
Moore, R.K., Grenfell, T.C., Barber, D.G., Digby, S., Drinkwater, M.R.
Ice melting, Snow ice interface, Ice electrical properties, Ice surveys, Snow electrical properties, Ice surface, Freezeup, Air ice water interaction, Ice edge, Remote sensing, Microwaves, Radiometry.

47-3032
Determination of sea ice motion from satellite images.
Holt, B., et al, *American Geophysical Union. Geophysical monograph series*, 1992, No.68, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.343-354, 47 refs.
Rothrock, D.A., Kwok, R.
Ice surveys, Sea ice distribution, Drift, Air ice water interaction, Ice edge, Ice detection, Spaceborne photography, Synthetic aperture radar, Radar tracking, Remote sensing, Image processing, Mathematical models.

47-3033
Approach to identification of sea ice types from spaceborne SAR data.
Kwok, R., et al, *American Geophysical Union. Geophysical monograph series*, 1992, No.68, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.355-360, 11 refs.
Cunningham, G., Holt, B.
Ice surveys, Sea ice distribution, Ice detection, Ice surface, Ice electrical properties, Spaceborne photography, Synthetic aperture radar, Radar tracking, Remote sensing, Backscattering, Image processing.

47-3034
Microwave remote sensing of low-salinity sea ice.
Hallikainen, M., *American Geophysical Union. Geophysical monograph series*, 1992, No.68, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.361-373, 33 refs.
Ice surveys, Sea ice distribution, Ice salinity, Ice cover thickness, Ice electrical properties, Ice detection, Ice surface, Synthetic aperture radar, Remote sensing, Microwaves, Radiometry, Backscattering, Mathematical models, Baltic Sea.

47-3035
Ice thickness distribution inferred using remote sensing techniques.
Wadhams, P., et al, *American Geophysical Union. Geophysical monograph series*, 1992, No.68, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.375-383, 52 refs.
Comiso, J.C.
Ice surveys, Sea ice distribution, Ice cover thickness, Ice bottom surface, Subglacial observations, Ice acoustics, Underwater acoustics, Synthetic aperture radar, Lidar, Remote sensing.

47-3036
Use of satellite observations in ice cover simulations.
Preller, R.H., et al, *American Geophysical Union. Geophysical monograph series*, 1992, No.68, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.385-404, Refs. p.400-404.
Walsh, J.E., Maslanik, J.A.
Ice surveys, Sea ice distribution, Air ice water interaction, Drift, Ice forecasting, Ice models, Ice surface, Spaceborne photography, Remote sensing, Image processing, Data processing, Computerized simulation, Mathematical models.

47-3037
Ice modeling and data assimilation with the Kalman smoother.
Rothrock, D.A., et al, *American Geophysical Union. Geophysical monograph series*, 1992, No.68, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.405-418, 18 refs.
Thomas, D.R.
Ice surveys, Sea ice distribution, Ice forecasting, Ice models, Ice edge, Ice electrical properties, Air ice water interaction, Spaceborne photography, Remote sensing, Image processing, Data processing, Computerized simulation, Mathematical models, Statistical analysis, Radiometry.

47-3038
Potential applications of polarimetry to the classification of sea ice.
Drinkwater, M.R., et al, *American Geophysical Union. Geophysical monograph series*, 1992, No.68, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.419-430, 25 refs.
Kwok, R., Rignot, E.J., Israelsson, H., Onstott, R.G., Winebrenner, D.P.
Ice surveys, Sea ice distribution, Ice surface, Ice electrical properties, Polarization (waves), Remote sensing, Microwaves, Radiometry, Backscattering, Image processing, Data processing, Mathematical models, Statistical analysis.

47-3039
Information fusion in sea ice remote sensing.
Collins, M.J., *American Geophysical Union. Geophysical monograph series*, 1992, No.68, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.431-441, 77 refs.
Ice surveys, Sea ice distribution, Ice electrical properties, Ice surface, Air ice water interaction, Snow ice interface, Ice forecasting, Ice detection, Remote sensing, Image processing, Data processing, Mathematical models, Statistical analysis.

47-3040
Status and future directions for sea ice remote sensing.
Carsey, F.D., et al, *American Geophysical Union. Geophysical monograph series*, 1992, No.68, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.443-446, 21 refs.
Barry, R.G., Rothrock, D.A., Weeks, W.F.
Ice surveys, Sea ice distribution, Ice cover thickness, Air ice water interaction, Ice edge, Ice surface, Snow ice interface, Spaceborne photography, Remote sensing, Image processing, Data processing.

47-3041
Measurement of helium isotopes in Vostok ice core. [Analyse des isotopes de l'hélium dans la calotte polaire Antarctique: résultats préliminaires au site Vostok]
Jean-Baptiste, P., et al, *Académie des sciences, Paris. Comptes rendus. Série II*, Feb. 18, 1993, 316(4), p.491-497, In French with abridged English version. 11 refs.
Ice cores, Ice composition, Isotope analysis, Antarctica—Vostok Station.
Samples of ice from a short core drilled at the Vostok Station were analyzed for He-3 and He-4. The samples were taken below the firn-ice transition region (which lies 90-100 m below the surface). Results suggest that between 27 and 42% of the initial helium had escaped before the ice samples were incorporated into the copper sample tubes. *Delta*He-3 results averaged -0.8%. It is unclear whether the measured helium loss occurred only by diffusion from the ice sheet to the atmosphere or if some loss may have occurred after the core was retrieved from the drill-hole. The different causes of bias, principally linked to the high diffusivity of He in ice, are reviewed and discussed. (Auth.)

47-3042
Preprints.
Symposium on Global Change Studies, 4th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, 438p., Refs. passim. For selected papers see 47-3043 through 47-3052.
Global warming, Global change, Atmospheric circulation, Air ice water interaction, Polar atmospheres, Air water interactions, Snow cover distribution, Snow air interface, Snowfall, Precipitation (meteorology), Hydrologic cycle, Ocean currents.

47-3043
Simulation of the regional climate and hydrology of the Great Lakes basin.
Bates, G.T., et al, Symposium on Global Change Studies, 4th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.32-33, 9 refs.
Hostetler, S.W., Giorgi, F.
Lake effects, Atmospheric circulation, Precipitation (meteorology), Snowstorms, Snowfall, Air water interactions, Computerized simulation, Great Lakes.

47-3044
GCM feedback sensitivity to interactive cloud water budget parameterization.
Del Genio, A.D., et al, Symposium on Global Change Studies, 4th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.176-181, 16 refs.
Yao, M.S., Wendell, C.E.
Cloud cover, Cloud physics, Ice nuclei, Atmospheric circulation, Radiation balance, Global warming, Water content, Computerized simulation, Mathematical models.

47-3045
Apparent moratorium on greenhouse warming.
Kellogg, W.W., Symposium on Global Change Studies, 4th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.265-267, 10 refs.
Ocean currents, Global warming, Air water interactions, Atmospheric circulation, Water temperature, Water transport.

47-3046
Can greenhouse warming induce ice sheet growth.
Ledley, T.S., et al, Symposium on Global Change Studies, 4th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.272-275, 8 refs.
Chu, S.P.
Global warming, Glaciation, Air ice water interaction, Snow ice interface, Ice sheets, Hydrologic cycle, Snowfall, Glacier oscillation, Atmospheric composition, Carbon dioxide.

47-3047
Global change implications for antarctic lakes.
Lindner, B.L., et al, Symposium on Global Change Studies, 4th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.276-279, 33 refs.
McKay, C.P., Clow, G.D., Wharton, R.A., Jr.
Global warming, Frozen lakes, Ice cover thickness, Air ice water interaction, Glacial lakes, Lake ice, Ice surveys, Meltwater, Water level, Antarctica.

47-3048
Estimation of arctic precipitation from water vapor flux convergence.
Walsh, J.E., et al. Symposium on Global Change Studies, 4th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.324-328, 22 refs.
Zhou, X.
Polar atmospheres, Global warming, Air ice water interaction, Precipitation (meteorology), Atmospheric circulation, Ocean currents, Water transport, Water balance, Hydrologic cycle, Water vapor, Runoff.

47-3049
Recent trends in Northern Hemisphere snow cover.
Robinson, D.A., Symposium on Global Change Studies, 4th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.329-334, 13 refs.
Snow cover distribution, Snow air interface, Snow surveys, Global warming.

47-3050
Analysis of low-frequency climate variations over the Northern Hemisphere using historical atmospheric data.
Hurrell, J.W., et al. Symposium on Global Change Studies, 4th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.355-360, 17 refs.
Van Loon, H.
Polar atmospheres, Atmospheric circulation, Global change, Air water interactions, Ocean currents, Atmospheric pressure, Climatic changes, Surface temperature, History.

47-3051
ENSO-snow-monsoon associations and seasonal prediction.
Yang, S., Symposium on Global Change Studies, 4th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.418-422, 14 refs.
Snow cover distribution, Snow air interface, Atmospheric circulation, Global change, Air water interactions, Snowfall, Snowstorms, Precipitation (meteorology), Statistical analysis.

47-3052
Intrinsic thermodynamical time-scales of the atmosphere-ocean-cryosphere climate system.
Chu, P.C., Symposium on Global Change Studies, 4th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.433-438, 8 refs.
Air ice water interaction, Atmospheric circulation, Global change, Paleoclimatology, Glaciation, Glacier oscillation, Hydrologic cycle, Mathematical models.

47-3053
Variation of the fluorescence quantum yield in relation to photosynthesis by phytoplankton from perennially ice- covered Lake Bonney.
Neale, P.J., et al. *Antarctic journal of the United States*, 1991, 26(5), p.228-230, 6 refs.
Priscu, J.C.
Limnology, Ice cover effect, Light transmission, Photosynthesis, Antarctica—Bonney, Lake.
The authors present preliminary results on the variation of fluorescence yield of Lake Bonney phytoplankton *in vitro* and discuss approaches used to estimate primary productivity from natural fluorescence. *In situ* measurements of natural fluorescence and other bio-optical parameters are presented in a separate contribution. Preliminary results suggest that both the original and modified method for the estimation of photosynthesis from natural fluorescence shows significantly slower saturation with increasing light intensity compared to the carbon-14 derived curve. On the other hand, the fluorescence ratio method shows a closer correspondence to the saturation characteristics of carbon-14 assimilation.

47-3054
Microorganisms entrapped in glacial ice.
Catranis, C., et al. *Antarctic journal of the United States*, 1991, 26(5), p.234-236, 16 refs.
Starmer, W.T.
Microbiology, Glacier ice, Cryobiology, Greenland.

47-3055
Ozone depletion and denitrification in the antarctic stratosphere in austral spring 1990.
Deshler, T., *Antarctic journal of the United States*, 1991, 26(5), p.242-244, 8 refs.
Ozone, Stratosphere, Air temperature, Antarctica—McMurdo Station.
In 1990, the balloonborne measurement campaign at McMurdo Station began on Aug. 25 and continued until Nov. 3. During this period, 40 ozone and temperature profiles extending to approximately 32 km were measured. Instruments were also included on 6 flights to measure polar stratospheric clouds, two flights to measure condensation nuclei, and two flights to measure water vapor. Although 1987, 1989, and 1990 were similar in the amount of ozone destroyed, the altitude of maximum depletion decreased from 16.5 to 15 km. In each of these years, the altitude of maximum depletion corresponds directly with the altitude of the minimum temperature. Although similar temperature profiles were observed in 1989 and 1986, ozone depletion was nearly twice as great in 1989 compared with 1986. The coldest Oct. was 1987, although 1990 had similar temperatures; however, the Oct. average ozone-mixing ratio reached its lowest value in 1990, thus replacing 1987 as the worst year of record.

47-3056
Optical properties of snow.
Brandt, R.E., et al. *Antarctic journal of the United States*, 1991, 26(5), p.272-275, 9 refs.
Grenfell, T.C., Warren, S.G.
Snow optics, Anisotropy, Grain size, Solar radiation, Albedo, Snow impurities, Sastrugi, Snow temperature, Antarctica—Amundsen-Scott Station, Antarctica—Vostok Station.
The interaction of the snow surface with solar radiation was studied at Amundsen-Scott and Vostok stations. The flights to Vostok Station offered the opportunity to supplement the Amundsen-Scott Station measurements at a higher, drier location 1,300 km away. The authors measured spectral albedo on several clear and cloudy days at Vostok Station, and photographed the snow grains in the uppermost layers. The variability in spectral albedo from day to day due to grain-size variations is apparently larger than any systematic variation with location from Amundsen-Scott to Vostok Station. Also measured was the downward spectral irradiance under clear sky and a variety of cloud conditions. In conjunction with the albedo measurements at Vostok, a soot survey was also conducted at that station. As at Amundsen-Scott, the snow at Vostok is polluted downwind, in the range of 1-7 nanograms of carbon/g of snow. The site chosen for albedo measurement, 1 km upwind of the station, is sufficiently unpolluted that the albedo is unaffected. A second portable spectral photometer was used at Amundsen-Scott Station to measure ultraviolet albedo of snow. Effects of sastrugi on bidirectional reflectance of snow and snow temperature were also measured. Some results are discussed.

47-3057
Air-snow exchange processes.
Harder, S.L., et al. *Antarctic journal of the United States*, 1991, 26(5), p.277-278, 4 refs.
Grootes, P.M., Charlson, R.J.
Snowfall, Snow composition, Aerosols, Antarctica—Amundsen-Scott Station.
Individual daily samples from every event of snowfall, diamond dust, and frost were collected at Amundsen-Scott Station from Dec. 1990 through Feb. 1991, to address two issues: what controls the isotopic composition of precipitation, and is the isotopic composition of snow altered by sublimation after deposition. The latter is studied by determining the seasonal changes in isotopic composition of near-surface snow; the process is described. The sampling was also carried out at Vostok Station in Dec. and Jan.; the samples have not yet been analyzed for isotopic oxygen-18.

47-3058
Year-round measurement of atmospheric infrared emission at the South Pole.
Murcray, F.J., et al. *Antarctic journal of the United States*, 1991, 26(5), p.278-281.
Heuberger, R.
Infrared radiation, Ozone, Data processing, Meteorological instruments, Antarctica—Amundsen-Scott Station.
The spectral distribution of the atmospheric emission in the infrared was measured at Amundsen-Scott Station during the period from Dec. 1989 to Jan. 1991. The data obtained by a Michelson interferometer, located on the roof of Skylab, include the column densities for water, carbon dioxide, ozone, fluorocarbon-11, fluorocarbon-12, and nitric acid in the wavenumber region ranging from 500/cm to 1,500/cm. Monitoring these components during the austral winter gives important information about the change in concentration during the long absence of sunlight, contributing to the knowledge of the chemistry that influences the depletion of the ozone layer. The measurements are fully automated and require a minimum of attention. The two outside blackbodies as well as an inside reference blackbody are used for calibration. This allows the data analyzer to obtain the absolute radiance emitted by the atmosphere and its spectral distribution. Experience showed that not enough measurements are taken under favorable conditions if they are taken at fixed time intervals.

47-3059
Preprints.
Symposium on Meteorological Observations and Instrumentation, 8th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, 501p. + joint papers, Refs. passim. Includes special sessions on water vapor and ultraviolet measurements and joint papers with the 8th Conference on Applied Climatology. For selected papers see 47-3060 through 47-3085.
Weather observations, Meteorological instruments, Precipitation (meteorology), Precipitation gages, Meteorological data, Snowfall, Snow optics, Snow surveys, Climatic changes, Air temperature, Visibility.

47-3060
Frensor—a new smart pavement sensor.
Katz, D.I., Symposium on Meteorological Observations and Instrumentation, 8th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.19-22, For another source see 47-956.
Road icing, Road maintenance, Ice detection, Chemical ice prevention, Salting, Temperature measurement, Sensors, Monitors.

47-3061
Novel digital holographic imaging system for observing ice crystals in cirrus.
Cormack, R.H., et al. Symposium on Meteorological Observations and Instrumentation, 8th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.25-29, 20 refs.
Lawson, R.P.
Ice detection, Ice crystal size, Ice crystal optics, Cloud cover, Holography, Image processing, Mathematical models.

47-3062
New airborne precipitation spectrometer for atmospheric research.
Lawson, R.P., et al. Symposium on Meteorological Observations and Instrumentation, 8th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.30-35, 5 refs.
Cormack, R.H., Weaver, K.A.
Precipitation gages, Snow optics, Ice crystal optics, Snowfall, Snowflakes, Hail, Raindrops, Meteorological instruments, Particle size distribution, Airborne equipment.

47-3063
Fog, snow and rain calibrations for forward-scatter visibility sensors.
Burnham, D.C., Symposium on Meteorological Observations and Instrumentation, 8th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.66-71, 3 refs.
Snow optics, Visibility, Fog, Rain, Meteorological instruments, Sensors, Data processing, Statistical analysis.

47-3064
Instrumentation to quantitatively measure dynamic snow accumulation processes in remote regions.
Braaten, D.A., Instrumentation to measure dynamic snow accumulation processes, Symposium on Meteorological Observations and Instrumentation, 8th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.72-73, 3 refs.
Snow accumulation, Snow surveys, Snow samplers, Snow stratigraphy, Snow erosion, Wind erosion, Precipitation gages, Meteorological instruments, Markers.

47-3065
Automated snow depth measurement.
Bradley, J.T., et al, Symposium on Meteorological Observations and Instrumentation, 8th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.74-79, 4 refs.
Lewis, R., Haas, P.A.
Snow depth, Precipitation gages, Snow surveys, Snow accumulation, Blowing snow, Snow acoustics, Snow optics, Scintillation, Meteorological instruments.

47-3066
Automating the observation of blowing snow.
Lewis, R., Symposium on Meteorological Observations and Instrumentation, 8th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.86-90, 7 refs.
Blowing snow, Snow optics, Falling snow, Visibility, Meteorological instruments, Weather observations.

47-3067
CR-1 cryogenic hygrometer on board the DLR Falcon: installation, performance tests, and examples of measured data.
Busen, R., et al, Symposium on Meteorological Observations and Instrumentation, 8th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.117-120, 7 refs.
Buck, A.L.
Hygrometers, Condensation trails, Low temperature tests, Freezing points, Dew point, Humidity, Air temperature, Temperature measurement, Meteorological instruments, Airborne equipment.

47-3068
Use of a wing-mounted airflow pod for airborne wind and flux measurement.
MacPherson, J.I., Symposium on Meteorological Observations and Instrumentation, 8th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.169-174, 7 refs.
Anemometers, Air ice water interaction, Wind velocity, Wind direction, Ice edge, Turbulence, Heat flux, Meteorological instruments, Airborne equipment.

47-3069
Airborne instrumentation and computing facilities for the Canadian Atlantic Storms Program (CASP II).
Jordan, J.E., et al, Symposium on Meteorological Observations and Instrumentation, 8th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.181-185, 5 refs.
Marcotte, D.L., Hardwick, C.D., Strapp, J.W.
Aircraft icing, Ice detection, Ice reporting, Air ice water interaction, Atmospheric disturbances, Meteorological instruments, Weather observations, Airborne equipment, Data processing, Computer applications.

47-3070
Experience in correction of precipitation point measurements and analysis of correction procedures.
Golubev, V.S., Symposium on Meteorological Observations and Instrumentation, 8th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.325-328, 15 refs.
Precipitation gages, Snow water equivalent, Precipitation (meteorology), Meteorological instruments, Weather observations, Statistical analysis.

47-3071
Biases in precipitation measurements: an American experience.
Peck, E.L., Symposium on Meteorological Observations and Instrumentation, 8th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.329-334, 23 refs.
Precipitation gages, Snow water equivalent, Precipitation (meteorology), Snowfall, Meteorological instruments, Weather observations, Statistical analysis.

47-3072
Correction of Canadian winter precipitation data.
Metcalfe, J.R., et al, Symposium on Meteorological Observations and Instrumentation, 8th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.338-343, 13 refs.
Goodison, B.E.
Precipitation gages, Snowfall, Snow water equivalent, Snow surveys, Precipitation (meteorology), Meteorological instruments, Weather observations, Statistical analysis.

47-3073
Experiences in correcting point precipitation measurement in Finland.
Elomaa, E.J., Symposium on Meteorological Observations and Instrumentation, 8th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.346-350, 8 refs.
Precipitation gages, Snowfall, Snow water equivalent, Snow surveys, Precipitation (meteorology), Meteorological instruments, Weather observations, Statistical analysis.

47-3074
ASOS sensor performance—an update.
Crosby, J.D., et al, Symposium on Meteorological Observations and Instrumentation, 8th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.358-362, 2 refs.
Nadolski, V.L.
Meteorological instruments, Weather observations, Visibility, Ice storms, Precipitation (meteorology), Snow optics, Weather forecasting, Sensors.

47-3075
Capabilities of the Automated Surface Observing System (ASOS) and comparisons to manual observing techniques.
Burch, L.E., Symposium on Meteorological Observations and Instrumentation, 8th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.363-367, 2 refs.
Weather observations, Precipitation (meteorology), Meteorological instruments, Visibility, Ice storms, Weather forecasting, Meteorological data, Data processing, Computer applications.

47-3076
Weather characterization by the mean of a vertically pointing CW radar.
Duvernoy, J., et al, Symposium on Meteorological Observations and Instrumentation, 8th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.379-381, 3 refs.
Gaumet, J.L., Gilet, M.
Weather observations, Precipitation (meteorology), Meteorological instruments, Snow electrical properties, Snow optics, Weather forecasting, Meteorological data, Data processing, Computer applications.

47-3077
High frequency satellite cloud motion at high latitudes.
Herman, L.D., Symposium on Meteorological Observations and Instrumentation, 8th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.465-468, 10 refs.
Polar atmospheres, Cloud cover, Atmospheric circulation, Weather observations, Weather forecasting, Spaceborne photography, Remote sensing.

47-3078
Pre-EUCREX in-flight humidity intercomparison.
Ström, J., et al, Symposium on Meteorological Observations and Instrumentation, 8th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.479-483, 12 refs.
Brown, P., Busen, R., Guillemet, B.
Hygrometers, Humidity, Cloud droplets, Freezing points, Dew point, Air temperature, Temperature measurement, Meteorological instruments, Airborne equipment.

47-3079
Measurements on contrails of commercial aircraft.
Baumann, R., et al, Symposium on Meteorological Observations and Instrumentation, 8th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.484-489, 9 refs.
Condensation trails, Ice crystal optics, Air pollution, Lidar, Airborne equipment.

47-3080
Air temperature fluctuations in Austria 1775-1991: a contribution to greenhouse warming discussion.
Boehm, R., Symposium on Meteorological Observations and Instrumentation, 8th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.J26-J30, 9 refs.
Air temperature, Global warming, Meteorological data, Climatic changes, History, Statistical analysis, Austria.

47-3081
Homogeneity problems in Danish and Greenlandic temperature time series.
Frich, P., Symposium on Meteorological Observations and Instrumentation, 8th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.J39-J42, 11 refs.
Air temperature, Meteorological data, Climatic changes, Diurnal variations, History, Statistical analysis, Denmark, Greenland.

47-3082
Towards unbiased estimates of North American precipitation.
Groisman, P.IA., Symposium on Meteorological Observations and Instrumentation, 8th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.J43-J47, 37 refs.
Precipitation (meteorology), Meteorological data, Climatic changes, Weather observations, Snowfall, Snow water equivalent, Statistical analysis.

47-3083
Estimation of biases in precipitation gage measurements: an example using the United States raingage network.
Legates, D.R., et al, Symposium on Meteorological Observations and Instrumentation, 8th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.J48-J51, 6 refs.
DeLiberty, T.
Precipitation gages, Precipitation (meteorology), Meteorological data, Weather observations, Snowfall, Statistical analysis.

47-3084
Homogeneity of precipitation time series in Finland.
Heino, R., Symposium on Meteorological Observations and Instrumentation, 8th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.J52-J55, 5 refs.
Precipitation gages, Precipitation (meteorology), Meteorological data, Weather observations, Snowfall, Statistical analysis, Finland.

47-3085
Long precipitation series in Norway—analysis of homogeneity and regionalization.
Hanssen-Bauer, I., et al, Symposium on Meteorological Observations and Instrumentation, 8th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.J56-J61, 6 refs.
Førland, E.J.
Precipitation (meteorology), Meteorological data, Weather observations, Climatic changes, History, Statistical analysis, Norway.

47-3086
Report on the antarctic expedition of the r/v *Professor Siedlecki* to the sea-ice zone, 1988-1989.
Rakusa-Suszczewski, S., *Polish polar research*, 1991, 12(4), p.485-494, 2 refs.
Sea ice, Marine biology, Expeditions, Antarctica—Weddell Sea, Antarctica—Elephant Island, South Orkney Islands.
The expedition was organized by the Institute of Ecology, Polish Academy of Sciences. Its purpose was to research the zone ahead of the pack-ice in the northern region of the Weddell Sea between Elephant I. and the South Orkney Is. The research was conducted on a meso-scale, continuing the studies begun earlier further to the west. The region studied and the period of study complemented the EPOS research program. A brief outline of Expedition details is provided, including personnel on the scientific team, schedule/calendar, map of the voyage from Elephant I. to the South Orkneys, and a list of sampling stations. (Auth. mod.)

47-3087
Hydrology and hydrochemistry of the surface water layer near the ice-edge in the Scotia Sea (December 1989-January 1989).
Tokarczyk, R., et al, *Polish polar research*, 1991, 12(4), p.495-505, With Polish summary. 33 refs.
Lipski, M., Perez, F.F., Reboredo, R.P.
Hydrology, Hydrogeochemistry, Sea ice, Scotia Sea.
Four water masses were distinguished in the upper water layer between Elephant I. and the South Orkneys. Measurements of temperature, salinity, concentrations of dissolved oxygen and silicates were used for the analysis of the hydrological situation and to recognize the origin of water masses. For additional information, nitrates and chlorophyll concentrations were used. Drake Passage and Bransfield Strait waters occupied the western part of the investigated area, from surface to 150 m depth. Below, the Circumpolar Warm Deep Waters (CWDW) were found. The region east of 53.5W was occupied by winter Weddell Sea water. Above this, a 45 m thin layer of summer modification of Weddell Sea Surface Water was found between 49W and the South Orkneys. The highest chlorophyll *a* concentrations were found in this modified water. (Auth.)

47-3088
Environmental conditions and phytoplankton standing crop near pack-ice in the Scotia Sea (December 1988-January 1989).
Lipski, M., *Polish polar research*, 1991, 12(4), p.507-513, With Polish summary. 22 refs.
Pack ice, Plankton, Water chemistry, Scotia Sea.
Results of an oceanographic survey along the edge of drifting pack ice in the area between Elephant I. and the South Orkney Is. are reported. The influence of sea ice on hydrological factors was very weak. It was not possible to develop oceanographic features characteristic for marginal sea- ice zones in the areas with well-marked surface currents and dynamic hydrological conditions. The spatial distribution of chlorophyll was governed by water stability, although during this survey, areas with enhanced vertical stability could not be described in terms of a sea-ice edge influence. (Auth.)

47-3089
Distribution of microflagellates and diatoms in the sea-ice zone between Elephant Island and the South Orkney Islands (December 1988-January 1989).
Kopczyńska, E., *Polish polar research*, 1991, 12(4), p.515-528, With Polish summary. 28 refs.
Sea ice, Plankton, Scotia Sea, Antarctica—Weddell Sea.
The highest concentrations of algal cells and of algal carbon were associated with a lens of ice melt water in the northeast of the study area. Phytoflagellates were dominant at all stations, with greater numbers always in the 0-20 m surface layer and with the peaks of Cryptophyceae in the open waters and also near the ice edge east of 50W. Picoplankton flagellates and monads were generally next in abundance and most important numerically in the near-ice stations in the western part of the study area. Parasinophyceae were usually more abundant than *Nitzschia cylindrus* (Grunow) Hasle, the only common diatom species found mainly in the western stations near ice edge. The presence of *N. cylindrus*, dominant in the pack ice and in phytoplankton near the ice edge, shows that algae released from ice may act as an inoculum for the phytoplankton. (Auth.)

47-3090
Distribution of net phytoplankton in the sea-ice zone between Elephant Island and the South Orkney Islands (December 1988-January 1989).
Ligowski, R., et al. *Polish polar research*. 1991, 12(4), p.529-546. With Polish summary. Refs. p.543-546.
Kopczyńska, E.
Ice edge, Plankton, Sea ice, Antarctica—King George Island, Antarctica—Bransfield Strait, Scotia Sea.
Altogether 105 algal taxa were identified including 101 diatom species. *Chaetoceros criophilus* was dominant in the western part of the study area influenced by waters from the Bellingshausen Sea. *Corethron criophilum* was abundant in the Weddell Sea water mass east of 53.5W. *Nitzschia cylindrus*, common in the ice-melt samples, was dominant in only two net phytoplankton collections obtained at the ice-edge zone. Additional samples from Admiralty Bay, King George I revealed the dominance of *Chaetoceros socialis* and the presence of many tychoplankton species. Very few diatom cells were found in the open waters of the Bransfield Strait which, combined with the presence of krill, suggested intensive grazing by herbivores. The unstable waters of the Weddell-Scotia Confluence area contained little phytoplankton except for a station dominated by *Phaeocystis pouchetii*. Greater cell densities were related to warm, lower salinity Weddell Sea water of summer modification found in the surface layer east from 49W. (Auth.)

47-3091
Sea ice microalgae at the northern boundary of the pack ice between Elephant Island and South Orkney Islands (December 1988-January 1989).
Ligowski, R., *Polish polar research*. 1991, 12(4), p.547-563. With Polish summary. Refs. p.561-563.
Microbiology, Marine biology, Sea ice, Ice edge, Scotia Sea.
At the northern border of pack ice a study on chlorophyll *a* content, density of cells, species composition and domination in samples from the drifting ice floes and from brash ice was carried out. 102 taxa of algae were found in the pack ice. In the study area algal taxa were rather uniformly distributed. In different ice layers the qualitative composition of diatom assemblages was similar and usually the diatom *Nitzschia cylindrus* was dominant and most frequent. Chlorophyll *a* content and the density of cells varied strongly in various habitats. Ice floes near the northern pack ice border contained low levels of chlorophyll *a*. However, brash sea ice originating from ice floes averaged 142.4 mg cu m of chlorophyll *a* in visibly discolored and 30.1 mg cu m of chlorophyll *a* in not visibly discolored parts. The range of chlorophyll *a* content and the presence of characteristic species aided in the identification of brash ice infiltration assemblage of diatoms. (Auth. mod.)

47-3092
Macrozooplankton near the pack ice between Elephant Island and the South Orkney Islands (December 1988-January 1989).
Siciński, J., et al. *Polish polar research*. 1991, 12(4), p.565-582. With Polish summary. 36 refs.
Kittel, W., Zmijewska, M.I.
Microbiology, Plankton, Ice edge, Antarctica—Elephant Island, South Orkney Islands.
Macrozooplankton were caught at 17 stations with a Bongo net from the 0-200 m layer. The stations were located near the pack ice edge between Elephant I. and the South Orkney Is. The cluster analysis of 58 recognized taxa provided the means to distinguish 3 regions: the western - near Elephant I., the middle and the eastern - at the South Orkney Is. No clear difference in macrozooplankton species composition at the open sea stations and those near pack ice was found. The average biomass of macrozooplankton in the investigated area amounted to 82.8 g 1000 cu m. Macrozooplankton was dominated by salps and krill. The biomass were 52.0 g 1000 cu m and 26.1 g 1000 cu m, respectively. Differences in the biomass distribution of some taxa in three distinguished regions were observed. Except for salps, the biomass of particular taxa caught near the pack ice edge and the same taxa caught in stations distant from this edge were similar. The biomass of salps was evidently higher in most northern stations. (Auth.)

47-3093
Krill migration at the ice edge zone (December 1988-January 1989).
Godlewska, M., et al. *Polish polar research*. 1991, 12(4), p.583-592. With Polish summary. 27 refs.
Klusek, Z.
Marine biology, Ice edge, Pack ice, Migration, Antarctica—Elephant Island, South Orkney Islands.
At the ice edge krill undergoes diurnal migrations with the period of 12 hours and amplitude of about 6 m. The mean depth of krill occurrence is 41 m, shallower then for open waters. These migration parameters are characteristic of juvenile adolescent krill dominating at the ice edge. (Auth.)

47-3094
Distribution and abundance of krill *Euphausia superba* Dana at the ice edge zone between Elephant Island and the South Orkney Islands.
Godlewska, M., et al. *Polish polar research*. 1991, 12(4), p.593-603. With Polish summary. 26 refs.
Klusek, Z., Kamionka, L.
Plankton, Distribution, Sea ice, Antarctica—Elephant Island, South Orkney Islands.
In the investigated area the overall abundance of krill was small and was increasing with distance from the ice. However, with the data available it was not possible to decide whether this increase was related to the ice border or was part of a larger-scale phenomenon. The depth distributions as well as the mean values of krill depth were similar to those of open water both in this study and as reported in the literature. (Auth.)

47-3095
Ichthyoplankton near ice edge between King George Island and the South Orkney Islands.
Skóra, K.E., *Polish polar research*. 1991, 12(4), p.605-611. With Polish summary. 10 refs.
Plankton, Distribution, Ice edge, Antarctica—King George Island, South Orkney Islands.
In the region between King George I. and the South Orkney Is 7 fish species from 6 families were found. The concentration of larvae at the edge of drifting ice was higher, 2550 ind cu m, than in the stations situated at a distance from the ice edge, 930 ind cu m. (Auth.)

47-3096
Anions and cations in a snow pit on the top of Nelson ice cap, the South Shetland Islands, Antarctica.
Qin, D.H., et al. *Chinese science bulletin*. Feb. 1993, 38(4), p.312-316, 11 refs.
Mayewski, P.A., Wake, C.P., Yang, Q.Z.
Snow composition, Ion density (concentration), Antarctica—Nelson Island, South Shetland Islands.
The Antarctic Ice Sheet contains a lot of detailed records of the changing processes of the environment, climate and industrialization. In recent years, glaciochemistry has been progressing rapidly. Soluble ions are the major impurity deposited on polar glaciers and also are an important aspect of glaciochemistry. Previous studies have covered several locations in Antarctica except the region around the Great Wall Station. This note presents the first measurements of soluble anions and cations in a snow pit on top of Nelson I. The characteristics of glaciochemistry and environment of the region are discussed. (Auth.)

47-3097
Mechanisms of attenuation of acoustic waves in antarctic ice.
Price, P.B., *Nuclear instruments & methods in physics research*, Feb. 1, 1993, A235(1,2), p.346-356, 34 refs.
Ice acoustics, Ice crystal structure, Ice physics, Antarctica—Byrd Station, Antarctica—Amundsen-Scott Station.
To guide in the design of an array of acoustic detectors of ultrahigh-energy neutrino interactions leading to electromagnetic cascades in the antarctic ice, estimates of acoustic wave attenuation in the frequency regime of 1 to 100 kHz are made. The mechanisms are scattering and reflection at grain boundaries and energy loss due to internal friction. For South Pole ice at -55 C, internal friction is mainly due to proton reorientation, and is small enough to permit acoustic waves at all frequencies of interest to propagate through more than 100 m. At frequencies above about 20 kHz the attenuation is mainly due to Rayleigh scattering at grain boundaries. For a mean crystal radius of 0.1 cm at 1 km depth, estimated from available data, it is concluded that, even for a random distribution of c- axes, acoustic waves throughout the frequency regime of interest will lose less than about 1 dB per 100 m at -55 C. Dispersion of arrival time and energy of the acoustic wavefront due to attenuation will not degrade the ability to measure the direction and energy of the cascade. (Auth.)

47-3098
Preprints.
Conference on Atmospheric Chemistry, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, 140p., Refs. passim. For selected papers see 47-3099 through 47-3102.
Atmospheric composition, Air pollution, Scavenging, Cloud physics, Aerosols, Ozone, Ice crystal nuclei, Ice vapor interface.

47-3099
Nine-winter record of cloud-droplet physical and chemical properties at a mountain-top site in Colorado, USA.
Hindman, E.E., et al, Conference on Atmospheric Chemistry, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.15-22, 19 refs.
Campbell, M.A., Borys, R.D.
Cloud droplets, Condensation nuclei, Snow crystal nuclei, Atmospheric composition, Cloud cover, Cloud physics, Atmospheric circulation, Alpine landscapes, Unfrozen water content, Winter, United States—Colorado.

47-3100
Study on the in-cloud removal of trace chemicals with a detailed microphysical and chemical model.
Chen, J.P., et al, Conference on Atmospheric Chemistry, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.53-56, 10 refs.
Lamb, D.
Atmospheric composition, Scavenging, Cloud physics, Ice crystal nuclei, Air pollution, Precipitation (meteorology), Alpine landscapes.

47-3101
Heterogeneous reactions on sulfuric acid surfaces.
Williams, L.R., et al, Conference on Atmospheric Chemistry, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.122-126, 29 refs.
Golden, D.M.
Atmospheric composition, Ozone, Polar atmospheres, Air pollution, Stratosphere, Global change, Aerosols, Photochemical reactions.
The importance of heterogeneous processes in the chemical balance of the stratosphere has been dramatically illustrated by the annual appearance of the ozone hole during the antarctic spring. Heterogeneous reactions on particle surfaces in the polar stratospheric clouds convert chlorine reservoir molecules into easily photolyzed active chlorine species which lead to ozone destruction. In addition, heterogeneous reactions remove odd nitrogen which would normally sequester active chlorine in stable reservoir molecules. There is now increasing evidence that similar heterogeneous chemistry on the background stratospheric sulfate aerosol may be contributing to global ozone depletion. The following 4 reactions are considered to be key contributors to the antarctic ozone hole: ClONO2 + H2O yields HOCl + HNO3, N2O5 + H2O yields 2 HNO3, ClONO2 + HCl yields Cl2 + HNO3, N2O5 + HCl yields ClNO2 + HNO3. All 4 reactions occur efficiently on water ice and nitric acid trihydrate, the materials believed to make up polar stratospheric clouds (PSCs). Laboratory results on the rates of heterogeneous reactions on sulfuric acid surfaces indicate that of the 4 reactions implicated in the antarctic ozone hole, only the second appears to be fast enough on sulfuric acid to affect the partitioning of nitrogen species and thus the ozone concentration. (Auth. mod.)

47-3102
The sorption and reactions of SO2, H2O2, and O3 on ice.
Pellerano, D., et al, Conference on Atmospheric Chemistry, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.131-134, 16 refs.
Lamb, D.
Atmospheric composition, Ice vapor interface, Scavenging, Air pollution, Aerosols, Ice crystals.

47-3103
Glacimarine sedimentary environment of Expedition Fiord, Canadian High Arctic.
Gilbert, R., et al, *Marine geology*, Mar. 1993, 110(3/4), p.257-273, 43 refs.
Aitken, A.E., Lemmen, D.S.
Sediments, Acoustic measurement, Drill core analysis, Ice rafting, Canada—Northwest Territories—Axel Heiberg Island.

47-3104
Recessed deflecting road reflector.
Sheldon, S.A., *U.S. Patent Office. Patent*, July 18, 1989, 6 col., USP-4,848,958, 6 refs.
Snow removal, Road maintenance, Winter maintenance, Markers, Subsurface structures, Reflectivity, Design, Cold weather performance.

47-3105
Snow and ice melting system for automotive vehicles.
Ahmed, M.I., *U.S. Patent Office. Patent*, July 18, 1989, 12 col., USP-4,848,510, 13 refs.
Vehicles, Cold weather performance, Equipment, Traction, Snow melting, Ice melting, Heating, Air flow, Design.

47-3106
Tire snow belt.
Lenet, L., *U.S. Patent Office. Patent*, July 18, 1989, 4 col., USP-4,848,430, 11 refs.
Tires, Covering, Traction, Ice solid interface, Design, Cold weather performance.

47-3107
Buildings for harsh environments.
Wallhead, M., *U.S. Patent Office. Patent*, July 18, 1989, 8 col., USP-4,848,046, 28 refs.
Buildings, Panels, Cold weather performance, Snowdrifts, Portable shelters, Design.

47-3108
Fiber optic probe system.
Brossia, C.E., et al, *U.S. Patent Office. Patent*, July 25, 1989, 20 col., USP-4,851,817, 6 refs.
Wu, S.C.
Ice detection, Probes, Electronic equipment, Radiation measuring instruments, Light transmission, Optical properties, Ice accretion, Design.

47-3109
Frost plug heater.
Smith, E.L., *U.S. Patent Office. Patent*, July 25, 1989, 6 col., USP-4,851,640, 28 refs.
Electric heating, Electric equipment, Engines, Temperature control, Design.

47-3110
Continuous snow chain.
Lew, H.S., *U.S. Patent Office. Patent*, July 25, 1989, 8 col., USP-4,850,410, 3 refs.
Tires, Cables (ropes), Covering, Portable equipment, Skid resistance, Rubber snow friction, Design.

47-3111
Plastic moldboards for snow plows and the like.
Ciula, J.C., *U.S. Patent Office. Patent*, Feb. 14, 1989, 14 col., USP-4,803,790, 2 refs.
Road maintenance, Snow removal, Equipment, Plastics snow friction, Cold weather performance, Design.

47-3112
Fluid line deicer.
Wilson, D.W., *U.S. Patent Office. Patent*, Feb. 14, 1989, 6 col., USP-4,804,013, 8 refs.
Vehicles, Brakes (motion arresters), Freezeup, Ice removal, Ice melting, Cold weather performance, Hydraulics, Design.

47-3113
Compositional state detection system and method.
Sinnar, A.M., *U.S. Patent Office. Patent*, Feb. 28, 1989, 12 col., USP-4,808,824, 5 refs.
Ice detection, Measuring instruments, Infrared equipment, Ice [illegible]hickness, Radiation absorption, Chemical [illegible]n, Design.

47-3114
Dilatometric variations of calcareous rock cylinders during freeze thaw cycles. [Variations dilatométriques de cylindres de roches calcaires subissant des cycles de gel-dégel].
Prick, A., et al, *Permafrost and periglacial processes*, Jan.-Mar. 1993, 4(1), p.1-15, In French with English summary. 26 refs.
Pissart, A., Ozouf, J.C.
Periglacial processes, Freeze thaw cycles, Frost action, Rock mechanics, Cryogenics, Ice solid interface, Water transport.

47-3115
High-latitude rock glaciers: a case study of forms and processes in the Canadian Arctic.
Evans, D.J.A., *Permafrost and periglacial processes*, Jan.-Mar. 1993, 4(1), p.17-35, With French summary. 40 refs.
Rock glaciers, Talus, Origin, Periglacial processes, Classifications, Geomorphology, Permafrost transformation, Geocryology.

47-3116
Freeze-thaw activity and some of its geomorphic implications in the Abisko Mountains, Swedish Lappland.
Nyberg, R., *Permafrost and periglacial processes*, Jan.-Mar. 1993, 4(1), p.37-47, With French summary. 18 refs.
Slope processes, Mountain soils, Periglacial processes, Geocryology, Solifluction, Freeze thaw cycles, Geomorphology, Site surveys.

47-3117
Investigations of cryogenic weathering in Europe and northern Asia.
Konishchev, V.N., et al, *Permafrost and periglacial processes*, Jan.-Mar. 1993, 4(1), p.49-64, With French summary. 39 refs.
Rogov, V.V.
Rock mechanics, Periglacial processes, Frost weathering, Geocryology, Lithology, Microstructure.

47-3118
Pleistocene periglacial structures and landforms in western Czechoslovakia.
Czudek, T., *Permafrost and periglacial processes*, Jan.-Mar. 1993, 4(1), p.65-75, With French summary. 12 refs.
Pleistocene, Periglacial processes, Geomorphology, Geocryology, Frost action, Permafrost transformation.

47-3119
Approach to determine the origin and age of massive ice blockages in two arctic caves.
Lauriol, B., et al, *Permafrost and periglacial processes*, Jan.-Mar. 1993, 4(1), p.77-85, With French summary. 24 refs.
Clark, I.D.
Ground ice, Periglacial processes, Origin, Ice formation, Ice caves, Isotope analysis, Cryogenic textures.

47-3120
Determination of pollen accumulation rates in frozen sediments.
Wang, X.C., et al, *Permafrost and periglacial processes*, Jan.-Mar. 1993, 4(1), p.87-93, With French summary. 26 refs.
Geurts, M.-A.
Palynology, Permafrost physics, Ice lenses, Sedimentation, Frost heave, Drill core analysis, Quaternary deposits, Accuracy.

47-3121
Changes in microstructure of fine-grained soils due to freezing.
Grechishchev, S.E., et al, *Permafrost and periglacial processes*, Jan.-Mar. 1992, 3(1), p.1-10, With French summary. 12 refs. For another source see 46-1835.
Pavlov, A.V., Ponomarev, V.V.
Soil tests, Freeze thaw tests, Frozen ground mechanics, Geocryology, Phase transformations, Electron microscopy, Microstructure, Soil water migration.

47-3122
Solifluction meter for permafrost sites.
Lewkowicz, A.G., *Permafrost and periglacial processes*, Jan.-Mar. 1992, 3(1), p.11-18, With French summary. 11 refs.
Permafrost surveys, Permafrost mass transfer, Active layer, Solifluction, Measuring instruments, Design, Performance.

47-3123
Hydrogen and oxygen isotopes and the origin of the ice in peat plateaus.
Harris, S.A., et al, *Permafrost and periglacial processes*, Jan.-Mar. 1992, 3(1), p.19-27, With French summary. 21 refs.
Schmidt, I.H., Krouse, H.R.
Permafrost surveys, Discontinuous permafrost, Permafrost hydrology, Ground ice, Origin, Peat, Chemical composition, Isotope analysis.

47-3124
Dynamics of rock glaciers of the northern Tien Shan and the Djungar Ala Tau, Kazakhstan.
Gorbunov, A.P., et al, *Permafrost and periglacial processes*, Jan.-Mar. 1992, 3(1), p.29-39, With French summary. 16 refs.
Titkov, S.N., Poliakov, V.G.
Periglacial processes, Geocryology, Rock glaciers, Slope processes, Geological surveys, Mass transfer, Periodic variations.

47-3125
Micro-relief on a rock glacier, Dalton Range, Yukon, Canada.
Johnson, P.G., *Permafrost and periglacial processes*, Jan.-Mar. 1992, 3(1), p.41-47, With French summary. 13 refs.
Periglacial processes, Glacier ice, Rock glaciers, Mass transfer, Surface structure, Microrelief, Shear properties.

47-3126
Frost action of rock faces within a glacier of the Juran Neuchâtel. [La gélivation des parois rocheuses dans une glacière du Jura Neuchâtelois].
Pancza, A., *Permafrost and periglacial processes*, Jan.-Mar. 1992, 3(1), p.49-54, In French with English summary. 14 refs.
Ice caves, Subglacial caves, Periglacial processes, Frost action, Microclimatology, Subglacial observations, Ice solid interface.

47-3127
Holocene periglacial processes and environmental changes in Daqingshan Mountains, Inner Mongolia, China.
Cui, Z.J., et al, *Permafrost and periglacial processes*, Jan.-Mar. 1992, 3(1), p.55-62, With French summary. 10 refs.
Song, C.Q.
Periglacial processes, Paleoclimatology, Paleobotany, Mountain soils, Climatic changes, Vegetation patterns, Soil profiles.

47-3128
Small-scale patterned ground, Comeragh Mountains, southeast Ireland.
Wilson, P., *Permafrost and periglacial processes*, Jan.-Mar. 1992, 3(1), p.63-70, With French summary. 39 refs.
Periglacial processes, Mountain soils, Soil analysis, Geocryology, Patterned ground, Surface structure, Grain size.

47-3129
Massive ice interactions with offshore structures.
Lu, M.C., Fairbanks, University of Alaska, 1992, 153p., University Microfilms order No.DA9303402, Ph.D. thesis. 70 refs.
Ice loads, Ice solid interface, Offshore structures, Ice floes, Ice pressure, Ice cover strength, Ice elasticity, Ice deformation, Ice islands, Computer programs, Mathematical models.

47-3130
Influence of winter road maintenance on traffic accident rates.
Hanbali, R.M., Milwaukee, Marquette University, 1992, 305p., University Microfilms order No.-DA9227122, Ph.D. thesis. 69 refs.
Road icing, Road maintenance, Safety, Salting, Snow removal, Chemical ice prevention, Accidents, Winter maintenance, Cost analysis, Economic analysis, Statistical analysis.

47-3131
Low-temperature isothermal physical hardening of asphalt cements.
Bahia, H.U.M., University Park, Pennsylvania State University, 1991, 292p., University Microfilms order No.DA9214103, Ph.D. thesis. Refs. p.232-240.
Concrete hardening, Concrete freezing, Concrete pavements, Concrete durability, Concrete retarders, Bituminous concretes, Cements, Low temperature tests, Rheology, Road maintenance, Isotherms, Mathematical models.

47-3132
Evaluation of low temperature and permanent deformation characteristics of some polymer modified asphalts.
Hussain, S.R., Edmonton, University of Alberta, 1990, 246p., M.S. thesis. Refs. passim.
Concrete freezing, Concrete pavements, Concrete durability, Concrete admixtures, Bituminous concretes, Cements, Frost protection, Frost resistance, Low temperature tests, Road maintenance, Polymers, Computer programs, Mathematical models.

47-3133
Passive microwave remote sensing of snow-covered floating ice during spring conditions in the Arctic and Antarctic.
Garrity, C., North York, Ontario, York University, 1991, 348p., Ph.D. thesis. Refs. p.324-343.
Ice surveys, Snow ice interface, Ice detection, Snow surveys, Snow depth, Ice cover thickness, Ice reporting, Sea ice distribution, Snow water content, Slush, Metamorphism (snow), Remote sensing, Microwaves, Radiometry, Mathematical models.
It is possible to classify first year from multi-year ice during the onset of melt period using a dual-polarized 37 GHz radiometer. The classification is based on the emission from the snow cover instead of from the sea ice when the snow is not dry. A snow cover on first year ice is typically thinner than for multi-year ice. Once snow depth and density are obtained, the amount of water a snow cover contains can be determined. If the brightness temperature is low and polarized, there could be slush at the snow-ice interface. Mapping of slush on sea ice would be a useful parameter to shipping since slush will reduce the speed of a ship. Based on 191 snow profiles over sea ice in the Weddell Sea during the spring of 1989, snow cover on antarctic ice was more homogeneous than on arctic ice. The snow cover thickness ranged from 0.05 to 1 m on second-year ice and rafted first-year ice. Average slush thickness was 6 cm. Snow cover further from the continent towards the ice edge was more advanced in snow metamorphism. When air temperatures were less than 268 K, snow wetness ranged from 0.1% to 0.4% where there was no slush at the snow ice interface, and from 0.4% to 2% where there was slush. When air temperatures were 268 to 273 K, snow wetness ranged from 1% to 2%, and when air temperatures were above 273 K, the snow wetness could reach 3%. (Auth. mod.)

47-3134
Prediction and fault detection of building energy consumption using multi-input, single-output dynamic model.
Pakanen, J., *Finland. Technical Research Centre (Valtion teknillinen tutkimuskeskus). VTT publications*, 1992, No.116, 32p. + appends., 13 refs.
Buildings, Climate control, Indoor climates, Cold weather performance, Heating, Statistical analysis, Computerized simulation, Mathematical models.

47-3135
Frost effects on the microstructure of high strength concrete, and methods for their analysis.
Kukko, H., *Finland. Technical Research Centre (Valtion teknillinen tutkimuskeskus). VTT publications*, 1992, No.126, 133p. + appends., Ph.D. thesis to be defended at the Helsinki University of Technology. Refs. p.125-133.
Concrete freezing, Concrete durability, Concrete strength, Concrete admixtures, Frost resistance, Frost protection, Frost action, Freeze thaw tests, Porosity, Microstructure, Mathematical models.

47-3136
Global and regional changes in atmospheric composition.
Mészáros, E., Boca Raton, FL, Lewis Publishers, 1993, 175p., Refs. p.147-165.
Atmospheric composition, Air pollution, Global change, Human factors, Environmental impact, Ozone.

47-3137
Ice, rain, fog, and frost protection.
Society of Automotive Engineers, *SAE aerospace information report*, 1990, AIR1168/4, 62p., 34 refs.
This report is included in the 3rd edition of the SAE aerospace applied thermodynamics manual.
Aircraft icing, Ice prevention, Ice removal, Defrosting, Mathematical models.

47-3138
New multipurpose icebreaker proves Finnish shipbuilding know-how. *Schiff und Hafen/Seewirtschaft*, Oct. 1992, 44(10), p.42,44.
Icebreakers, Ice navigation, Pipe laying.

47-3139
Antarctica and the detection of environmental change.
Weller, G., *Royal Society of London. Philosophical transactions. Series B*, Nov. 30, 1992, 338(1285), p.201-208, 4 refs.
DLC QH301.R648a
Environmental protection, Climatic changes, Sea ice, Air ice water interaction.
Antarctica plays a critical role in global change because major interactions in this region among the atmosphere, ice, oceans, and biota affect the entire global system through feedbacks, dynamic biogeochemical cycles, deep ocean circulation, atmospheric transport of energy and pollutants, and changes in mass balance. Antarctica is also sensitive to global change and is a key area for detecting and monitoring environmental change. The parameters to be monitored in Antarctica, the deficiencies in the present measurements, and future methods and techniques were listed by the Scientific Committee on Antarctic Research (SCAR) as part of an overall global change research strategy for Antarctica, and are summarized in this paper. (Auth.)

47-3140
Response of antarctic climate in general circulation model experiments with transiently increasing carbon dioxide concentrations.
Cattle, H., et al, *Royal Society of London. Philosophical transactions. Series B*, Nov. 30, 1992, 338(1285), p.209-218, 27 refs.
Murphy, J.M., Senior, C.A.
DLC QH301.R648a
Climatic changes, Air ice water interaction, Models.
Processes in the southern ocean around Antarctica are important for determining the global pattern of transient temperature change as CO2 increases. This is illustrated by results from two experiments. First, an experiment with a high resolution (2.5 deg x 3.75 deg) atmospheric model coupled to a simple slab ocean in which the response of climate to an instantaneous doubling of greenhouse gas concentrations was examined, and this showed the largest induced warming to be in the polar regions in winter, similarly to the results of previous experiments carried out at the Meteorological Office and elsewhere. However, an experiment with a deep ocean model and a (more realistic) 1% per annum increase in greenhouse gas concentrations shows the pattern of global warming to be shifted to give minimum values around Antarctica as a result of deep oceanic mixing processes in the southern ocean, consistent with similar experiments carried out at other centers. (Auth. mod.)

47-3141
Ozone loss in Antarctica: the implications for global change.
Pyle, J.A., et al, *Royal Society of London. Philosophical transactions. Series B*, Nov. 30, 1992, 338(1285), p.219-226, Refs. p.225-226.
DLC QH301.R648a
Ozone, Stratosphere, Atmospheric composition, Chemical analysis, Models.
Although stratospheric ozone loss had been predicted for many years, the discovery of the antarctic ozone hole was a surprise which necessitated major rethinking in theories of stratospheric chemistry. The new ideas advanced are discussed here. Global ozone loss has now also been reported after careful analysis of satellite and groundbased data sets. The possible causes of this loss are considered. Further advances require a careful coordination of field measurements and large-scale numerical modeling. (Auth.)

47-3142
Ice core record: past archive of the climate and signpost to the future.
Lorius, C.J., et al, *Royal Society of London. Philosophical transactions. Series B*, Nov. 30, 1992, 338(1285), p.227-234, Refs. p.232-234.
Jouzel, J., Raynaud, D.
DLC QH301.R648a
Ice cores, Climatic changes, Paleoclimatology, Atmospheric composition, Antarctica—Vostok Station.
Ice cores from Antarctica provide multi proxy records of climate and environmental parameters. They have recorded glacial-interglacial temperature changes with cold stages associated with lower snow accumulation and high concentration of aerosols from marine and continental sources. The 160,000-year-long Vostok isotope temperature record exhibits signatures of the insolation orbital forcing as well as a close association between climate and greenhouse gas concentrations. These gases are likely to have played an important role in amplifying the amplitude of past global temperature changes. Data from the ice show evidence of anthropogenic impact on atmospheric greenhouse gases (CO2 and CH4) over the past 200 years. They suggest a climate sensitivity to greenhouse forcing which is consistent with General Circulation Model simulations for a future doubled atmospheric CO2. Further ice coring in Antarctica should help to improve the understanding of the climate system. (Auth.)

47-3143
Response of large ice sheets to climatic change.
Drewry, D.J., et al, *Royal Society of London. Philosophical transactions. Series B*, Nov. 30, 1992, 338(1285), p.235-242, Refs. p.241-242.
Morris, E.M.
DLC QH301.R648a
Ice sheets, Glacier mass balance, Ice volume, Ice models, Climatic changes, Ice air interface.
The antarctic ice sheet contains between 24 M cu km and 29 M cu km of ice, equivalent to a eustatic sea level change of between 60 m and 72 m. The annual surface accumulation is estimated to be of the order of 2200 Gtonnes, equivalent to a sea level change of 6 mm/a. Analysis of the present-day accumulation regime of Antarctica indicates that about 25% (*ca.* 500 Gt/a) of snowfall occurs in the Antarctic Peninsula region with an area of only 6.8% of the continent. For the Antarctic Peninsula with mountainous terrain containing ice caps, outlet glaciers, valley glaciers and ice shelves, where there can be significant ablation at low levels and distinct climatic regimes, models of the climate response are complex. In addition, owing to the high accumulation and flow rates, even short- to medium-term predictions must take account of ice dynamics. Relationships are derived for the mass balance sensitivity and, using a model developed by Hindmarsh, the transient effects of ice dynamics are estimated. It is suggested that for a 2 C rise in mean annual surface temperature over 40 years, ablation in the Antarctic Peninsula region would contribute at least 1.0 mm to sea level rise, offsetting the fall of 0.5 mm contributed by increased accumulation. (Auth. mod.)

47-3144
Southern ocean sea-ice distributions and extents.
Parkinson, C.L., *Royal Society of London. Philosophical transactions. Series B*, Nov. 30, 1992, 338(1285), p.243-250, 22 refs.
DLC QH301.R648a
Sea ice distribution, Ice volume, Seasonal variations.
Results presented here show in a variety of forms some of the variability that occurred in the southern ocean sea-ice distributions and extents over the 1970s and 1980s. Interannual variability is examined by identifying changes in three measures: sea-ice extents, sea-ice distributions, and the length of the sea-ice season. Regarding these three: maximum ice extents varied by approximately 12%, decreasing during the mid-1970s, followed by increases over the next few years and a levelling off for much of the 1980s; the area of interannual variability in monthly average sea-ice distributions in summer far exceeds the summertime area of consistent ice coverage, in sharp contrast to wintertime, when the area of consistent ice coverage is considerably larger; the length of the sea-ice season, calculated for the years 1979-1986, with satellite passive microwave data coverage through all months of the year, showed increases over that period in the Ross Sea but decreases in the Weddell and Bellingshausen seas. In both cases it appears, through comparisons with data from 1973-1976, that the 1979-1986 changes more likely reflect a fluctuating behavior of the ice cover than a long-term trend. The changes in the ice cover have influences not only on the ocean and the atmosphere but on aquatic plant and animal life as well. (Auth. mod.)

47-3145
Sedimentary record of antarctic climate change.
Barker, P.F., *Royal Society of London. Philosophical transactions. Series B*, Nov. 30, 1992, 338(1285), p.259-267, Refs. p.265-267.
DLC QH301.R648a
Climatic changes, Paleoclimatology, Glaciation, Glacial deposits, Paleoecology, Ice sheets, Sea ice.
Circum-Antarctic marine sediments contain a record of past climate and southern ocean circulation that both complements and considerably extends the record in the continental ice. Variations in primary biological production, reflecting changes in sea-ice cover and sea surface temperature, in bottom current strength and the size of the grounded continental ice sheet, all contribute to changes in sediment characteristics, in a record extending back many million years. It is possible to assess both the value of the proxy record in antarctic sediments, and the validity of the analog approach to understanding climate change, by focusing on the last glacial cycle and, for comparison, on earlier periods that were significantly different: the Pliocene before 3 Ma that could provide an analog for global warming, and the Oligocene before there was an Antarctic Circumpolar Current. (Auth.)

47-3146
Rock weathering, soil development and colonization under a changing climate.
Hall, K.J., et al, *Royal Society of London. Philosophical transactions. Series B*, Nov. 30, 1992, 338(1285), p.269-277, Refs. p.276-277.
Walton, D.W.H.
DLC QH301.R648a
Climatic changes, Weathering, Soil formation, Ecosystems.
Antarctic continental soils are arid, saline and lacking in organic matter, whereas maritime soils, in a wetter environment, range from structureless lithosols to frozen peat. Two important factors in the development and diversity of their associated terrestrial communities are water availability and the period of exposure since deglaciation. The retreat of ice sheets offers new sites for colonization by microbes, plants and animals. The interactions among snow lie, freeze-thaw cycles, wet-dry cycles and the length of the summer are considered as critical in determining the extent and rate of localized changes in weathering and pedogenesis. The implications of higher temperatures and differing precipitation regimes are considered in relation to weathering, soil development and the establishment and development of terrestrial communities. It is concluded that, in the context of decades, most changes will be slow and localized. They are unlikely to be of regional significance, unlike some of those in the Arctic. They will, however, provide a good model of how present soils and communities developed at the end of the last glacial maximum.

47-3147
Matter and methods at low temperatures.
Pobell, F., Berlin, Springer-Verlag, 1992, 319p., Refs. p.287-305.
Cryogenics, Low temperature research, Temperature measurement, Phase transformations, Mathematical models.

47-3148
Glacial geology and glacial sediment geochemistry in the Clyde Forks-Westport area of Ontario.
Kettles, I.M., *Canada. Geological Survey. Paper*, 1992, No.91-17, 34p. + maps, With French summary. Refs. p.32-34.
Glacial deposits, Glacial geology, Exploration, Geochemistry, Minerals, Quaternary deposits, Geological surveys, Geological maps, Canada—Ontario.

47-3149
Improvements in general circulation model performance in simulating antarctic climate.
Simmonds, I., *Antarctic science*, Dec. 1990, 2(4), p.287-300, 46 refs.
Polar atmospheres, Atmospheric circulation, Air ice water interaction, Wind (meteorology), Atmospheric pressure, Global change, Computerized simulation, Antarctica.

47-3150
Canada-France Pipeline-Ground Freezing Experiment: Frozen transition experiment. First freeze period and pipe relaxation period.
Carleton University, Geotechnical Science Laboratories, Ottawa, May 1992, 68p., IR-62, 14 refs.
Underground pipelines, Pipeline freezing, Frost heave, Soil freezing, Gas pipelines, Freeze thaw tests, Frost penetration, Soil pressure, Permafrost beneath structures, Frozen ground settling, Thaw consolidation, Strain tests.

47-3151
Oxygen-18 in permafrost ice.
Vaikmäe, R., International Symposium on Isotope Techniques in Water Resources Development, Vienna, Mar. 11-15, 1991. Proceedings, Vienna, International Atomic Energy Agency, 1992, p.587-601, 22 refs.
Permafrost dating, Ground ice, Ice dating, Paleoclimatology, Ice composition, Fossil ice, Ice wedges, Isotope analysis, Oxygen isotopes, Drill core analysis, Climatic changes, Global change.

47-3152
Ice cores: a bibliography.
Macqueen, A.D., *Scott Polar Research Institute Library. Occasional bibliography*, 1992, No.16, 48p., 600 refs.
Ice cores, Bibliographies.
This bibliography lists all relevant publications on ice cores through June 1992, in the Scott Polar Research Institute Library database, University of Cambridge, England. Of a total of 600 citations, about 240 are pertinent to Antarctica. Included

are annotations, a subject and geographic index, and an author index.

47-3153
Snow and avalanches in the Dolomites and Veneto Fore-alps, winter season 1991-92. [Neve e valanghe nelle Dolomiti e Prealpi Venete, stagione invernale 1991-92].
Cagnati, A., et al, Arabba, Italy, Regione del Veneto, Dipartimento Foreste, Centro Sperimentale Valanghe e Difesa Idrogeologica, [1993], 45p., In Italian with English summary. 4 refs.
Snowfall, Avalanches, Snow depth, Snow cover stability, Snowstorms, Snow surveys, Air temperature, Italy.

47-3154
Hydrological yearbook 1989. [Hydrologinen vuosikirja 1989].
Leppäjärvi, R., ed, Helsinki, Vesi- ja ympäristöhallitus (National Board of Waters and the Environment), 1992, 174p., In Finnish, English, and Swedish.
Water reserves, Water level, River flow, Runoff, Stream flow, Hydrology, Snow water equivalent, Snow depth, Precipitation (meteorology), Freezeup, Ice breakup, Frost penetration, Statistical analysis, Finland.

47-3155
Structure and dynamics in hexagonal ice: a molecular dynamics simulation with an *ab initio* polarizable and flexible potential.
Sciortino, F., et al, *Journal of chemical physics*, Apr. 1, 1993, 98(7), p.5694-5700, 26 refs.
Corongiu, G.
Ice physics, Ice structure, Molecular structure, Molecular energy levels, Phase transformations, Water structure, Simulation, Solid phases.

47-3156
Cirrus optical properties determination from actinometric observations.
Tarasova, T.A., *Izvestiya. Atmospheric and oceanic physics*, Apr. 1992, 27(9), p.690-696, Translated from Izvestiia. Fizika atmosfery i okeana. 12 refs.
Cloud physics, Optical properties, Atmospheric density, Solar radiation, Ice crystal optics, Light scattering, Light scattering, Climatic changes, Radiation balance.

47-3157
Investigation of cirrus microstructure on May 15, 1989.
Burkovskaia, S.N., et al, *Izvestiya. Atmospheric and oceanic physics*, Apr. 1992, 27(9), p.714-724, Translated from Izvestiia. Fizika atmosfery i okeana. 18 refs.
Kosarev, A.L., Naumov, A.IA.
Cloud physics, Aerial surveys, Microstructure, Particle size distribution, Water content, Ice crystals.

47-3158
Cirrus identification from multichannel satellite data.
Sterliadkina, E.A., et al, *Izvestiya. Atmospheric and oceanic physics*, Apr. 1992, 27(9), p.729-733, Translated from Izvestiia. Fizika atmosfery i okeana. 5 refs.
Sutovskiĭ, V.M., IUrov, V.I.
Cloud cover, Radiometry, Spaceborne photography, Classifications, Ice crystal optics, Ice detection, Image processing.

47-3159
Kinetic enrichment of stable isotopes in cryogenic calcites.
Clark, I.D., et al, *Chemical geology*, Dec. 15, 1992, 102(1-4), p.217-228, 30 refs.
Lauriol, B.
Geochemistry, Geocryology, Diagenesis, Carbon isotopes, Ground water, Ground ice, Chemical properties, Caves, Mineralogy.

47-3160
Multiple-scattering lidar experiments.
Werner, C., et al, *Optical engineering*, Aug. 1992, 31(8), p.1731-1745, 44 refs.
Streicher, J., Herrmann, H., Dahn, H.G.
Cloud physics, Remote sensing, Lidar, Scattering, Ice detection, Ice crystal optics, Polarization (waves), Meteorological factors, Optical properties, Performance.

47-3161
Stratospheric ozone on Adélie Coast. [L'ozone stratospherique en Terre-Adélie].
Aimedieu, P., *Expéditions polaires françaises. Missions Paul-Emile Victor. Bulletin d'information*, June 1990, No.24, p.47-49, In French.
Ozone, Stratosphere, Meteorological instruments, Antarctica—Adélie Coast.
Studies of stratospheric ozone carried out at Dumont d'Urville Station since 1986 are discussed. Methods of analysis of data obtained by a spectrometer (SAOZ) a lidar and an ozonosonde, installed at the Station in 1988-1989, are described. In comparing the SAOZ data with satellite (TOMS) data, it was found that TOMS indicated much lower ozone values than those obtained from SAOZ; an interpretation for this difference is proposed.

47-3162
Atmospheric physics and chemistry of Adélie Coast. [La physico-chimie de l'atmosphere en Terre-Adélie].
Polian, G., *Expéditions polaires françaises. Missions Paul-Emile Victor. Bulletin d'information*, June 1990, No.24, p.50-59, In French with English summary. 13 refs.
Radioactivity, Fallout, Air pollution, Snow impurities, Atmospheric composition, Ozone, Antarctica—Adélie Coast.
Several physico-chemical atmospheric processes of great importance for the Southern Hemisphere as well as the whole planet, occurring in the antarctic area, were studied. Lead 210, a long lived decay product of radon 222, has been continuously recorded at Dumont d'Urville Station since the early 60s, providing information on a possible recent alteration of the antarctic atmospheric general advective pattern (possibly related to the ozone hole). The same isotope, measured in the superficial firn layers, has yielded dating and accumulation rates of snow during the last 100 years. By means of comparison with strontium 90 data measured in the firn, washout factor and dry deposition rates have been calculated. (Auth. mod.)

47-3163
Construction of the Dumont d'Urville airfield. [Construction de l'aerodrome de Dumont d'Urville].
Engler, M., *Expéditions polaires françaises. Missions Paul-Emile Victor. Bulletin d'information*, June 1990, No.24, p.78-83, In French with English summary.
Ice runways, Cold weather construction, Antarctica—Dumont d'Urville Station.
Detailed plans for the construction of a coastal airstrip in the vicinity of Dumont d'Urville Station are reviewed. An experimental model for a causeway 100 m long and 60 m wide, created after a preliminary study of environmental conditions at the selected site, is described. The construction of the actual causeway across 7 islets, 1000 m long and able to support a runway, began in the summer of 1988-1989 and is to be completed in Dec. 1992.

47-3164
Polar engineering. [Ingenierie polaire].
Guichard, A., et al, *Expéditions polaires françaises. Missions Paul-Emile Victor. Bulletin d'information*, June 1990, No.24, p.84-87, In French with English summary.
Regrettier, J.F.
Cold weather construction, Structures, Ice runways, Antarctica—Dumont d'Urville Station.
The polar area's specific and particularly hard climate requires the development of new techniques. France, whose station on Adélie Coast is an exceptional experimental site, has launched a wide-ranging technological research program, involving continuous field work since 1987. This polar engineering research centers on four main themes: structure analysis, ground-structure interaction, ice-structure interaction, and environmental data processing.

47-3165
Eocene-Oligocene climatic and biotic evolution.
Prothero, D.R., ed, Princeton, N.J., Princeton University Press, 1992, 568p., Refs. passim. For selected papers see E-48285 through E-48289 or 47-3166.
Berggren, W.A., ed.
DLC QE737.E53
Paleoclimatology, Ice sheets, Glaciation.
Five papers, included in the second chapter of this book, deal with Eocene-Oligocene climatic events in the southern ocean. Late Paleogene ice sheets, deep-water history, antarctic glaciation, and faunal and floral turnover are discussed.

47-3166
Evidence from the antarctic continental margin of Late Paleogene ice sheets: a manifestation of plate reorganization and synchronous changes in atmospheric circulation over the emerging southern ocean?.
Bartek, L.R., et al, Eocene-Oligocene climatic and biotic evolution. Edited by D.R. Prothero and W.A. Berggren, Princeton, Princeton University Press, 1992, p.131-159, Refs. p.154-159.
Sloan, L.C., Anderson, J.B., Ross, M.I.
DLC QE737.E53
Glacial geology, Paleoclimatology, Glaciation, Ice sheets, Antarctica—Ross Sea.
Results from parametrically modelled simulations of southern ocean paleoclimates suggest that the development of the East Antarctic ice sheet may have been triggered by the opening of a seaway between Antarctica and Australia during late Cretaceous/early Paleogene time. The development of a seaway between the two continents decreased the continentality of the region and resulted in onshore transport of moist air over Antarctica. Transport of moisture over the cold antarctic continental landmass resulted in precipitation and the formation of antarctic ice sheets by at least late Paleogene time. Widespread erosion of the continental shelf and shelf overdeepening occurred when the ice advanced onto the Ross Sea continental shelf during late Oligocene time. It is hypothesized that metastable marine-based ice sheets have waxed and waned on the Ross Sea continental shelf since the Oligocene grounding event. These results are at least in part supported by results from an atmospheric general circulation model. (Auth. mod.)

47-3167
Preliminary study of electromagnetic emissions from cracks in ice.
Fifolt, D.A., et al, *Philosophical magazine B*, Mar. 1993, 67(3), p.289-299, 9 refs.
Petrenko, V.F., Schulson, E.M.
Ice physics, Ice electrical properties, Electric charge, Ice cracks, Cracking (fracturing), Electrical measurement, Ice microstructure, Glaciology.

47-3168
On the nature of electrical polarization of materials caused by cracks. Application to ice electromagnetic emission.
Petrenko, V.F., *Philosophical magazine B*, Mar. 1993, 67(3), p.301-305, 22 refs.
Ice physics, Ice electrical properties, Ice cracks, Cracking (fracturing), Charge transfer, Polarization (charge separation), Electric fields, Analysis (mathematics).

47-3169
Oscillations of an ice sheet under a periodically varying load.
Kozin, V.M., et al, *Journal of applied mechanics and technical physics*, Mar. 1993, 33(6), p.746-750, Translated from Prikladnaia mekhanika i tekhnicheskaia fizika. 7 refs.
Skripachev, V.V.
Sea ice, Ice sheets, Ice breaking, Air cushion vehicles, Oscillations, Stress concentration, Flexural strength, Analysis (mathematics).

47-3170
Ice level and volume variations of the Caresèr glacier (Ortles-Cevedale Group) between 1980 and 1990. [Variazioni di livello e volumetriche sulla vedretta del Caresèr (Gruppo Ortles-Cevedale) tra il 1980 e il 1990].
Giada, M., et al, *Geografia fisica e dinamica quaternaria*, 1991, 14(2), p.221-227, In Italian with English summary. 4 refs.
Zanon, G.
Alpine glaciation, Glacier surveys, Glacier mass balance, Photogrammetric surveys, Periodic variations, Glacier surfaces.

47-3171
Reports on the Glaciological Survey of 1990. [Relazioni della Campagna Glaciologica 1990].
Armando, E., et al, *Geografia fisica e dinamica quaternaria*, 1991, 14(2), p.263-310, In Italian.
Smiraglia, C., Zanon, G.
Glaciology, Glacier surveys, Glacier oscillation, Periodic variations, Mountain glaciers.

47-3172
Polarimetric observations and theory of millimeter-wave backscatter from snow cover.
Mead, J.B., et al, *IEEE transactions on antennas and propagation*, Jan. 1993, 41(1), p.38-46, 13 refs.
Snow cover structure, Radar echoes, Remote sensing, Backscattering, Polarization (waves), Ice crystal optics, Anisotropy, Analysis (mathematics).

47-3173
Evolution of the internal drainage system in the lower part of the ablation area of Storglaciären, Sweden.
Hock, R., et al, *Geological Society of America. Bulletin*, Apr. 1993, 105(4), p.537-546, 41 refs.
Hooke, R.L.
Glacial hydrology, Glacier ablation, Subglacial drainage, Subglacial caves, Subsurface structures, Ice water interface, Seasonal variations.

47-3174
Action of electric fields on the plastic deformation of pure and doped ice single crystals.
Petrenko, V.F., et al, *Philosophical magazine A*, Jan. 1993, 67(1), p.173-185, 27 refs. For another version see 46-3906.
Schulson, E.M.
Ice physics, Ice deformation, Plastic deformation, Ice electrical properties, Ice crystal structure, Electric fields, Doped ice, Analysis (mathematics).

47-3175
Composition and properties of glacigenic sediments in the southwestern Barents Sea.
Saettem, J., et al, *Marine geotechnology*, July-Dec. 1991, 10(3-4), p.229-255, 55 refs.
Rise, L., Westgaard, D.A.
Marine geology, Glacial geology, Bottom sediment, Physical properties, Glacial deposits, Boreholes, Drill core analysis, Lithology.

47-3176
Electrochemical characteristics of aluminum galvanic anodes in an arctic seawater.
Tamada, A., et al, *Corrosion science*, Feb. 1993, 34(2), p.261-277, 16 refs.
Tamura, Y.
Sea water, Offshore structures, Protection, Metals, Corrosion, Liquid solid interfaces, Polarization (charge separation), Temperature effects.

47-3177
Surface-defect vibrational modes of large ice clusters.
Rowland, B., et al, *Journal of physical chemistry*, Mar. 18, 1993, 97(11), p.2485-2487, 12 refs.
Fisher, M., Devlin, J.P.
Ice physics, Ice spectroscopy, Infrared spectroscopy, Ice crystal structure, Defects, Spectra, Surface structure, Molecular energy levels.

47-3178
Comment on porosities of ice films used to simulate stratospheric cloud surfaces.
Keyser, L.F., et al, *Journal of physical chemistry*, Mar. 18, 1993, 97(11), p.2800-2803, Includes reply. 10 refs. For article under discussion see 46-5256.
Cloud physics, Heterogeneous nucleation, Ice surface, Porosity, Ice vapor interface, Simulation, Accuracy.

47-3179
French research on polar ozone. [Recherches françaises sur l'ozone polaire].
Pommereau, J.P., *Expéditions polaires françaises. Missions Paul-Emile Victor. Bulletin d'information*, Aug. 1991, No.25, p.28-35, In French.
Ozone, Polar atmospheres, Stratosphere, Atmospheric composition, Antarctica—Dumont d'Urville Station.
Data from daily measurements of ozone and NO2, carried out at Dumont d'Urville Station for over 3 years, are discussed. A figure is presented showing the variations of total ozone during 1989 and the difference between satellite (TOMS) and spectrometer (SAOZ) data, the former showing significantly lower total column ozone than the latter. Daily variations of NO2 are also illustrated.

47-3180
Use of concrete for new structures on Adélie Coast. [Emploi du béton pour la construction de nouvelles infrastructures en Terre-Adélie].
Leguet, J.L., *Expéditions polaires françaises. Missions Paul-Emile Victor. Bulletin d'information*, Aug. 1991, No.25, p.76-80, In French with English summary.
Cold weather construction, Construction materials, Concrete structures, Low temperature tests, Antarctica—Adélie Coast.
A laboratory test and the building of a hangar, designed to prove the feasibility of the use of concrete in polar construction, are described. After providing some guidelines for dealing with low temperature and wind action effects on materials and equipment, it is concluded that the results of the operation permit one to consider with confidence the use of concrete on Adélie Coast.

47-3181
Iceberg impact program. [Programme "Impacts icebergs"].
Guichard, A., *Expéditions polaires françaises. Missions Paul-Emile Victor. Bulletin d'information*, Aug. 1991, No.25, p.81-87, In French with English summary. 12 refs.
Impact tests, Iceberg towing, Ice solid interface, Antarctica—Adélie Coast.
Full scale experiments taking place on Adélie Coast to study the impact of icebergs on massive structures are discussed. The constraining geographic setting as well as the innovative aspect of those experiments impose a long-term job. After two campaigns, the methods are settled, and great hopes for the experiments of the 1991/92 summer season are expressed. Experimentation principles are outlined. (Auth. mod.)

47-3182
Proceedings.
International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1992, SR 92-27, 485p., ADA-263 267, Refs. passim. For individual papers see 47-3183 through 47-3229.
Tobiasson, W., ed, Wright, E., ed.
Snow loads, Roofs, Snow removal, Cold weather construction, Snow depth, Snow surveys, Building codes, Snowdrifts, Snow cover stability, Design criteria.

47-3183
Statistical analysis of annual extreme ground snow weights for structural design.
Joh, O., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.3-14, 2 refs.
Sakurai, S., Shibata, T.
Snow loads, Snow depth, Snow density, Snow surveys, Building codes, Safety, Statistical analysis.

47-3184
Snow load variation with altitude in Norway.
Sandvik, R., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.15-20, 4 refs.
Snow loads, Snow surveys, Topographic effects, Statistical analysis.

47-3185
Estimation of ground snow depth based on topographic factors.
Takahashi, T., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.21-32, 12 refs.
Mihashi, H., Izumi, M.
Snow loads, Snow depth, Snow surveys, Topographic effects, Building codes, Safety, Statistical analysis.

47-3186
Continuous measurement of snowfall intensity per short time interval.
Tamura, M., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.33-43, 2 refs.
Snowfall, Precipitation gages, Artificial melting, Road maintenance, Monitors.

47-3187
Use of snow survey data in determination of ground snow loads.
Powell, D.R., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.45-56, 10 refs.
Snow loads, Snow surveys, Snow water equivalent, Snow survey tools, Runoff forecasting.

47-3188
Effects of roof size and heat transfer on snow loads on flat roofs.
Irwin, P.A., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.59-68, 9 refs.
Gamble, S.L., Retzlaff, R.N., Taylor, D.A.
Snow loads, Roofs, Snow heat flux, Heat loss, Building codes, Statistical analysis.

47-3189
Field measurement and characteristic analyses of snow load on flat roofs.
Mihashi, H., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.69-80, 7 refs.
Takahashi, T., Izumi, M.
Snow loads, Roofs, Snow surveys, Snow depth, Snow density, Statistical analysis.

47-3190
Roof snow observation and application to house construction.
Nakamura, T., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.81-92, 9 refs.
Abe, O., Takada, S.
Snow loads, Roofs, Snow depth, Houses, Cold weather construction, Design criteria.

47-3191
Survey of roof snow depths by aerial photogrammetry.
Sakurai, S., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.93-103, 6 refs.
Joh, O., Shibata, T.
Snow loads, Roofs, Snow depth, Photogrammetry.

47-3192
Wind effects on snow accumulation on a flat roof.
Suzuya, J., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.105-116, 11 refs.
Uematsu, Y., Nozawa, T.
Snow loads, Roofs, Snow depth, Wind factors, Statistical analysis.

47-3193
Three-dimensional simulation of powder avalanches.
Brandstätter, W., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.119-133, 14 refs.
Weiser, K., Schaffhauser, H.
Avalanche modeling, Avalanche mechanics, Avalanche formation, Snow cover stability, Computerized simulation, Mathematical models.

47-3194
Snow load prediction in the Andes Mountains and downtown Toronto.
Williams, C.J., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.135-145, 4 refs.
Gamble, S.L., Kochanski, W.W.
Snow loads, Roofs, Safety, Computerized simulation, Statistical analysis.

47-3195
Investigations on snow disasters and development of a disaster potential index.
Ito, T., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.147-156, 1 ref.
Avalanche forecasting, Snow cover stability, Snow depth, Snowstorms, Accidents, Statistical analysis, Japan.

47-3196
Estimation of daily snow mass on the ground using air temperature and precipitation data.
Kamimura, S., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.157-167, 4 refs.
Umemura, T.
Snow loads, Roofs, Snow surveys, Snow depth, Snow density, Degree days, Statistical analysis.

47-3197
Simulation on depth of newly fallen snow based on AMeDAS data.
Yamada, Y., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.169-178, 6 refs.
Ikarashi, T.
Snowfall, Snow depth, Weather forecasting, Snow surveys, Meteorological data, Computerized simulation.

47-3198
Wind tunnel modeling of snow accumulations on large-area roofs.
Isyumov, N., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.181-193, 11 refs.
Mikitiuk, M.
Snow loads, Roofs, Snowdrifts, Snow depth, Wind erosion, Wind tunnels, Mathematical models.

47-3199
Laboratory studies of snow drifts on multilevel roofs.
O'Rourke, M.J., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.195-206, 8 refs.
Weitman, N.
Snow loads, Roofs, Snowdrifts, Wind erosion, Mathematical models.

47-3200
Development of a wind tunnel for the study of snowdrifting.
Toyoda, K., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.207-214, 3 refs.
Tomabechi, T.
Snow loads, Snowdrifts, Snowstorms, Snow fences, Wind tunnels.

47-3201
Excess loads on flat roofs of buildings with and without parapets under the action of wind and snow.
Wianecki, J., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.215-228, 3 refs.
Chevallier, A.
Snow loads, Roofs, Snowdrifts, Wind tunnels, Mathematical models.

47-3202
Static friction of roofing materials against an ice mass.
Watanabe, M., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.231-240, 15 refs.
Hirai, K.
Roofs, Snow removal, Snow slides, Ice adhesion, Ice friction.

47-3203
Specifying snow melting system performance.
Fyall, W.L., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.241-252, 4 refs.
Hart, D.L.
Snow removal, Snow melting, Artificial melting, Electric heating, Cold weather performance.

47-3204
Snow removal from a pantiled roof using electrically heated roof tiles.
Higashiyama, Y., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.253-262, 3 refs.
Asano, K., Miyano, A., Murata, Y.
Roofs, Snow removal, Snow melting, Artificial melting, Snow slides, Electric heating.

47-3205
Removal of snow from membrane structures.
Otsuka, K., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.263-274, 4 refs.
Homma, Y.
Roofs, Snow removal, Snow slides, Snow melting, Artificial melting, Ice adhesion, Ice friction.

47-3206
Engineering studies on pneumatic conveying systems of snow.
Kobayashi, T., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.275-286, 7 refs.
Kumagai, M.
Road maintenance, Snow removal, Ducts, Air flow.

47-3207
Hydraulic transportation machine development for snow removal from urban areas.
Umemura, T., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.287-297, 12 refs.
Snow removal, Drains, Municipal engineering, Hydraulics, Water pipelines, Water flow, Pipe flow.

47-3208
Flow characteristics of snow-water mixtures in horizontal pipes.
Sasaki, M., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.301-312, 2 refs.
Kawashima, T., Takahashi, H.
Snow removal, Drains, Water pipelines, Channels (waterways), Water flow, Pipe flow, Municipal engineering, Hydraulics.

47-3209
Mechanical properties of high water content snow.
Kobayashi, S., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.313-321, 15 refs.
Izumi, K., Ezaki, Y., Tan, M.
Wet snow, Snow strength, Snow cover stability, Slush, Snow water content.

47-3210
Characteristics of snow pressure acting on avalanche-preventive fences.
Katakawa, K., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.323-331.
Shimomura, C., Ishikawa, H., Hatae, S., Matsuda, H.
Snow loads, Snow fences, Avalanche engineering, Snow retention, Snow stabilization, Snow cover stability.

47-3211
Use of a cold energy element in a low-temperature storage system.
Suzuki, T., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.333-339, 3 refs.
Cold storage, Ice refrigeration, Ice thermal properties, Snow thermal properties.

47-3212
Design of North Cascade visitor center located in deep snow country.
Albrecht, R.G., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.343-352.
Snow loads, Roofs, Cold weather construction, Design criteria, Sanitary engineering.

47-3213
Roof snow/ice loads at north-facing roof eaves compared to ground snow load: proposed testing.
Mackinlay, I., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.353-363, 3 refs.
Flood, R.S.
Snow loads, Roofs, Ice loads, Cold weather construction, Cold weather tests.

47-3214
Re-application of traditional architectural schemes in the snow country.
Mizuno, I., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.365-371, 6 refs.
Houses, Cold weather construction, Snow removal, Urban planning, Japan.

47-3215
Design review for snow country.
Paine, J.C., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.373-379, 1 ref.
Snow loads, Roofs, Cold weather construction, Design criteria.

47-3216
ASCE Standard 7 snow loads.
Sack, R.L., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.381-391, 31 refs.
Shah, A.
Snow loads, Roofs, Building codes, Cold weather construction, Design criteria, Standards.

47-3217
Overview of snow loads for Fairbanks, Alaska.
Tobiasson, W., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Dec. 1992, SR 92-27, MP 3228, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.393-404, 14 refs.
Greatorex, A.
Snow loads, Roofs, Building codes, Cold weather construction, Snow surveys, Snow depth, Snow water equivalent, Design criteria, Standards, United States—Alaska—Fairbanks.
In the 1970s design roof snow loads for Fairbanks, AK, ranged from 1.4 kPa (30 psf) to 3.1 kPa (65 psf) among the various "local experience" guidelines available. Three studies done between 1973 and 1978 provided a statistical basis for new guidance. The range of values was less among these new guidelines but differences persisted. Heavy snows during the 1990-91 winter caused several roofs to collapse and existing snow load design criteria to be questioned. Measurements were made of ground and roof snow loads during these record snows and meteorological information was updated and reanalyzed. The updated database indicated that the 50-year ground snow load should be 2.9 kPa (60 psf). Observations and measurements of snow on the ground and on roofs indicated that the 0.6 factor in the equation used to convert ground loads to roof loads should be increased to 0.7 for roofs in the Fairbanks area. Winter winds in that area are quite low. Because the design snowpack is quite deep, it is not considered necessary to add a rain-on-snow surcharge load to roof snow loads. Rain has already been included in the water equivalent measurements used to establish the 2.9 kPa (60 psf) ground snow load.

47-3218
Snow recycling house in a heavy snowfall district.
Higuchi, T., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.405-408.
Houses, Cold weather construction, Ice (water storage), Snow retention.

47-3219
Standardization of snow loads on roofs—DIS 4355: revision of ISO Standard 4355.
Apeland, K., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.411-437, 3 refs.
Snow loads, Roofs, Building codes, Cold weather construction, Design criteria, Standards, Mathematical models.

47-3220
Effectiveness of code provisions for snow accumulations on stepped roofs.
Kennedy, D.J.L., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.439-452, 8 refs.
Isyumov, N., Mikitiuk, M.
Snow loads, Roofs, Building codes, Cold weather construction, Design criteria, Standards, Mathematical models.

47-3221
Codification of European snow loading.
Tery, J.R., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.453-464, 9 refs.
Snow loads, Roofs, Building codes, Cold weather construction.

47-3222
Perspective: Ground snow.
Mihashi, H., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.467-468.
Snow loads, Snow depth, Snow surveys.

47-3223
Perspective: Structured case histories.
O'Rourke, M.J., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.469-470.
Snow loads, Roofs.

47-3224
Perspective: Analytical modeling.
Irwin, P.A., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.471-472.
Snow loads, Snow cover stability, Avalanche forecasting, Roofs, Computerized simulation, Statistical analysis.

47-3225
Perspective: Experimental modeling.
Isyumov, N., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.473-476.
Snow loads, Snowdrifts, Roofs, Wind tunnels.

47-3226
Perspective: Snow control.
Williams, C., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.477-478.
Roofs, Snow removal, Snow melting, Artificial melting, Snow slides.

47-3227
Perspective: Mechanical properties and behavior.
Tobiasson, W., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1992, SR 92-27, MP 3229, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.479-480.
Snow mechanics, Snow removal, Snow strength, Snow loads, Avalanche engineering, Snow thermal properties.

47-3228
Perspective: Building design.
Mackinlay, I., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.481-484.
Flood, R.S.
Snow loads, Roofs, Cold weather construction, Design criteria.

47-3229
Perspective: Codes and standards.
Apeland, K., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1992, SR 92-27, International Conference on Snow Engineering, 2nd, Santa Barbara, CA, June 21-26, 1992. Edited by W. Tobiasson and E. Wright, p.485.
Snow loads, Roofs, Building codes, Cold weather construction.

47-3230
On the propagation of discontinuities in a drifting ice cover.
Marchenko, A.V., *Journal of applied mathematics and mechanics*, 1992, 56(3), p.346-358, Translated from Prikladnaya matematika i mekhanika. 13 refs.
Sea ice, Ice deformation, Ice models, Ice floes, Rheology, Drift, Impact, Mathematical models.

47-3231
Acoustic scattering from elemental arctic ice features: numerical modeling results.
Fricke, J.R., *Acoustical Society of America. Journal*, Apr. 1993, 93(4)Pt.1, p.1784-1796, 21 refs.
Sea ice, Pressure ridges, Ice acoustics, Underwater acoustics, Wave propagation, Scattering, Ice cover effect, Mathematical models.

47-3232
Broadband source localization and signature estimation.
Yang, T.C., *Acoustical Society of America. Journal*, Apr. 1993, 93(4)Pt.1, p.1797-1806, 19 refs.
Underwater acoustics, Acoustic measurement, Wave propagation, Detection, Ice cover effect, Attenuation, Data processing, Analysis (mathematics).

47-3233
Scattering from boundary protuberances and reverberation imaging.
Yang, T.C., *Acoustical Society of America. Journal*, Jan. 1993, 93(1), p.231-242, 13 refs.
Underwater acoustics, Wave propagation, Topographic surveys, Data processing, Scattering, Ice cover effect, Imaging, Analysis (mathematics).

47-3234
Neutron diffraction studies of ices III and IX on under-pressure and recovered samples.
Londono, J.D., et al, *Journal of chemical physics*, Mar. 15, 1993, 98(6), p.4878-4888, 23 refs.
Kuhs, W.F., Finney, J.L.
Ice physics, High pressure ice, Ice structure, Molecular structure, Neutron diffraction, Low temperature research, Phase transformations, Hydrogen bonds.

47-3235
Report.
Sea Ice Thickness Workshop, New Carrollton, MD, Nov. 19-21, 1991, Seattle, University of Washington, Applied Physics Laboratory, Oct. 1992, 41p. + appends., 21 refs. For individual papers, included as appendixes, see 47-3236 through 47-3258.
Thorndike, A.S., ed, Parkinson, C., ed, Rothrock, D.A., ed.
Ice cover thickness, Sea ice distribution, Ice surveys.

47-3236
Sea ice thickness: an overview.
Thorndike, A.S., Sea Ice Thickness Workshop, New Carrollton, MD, Nov. 19-21, 1991. Report. Edited by A.S. Thorndike, C. Parkinson, and D.A. Rothrock, Seattle, University of Washington, Applied Physics Laboratory, Oct. 1992, p.A1-A3.
Ice cover thickness, Sea ice distribution, Global warming.

47-3237
Controls on ice thickness.
Rothrock, D.A., Sea Ice Thickness Workshop, New Carrollton, MD, Nov. 19-21, 1991. Report. Edited by A.S. Thorndike, C. Parkinson, and D.A. Rothrock, Seattle, University of Washington, Applied Physics Laboratory, Oct. 1992, p.A4-A9, 3 refs.
Ice cover thickness, Sea ice distribution, Air ice water interaction, Ice heat flux.

47-3238
Definitions relating to ice thickness.
Thorndike, A.S., Sea Ice Thickness Workshop, New Carrollton, MD, Nov. 19-21, 1991. Report. Edited by A.S. Thorndike, C. Parkinson, and D.A. Rothrock, Seattle, University of Washington, Applied Physics Laboratory, Oct. 1992, p.A10-A13, 1 ref.
Ice cover thickness, Sea ice distribution, Pressure ridges, Terminology.

47-3239
Sampling requirements.
Thorndike, A.S., Sea Ice Thickness Workshop, New Carrollton, MD, Nov. 19-21, 1991. Report. Edited by A.S. Thorndike, C. Parkinson, and D.A. Rothrock, Seattle, University of Washington, Applied Physics Laboratory, Oct. 1992, p.A14-A16.
Ice cover thickness, Sea ice distribution, Ice surveys, Ice sampling, Statistical analysis.

47-3240
Drill hole and ice-core studies of sea-ice thickness distributions in the Arctic and Antarctic.
Eicken, H., et al, Sea Ice Thickness Workshop, New Carrollton, MD, Nov. 19-21, 1991. Report. Edited by A.S. Thorndike, C. Parkinson, and D.A. Rothrock, Seattle, University of Washington, Applied Physics Laboratory, Oct. 1992, p.B1-B4, 4 refs.
Lange, M.A.
Ice cover thickness, Sea ice distribution, Ice surveys, Ice cores, Drill core analysis, Snow ice interface.
Extensive sea ice thickness surveys both in the Arctic and Antarctic have been performed using direct field measurements of sea ice thicknesses through mechanically drilled holes. Information obtained from drill-hole thickness profiles may be important in linking ground-truth data and remote sensing techniques. In a study conducted in the Weddell Sea, ice thickness profiles could be subdivided into four different thickness classes based on characteristics of ice thickness and snow depth probability density functions (pdf) and the actual profiles. These classes I to IV represent deformed and undeformed first-year ice, and undeformed and deformed second or multi-year ice, respectively. The ice surface of classes I, III, and IV is prone to flooding as a result of depression resulting either from the heavy snow load (classes III and IV) or from ridging (classes I and IV). This influences the microwave signature of the ice, and may provide indirect evidence of ice thickness and its smaller-scale distribution. In addition, through the resulting formation of snow ice, it influences the mass balance of sea ice. Furthermore, the abundance and spatial distribution of these ice classes in the Weddell Sea allow the speciation of dynamic processes of the sea ice cover in the area under investigation. (Auth. mod.)

47-3241
Thickness measurements of arctic multiyear ice.
Tucker, W.B., MP 3230, Sea Ice Thickness Workshop, New Carrollton, MD, Nov. 19-21, 1991. Report. Edited by A.S. Thorndike, C. Parkinson, and D.A. Rothrock, Seattle, University of Washington, Applied Physics Laboratory, Oct. 1992, p.B5-B9, 3 refs.
Ice cover thickness, Sea ice distribution, Ice surveys, Ice cores, Drill core analysis, Snow ice interface.

47-3242
Sea ice thickness distributions derived from archived aerial photographs of the arctic sea ice pack.
Eppler, D.T., et al, Sea Ice Thickness Workshop, New Carrollton, MD, Nov. 19-21, 1991. Report. Edited by A.S. Thorndike, C. Parkinson, and D.A. Rothrock, Seattle, University of Washington, Applied Physics Laboratory, Oct. 1992, p.B10-B15, 5 refs.
Farmer, L.D.
Ice cover thickness, Sea ice distribution, Ice surveys, Aerial surveys, Photogrammetric surveys.

47-3243
Antarctic ice thickness distributions obtained from aerial photography.
Ackley, S.F., et al, Sea Ice Thickness Workshop, New Carrollton, MD, Nov. 19-21, 1991. Report. Edited by A.S. Thorndike, C. Parkinson, and D.A. Rothrock, Seattle, University of Washington, Applied Physics Laboratory, Oct. 1992, p.B16-B18.
Wadhams, P., Lange, M.A.
Ice cover thickness, Sea ice distribution, Ice surveys, Ice edge, Aerial surveys, Photogrammetric surveys, Antarctica—Weddell Sea.
During the 1986 Winter Weddell Sea Project, aerial photographs were taken from a helicopter on over 20 occasions. These flights obtained photographs over approximately 20 to 50 km of track with a nominal frame size of 0.75 x 0.75 km. This has resulted in 2600 frames being digitized, representing 24 different sea ice regions in the eastern Weddell Sea. Six categories of sea ice thickness were obtained, varying from black for open water through dark gray (thin nilas of 5 to 10 cm thickness), gray (nilas to young ice of 10 to 20 cm thickness), gray to gray-white (young ice of 20 to 30 cm thickness), gray-white (young ice of 30 to 50 cm thickness), and white (snow-covered floes of 40 to 80 cm thickness). There was a surprisingly small open water percentage of less than 2%. Over the three lowest categories, however, corresponding to ice less than 20 cm, the sum of the total area was nearly 20%. These results are similar to other distributions obtained away from the Marginal Ice Zone that suggest the actual open water fraction is generally very low in the pack ice, but the combination of open water and thin ice is generally about 10 to 30% of the total coverage. (Auth. mod.)

47-3244
Ice thickness observations from British submarines.
Wadhams, P., Sea Ice Thickness Workshop, New Carrollton, MD, Nov. 19-21, 1991. Report. Edited by A.S. Thorndike, C. Parkinson, and D.A. Rothrock, Seattle, University of Washington, Applied Physics Laboratory, Oct. 1992, p.B19-B21, 2 refs.
Ice cover thickness, Sea ice distribution, Ice surveys, Ice bottom surface, Subglacial observations, Ice acoustics, Underwater acoustics, Submarines.

47-3245
Accuracy of submarine ice draft measurements.
Tucker, W.B., et al, MP 3231, Sea Ice Thickness Workshop, New Carrollton, MD, Nov. 19-21, 1991. Report. Edited by A.S. Thorndike, C. Parkinson, and D.A. Rothrock, Seattle, University of Washington, Applied Physics Laboratory, Oct. 1992, p.B22-B24, 4 refs.
Anderson, R., Newton, J., Wales, C., Newton, G., Lualdin, T.
Ice cover thickness, Sea ice distribution, Ice surveys, Ice bottom surface, Subglacial observations, Ice acoustics, Underwater acoustics, Submarines.

47-3246
Upward looking sonar ice draft series from the Greenland Sea.
Kvambekk, A.S., et al, Sea Ice Thickness Workshop, New Carrollton, MD, Nov. 19-21, 1991. Report. Edited by A.S. Thorndike, C. Parkinson, and D.A. Rothrock, Seattle, University of Washington, Applied Physics Laboratory, Oct. 1992, p.B25-B28, 2 refs.
Vinje, T.
Ice cover thickness, Sea ice distribution, Ice surveys, Ice bottom surface, Subglacial observations, Ice acoustics, Underwater acoustics.

47-3247
Sampling the temporal variability of sea ice draft distribution.
Moritz, R.E., Sea Ice Thickness Workshop, New Carrollton, MD, Nov. 19-21, 1991. Report. Edited by A.S. Thorndike, C. Parkinson, and D.A. Rothrock, Seattle, University of Washington, Applied Physics Laboratory, Oct. 1992, p.B29-B38, 5 refs.
Ice cover thickness, Sea ice distribution, Ice surveys, Ice bottom surface, Subglacial observations, Ice acoustics, Underwater acoustics, Statistical analysis.

47-3248
Airborne laser altimetry measurements for sea ice thickness.
Krabill, W.B., Sea Ice Thickness Workshop, New Carrollton, MD, Nov. 19-21, 1991. Report. Edited by A.S. Thorndike, C. Parkinson, and D.A. Rothrock, Seattle, University of Washington, Applied Physics Laboratory, Oct. 1992, p.B39-B42.
Ice cover thickness, Sea ice distribution, Ice surveys, Ice surface, Aerial surveys, Height finding, Lidar.

47-3249
Inferring ice thickness distribution from airborne laser profiling.
Wadhams, P., et al, Sea Ice Thickness Workshop, New Carrollton, MD, Nov. 19-21, 1991. Report. Edited by A.S. Thorndike, C. Parkinson, and D.A. Rothrock, Seattle, University of Washington, Applied Physics Laboratory, Oct. 1992, p.B43-B51, 14 refs.
Comiso, J.C.
Ice cover thickness, Sea ice distribution, Ice surveys, Ice surface, Aerial surveys, Height finding, Lidar, Statistical analysis.

47-3250
Remote measurement of sea ice thickness using electromagnetic sounding.
Kovacs, A., MP 3232, Sea Ice Thickness Workshop, New Carrollton, MD, Nov. 19-21, 1991. Report. Edited by A.S. Thorndike, C. Parkinson, and D.A. Rothrock, Seattle, University of Washington, Applied Physics Laboratory, Oct. 1992, p.B52-B54, 1 ref.
Ice cover thickness, Sea ice distribution, Ice surveys, Ice electrical properties, Airborne radar, Aerial surveys, Radio echo soundings.

47-3251
Operational airborne sea ice thickness measurement system.
Holladay, J.S., Sea Ice Thickness Workshop, New Carrollton, MD, Nov. 19-21, 1991. Report. Edited by A.S. Thorndike, C. Parkinson, and D.A. Rothrock, Seattle, University of Washington, Applied Physics Laboratory, Oct. 1992, p.B55-B59.
Ice cover thickness, Sea ice distribution, Ice surveys, Airborne radar, Aerial surveys, Lidar.

47-3252
Ice thickness observations from satellites.
Rothrock, D.A., Sea Ice Thickness Workshop, New Carrollton, MD, Nov. 19-21, 1991. Report. Edited by A.S. Thorndike, C. Parkinson, and D.A. Rothrock, Seattle, University of Washington, Applied Physics Laboratory, Oct. 1992, p.B60-B65, 8 refs.
Ice cover thickness, Sea ice distribution, Ice surveys, Ice surface, Spaceborne photography, Remote sensing, Radiometry

47-3253
Active and passive microwave signatures and relationship to ice thickness.
Comiso, J.C., et al, Sea Ice Thickness Workshop, New Carrollton, MD, Nov. 19-21, 1991. Report. Edited by A.S. Thorndike, C. Parkinson, and D.A. Rothrock, Seattle, University of Washington, Applied Physics Laboratory, Oct. 1992, p.B66-B75, 23 refs.
Wadhams, P.
Ice cover thickness, Sea ice distribution, Ice surveys, Ice surface, Ice electrical properties, Synthetic aperture radar, Remote sensing, Radiometry.

47-3254
Some impromptu remarks regarding passive microwave measurements of sea ice properties and their relationship to sea ice thickness.
Gloersen, P., Sea Ice Thickness Workshop, New Carrollton, MD, Nov. 19-21, 1991. Report. Edited by A.S. Thorndike, C. Parkinson, and D.A. Rothrock, Seattle, University of Washington, Applied Physics Laboratory, Oct. 1992, p.B76-B82, 5 refs.
Ice cover thickness, Sea ice distribution, Ice surveys, Ice surface, Ice electrical properties, Radiometry.

47-3255
Modeling the thickness distribution of arctic pack ice.
Flato, G.M., Sea Ice Thickness Workshop, New Carrollton, MD, Nov. 19-21, 1991. Report. Edited by A.S. Thorndike, C. Parkinson, and D.A. Rothrock, Seattle, University of Washington, Applied Physics Laboratory, Oct. 1992, p.C1-C3, 4 refs.
Ice cover thickness, Sea ice distribution, Pack ice, Pressure ridges, Ice models.

47-3256
Model predicted arctic sea ice mass and its sensitivities.
Häkkinen, S., Sea Ice Thickness Workshop, New Carrollton, MD, Nov. 19-21, 1991. Report. Edited by A.S. Thorndike, C. Parkinson, and D.A. Rothrock, Seattle, University of Washington, Applied Physics Laboratory, Oct. 1992, p.C4-C8, 2 refs.
Ice cover thickness, Sea ice distribution, Ice models, Ice forecasting.

47-3257
Arctic radiation forcing fields for dynamic-thermodynamic sea ice models.
Key, J.R., et al, Sea Ice Thickness Workshop, New Carrollton, MD, Nov. 19-21, 1991. Report. Edited by A.S. Thorndike, C. Parkinson, and D.A. Rothrock, Seattle, University of Washington, Applied Physics Laboratory, Oct. 1992, p.C9-C13, 4 refs.
Schweiger, A.J., Maslanik, J.A.
Ice cover thickness, Sea ice distribution, Ice models, Ice heat flux, Radiation balance.

47-3258
Model simulation of changes in arctic sea ice, 1960-1989.
Walsh, J.E., Sea Ice Thickness Workshop, New Carrollton, MD, Nov. 19-21, 1991. Report. Edited by A.S. Thorndike, C. Parkinson, and D.A. Rothrock, Seattle, University of Washington, Applied Physics Laboratory, Oct. 1992, p.C14-C16, 4 refs.
Ice cover thickness, Sea ice distribution, Ice models, Global change.

47-3259
Freezing resistance in antarctic and arctic fishes. [Gefrierschutz bei Fischen der Polarmeere].
Wöhrmann, A.P.A., *Berichte zur Polarforschung*, 1993, No.119, 99p., In German with English summary. Refs. p.87-98.
Antifreezes, Cryobiology, Marine biology, Cold tolerance.

47-3260
Fatal avalanche accidents in the United States 1991/92-1992/93 (through 2/13/93).
Atkins, D., *Avalanche review*, Mar. 1993, 11(5), p.1,5, 3 refs.
Avalanches, Accidents, Safety, United States.

47-3261
Snowy torrents '92-'93. *Avalanche review*, Mar. 1993, 11(5), p.3.
Avalanches, Accidents.

47-3262
Working wih ultrasonic snow depth sensors.
Judd, D., *Avalanche review*, Mar. 1993, 11(5), p.6-7.
Snow depth, Precipitation gages, Snow survey tools, Snow acoustics, Acoustic measurement, Echo sounding, Computer programs.

47-3263
Depth sensors, part 2.
Judd, D., *Avalanche review*, Apr. 1993, 11(6), p.6-7.
Snow depth, Precipitation gages, Snow survey tools, Snow water equivalent, Computer programs.

47-3264
Frozen ground. *International Permafrost Association. News bulletin*, June 1992, No.11, 23p.
Research projects, Organizations, Meetings, Permafrost.

47-3265
Estimation of casings strength properties.
Medvedskil, R.I., et al, *Neftianoe khoziaĭstvo*, May 1992, No.5, p.68-69, Translated from Neftianoe khoziaĭstvo.
Ultimate strength, Frozen liquids, Frozen rock strength, Pipes (tubes).

47-3266
Cryogenesis and frost genesis in soils. [Kriogenez i merzlotogenez v pochvakh].
Vtorushin, V.A., *Geografiia i prirodnye resursy*, July-Sep. 1992, No.3, p.38-42, In Russian. 21 refs.
Cryogenic soils, Frost, Geocryology.

47-3267
Characteristics of the relict cryolithozone of the West Siberian Plain. [Osobennosti reliktovoĭ kriolitozony Zapadno-Sibirskoĭ ravniny].
Zemtsov, A.A., et al, *Geografiia i prirodnye resursy*, July-Sep. 1992, No.3, p.103-107, In Russian. 16 refs.
Shamakhov, A.F.
Geocryology, Lithology, Permafrost depth, Permafrost thermal properties, Frozen rock strength, USSR--West Siberian Plain.

47-3268
Inconsistencies in modern notions about the greenhouse effect and future environmental conditions. [Protivorechivost' sovremennykh predstavleniĭ o parnikovom effekte i budushchei prirodnoĭ obstanovke].
Reznikov, A.P., *Geografiia i prirodnye resursy*, July-Sep. 1992, No.3, p.165-170, In Russian. 43 refs.
Global change, Global warming, Carbon dioxide, Climatic changes, Temperature variations.

47-3269
Landscapes and soils of the mountain subarctic Transbaikal. [Landshafty i pochvy gornoĭ subarktiki Zabaĭkal'iia].
Kuz'min, V.A., et al, *Geografiia i prirodnye resursy*, Apr.-June 1992, No.2, p.94-98, In Russian. 10 refs.
Pliusnin, V.M.
Subarctic landscapes, Mountain soils, Taiga, USSR--Transbaikal.

47-3270
Cryogenic phenomena on the banks of the Angara water reservoirs. [Kriogennye iavleniia na beregakh angarskikh vodokhranilishch].
Shul'gin, M.V., et al, *Geografiia i prirodnye resursy*, Apr.-June 1992, No.2, p.99-102, In Russian. 2 refs.
Leshchikov, F.N.
Seasonal freeze thaw, Reservoirs, Geocryology, Banks (waterways), USSR--Angara River.

47-3271
Tundra-forest soils in the arctic Yenisey region, subjected to sulfur-containing industrial discharge. [Pochvy predtundrovykh lesov Eniseĭskogo Zapoliar'ia, podverzhennye aeropromyshlennym vybrosam sery].
Ershov, IU.I., *Geografiia i prirodnye resursy*, Jan.-Mar. 1992, No.1, p.33-39, In Russian. 8 refs.
Soil pollution, Forest tundra, Forest soils, Environmental impact, Soil analysis.

47-3272
Dust-accumulative capacity of pine and birch phytocenosis in forest-steppe regions in Siberia. [Pyleakkumuliruiushchaia sposobnost' sosnovykh i berezovykh fitotsenozov lesostepnykh ralonov Sibiri].
Skripal'shchikova, L.N., *Geografiia i prirodnye resursy*, Jan.-Mar. 1992, No.1, p.39-43, In Russian. 9 refs.
Trees (plants), Plant physiology, Dust, Steppes, Snow cover effect.

47-3273
Snow cover and moisture limit in the Tazheran steppe (Priol'khon'e). [Snezhnyĭ pokrov i limit vlagi v Tazheranskikh stepiakh Priol'khon'ia].
Gagarin, P.K., *Geografiia i prirodnye resursy*, Jan.-Mar. 1992, No.1, p.62-69, In Russian. 4 refs.
Steppes, Snow cover effect, Snow cover distribution, Snow depth, Snow water content.

47-3274
Nature of lakes in the West Siberian subarctic. [Priroda ozer Zapadno-Sibirskoĭ subarktiki].
Savchenko, N.V., *Geografiia i prirodnye resursy*, Jan.-Mar. 1992, No.1, p.85-92, In Russian. 4 refs.
Glacial lakes, Thermokarst lakes, Chemical analysis, USSR--Siberia.

47-3275
Characteristics of the formation of spring runoff from rivers in the cryolithozone. [Osobennosti formirovaniia vesennego stoka rek kriolitozony].
Kravchenko, V.V., et al. *Geografiia i prirodnye resursy*, July-Sep. 1991, No.3, p.53-64, In Russian. 17 refs.
Chernykh, O.A.
Runoff, Rivers, Snowmelt, Meltwater, Water balance, Alimentation, River basins.

47-3276
Exogenous processes of the Altai highlands and their relations. [Ekzogennye protsessy vysokogorii Altaia i ikh sviazi].
Ivanovskiĭ, L.N., *Geografiia i prirodnye resursy*, Oct.-Dec. 1991, No.4, p.26-33, In Russian. 20 refs.
Geologic processes, Geocryology, Snow cover effect, USSR—Altai Mountains.

47-3277
Ecological aspects of the establishment of a West Siberian territorial-industrial complex. [Ekologicheskie aspekty formirovaniia Zapadno-Sibirskogo territorial'no-proizvodstvennogo kompleksa].
Bud'kov, S.T., *Geografiia i prirodnye resursy*, Oct.-Dec. 1991, No.4, p.34-42, In Russian. 41 refs.
Environmental impact, Environmental protection, Economic development, Snow impurities.

47-3278
Assessment of the technogenic migration of chemical elements through terrain of a large urbanized territory. [Otsenka tekhnogennoĭ migratsii khimicheskikh elementov v landshaftakh krupnoĭ urbanizirovannoĭ territorii].
Sorokina, E.P., et al, *Geografiia i prirodnye resursy*, Oct.-Dec. 1991, No.4, p.42-49, In Russian. 8 refs.
Pronin, A.P., Kulachkova, O.G.
Snow impurities, Snow cover, Microelement content, Snow composition, Environmental impact, USSR—Moscow.

47-3279
Erosion of agricultural lands in the Irkutsk region. [Eroziia na sel'skokhoziaĭstvennykh zemliakh Irkutskoĭ oblasti].
Khismatullin, Sh.D., *Geografiia i prirodnye resursy*, Oct.-Dec. 1991, No.4, p.49-61, In Russian. 6 refs.
Agriculture, Soil erosion, Cryogenic soils, Taiga, Water erosion, Wind erosion, USSR—Irkutsk.

47-3280
Hydrothermy of slope soils in Transbaikal. [Gidrotermika sklonovykh pochv Zabaĭkal'iaj.
Kulikov, A.I., et al, *Geografiia i prirodnye resursy*, Oct.-Dec. 1991, No.4, p.69-76, In Russian. 13 refs.
Dugarov, V.I., Badmaev, N.B.
Hydrothermal processes, Slope processes, Water balance, Soil water, Permafrost, USSR—Transbaikal.

47-3281
Influence of natural conditions on the development of transportation in the Far East. [Vliianie prirodnykh uslovii na razvitie transporta Dal'nego Vostoka].
Vakhnenko, R.V., *Geografiia i prirodnye resursy*, Oct.-Dec. 1991, No.4, p.103-106, In Russian. 5 refs.
Marine transportation, Ice navigation, Sea ice, River ice, Transportation, Glaze, USSR- Far East.

47-3282
On spatial irregularities in the frost penetration of soils in river basins. [Ob uchete prostranstvennoĭ neravnomernosti promerzaniia pochvogruntov v rechnykh basseĭnakh].
Manukalo, V.A., et al, *Geografiia i prirodnye resursy*, Oct.-Dec. 1991, No.4, p.119-123, In Russian. 3 refs.
Petruk, A.M.
Frost penetration, Soil freezing, River basins.

47-3283
Dissipative structures of rivers in the cryolithozone. [Dissipativnye struktury rek kriolitozony].
Markov, M.L., *Geografiia i prirodnye resursy*, Apr.-June 1991, No.2, p.11-20, In Russian. 16 refs.
Rivers, River ice, Naleds.

47-3284
Some aspects of studying present glaciation in the northwestern Baikal region. [Nekotorye aspekty issledovaniia sovremennogo oledeneniia v Severo-Zapadnom Pribaĭkal'e].
Aleshin, G.V., *Geografiia i prirodnye resursy*, Apr.-June 1991, No.2, p.118-124, In Russian. 15 refs.
Glaciation, Glacier oscillation, Glacier surveys.

47-3285
Atmospheric and climatic changes. [Izmeneniia atmosfery i klimata].
Golitsyn, G.O., et al, *Rossiiskaia akademiia nauk. Seriia geograficheskaia*, Mar.-Apr. 1992, No.2, p.33-43, In Russian with English summary. 28 refs.
MacBean, G.A.
Climatic changes, Atmospheric composition, Global change, Global warming, Ozone.

47-3286
Abrasion of concrete structures by ice.
Huovinen, S., *Cement and concrete research*, Jan. 1993, 23(1), p.69-82, 3 refs.
Offshore structures, Concrete structures, Concrete strength, Floating ice, Ice loads, Abrasion, Ice solid interface, Countermeasures.

47-3287
Recent advances in research on water-freezing and ice-melting problems.
Fukusako, S., et al, *Experimental thermal and fluid science*, Jan. 1993, 6(1), p.90-105, 141 refs.
Yamada, M.
Ice physics, Ice melting, Ice formation, Phase transformations, Ice thermal properties, Ice water interface, Heat transfer, Temperature effects.

47-3288
Experimental observations and theoretical studies on solidification processes in saline solutions.
Rubinsky, B., et al, *Experimental thermal and fluid science*, Feb. 1993, 6(2), p.157-167, 23 refs.
Lee, C., Chaw, M.
Salt water, Solidification, Heat transfer, Phase transformations, Liquid solid interfaces, Freezing front, Ice microstructure.

47-3289
Direct evidence for melting transition at interface between ice crystal and glass substrate.
Furukawa, Y., et al, *Journal of crystal growth*, Mar. 1, 1993, 128(1-4)Pt.2, International Conference on Crystal Growth, 10th, San Diego, CA, Aug. 16-21, 1992. Proceedings. Edited by J.B. Mullin et al, p.1137-1142, 15 refs.
Ishikawa, I.
Ice crystal optics, Ice solid interface, Ice cover thickness, Ice melting, Phase transformations, Temperature effects, Refractivity.

47-3290
Very large melting point depression of water in silica.
van Miltenburg, J.C., et al, *Journal of crystal growth*, Mar. 1, 1993, 128(1-4)Pt.2, International Conference on Crystal Growth, 10th, San Diego, CA, Aug. 16-21, 1992. Proceedings. Edited by J.B. Mullin et al, p.1143-1149, 12 refs.
van der Eerden, J.P.
Porous materials, Liquid solid interfaces, Ice melting, Liquid phases, Thermodynamics, Melting points, Temperature effects, Surface energy.

47-3291
Scientific concept of the Arctic Climate System Study (ACSYS).
Augstein, E., ed, *World Meteorological Organization. Technical document*, May 1992, WMO/TD-No.486, World Climate Research Programme, WCRP-72, 89p. + appends., Refs. p.76-87.
Report of the Joint Scientific Committee (JSC) Study Group on ACSYS, Bremerhaven, June 10-12, 1991 and London, Nov. 18-19, 1991.
Polar atmospheres, Air ice water interaction, Atmospheric circulation, Ocean currents, Sea ice distribution, Ice surveys, Drift, Global change.

47-3292
Sensitivity experiment of ocean general circulation model—responses for wind stress (first report).
Matsuura, T., et al, *Japan. National Research Institute for Earth Science and Disaster Prevention. Report*, Oct. 1991, No.48, p.39-68, In Japanese with English summary. 17 refs.
Takeda, A., Yamagata, T.
Ocean currents, Air water interactions, Polar atmospheres, Atmospheric circulation, Turbulent boundary layer, Wind factors, Water transport, Computerized simulation, Mathematical models, Antarctica.
A coarse resolution, primitive equation ocean general circulation model in a cyclic channel, with idealized wind stress, is used to explore sensitivity to the assumption that the vertical viscosity and diffusivity depend upon the level 2.5 turbulent closure model. The characteristics of the turbulent closure model are clarified by comparing the constant vertical eddy viscosity and diffusivity model. The model domain is idealized for the region of the Antarctic Circumpolar current and the density and current structures obtained from the numerical simulation are compared with those observed at the Drake Passage. It is found that the turbulent closure resolves efficiently the Ekman boundary layer at the sea surface and the turbulent mixing layer. This model settles the problem which occurs with extreme vertical shear in the mixed layer when a constant vertical eddy viscosity and diffusivity are used. It is known that there is a region of a low density pool in the north of the Drake Passage. The described model confirms the above observational result. It is concluded that the low density pool is formed by strong mixing in the Drake Passage because the Ekman transport is northwards for westerly wind in the Southern Hemisphere.

47-3293
Experimental and theoretical study on heat mechanism of groundwater flow (first report).
Higashiura, M., et al, *Japan. National Research Institute for Earth Science and Disaster Prevention. Report*, Oct. 1991, No.48, p.69-88, In Japanese with English summary. 10 refs.
Sato, T., Kimura, T., Yokoyama, T., Tanno, K.
Snow removal, Snow melting, Artificial melting, Ground water, Water temperature, Heat transfer, Wells.

47-3294
Radar echo morphology and airflow influenced by a mountain range in winter monsoon period—a case of cold frontal precipitation.
Nakai, S., et al, *Japan. National Research Institute for Earth Science and Disaster Prevention. Report*, Dec. 1992, No.50, p.1-23, In Japanese with English summary. 22 refs.
Endoh, T.
Snowfall, Snowstorms, Weather forecasting, Ice storms, Precipitation (meteorology), Fronts (meteorology), Clouds (meteorology), Radar echoes, Japan.

47-3295
Sea ice observation in the Arctic Ocean (I).
Nakamura, H., et al, *Japan. National Research Institute for Earth Science and Disaster Prevention. Report*, Dec. 1992, No.50, p.83-97, In Japanese with English summary. 10 refs.
Nakamura, T., Sasaki, Y.
Ice cover thickness, Sea ice distribution, Ice surveys, Ice heat flux, Ice thermal properties, Ice edge.

47-3296
Estimation of snowfall intensity on measurements of total snow weight using a pressure pillow.
Abe, O., et al, *Japan. National Research Institute for Earth Science and Disaster Prevention. Report*, Dec. 1992, No.50, p.115-122, In Japanese with English summary. 4 refs.
Kimura, T., Numano, N., Nakamura, H.
Snowfall, Snow surveys, Snow loads, Snow accumulation, Snow pillows.

47-3297
Numerical simulation of snowdrift on a road.
Sato, A., et al, *Japan. National Research Institute for Earth Science and Disaster Prevention. Report*, Dec. 1992, No.50, p.123-135, In Japanese with English summary. 8 refs.
Uematsu, T.
Snowdrifts, Road maintenance, Weather forecasting, Safety, Computerized simulation.

47-3298
Simple differentiation of snow road formation for snow removal road.
Abe, O., *Japan. National Research Institute for Earth Science and Disaster Prevention. Report*, Dec. 1992, No.50, p.137-143, In Japanese with English summary. 5 refs.
Road icing, Road maintenance, Snow removal, Ice detection.

47-3299
New discrimination method of snow and ice road conditions using an observation car equipped with multiple sensors.
Abe, O., *Japan. National Research Institute for Earth Science and Disaster Prevention. Report*, Dec. 1992, No.50, p.145-167, In Japanese with English summary. 5 refs.
Road icing, Road maintenance, Ice detection.

47-3300
Studies of icing on road surface in snowy region.
Nakawo, M., et al, *Japan. National Research Institute for Earth Science and Disaster Prevention. Report*, Dec. 1992, No.50, p.169-191, In Japanese with English summary. 17 refs.
Shimizu, M., Takahashi, S.
Road icing, Road maintenance, Ice forecasting, Frost forecasting, Ice detection.

47-3301
Development of a method for predicting road surface temperature and icing on roads.
Funada, H., et al, *Japan. National Research Institute for Earth Science and Disaster Prevention. Report.* Dec. 1992, No.50, p.193-231, In Japanese with English summary. 6 refs.
Senkuro, K., Matsukawa, M., Ishizaka, T.
Road icing, Road maintenance, Ice detection, Ice forecasting, Frost forecasting.

47-3302
Outline of the network information systems on snow in Japan and the keys of the information system.
Nakamura, T., *Japan. National Research Institute for Earth Science and Disaster Prevention. Report.* Dec. 1992, No.50, p.233-250, In Japanese with English summary. 8 refs.
Snowfall, Road icing, Weather forecasting, Road maintenance, Safety.

47-3303
Disposal of hazardous wastes in Canada's Northwest Territories.
Heeney, P.L., et al, *Canadian journal of civil engineering*, Oct. 1992, 19(5), p.806-810, With French summary. 20 refs.
Heinke, G.W.
Arctic landscapes, Waste disposal, Environmental impact, Cold weather operation.

47-3304
Model tests of dynamic ice loading on the Chinese JZ-20-2 jacket platform.
Timco, G.W., et al, *Canadian journal of civil engineering*, Oct. 1992, 19(5), p.819-832, With French summary. 20 refs.
Offshore structures, Sea ice, Ice loads, Dynamic loads, Simulation, Ice solid interface, Vibration, Mechanical tests, Design criteria.

47-3305
Bend ice jams: laboratory observations.
Urroz, G.E., et al, *Canadian journal of civil engineering*, Oct. 1992, 19(5), p.855-864, With French summary. 12 refs.
Ettema, R.
River ice, Ice jams, Ice formation, Ice cover effect, River flow, Hydraulics, Simulation, Topographic effects.

47-3306
Probability analysis of historical ice jam flood data for a complex reach: a case study.
Stanley, S.J., et al, *Canadian journal of civil engineering*, Oct. 1992, 19(5), p.875-885, With French summary. 17 refs.
Gerard, R.
River ice, River flow, Ice jams, Flood forecasting, Water level, History.

47-3307
Engineering properties of rubberized concrete.
Eldin, N.N., et al, *Canadian journal of civil engineering*, Oct. 1992, 19(5), p.912-923, With French summary. 13 refs.
Senouci, A.B.
Concrete aggregates, Concrete durability, Rubber, Tires, Physical properties, Freeze thaw tests, Waste disposal, Mechanical tests.

47-3308
Finite element modeling of surge propagation and an application to the Hay River, N.W.T.
Hicks, F.E., et al, *Canadian journal of civil engineering*, June 1992, 19(3), p.454-462, With French summary. 17 refs.
Steffler, P.M., Gerard, R.
River ice, River flow, Ice jams, Ice breakup, Ice cover effect, Fluid mechanics, Wave propagation, Flood forecasting, Mathematical models.

47-3309
Analysis of ground-probing radar data: predictive deconvolution.
LaFleche, P.T., et al, *Canadian geotechnical journal*, Feb. 1991, 28(1), p.134-139, With French summary. 26 refs.
Todoeschuck, J.P., Jensen, O.G., Judge, A.S.
Radar echoes, Geophysical surveys, Subsurface investigations, Subsurface structures, Data processing, Performance, Detection, Permafrost surveys.

47-3310
Aerodynamic effects of deicing and anti-icing fluids.
Reinmann, J.J., et al, *Journal of aircraft*, Jan.-Feb. 1993, 30(1), p.8-9, 1 ref.
Adams, D.
Aircraft icing, Ice removal, Chemical ice prevention, Solutions, Performance, Fluid dynamics, Air flow, Interfaces.

47-3311
Contrasting requirements for Type II de anti-icing fluids.
Ross, J.F., et al, *Journal of aircraft*, Jan.-Feb. 1993, 30(1), p.10-13, 9 refs.
Connolly, J.T.
Aircraft icing, Chemical ice prevention, Ice removal, Solutions, Performance, Specifications, Viscosity, Temperature effects, Fluid dynamics.

47-3312
Development of an international standard for safe winter operation.
Hornig, R., *Journal of aircraft*, Jan.-Feb. 1993, 30(1), p.14-18, 3 refs.
Aircraft icing, Accidents, Safety, Ice cover effect, Ice removal, Chemical ice prevention, Cold weather operation, Standards.

47-3313
Aircraft ground deicing, a flight crew perspective.
Haase, D.J., *Journal of aircraft*, Jan.-Feb. 1993, 30(1), p.19-23, 14 refs. For another version see 46-1085.
Aircraft icing, Accidents, Safety, Ice removal, Chemical ice prevention, Education, Human factors, Standards.

47-3314
Aerodynamic effects of aircraft ground deicing anti-icing fluids.
Hill, E.G., et al, *Journal of aircraft*, Jan.-Feb. 1993, 30(1), p.24-34, 17 refs.
Zierten, T.A.
Aircraft icing, Ice removal, Chemical ice prevention, Cold weather tests, Performance, Fluid dynamics, Air flow, Standards.

47-3315
Aerodynamic effects of ground de anti-icing fluids on Fokker 50 and Fokker 100.
van Hengst, J., *Journal of aircraft*, Jan.-Feb. 1993, 30(1), p.35-40, 8 refs.
Aircraft icing, Ice removal, Chemical ice prevention, Performance, Air flow, Tests, Fluid dynamics, Viscosity, Surface roughness.

47-3316
New concept in runback water modeling for anti-iced aircraft surfaces.
Al-Khalil, K.M., et al, *Journal of aircraft*, Jan.-Feb. 1993, 30(1), p.41-49, 7 refs.
Keith, T.G., Jr., De Witt, K.J.
Aircraft icing, Ice prevention, Ice melting, Water films, Fluid dynamics, Liquid solid interfaces, Heat transfer, Mathematical models, Electric heating.

47-3317
Ice formations near upland tarns in Cumbria, 16 April 1992.
Kay, A., *Weather*, Apr. 1993, 48(4), p.112-113.
Weather observations, Ice formation, Wind factors, Vegetation factors, Topographic effects.

47-3318
Glacial retreat in the Pyrenees. *Weather*, Apr. 1993, 48(4), p.116-117, 1 ref.
Mountain glaciers, Glacier oscillation, Correlation.

47-3319
Uptake of HNO3 onto ice, NAT, and frozen sulfuric acid.
Hanson, D.R., *Geophysical research letters*, Oct. 23, 1992, 19(20), p.2063-2066, 15 refs.
Cloud physics, Stratosphere, Heterogeneous nucleation, Condensation, Ice vapor interface, Ozone, Chemical properties, Simulation.
The uptake of HNO3 onto ice, HNO3-H2O layers, and solid H2SO4/H2O solutions was studied in a cylindrical flow tube in conjunction with a chemical ionization mass spectrometer detection system. An efficient loss of HNO3 from the gas-phase to these surfaces was observed, and the uptake coefficient was <0.3. The HNO3-H2O layers formed, however, had HNO3 vapor pressures significantly in excess of the expected values for NAT (nitric acid trihydrate). Supersaturations in HNO3 of factors from three to ten were observed, suggesting a hindrance to the formation of NAT. These results imply that the condensation temperatures of Type I polar stratospheric clouds are 2-3 K colder than that expected for NAT. (Auth. mod.)

47-3320
Spatial and temporal variation of sea ice geophysical properties and microwave remote sensing observations: the SIMS'90 experiment.
Barber, D.G., et al, *Arctic*, Sep. 1992, 45(3), p.233-251, With French summary. 22 refs.
Flett, D.G., De Abreu, R.A., LeDrew, E.F.
Sea ice distribution, Remote sensing, Geophysical surveys, Synthetic aperture radar, Surface properties, Snow cover effect, Seasonal variations, Scattering, Snowmelt.

47-3321
Interannual variability of landfast ice thickness in the Canadian High Arctic, 1950-89.
Brown, R.D., et al, *Arctic*, Sep. 1992, 45(3), p.273-284, With French summary. 37 refs.
Cote, P.
Sea ice, Ice cover thickness, Fast ice, Ice melting, Snow depth, Snow cover effect, Periodic variations, Climatic changes, Insulation.

47-3322
Palynological investigations of Miocene deposits on the New Siberian Archipelago (U.S.S.R.).
Zyrianov, E.V., *Arctic*, Sep. 1992, 45(3), p.285-294, With French summary. 20 refs.
Arctic landscapes, Vegetation patterns, Paleobotany, Paleoecology, Palynology, Landscape types.

47-3323
Mobile marine operations structure.
Bhalaik, A., et al, *U.S. Patent Office. Patent*, Feb. 28, 1989, 38 col., USP-4,808,036, 4 refs.
Braddick, P.W., Brittin, D.S., Johnson, G.L.
Offshore structures, Subsurface structures, Modular construction, Protection, Walls, Ice breaking, Portable equipment, Design.

47-3324
Snow removal device for vehicle.
Motohashi, Y., *U.S. Patent Office. Patent*, Feb. 21, 1989, 12 col., USP-4,805,323, 14 refs.
Equipment, Snow removal, Vehicles, Windows, Pipes (tubes), Design.

47-3325
Ice breaker.
Hellmann, J.H., et al, *U.S. Patent Office. Patent*, Jan. 31, 1989, 8 col., USP-4,800,831, 11 refs.
Rupp, K.H., Varges, G.
Icebreakers, Ice navigation, Machinery, Subsurface structures, Cables (ropes), Piles, Design.

47-3326
Automobile windshield cleaning tool.
Littledeer, T.F., *U.S. Patent Office. Patent*, Feb. 28, 1989, 4 col., USP-4,807,322, 16 refs.
Portable equipment, Snow removal, Ice removal, Vehicles, Windows, Design.

47-3327
Integrated semiconductor resistance temperature sensor and resistive heater.
Sittler, F.C., et al, *U.S. Patent Office. Patent*, Feb. 28, 1989, 10 col., USP-4,808,009, 23 refs.
Bohara, R.C.
Sensors, Electronic equipment, Anemometers, Ice detection, Moisture detection, Mass flow, Electrical resistivity, Design.

47-3328
Photoelectric ice accumulation monitor using dual detectors.
Rein, R.G., Jr., *U.S. Patent Office. Patent*, Jan. 10, 1989, 16 col., USP-4,797,660, 2 refs.
Indicating instruments, Radiation measuring instruments, Sensors, Ice accretion, Ice detection, Moisture detection, Winter maintenance, Design.

47-3329
Snow-weathering test apparatus for self-propelled vehicle.
Kimura, C., *U.S. Patent Office. Patent*, Jan. 24, 1989, 6 col., USP-4,799,390, 25 refs.
Test equipment, Test chambers, Cold weather tests, Vehicles, Artificial snow, Spray freezing, Snow manufacturing, Design.

47-3330
Apparatus for measuring the moisture content of snow particles.
Suga, N., *U.S. Patent Office. Patent*, Jan. 24, 1989, 6 col., USP-4,799,379, 7 refs.
Measuring instruments, Moisture meters, Falling snow, Snow physics, Snow water content, Sensors, Design.

47-3331
Pneumatic process and device for conveying snow.
Pasquier, A., *U.S. Patent Office. Patent*, Jan. 17, 1989, 10 col., USP-4,798,012, 8 refs.
Snow removal, Snow vehicles, Snow disposal, Blowing snow, Snow mechanics, Winter maintenance, Design, Equipment.

47-3332
Dual freezing chamber system and method for water purification.
Chang, C.N., *U.S. Patent Office. Patent*, Jan. 24, 1989, 14 col., USP-4,799,945, 19 refs.
Water treatment, Equipment, Ice crystal growth, Ice melting, Ice makers, Phase transformations, Design.

47-3333
Crystallizing apparatus.
Connery, C.A., *U.S. Patent Office. Patent*, Jan. 31, 1989, 12 col., USP-4,801,436, 9 refs.
Equipment, Manufacturing, Ice makers, Ice crystal growth, Desalting, Distilled water, Design, Buoyancy.

47-3334
Climatic regime of the Arctic at the transition from the 20th to the 21st century. [Klimaticheskiĭ rezhim Arktiki na rubezhe XX i XXI vv.],
Krutskikh, B.A., ed, St. Petersburg, Gidrometeoizdat, 1991, 200p., In Russian with English summary and table of contents. 166 refs.
Climatic changes, Air ice water interaction, Sea ice, Carbon dioxide, Atmospheric circulation, Ice conditions, Sea ice distribution, Boundary layer, Hydrology, Arctic Ocean, USSR—Kara Sea.

47-3335
Rifting, ozone layer and the level of the world ocean. [Riftogenez, ozonovyĭ sloĭ i uroven' Mirovogo okeana],
Syvorotkin, V.L., et al, *Rossiĭskaia akademiia nauk. Doklady*, 1992, 323(4), p.731-733, In Russian. 13 refs.
Sadovskiĭ, N.A.
Ozone, Hydrogen, Stratosphere, Water level.
Ozone holes appear as the result of endogenic activity of the Earth. Their appearance in the stratosphere in the mid-1980s was probably related to the unusual increase of solar activity which occurred at the end of the century and coincided with an entire series of natural cataclysms (earthquakes, volcanic eruptions, epidemics). Increased solar activity in some manner causes an increase in the flow of endogenic reduced gases, which contribute to the deterioration of the ozone layer. Data from American researchers show an increase in the concentration of hydrogen in the atmosphere since the mid-1980s, which coincides with the appearance of the ozone hole above Antarctica. (Auth. mod.)

47-3336
Annual gas-geochemical cyclic recurrence in a seasonally thawed layer in the lowlands of the cryolithozone. [Godovaia gazogeokhimicheskaia tsiklichnost' v sezonno-talom sloe nizmennostei kriolitozony],
Glotov, V.E., *Rossiĭskaia akademiia nauk. Doklady*, 1992, 325(1), p.150-153, In Russian. 9 refs.
Geocryology, Geochemical cycles, Gases, Active layer.

47-3337
Sea surface temperature of the southern ocean in iceberg regions. [Temperatura pripoverkhnostnogo sloia vod IUzhnogo okeana v raĭonakh rasprostraneniia aĭsbergov],
Popov, I.K., *Rossiĭskaia akademiia nauk. Doklady*, 1992, 326(1), p.181-183, In Russian. 2 refs.
Sea water, Surface temperature, Water temperature, Icebergs, Drift.
The described processes were observed during the summer, their intensity depending on the thermohaline structure of the ocean, at least up to the depth of the iceberg draft. The observations in below-zero temperatures did not reveal a significant impact of the icebergs on the surface temperatures of water at intervals greater than 300-400 m. (Auth. mod.)

47-3338
Field survey of potential airstrip locations: Mt. Howe, Antarctica, 1991.
DenHartog, S.L., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Feb. 1993, SR 93-01, 6p., ADA-263 199, 1 ref.
Ice runways, Aircraft landing areas, Ice (construction material), Antarctica—Howe, Mount.
The blue ice area just west of the Mt. Howe ridge was surveyed with the intent of establishing a runway for large, wheeled cargo aircraft. Site limitations and wind observations precluded selection of an airstrip location. Installation of an automatic weather station to monitor winds at the site will allow determination of site suitability. (Auth.)

47-3339
Subsurface drainage of pavement structures: current Corps of Engineers and industry practice.
Allen, W.L., *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, Dec. 1991, CR 91-22, 31p., ADA-245 898, 44 refs.
Subsurface drainage, Pavement bases, Roads, Freeze thaw cycles, Ice lenses, Design, Seepage, Surface drainage, Permeability.
Drainage of pavement structures is recognized as a key factor in improving the performance and extending the maintenance-free life of pavement systems. The use of pavement drainage structures to remove water introduced to the pavement system by surface infiltration, melting of ice lenses formed during freeze-thaw cycles, and groundwater sources has become more prevalent during the last decade. The components that make up a well-drained pavement section are commonly known: adequate surface drainage, permeable base courses, filters and a system of collector pipes. However, the details of the design of these components change with the agency constructing the pavement and the use of the pavement. The criteria and specifications of Federal and State governments, and private industry, along with those currently used by the Corps of Engineers, will be presented in this document. A comparison of the practices used in designing pavement drainage systems, among agencies, is presented to show where some design practices may benefit from technologies already accepted by others.

47-3340
Performance and phenology of alpine herbs along a snow-melting gradient.
Kudo, G., *Ecological research*, Dec. 1992, 7(3), p.297-304, 19 refs.
Alpine landscapes, Plant ecology, Growth, Seasonal variations, Phenology, Snow cover effect, Snowmelt, Site surveys.

47-3341
Extreme values of thermal loading parameters in concrete bridges.
Maes, M.A., et al, *Canadian journal of civil engineering*, Dec. 1992, 19(6), p.935-946, With French summary. 19 refs.
Dilger, W.H., Ballyk, P.D.
Bridges, Prestressed concretes, Design criteria, Temperature measurement, Thermal stresses, Temperature effects, Analysis (mathematics).

47-3342
Frost resistance of high-strength concrete. [La durabilité au gel des bétons à haute performance],
Pigeon, M., et al, *Canadian journal of civil engineering*, Dec. 1992, 19(6), p.975-980, In French with English summary. 11 refs.
Gagné, R., Aïtcin, P.C., Langlois, M.
Concrete durability, Cold weather performance, Freeze thaw tests, Air entrainment, Frost resistance, Physical properties, Specifications.

47-3343
Freeze-thaw durability and scaling resistance of concrete paving blocks. [Durabilité au gel-dégel et résistance 2Va l'écaillage des pavés de béton],
Boisvert, J., et al, *Canadian journal of civil engineering*, Dec. 1992, 19(6), p.1017-1024, In French with English summary. 14 refs.
Marchand, J., Pigeon, M., Isabelle, H.L.
Concrete pavements, Concrete durability, Frost resistance, Freeze thaw tests, Air entrainment, Salt water, Specifications.

47-3344
Sensitivity method for ice floe trajectory calculations.
Thomson, N.R., et al, *Canadian journal of civil engineering*, Aug. 1992, 19(4), p.573-585, With French summary. 9 refs.
Sykes, J.F.
Sea ice, Ice floes, Drift, Forecasting, Velocity measurement, Mathematical models, Correlation, Accuracy, Ice water interface.

47-3345
Potential leachate production due to cold weather effects.
Leskiw, E.J., et al, *Canadian journal of civil engineering*, Aug. 1992, 19(4), p.660-667, With French summary. 12 refs.
Sego, D.C., Smith, D.W.
Waste disposal, Soil pollution, Leaching, Soil water migration, Frozen ground mechanics, Frost heave, Cold weather tests, Temperature effects.

47-3346
Water resource modelling using remote sensing and object-oriented simulation.
McKim, H.L., et al, *Hydrological processes*, 1993, Vol.7, MP 3234, p.153-165, 16 refs.
Cassell, E.A., LaPotin, P.J.
Hydrology, Water reserves, Remote sensing, Runoff forecasting, Computerized simulation, Computer programs, Snowmelt, Watersheds.

47-3347
Measurement of microbial biomass in arctic tundra soils using fumigation-extraction and substrate-induced respiration procedures.
Cheng, W.X., et al, *Soil biology & biochemistry*, Jan. 1993, 25(1), p.135-141, 23 refs.
Virginia, R.A.
Tundra, Soil microbiology, Biomass, Soil tests, Test equipment, Performance, Correlation.

47-3348
High subarctic forest-tundra of northwestern Canada: position, width, and vegetation gradients in relation to climate.
Timoney, K.P., et al, *Arctic*, Mar. 1992, 45(1), p.1-9, With French summary. 76 refs.
La Roi, G.H., Zoltai, S.C., Robinson, A.L.
Subarctic landscapes, Forest tundra, Forest lines, Vegetation patterns, Climatic factors, Site surveys, Plant ecology.

47-3349
Geochemistry and organic contaminants in the sediments of Great Slave Lake, Northwest Territories, Canada.
Mudroch, A., et al, *Arctic*, Mar. 1992, 45(1), p.10-19, With French summary. 31 refs.
Allan, R.J., Joshi, S.R.
Limnology, Watersheds, Geochemistry, Bottom sediment, Water pollution, Sampling, Environmental impact, Hydrocarbons.

47-3350
Noise and vibration levels in artificial polar bear dens as related to selected petroleum exploration and developmental activities.
Blix, A.S., et al, *Arctic*, Mar. 1992, 45(1), p.20-24, With French summary. 8 refs.
Lentfer, J.W.
Ice caves, Vibration, Seismic surveys, Snow cover stability, Snow acoustics, Attenuation, Animals, Ecology.

47-3351
Suspended sediment character and distribution in McBeth Fiord, Baffin Island.
Winters, G.V., et al, *Arctic*, Mar. 1992, 45(1), p.25-35, With French summary. 46 refs.
Syvitski, J.P.M.
Oceanographic surveys, Suspended sediments, Sediment transport, Sedimentation, Estuaries, Ocean currents, Wind factors, Physical properties.

47-3352
Pliocene marine transgressions of northern Alaska: circumarctic correlations and paleoclimatic interpretations.
Brigham-Grette, J., et al, *Arctic*, Mar. 1992, 45(1), p.74-89, With French and Russian summaries. Refs. p.87-89.
Carter, L.D.
Geologic structures, Subpolar regions, Marine deposits, Marine geology, Paleoclimatology, Correlation, Sea level, Stratigraphy.

47-3353
Adjoint sensitivity theory for a pack ice momentum model.
Sykes, J.F., et al, *Canadian geotechnical journal*, Dec. 1992, 29(6), p.881-889, With French summary. 20 refs.
Miller-Cushon, J.D.
Sea ice, Pack ice, Drift, Velocity measurement, Ice mechanics, Ice models, Analysis (mathematics), Computerized simulation.

47-3354
Sensitivity analysis of ice motion near Adams Island.
Sykes, J.F., et al, *Canadian geotechnical journal*, Dec. 1992, 29(6), p.890-901, With French summary. 17 refs.
Miller-Cushon, J.D.
Sea ice, Fast ice, Drift, Ice mechanics, Velocity measurement, Rheology, Air ice water interaction, Mathematical models.

47-3355
Erratum: sharp cone testing of creep properties of frozen sand.
Ladanyi, B., et al, *Canadian geotechnical journal*, Dec. 1992, 29(6), p.1008, 1 ref. For article under discussion see 47-1440.
Sgaoula, J.
Sands, Soil tests, Frozen ground strength, Penetrometers, Accuracy.

47-3356
Combined infrared emission spectra and radar reflectivity studies of cirrus clouds.
Palmer, A.J., et al, *IEEE transactions on geoscience and remote sensing*, Jan. 1993, 31(1), p.64-69, 10 refs.
Cloud physics, Ice detection, Radar echoes, Remote sensing, Ice crystal optics, Infrared reconnaissance, Spectra, Backscattering.

47-3357
Rotational Raman lidar to measure the atmospheric temperature from the ground to 30 km.
Nedeljkovic, D., et al, *IEEE transactions on geoscience and remote sensing*, Jan. 1993, 31(1), p.90-101, 15 refs.
Hauchecorne, A., Chanin, M.L.
Meteorological data, Air temperature, Sounding, Temperature measurement, Lidar, Backscattering, Performance, Mathematical models.

47-3358
Helicopter-borne eight-channel ranging scatterometer for remote sensing: part 1: system description.
Hallikainen, M., et al, *IEEE transactions on geoscience and remote sensing*, Jan. 1993, 31(1), p.161-169, 11 refs.
Airborne radar, Geophysical surveys, Remote sensing, Helicopters, Radar echoes, Backscattering, Airborne equipment, Design.

47-3359
Repeat-pass interferometry with airborne synthetic aperture radar.
Gray, A.L., et al, *IEEE transactions on geoscience and remote sensing*, Jan. 1993, 31(1), p.180-191, 26 refs.
Farris-Manning, P.J.
Remote sensing, Topographic surveys, Aerial surveys, Airborne radar, Synthetic aperture radar, Performance, Imaging, Data processing.

47-3360
Change detection on Alaska's North Slope using repeat-pass ERS-1 SAR images.
Villasenor, J.D., et al, *IEEE transactions on geoscience and remote sensing*, Jan. 1993, 31(1), p.227-236, 23 refs.
Fatland, D.R., Hinzman, L.D.
Spaceborne photography, Synthetic aperture radar, Geophysical surveys, Radar echoes, Backscattering, Topographic effects, Image processing, Correlation, Frozen ground, Surface properties.

47-3361
Investigation of GPS precise relative static positioning during periods of ice clouds and snowfall precipitation.
Tranquilla, J.M., et al, *IEEE transactions on geoscience and remote sensing*, Jan. 1993, 31(1), p.295-299, 14 refs.
Al-Rizzo, H.M.
Spacecraft, Geodetic surveys, Radio waves, Wave propagation, Polarization (waves), Scattering, Orientation, Falling snow, Snow crystals, Accuracy, Snow optics.

47-3362
Study of precipitation in the coastal area of Antarctica as observed at Syowa Station using a vertical pointing radar.
Wada, M., et al, *Antarctic record*, Nov. 1992, 36(3), p.341-349, 17 refs.
Konishi, H.
Snow accumulation, Precipitation (meteorology), Meteorological instruments, Seasonal variations, Antarctica—Showa Station.
A new vertical pointing radar was installed at Showa Station in 1988 for observing precipitation and clouds in the Antarctic Climate Research project begun in 1987. The precipitation in 1988 was approximately half that of 1989. The total precipitation was estimated at about 200 mm from Feb. 23, 1988 to Feb. 22, 1989, and about 390 mm from Feb. 1, 1989 to Nov. 30, 1989. The trend of light snow accumulation in 1988 can be seen in the year-to-year data of the maximum snow depth, measured on the sea ice near Showa Station, and in the annual data of snow accumulation on the coast near Showa Station. (Auth. mod.)

47-3363
Newly developed snow vehicle (SM100S) for Antarctica. 1. Necessity and process of the development.
Takeuchi, S., et al, *Antarctic record*, Nov. 1992, 36(3), p.363-375, In Japanese with English summary. 3 refs.
Snow vehicles, Design, Traverses, Low temperature tests.
Specifications and illustrations of 4 types of snow vehicles and tractors, operated by JARE on inland ice sheets, sea ice and inland traverses, are presented. As the JARE research area is expanding to increasingly colder regions, a new snow vehicle capable of operating in very low temperatures and low pressure conditions was designed and tested in the winter of 1992. Its performance on the antarctic ice sheet is reported to be satisfactory.

47-3364
Newly developed snow vehicle (SM100S) for Antarctica. 2. Design of the system.
Nakajima, M., et al, *Antarctic record*, Nov. 1992, 36(3), p.376-392, In Japanese with English summary. 2 refs.
Hosoya, M.
Snow vehicles, Design, Engines, Low temperature research.
The design of the systems of a newly developed snow vehicle, which will be used in a deep ice coring project at Dome Fuji, is described. The vehicle is a cab-over full-track type with accommodations for two. It is 11,500 kg in gross weight, and it traverses the ice sheet at 5-8 km/h, pulling 7 wooden sledges weighing 2.6 t in loaded weight each. The vehicle operates from the plain up to the high plateau (4,000 m) at temperatures down to -60 C; it can survive temperatures as low as -90 C. Specifications and illustrations of the SM100S and some of its parts are included.

47-3365
Newly developed snow vehicle (SM100S) for Antarctica. 3. Low temperature toughness of the welded joints of the structural steel.
Sakui, S., et al, *Antarctic record*, Nov. 1992, 36(3), p.393-397, In Japanese with English summary. 2 refs.
Nakajima, M.
Snow vehicles, Low temperature tests, Steel structures, Impact tests.
For the purpose of developing a new snow vehicle for a deep ice coring project at Dome Fuji, the low temperature resistance of structural steel welded joints was investigated. It is proposed that in cases of vehicles employed in temperatures of -50 C, the brittle fracture of the structural members will not occur, provided that semi-chilled or chilled steel is used, for which 50% FATT (fracture appearance transition temperature) of the Charpy impact test is about -50 C, and the Charpy impact values at -50 C are 20-29 J/sq cm. Based on results of the Charpy impact test performed, it is concluded that the JIS steels SL2N255 and STPL450 can be used in the construction of the new snow vehicle at Dome Fuji.

47-3366
Newly developed snow vehicle (SM100S) for Antarctica. 4. Low temperature properties of crawler belt.
Maekawa, E., et al, *Antarctic record*, Nov. 1992, 36(3), p.398-409, In Japanese with English summary. 6 refs.
Terayama, Y.
Low temperature tests, Rubber ice friction, Snow vehicles, Construction materials.
In order to discover a high cold-resistance material for use in the crawler belt of snow vehicles, the physical properties at very low temperatures of a recently developed material, isoprene/butadiene (70/30) random copolymer filled with carbon black, were investigated and compared with those of a blended rubber NR/BR (65/35) and a currently used NR. Test results show that the isoprene material can keep its rubber elasticity even at temperatures below -70 C. Although it was found to be somewhat inferior to the other two materials in stress-at-break and tear tests, its use is recommended in the construction of snow vehicles in Antarctica.

47-3367
Newly developed snow vehicle (SM100S) for Antarctica. 5. Result of general performance tests.
Saito, M., et al, *Antarctic record*, Nov. 1992, 36(3), p.410-440, In Japanese with English summary.
Seki, T., Hosoya, M.
Snow vehicles, Low temperature research, Cold weather performance, Low temperature tests.
The results of fundamental and general performance tests of a newly developed snow vehicle, to be used in a deep ice coring project at Dome Fuji, showed the following: the vehicle's performance and the purpose of the system's design were found to be satisfactory, but its structure was not. The tests were carried out on concrete pavement, where the vehicle's performance can be compared to that of similar vehicles, and on a compacted-snow surface which has the simulated hardness of antarctic snow.

47-3368
Activities of the wintering party at Syowa Station by the 32nd Japanese Antarctic Research Expedition in 1991.
Fujii, Y., *Antarctic record*, Nov. 1992, 36(3), p.441-472, In Japanese with English summary.
Research projects, Traverses, Sea ice distribution, Glacial meteorology, Antarctica—Showa Station.
The wintering party of JARE-32 performed its activities at two wintering sites from 1991 to 1992. It consisted of 31 members at Showa Station and 8 members at Asuka Station. Wintering activities at Asuka Station will be reported separately. The main scientific research programs at Showa Station were as follows: studies on ocean-atmosphere interaction in the sea ice area as part of the Antarctic Climate Research Program; environmental science studies; Polar Patrol Balloon experiments; and life science studies. Various airborne observations and inland glaciological traverses were carried out. *(Auth.)*

47-3369
Abstracts and papers.
WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991, Ottawa, Environment Canada, Dec. 1991, 2 vols., Refs. passim. For selected papers see 47-3370 through 47-3410.
Richardson, F., comp.
Ice surveys, Sea ice distribution, Ice reporting, Ice detection, Ice forecasting, Ice conditions, Ice cover thickness, Snow ice interface, Remote sensing, Radiometry, Spaceborne photography, Synthetic aperture radar.

47-3370
Use of ice data in icebreaker operations.
Eggenberger, J.P., WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.1, Ottawa, Environment Canada, Dec. 1991, p.13-18.
Ice surveys, Ice reporting, Ice routing, Ice navigation, Icebreakers, Remote sensing.

47-3371
Data acquisition strategy for AES' ice services program.
Champ, D.H., WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.1, Ottawa, Environment Canada, Dec. 1991, p.19-20.
Ice surveys, Ice reporting, Data transmission, Remote sensing, Canada.

47-3372
Satellite-image workstation for icebreakers.
Berglund, R., WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.1, Ottawa, Environment Canada, Dec. 1991, p.21-24, 1 ref.
Ice surveys, Ice reporting, Ice routing, Ice navigation, Icebreakers, Spaceborne photography, Image processing.

47-3373
IPIX radar: a tool for ocean surveillance and meteorological research.
Currie, B.W., et al, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.1, Ottawa, Environment Canada, Dec. 1991, p.25-36, 10 refs.
Haykin, S., Krasnor, C., Kezys, V., Weber, P.
Ice surveys, Ice reporting, Ice detection, Radar.

47-3374
Comparison of several sea ice data sets.
Etkin, D.A., et al, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.1, Ottawa, Environment Canada, Dec. 1991, p.41-47, 3 refs.
Ramseier, R.O.
Ice surveys, Sea ice distribution, Radar photography, Radiometry.

47-3375
Comparison of remote sensing systems for operational ice analysis.
Carrieres, T., et al, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.1, Ottawa, Environment Canada, Dec. 1991, p.51-61, 4 refs.
Crosbie, D.
Ice surveys, Ice reporting, Ice detection, Sea ice distribution, Remote sensing.

47-3376
***Maxim Gorky* accident: how good are ice charts.**
Ramseier, R.O., et al, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.1, Ottawa, Environment Canada, Dec. 1991, p.65-73.
Strübing, K., Rubinstein, I.G.
Ice surveys, Ice reporting, Ice detection, Sea ice distribution, Accidents.

47-3377
Objective analysis of ice cover at the Canadian Meteorological Center and its use in numerical weather prediction.
Hallé, J., WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.1, Ottawa, Environment Canada, Dec. 1991, p.75-85, Legends to some of the charts are in French.
Ice surveys, Ice reporting, Sea ice distribution, Ice cover effect, Weather forecasting, Meteorological charts, Meteorological data, Statistical analysis.

47-3378
SSM/I and other cryospheric products from the snow and ice DAAC.
Barry, R.G., et al, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.1, Ottawa, Environment Canada, Dec. 1991, p.87-100.
Weaver, R.L., Troisi, V.J.
Ice surveys, Snow surveys, Sea ice distribution, Remote sensing, Data processing.

47-3379
Barents Sea ice conditions as observed by passive microwave and other techniques.
Lövas, S.M., et al, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.1, Ottawa, Environment Canada, Dec. 1991, p.101-115, 7 refs.
Vefsnmo, S., Ramseier, R.O.
Ice surveys, Sea ice distribution, Ice reporting, Ice edge, Ice detection, Ice conditions, Spaceborne photography, Radiometry, Barents Sea.

47-3380
Inferring snow cover on sea ice from passive microwave signatures.
Lohanick, A.W., MP 3235, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.1, Ottawa, Environment Canada, Dec. 1991, p.119-124.
Ice surveys, Snow surveys, Snow ice interface, Radiometry.

47-3381
Snow cover and some of its effects on passive microwave signatures.
Garrity, C., WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.1, Ottawa, Environment Canada, Dec. 1991, p.125-132, For Ph.D. thesis from which figures are taken, see 47-3133.
Ice surveys, Snow surveys, Snow ice interface, Radiometry.

47-3382
Surface albedo of snow covered first year and multiyear sea ice.
De Abreu, R.A., et al, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.1, Ottawa, Environment Canada, Dec. 1991, p.133-140.
Papakyriakou, T.N., Barber, D.G., LeDrew, E.F.
Ice surveys, Snow surveys, Snow ice interface, Albedo, Radiometry.

47-3383
Optimal radar ice surveillance.
Bercha, F.G., et al, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.1, Ottawa, Environment Canada, Dec. 1991, p.143-164, 3 refs.
Steen, J.W., Currie, D.H.
Ice surveys, Ice reporting, Ice detection, Sea ice distribution, Radar tracking, Side looking radar, Synthetic aperture radar.

47-3384
Operational airborne sea ice thickness measurement system.
Rossiter, J.R., et al, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.1, Ottawa, Environment Canada, Dec. 1991, p.167-177.
Holladay, J.S., Prinsenberg, S.J.
Ice surveys, Ice cover thickness, Sea ice distribution, Airborne radar.

47-3385
Spatial and temporal variations of surface geophysical properties and airborne SAR data during SIMS'90 and SIMS'91.
Flett, D.G., et al, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.1, Ottawa, Environment Canada, Dec. 1991, p.179-186.
Barber, D.G., LeDrew, E.F.
Ice surveys, Sea ice distribution, Ice surface, Snow ice interface, Synthetic aperture radar.

47-3386
Beaufort Sea Ice-1: an overview.
Livingstone, C.E., et al, MP 3236, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.1, Ottawa, Environment Canada, Dec. 1991, p.189-205.
Kovacs, A.
Ice surveys, Sea ice distribution, Ice surface, Ice cover thickness, Synthetic aperture radar, Radar tracking, Beaufort Sea.

47-3387
Integration of optical and active microwave data of a snow-covered sea ice surface.
Manore, M.J., et al, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.1, Ottawa, Environment Canada, Dec. 1991, p.209-215.
Barber, D.G.
Ice surveys, Sea ice distribution, Ice surface, Snow ice interface, Synthetic aperture radar.

47-3388
Applications of new remote-sensing and image processing technologies to improve ice forecasting.
Marko, J.R., et al, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.1, Ottawa, Environment Canada, Dec. 1991, p.217-226, 2 refs.
Fissel, D.B.
Ice surveys, Ice forecasting, Drift, Sea ice distribution, Icebergs, Radar tracking, Remote sensing, Image processing.

47-3389
Existing and planned uses of remotely sensed data in the U.S. Navy's sea ice forecast models.
Preller, R.H., et al, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.1, Ottawa, Environment Canada, Dec. 1991, p.235-255.
Posey, P.G., Cheng, A.
Ice surveys, Ice forecasting, Drift, Sea ice distribution, Ice edge, Ice models, Remote sensing, Image processing.

47-3390
Cloud induced limitations to satellite based sea ice mapping. The Greenland Sea, August-September 1981-89.
Nielsen, P., et al, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.1, Ottawa, Environment Canada, Dec. 1991, p.263-276.
Valeur, H.H.
Ice surveys, Ice reporting, Sea ice distribution, Ice routing, Ice navigation, Cloud cover, Spaceborne photography, Greenland Sea.

47-3391
MOS-1 multi-sensor data set and sea ice study.
Nishio, F., et al, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.1, Ottawa, Environment Canada, Dec. 1991, p.277-287, 11 refs.
Cho, K., Takeda, K., Maeda, K., Kodama, T., Yamanouchi, T.
Ice surveys, Sea ice distribution, Ice detection, Ice conditions, Spaceborne photography, Radiometry, Data processing, Research projects.
Japan's first polar orbiting earth observation satellite series MOS-1 and MOS-1b are on board with three different sensors, which are MESSR (Multi-spectrum Electronic Self-scanning Radiometer), VTIR (Visible Thermal Infrared Radiometer) and MSR (Microwave Scanning Radiometer). The great advantage of MOS-1 is that it can observe the same phenomena by three different sensors at the same time. In order to contribute to the ISY (International Space Year)/PIE (Polar Ice Extent) Program, MOS-1 multisensor data sets of the Okhotsk Sea and the Antarctic received at Showa Station have been produced. The use of the data set for sea ice study and monitoring, and also further plans to produce the MOS-1 data set in Arctic regions, are described. (Auth. mod.)

47-3392
AES Dash-7 ice reconnaissance aircraft.
Ramplee-Smith, C., et al, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.1, Ottawa, Environment Canada, Dec. 1991, p.289-293.
Hall, R.B.
Ice surveys, Ice reporting, Sea ice distribution, Ice detection, Radar tracking, Side looking radar, Airplanes.

47-3393
Real-time ice monitoring using synthetic aperture radar.
Ramsay, B.R., WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.1, Ottawa, Environment Canada, Dec. 1991, p.295-306, 7 refs.
Ice surveys, Ice reporting, Sea ice distribution, Ice detection, Radar tracking, Synthetic aperture radar, Data transmission, Data processing.

47-3394
Real-time ice monitoring within the International Space Year.
Strübing, K., WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.2, Ottawa, Environment Canada, Dec. 1991, p.7-18.
Ice surveys, Ice reporting, Sea ice distribution, Ice detection, Spaceborne photography, Research projects.

47-3395
Recent progress in developing predictive capabilities for annual variability of sea ice and icebergs off eastern Canada.
Fissel, D.B., et al, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.2, Ottawa, Environment Canada, Dec. 1991, p.19-32, 27 refs.
Marko, J.R.
Ice surveys, Ice forecasting, Drift, Sea ice distribution, Icebergs, Statistical analysis, Canada.

47-3396
SICAR: a program for semi-automated digitizing of composite ice charts.
Piwowar, J.M., et al, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.2, Ottawa, Environment Canada, Dec. 1991, p.33-41.
LeDrew, E.F., Chagnon, R., Mudry, D.
Ice surveys, Sea ice distribution, Computer programs, Data processing.

47-3397
Operational utility of satellite passive microwave imagery in supporting Canadian regional sea ice monitoring.
Nazarenko, D.M., et al, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.2, Ottawa, Environment Canada, Dec. 1991, p.47-52.
Rubinstein, I.G., Carrieres, T.
Ice surveys, Sea ice distribution, Ice forecasting, Ice reporting, Radiometry, Spaceborne photography.

47-3398
Ice Branch operational use of ice beacons on sea ice.
Weir, L., et al, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.2, Ottawa, Environment Canada, Dec. 1991, p.53-59.
McRuer, W.H.
Ice surveys, Sea ice distribution, Ice forecasting, Ice reporting, Drift stations, Data processing.

47-3399
Statistical analysis of sea ice for the eastern Barents Sea.
Vefsnmo, S., et al, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.2, Ottawa, Environment Canada, Dec. 1991, p.61-80.
Lövas, S.M., Kjelaas, A.G.
Ice surveys, Sea ice distribution, Ice reporting, Ice routing, Ice navigation, Statistical analysis, Barents Sea.

47-3400
Identification of sea ice using NOAA satellite data.
Zhang, L.X., et al, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.2, Ottawa, Environment Canada, Dec. 1991, p.81-86, 2 refs.
Qiu, K.M., Wu, X.
Ice surveys, Sea ice distribution, Ice detection, Ice reporting, Spaceborne photography, Data processing.

47-3401
Evaluation of two classification algorithms to discriminate open water and sea ice from SAR image.
Similä, M., WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.2, Ottawa, Environment Canada, Dec. 1991, p.89-106, 13 refs.
Ice surveys, Sea ice distribution, Ice detection, Ice edge, Ice water interface, Ice conditions, Synthetic aperture radar, Image processing.

47-3402
Fourier domain multifrequency classification of single frequency SAR images of sea ice.
Barber, D.G., et al, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.2, Ottawa, Environment Canada, Dec. 1991, p.111-118.
LeDrew, E.F.
Ice surveys, Sea ice distribution, Ice detection, Synthetic aperture radar, Image processing.

47-3403
SSM/I NASA algorithm sea ice retrieval comparison with Landsat satellite and aerial photography for the Bering Sea.
Steffen, K., et al, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.2, Ottawa, Environment Canada, Dec. 1991, p.121-129.
Schweiger, A.J.
Ice surveys, Sea ice distribution, Ice detection, Spaceborne photography, Aerial surveys, Radiometry, Image processing, LANDSAT.

47-3404
Integration of high and low resolution microwave observations.
Rubinstein, I.G., et al, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.2, Ottawa, Environment Canada, Dec. 1991, p.131-142.
Shokr, M.E., Ostigey, P.
Ice surveys, Sea ice distribution, Ice detection, Synthetic aperture radar, Radiometry, Image processing.

47-3405
Digital DMSP OLS fine imagery sea ice applications.
Hawkins, J.D., et al, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.2, Ottawa, Environment Canada, Dec. 1991, p.153-155.
Fetterer, F.M.
Ice surveys, Sea ice distribution, Ice detection, Radiometry, Image processing.

47-3406
Polynomial trend surface analysis applied to AVHRR images to improve definition of arctic leads through binary segmentation procedures.
Eppler, D.T., et al, MP 3237, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.2, Ottawa, Environment Canada, Dec. 1991, p.161-189, 15 refs.
Full, W.E.
Ice surveys, Sea ice distribution, Ice openings, Ice detection, Ice water interface, Ice conditions, Radiometry, Image processing, Computer applications, Statistical analysis.
Polynomial trend surface analysis was applied to three AVHRR images to determine whether regional trends in image radiance can be removed with this procedure. Results suggest that trend surface techniques can be effective in removing region-scale variation in image radiances. Optimum results are achieved when the third- and fourth-order surfaces are subtracted to remove local temperature and illumination anomalies that occur at smaller spatial scales, primarily in the vicinity of clouds. Application of higher-order surfaces fails to improve image quality. There is some indication that the topography of these higher-order surfaces in part maps regional variation in lead density. Use of a best-fit criterion based on a strict variance technique (such as the least-squares method) to define the trend surface limits the effectiveness of the technique in this application. A criterion that allows for data to be weighted based on their distance from the plane about which they cluster is more appropriate to the structure of AVHRR radiance data typical of images that show sea ice. A criterion that incorporates a rule system based on fuzzy logic offers an alternative means of assessing goodness-of-fit that might prove appropriate in this application.

47-3407
Verification of an operational sea ice forecast model.
Yao, T., et al, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.2, Ottawa, Environment Canada, Dec. 1991, p.193-200, 6 refs.
Fissel, D.B.
Ice surveys, Sea ice distribution, Ice forecasting, Drift, Ice edge, Ice conditions, Ice models, Statistical analysis.

47-3408
Verification of remotely sensed ice thickness data.
Prinsenberg, S.J., WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.2, Ottawa, Environment Canada, Dec. 1991, p.201-212, 3 refs.
Ice surveys, Ice cover thickness, Sea ice distribution, Remote sensing, Data processing, Statistical analysis.

47-3409
Thin-ice statistics for strength calculations without sub-category classification.
Soulis, E.D., et al, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.2, Ottawa, Environment Canada, Dec. 1991, p.213-226.
Lennox, W.C., Sykes, J.F.
Ice surveys, Ice cover thickness, Sea ice distribution, Ice cover strength, Statistical analysis.

47-3410
Northeast passage; ERS-1 ice routing for the Polar/Vessel *L'Astrolabe.*
Johannessen, O.M., et al, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.2, Ottawa, Environment Canada, Dec. 1991, p.227-236.
Ice surveys, Ice routing, Ice navigation, Sea ice distribution, Ice reporting, Spacecraft, Data transmission.

47-3411
Adjustable, manual snowplow.
Kulat, A.C., *U.S. Patent Office. Patent*, Jan. 10, 1989, 4 col., USP-4,796,367, 25 refs.
Snow removal, Portable equipment, Winter maintenance, Design.

47-3412
Contact assembly for high-voltage switch.
Roman, C.D., et al, *U.S. Patent Office. Patent*, Jan. 3, 1989, 6 col., USP-4,795,869, 6 refs.
Czuma, D.M.
Electric equipment, Icing, Countermeasures, Cold weather performance, Design.

47-3413
Cleats for snowmobile track.
Simmons, V.M., *U.S. Patent Office. Patent*, Jan. 3, 1989, 8 col., USP-4,795,221, 10 refs.
Tracked vehicles, Snow vehicles, Traction, Vehicle wheels, Surface structure, Design.

47-3414
Clamp for arctic pipeline support.
Morton, A.W., *U.S. Patent Office. Patent*, Nov. 29, 1988, 4 col., USP-4,787,583, 18 refs.
Pipeline supports, Pipeline heating, Design, Heat transmission, Countermeasures, Permafrost preservation.

47-3415
Arctic production terminal facility.
Williams, T.E., *U.S. Patent Office. Patent*, Nov. 22, 1988, 4 col., USP-4,786,210, 3 refs.
Offshore structures, Docks, Petroleum industry, Oil storage, Ice control, Ice prevention, Design.

47-3416
Support standard for implement.
Schoessow, J., *U.S. Patent Office. Patent*, Nov. 15, 1988, 4 col., USP-4,784,085, 4 refs.
Agriculture, Supports, Subsurface structures, Ice solid interface, Countermeasures, Bearing strength, Design.

47-3417
Water freeze prevention valve.
Carney, F.P., *U.S. Patent Office. Patent*, Nov. 15, 1988, 24 col., USP-4,784,173, 27 refs.
Valves, Water pipelines, Ice prevention, Countermeasures, Design.

47-3418
Arctic offshore structure and installation method therefor.
Turner, J.W., *U.S. Patent Office. Patent*, Nov. 15, 1988, 8 col., USP-4,784,526, 11 refs.
Offshore structures, Petroleum industry, Subsurface structures, Supports, Ice loads, Protection, Modular construction, Design.

47-3419
Snow removal method.
Swanson, E.V., *U.S. Patent Office. Patent*, Nov. 22, 1988, 8 col., USP-4,785,561, 7 refs.
Winter maintenance, Snow removal, Snow disposal, Snow melting, Equipment, Design.

47-3420
Tunnel kiln adapted for firing frost-resistant bricks in a reducing atmosphere.
Mueller, M., *U.S. Patent Office. Patent*, Sep. 27, 1988, 6 col., USP-4,773,851, 5 refs.
Structures, Bricks, Manufacturing, Frost resistance, Surface properties, Vapor diffusion, Design.

47-3421
Dimensional variations, capillary absorption and freeze-thaw resistance of repair mortars admixed with polymers.
Atzeni, C., et al, *Cement and concrete research*, Mar. 1993, 23(2), p.301-308, 15 refs.
Massidda, L., Sanna, U.
Mortars, Cement admixtures, Polymers, Mechanical tests, Freeze thaw cycles, Physical properties, Cold weather performance.

47-3422
Relative rates of glacial and nonglacial erosion in alpine environments.
Harbor, J.M., et al, *Arctic and alpine research*, Feb. 1993, 25(1), p.1-7, 39 refs.
Warburton, J.
Alpine landscapes, Alpine glaciation, River basins, Glacial erosion, Soil erosion, Sedimentation, Correlation.

47-3423
Shoreline shrub population extension in response to recent isostatic rebound in eastern Hudson Bay, Quebec, Canada.
von Mörs, I., et al, *Arctic and alpine research*, Feb. 1993, 25(1), p.15-23, 25 refs.
Bégin, Y.
Plant ecology, Littoral zone, Vegetation patterns, Shoreline modification, Isostasy, Subarctic landscapes.

47-3424
Pine (*Pinus sylvestris* L.) tree-limit surveillance during recent decades, central Sweden.
Kullman, L., *Arctic and alpine research*, Feb. 1993, 25(1), p.24-31, 53 refs.
Trees (plants), Vegetation patterns, Forest lines, Site surveys, Periodic variations, Climatic changes, Subarctic landscapes, Temperature effects.

47-3425
Seasonal changes in the radiation balance of subarctic forest and tundra.
Lafleur, P.M., et al, *Arctic and alpine research*, Feb. 1993, 25(1), p.32-36, 16 refs.
Renzetti, A.V., Bello, R.
Subarctic landscapes, Forest land, Tundra, Radiation balance, Seasonal variations, Snow cover effect, Albedo, Site surveys.

47-3426
Effect of site disturbance on the soil thermal regime near Fort Simpson, Northwest Territories, Canada.
Hayhoe, H.N., et al, *Arctic and alpine research*, Feb. 1993, 25(1), p.37-44, 26 refs.
Tarnocai, C.
Discontinuous permafrost, Subarctic landscapes, Soil surveys, Permafrost transformation, Soil temperature, Thermal regime, Climatic changes, Mathematical models, Snow cover effect.

47-3427
Ecological genetic variation in seed banks. 4. Differentiation of extant and seed bank-derived populations of *Eriophorum vaginatum*.
McGraw, J.B., *Arctic and alpine research*, Feb. 1993, 25(1), p.45-49, 19 refs.
Plant ecology, Tundra, Revegetation, Growth, Vegetation patterns, Phenology, Site surveys.

47-3428
Extracellular acid phosphatase activities in *Eriophorum vaginatum* tussocks: a modeling synthesis.
Moorhead, D.L., et al, *Arctic and alpine research*, Feb. 1993, 25(1), p.50-55, 40 refs.
Kroehler, C.J., Linkins, A.E., Reynolds, J.F.
Plant ecology, Tundra, Nutrient cycle, Active layer, Biomass, Mathematical models, Site surveys, Soil profiles, Decomposition.

47-3429
Design of greenhouses for the manipulation of temperature in tundra plant communities.
Debevec, E.M., et al, *Arctic and alpine research*, Feb. 1993, 25(1), p.56-62, 6 refs.
MacLean, S.F., Jr.
Tundra, Plant ecology, Photosynthesis, Climatic changes, Simulation, Temperature control, Wooden structures, Design, Materials.

47-3430
Estimating ecesis for tree-ring dating of moraines: a comparative study from the Canadian Cordillera.
McCarthy, D.P., et al, *Arctic and alpine research*, Feb. 1993, 25(1), p.63-68, 33 refs.
Luckman, B.H.
Moraines, Age determination, Trees (plants), Plant ecology, Vegetation patterns, Substrates, Glacier oscillation.

47-3431
Determination of compressional wave and shear wave speed profiles in sea ice by crosshole tomography—theory and experiment.
Rajan, S.D., et al, *Acoustical Society of America. Journal*, Feb. 1993, 93(2), p.721-738, 36 refs.
Frisk, G.V., Doutt, J.A., Sellers, C.J.
Sea ice, Ice structure, Wave propagation, Elastic waves, Seismic velocity, Ice acoustics, Acoustic measurement, Boreholes, Attenuation.

47-3432
Very-low-frequency under-ice reflectivity.
Wolf, J.W., et al, *Acoustical Society of America. Journal*, Mar. 1993, 93(3), p.1329-1334, 10 refs.
Diachok, O.I., Yang, T.C., Wales, S.
Sea ice, Ice water interface, Underwater acoustics, Wave propagation, Scattering, Pressure ridges, Distribution, Ice bottom surface, Very low frequencies.

47-3433
Speed of sound in pure water as a function of temperature.
Bilaniuk, N., et al, *Acoustical Society of America. Journal*, Mar. 1993, 93(3), p.1609-1612, 2 refs.
Wong, G.S.K.
Sound transmission, Velocity measurement, Underwater acoustics, Water temperature, Temperature variations, Temperature effects, Standards.

47-3434
Effect of soil moisture and thaw depth on CH4 flux from wet coastal tundra ecosystems on the North Slope of Alaska.
Vourlitis, G.L., et al. *Chemosphere*. Jan.-Feb. 1993. 26(1-4). NATO Advanced Research Workshop. Mount Hood, OR, Oct. 7-11, 1991. Proceedings. Atmospheric methane: sources, sinks and role in global change. Edited by M.A.K. Khalil et al. p.329-337. 27 refs.
Oechel, W.C., Hastings, S.J., Jenkins, M.A.
Arctic landscapes, Ecosystems, Tundra, Wetlands, Natural gas, Soil air interface, Soil water, Thaw depth, Global warming.

47-3435
Significance of stomatal control on methane release from *Carex*-dominated wetlands.
Morrissey, L.A., et al. *Chemosphere*. Jan.-Feb. 1993. 26(1-4). NATO Advanced Research Workshop. Mount Hood, OR, Oct. 7-11, 1991. Proceedings. Atmospheric methane: sources, sinks and role in global change. Edited by M.A.K. Khalil et al. p.339-355. Refs. p.351-354.
Zobel, D.B., Livingston, G.P.
Wetlands, Tundra, Subarctic landscapes, Natural gas, Plant physiology, Soil air interface, Site surveys, Climatic factors.

47-3436
Environmental and biotic controls over methane flux from arctic tundra.
Torn, M.S., et al. *Chemosphere*. Jan.-Feb. 1993. 26(1). NATO Advanced Research Workshop. Mount Hood, OR, Oct. 7-11, 1991. Proceedings. Atmospheric methane: sources, sinks and role in global change. Edited by M.A.K. Khalil et al. p.357-368. Refs. p.366-368.
Chapin, F.S., III.
Arctic landscapes, Ecosystems, Tundra, Wetlands, Natural gas, Plant physiology, Soil air interface, Environmental tests, Climatic factors.

47-3437
Permafrost methane content: 1. Experimental data from sites in northern Alaska.
Rasmussen, R.A., et al. *Chemosphere*. Jan.-Feb. 1993. 26(1). NATO Advanced Research Workshop. Mount Hood, OR, Oct. 7-11, 1991. Proceedings. Atmospheric methane: sources, sinks and role in global change. Edited by M.A.K. Khalil et al. p.591-594. 4 refs.
Khalil, M.A.K., Moraes, F.
Permafrost surveys, Permafrost transformation, Natural gas, Chemical composition, Frozen ground chemistry, Gas inclusions.

47-3438
Permafrost methane content: 2. Modeling theory and results.
Moraes, F., et al. *Chemosphere*. Jan.-Feb. 1993. 26(1). NATO Advanced Research Workshop. Mount Hood, OR, Oct. 7-11, 1991. Proceedings. Atmospheric methane: sources, sinks and role in global change. Edited by M.A.K. Khalil et al. p.595-607. 25 refs.
Khalil, M.A.K.
Permafrost transformation, Ground thawing, Natural gas, Soil air interface, Gas inclusions, Mathematical models, Climatic factors, Global change.

47-3439
Methane in permafrost—preliminary results from coring at Fairbanks, Alaska.
Kvenvolden, K.A., et al. *Chemosphere*. Jan.-Feb. 1993. 26(1). NATO Advanced Research Workshop. Mount Hood, OR, Oct. 7-11, 1991. Proceedings. Atmospheric methane: sources, sinks and role in global change. Edited by M.A.K. Khalil et al. p.609-616. 15 refs.
Lorenson, T.D.
Discontinuous permafrost, Permafrost surveys, Drill core analysis, Gas inclusions, Natural gas, Climatic factors, Soil air interface, Global change.

47-3440
Ice algae during EPOS, leg 1: assemblages, biomass, origin and nutrients.
Syvertsen, E.E., et al. *Polar biology*. Feb. 1993. 13(1). p.61-65. 15 refs.
Kristiansen, S.
Ice cover effect, Sea ice, Algae, Biomass, Antarctica—Weddell Sea.
Ice algae in infiltration assemblages were the dominating primary producers in the northwestern Weddell Sea during the austral spring of 1988. Band and sub-ice assemblages were encountered at a few stations only. Maximum ice algal biomass measured was 424 micrograms Chl.a·l compared to less than 0.4 microgram Chl.a·l in the water column. Biomass and nutrient concentrations in the infiltration layer decreased inward from the edge of ice floes. The composition of algal groups indicated that the concentric distribution was due to migration by mobile taxa. Various procedures for melting of ice-containing samples of algae were tested. Melting in dialysis tubing seemed to have advantages over other methods, especially for cells to be used in physiological experiments. (Auth.)

47-3441
Formation of glacial flutes: assessment of models with evidence from Lyngsdalen, North Norway.
Gordon, J.E., et al. *Quaternary science reviews*. 1992. 11(7/8). p.709-731. 63 refs.
Whalley, W.B., Gellatly, A.F., Vere, D.M.
Landforms, Glacial geology, Ice creep, Norway.

47-3442
Genesis and significance of 'hummocky moraine': evidence from the Isle of Skye, Scotland.
Benn, D.I., *Quaternary science reviews*. 1992. 11(7/8). p.781-799. 65 refs.
Landforms, Moraines, Ice edge, Scotland.

47-3443
First transit of the Northwest Passage by Russian icebreaker.
Splettstoesser, J., et al. *Polar record*. Apr. 1993. 29(169). p.148. 1 ref.
Splettstoesser, B.D.
Ice navigation, Icebreakers.

47-3444
Stratospheric ClO and ozone from the Microwave Limb Sounder on the upper atmosphere research satellite.
Waters, J.W., et al. *Nature*. Apr. 15, 1993. 362(6421). p.597-602. 52 refs.
Ozone, Atmospheric composition, Atmospheric circulation, Meteorological instruments.
Concentrations of atmospheric ozone and of ClO (the predominant form of reactive chlorine responsible for stratospheric ozone depletion) are reported for both the arctic and antarctic winters of the past 18 months. Chlorine in the lower stratosphere was almost completely converted to chemically reactive forms in both the northern and southern polar winter vortices. This occurred in the south long before the development of the antarctic ozone hole, suggesting that ozone loss can be masked by influx of ozone-rich air. (Auth.)

47-3445
Variations in mercury deposition to Antarctica over the past 34,000 years.
Vandal, G.M., et al. *Nature*. Apr. 15, 1993. 362(6421). p.621-623. 30 refs.
Fitzgerald, W.F., Boutron, C.F., Candelone, J.P.
Ice sheets, Chemical composition, Biomass, Antarctica—Dome C.
Polar ice contains a valuable record of past atmospheric mercury deposition, which can provide information about both the natural biogeochemical cycling of this toxic trace metal and the impact of recent anthropogenic emissions. But existing studies of mercury in polar ice and snow cores suffer from sample contamination and inadequate analytical procedures. Reported here are measurements of mercury concentrations spanning the past 34,000 years from the Dome C ice core, using stringent trace-metal clean protocols developed by Patterson and coworkers. Although this record does not extend into the industrial period, it provides an important baseline for future attempts to identify anthropogenic mercury in antarctic ice and snow. Mercury concentrations were strikingly elevated during the last glacial maximum (18,000 years ago), when oceanic productivity may have been higher than it is today. As oceanic mercury emission is correlated with productivity, it is suggested that this was the principal pre-industrial source of mercury to Antarctica; mercury concentrations in antarctic ice might therefore serve as a palaeoproductivity indicator for the more distant past. (Auth.)

47-3446
Test record for the retest of the Heavy Equipment Transport System (HETS) M1000 trailer.
Reagan, J.E., Seattle, U.S. Army Cold Regions Test Center, Apr. 1993. 3p. + appends., U.S. Army Test and Evaluation Command, TECOM project No.1-VS-120-HET-009, 3 refs.
Snow vehicles, Tractors, Military transportation, Brakes (motion arresters), Cold weather tests.

47-3447
Research and development in building physics during the last 25 years. Stockholm, Swedish Council for Building Research (Byggforskningsradet), 1992. 165p., D15:1992, Refs. passim. Presented at an international symposium to celebrate Professor Lars Erik Nevander's 70 years birthday, Lund, Sweden, Sep. 13, 1991. For selected papers see 47-3448 through 47-3455.
Thermal insulation, Buildings, Vapor barriers, Waterproofing.

47-3448
Thermal performance of insulation materials and systems: a retrospective review.
Tye, R.P., Research and development in building physics during the last 25 years, Stockholm, Swedish Council for Building Research, 1992, p.17-27, 29 refs.
Thermal insulation, Buildings, Temperature measurement, Thermal conductivity, Standards.

47-3449
Thermal insulation and research in heat transfer.
Bankvall, C., Research and development in building physics during the last 25 years, Stockholm, Swedish Council for Building Research, 1992, p.29-35.
Thermal insulation, Buildings, Heat transfer.

47-3450
Validation of mass transfer calculations.
Nielsen, A., Research and development in building physics during the last 25 years, Stockholm, Swedish Council for Building Research, 1992, p.37-47, 11 refs.
Thermal insulation, Buildings, Moisture transfer, Vapor barriers, Waterproofing.

47-3451
Moisture research in North America.
Bomberg, M.T., et al, MP 3238, Research and development in building physics during the last 25 years, Stockholm, Swedish Council for Building Research, 1992, p.57-93, Refs. passim.
Tobiasson, W.
Thermal insulation, Buildings, Moisture transfer, Vapor barriers, Waterproofing, Research projects, Bibliographies.

47-3452
Utilizing capillary suction fabric to prevent moisture accumulation in thermal insulation of cold, impermeable surfaces.
Korsgaard, V., Research and development in building physics during the last 25 years, Stockholm, Swedish Council for Building Research, 1992, p.95-110, 4 refs.
Thermal insulation, Buildings, Vapor barriers, Waterproofing.

47-3453
Concrete slab on the ground and moisture control—verification of some methods to improve the moisture conditions in the foundation.
Harderup, L.E., Research and development in building physics during the last 25 years, Stockholm, Swedish Council for Building Research, 1992, p.117-125, 11 refs.
Thermal insulation, Concrete slabs, Vapor barriers, Waterproofing, Floors.

47-3454
National and international standardization in the field of thermal insulation.
Tammes, E., Research and development in building physics during the last 25 years, Stockholm, Swedish Council for Building Research, 1992, p.127-131.
Thermal insulation, Buildings, Temperature measurement, Standards.

47-3455
Aerated concrete—a building material for the future?.
Dahl, G., Research and development in building physics during the last 25 years, Stockholm, Swedish Council for Building Research, 1992, p.145-149.
Cellular concretes, Concrete slabs, Thermal insulation, Construction materials, Buildings.

47-3456
1988 Endicott Environmental Monitoring Program. Final report.
Dewey, R.K., ed, Anchorage, U.S. Army Corps of Engineers, Alaska District, 1992, 5 vols., Refs. passim.
Offshore drilling, Embankments, Artificial islands, Environmental impact, Ocean environments, Oceanographic surveys, Shore erosion, Ecosystems, Freezeup, Ice breakup, Petroleum industry, United States—Alaska—Prudhoe Bay.

47-3457
High-altitude and polar humidity.
Schlatter, T., *Weatherwise*, Dec. 1992-Jan. 1993. 45(6). p.39-40.
Atmospheric composition, Altitude, Polar atmospheres, Humidity, Measurement, Water vapor.

47-3458
Observations of the initial stage of ice phase evolution in supercooled clouds.
Nevzorov, A.N., et al, *Soviet meteorology and hydrology*, 1992, No.1, p.69-76, Translated from Meteorologiia i gidrologiia. 16 refs.
Shugaev, V.F.
Clouds (meteorology), Supercooled clouds, Cloud physics, Ice formation, Ice crystal nuclei, Phase transformations, Ice microstructure.

47-3459
Hydrometeorological and ice conditions in the arctic seas of the USSR during 1990-1991.
Siniurin, IU.N., *Soviet meteorology and hydrology*, 1992, No.1, p.93-96, Translated from Meteorologiia i gidrologiia.
Polar atmospheres, Precipitation (meteorology), Sea ice distribution, Ice conditions, Seasonal variations.

47-3460
Late Pliocene to Early Pleistocene ostracod stratigraphy and palaeoclimate of the Lodin Elv and Kap Kobenhavn formations, East Greenland.
Penney, D.N., *Palaeogeography, palaeoclimatology, palaeoecology*, Mar. 1993, 101(1-2), p.49-66, 63 refs.
Paleoclimatology, Pleistocene, Climatic changes, Marine deposits, Age determination, Stratigraphy, Glacial deposits.

47-3461
Arctic haze: patterns and relationships to regional signatures of trace gases.
Khalil, M.A.K., et al, *Global biogeochemical cycles*, Mar. 1993, 7(1), p.27-36, 16 refs.
Rasmussen, R.A.
Polar atmospheres, Atmospheric composition, Haze, Sampling, Air pollution, Origin, Chemical composition.

47-3462
Annual cycles of phytoplankton chlorophyll concentrations in the global ocean: a satellite view.
Yoder, J.A., et al, *Global biogeochemical cycles*, Mar. 1993, 7(1), p.181-193, 40 refs.
McClain, C.R., Feldman, G.C., Esaias, W.E.
Oceanography, Plankton, Biomass, Spaceborne photography, Seasonal variations.
This paper uses coastal zone color scanner chlorophyll imagery (CZCS-Chl) to determine annual cycles in phytoplankton chlorophyll (biomass) averaged over very large areas of the global ocean. Among the results presented: subpolar waters in the Northern Hemisphere (NH) have mean monthly CZCS-Chl concentrations during May and June that are manyfold higher than in winter, particularly in the North Atlantic; and subpolar waters in the Southern Hemisphere (SH) do not show differences between spring maxima and winter minima as large as those in the subpolar NH. The simple patterns reported here imply that mean annual cycles in phytoplankton biomass averaged over very large areas of the global ocean are largely explainable by very simple mathematical models. (Auth. mod.)

47-3463
Modified HNO3 seasonality in volcanic layers of a polar ice core: snow-pack effect or photochemical perturbation?.
Laj, P., et al, *Journal of atmospheric chemistry*, Apr. 1993, 16(3), p.219-230, 41 refs.
Palais, J.M., Gardner, J.E., Sigurdsson, H.
Ice sheets, Ice cores, Atmospheric composition, Chemical properties, Snow composition, Periodic variations, Volcanoes, Aerosols, Photochemical reactions, Heterogeneous nucleation.

47-3464
Equilibrium constant of NO2 with N2O4 and the temperature dependence of the visible spectrum of NO2: a critical review and implications for measurements of NO2 in the polar stratosphere.
Roscoe, H.K., et al, *Journal of atmospheric chemistry*, Apr. 1993, 16(3), p.257-276, 38 refs.
Hind, A.K.
Polar atmospheres, Atmospheric composition, Stratosphere, Chemical properties, Chemical analysis, Spectroscopy, Accuracy, Laboratory techniques.
Measurements of stratospheric NO2 by ground-based visible spectrometers rely on laboratory measurements of absorption cross-sections. Here are reviewed low-temperature laboratory measurements, which disagree by amounts claimed to be significant. Recalculation of their errors shows that in general disagreements are not significant and that errors in the ratios of cross-sections at low to room temperature are between +/- 3% and +/- 8.8%. Of these errors, up to +/- 3.5% was contributed by errors in the equilibrium constant in those measurements where the pressure was above 0.1 mbar. Extrapolation of these cross-sections to analysis of measurements of NO2 at the low temperatures of the arctic and antarctic stratosphere is dubious. For satisfactory analysis of polar spectra, the NO2 cross-sections should be measured at temperatures down to 190 K with a relative accuracy of +/- 1%. (Auth. mod.)

47-3465
Growth rate of polyhedral ice crystals growing from the vapor phase and their habit change.
Sei, T., et al, *Meteorological Society of Japan. Journal*, Aug. 1989, 67(4), p.495-502, With Japanese summary. 13 refs.
Gonda, T.
Precipitation (meteorology), Ice crystal growth, Snow crystal structure, Phase transformations, Temperature effects, Supersaturation, Surface structure.
Polyhedral ice crystals were grown on a growth substrate at a low air pressure of 40 Pa at -7, -15 and -30 C at relatively low supersaturations. Measurements of the normal growth rates of ice crystals versus supersaturation and *in situ* observations of ice crystal surfaces were carried out. It is inferred that the {0001} and {1010} faces of ice crystals grown under these conditions grow by the mechanism proposed by Burton, Cabrera and Frank. The habit change of ice crystals with temperature is equivalent to the temperature dependence of the condensation coefficient of the {0001} and {1010} faces. In this paper, the formation mechanism of non-hexagonal snow crystals observed in the upper atmosphere and in Antarctica is discussed. (Auth. mod.)

47-3466
Doppler radar analysis of the structure of mesoscale snow bands developed between the winter monsoon and the land breeze.
Ishihara, M., et al, *Meteorological Society of Japan. Journal*, Aug. 1989, 67(4), p.503-520, With Japanese summary. 23 refs.
Sakakibara, H., Yanagisawa, Z.
Clouds (meteorology), Precipitation (meteorology), Structural analysis, Snowfall, Radar echoes, Marine meteorology, Wind factors, Turbulent boundary layer.

47-3467
Crystal structure of typical snow crystals of low temperature types.
Sato, N., et al, *Meteorological Society of Japan. Journal*, Aug. 1989, 67(4), p.521-528, With Japanese summary. 8 refs.
Kikuchi, K.
Snow crystal structure, Surface structure, Classifications, Correlation, Microstructure, Orientation.

47-3468
Compression jig for x-ray topography of ice.
Liu, F., et al, *Measurement and science technology*, Mar. 1993, 4(3), p.416-421, 12 refs.
Baker, I.
Ice physics, Test equipment, Design, Ice crystal structure, Ice microstructure, Ice deformation, Defects, X ray analysis, Topographic features.

47-3469
Three-dimensional pattern formation during growth of ice dendrites—its relation to universal law of dendritic growth.
Furukawa, Y., et al, *Journal of crystal grov .h*, Mar. 1, 1993, 128(1-4)Pt.1, International Conference on Crystal Growth, 10th, San Diego, CA, Aug. 16-21, 1992. Proceedings, Pt.1. Edited by J.B. Mullin et al, p.234-239, 11 refs.
Shimada, W.
Ice crystal growth, Ice crystal structure, Dendritic ice, Ice microstructure, Phase transformations, Supercooling, Ice water interface.

47-3470
Formation of patterns during growth of snow crystals.
Yokoyama, E., *Journal of crystal growth*, Mar. 1, 1993, 128(1-4)Pt.1, International Conference on Crystal Growth, 10th, San Diego, CA, Aug. 16-21, 1992. Proceedings, Pt.1. Edited by J.B. Mullin et al, p.251-257, 26 refs.
Snow crystal growth, Snow crystal structure, Phase transformations, Anisotropy, Supersaturation, Analysis (mathematics).

47-3471
Loch Lomond Stadial glacier at Fan Hir, Mynydd Du (Brecon Beacons), South Wales: critical evidence and paleoclimatic implications.
Shakesby, R.A., et al, *Geological journal*, Mar. 1993, 28(1), p.69-79, 52 refs.
Matthews, J.A.
Glacial deposits, Glacial geology, Paleoclimatology, Landforms, Glacier formation, Moraines, Blowing snow.

47-3472
C4 photosynthesis in alpine species of the Pamirs.
P'iankov, V.I., et al, *Soviet plant physiology*, July-Aug. 1992, 39(4)Pt.1, p.421-430, Translated from Fiziologiia rastenii. 31 refs.
Plant ecology, Alpine landscapes, Photosynthesis, Plant physiology, Plant tissues, Vegetation patterns, Acclimatization, Carbon dioxide.

47-3473
Early Pleistocene glacial-interglacial cycle in the Breidavík group on Tjörnes, Iceland: sedimentary facies, foraminifera, and molluscs.
Eiríksson, J., et al, *Quaternary science reviews*, 1992, 11(7-8), p.733-757, Refs. p.755-757.
Knudsen, K.L., Vilhjálmsson, M.
Pleistocene, Paleoclimatology, Climatic changes, Quaternary deposits, Glaciation, Glacier oscillation, Lithology.

47-3474
Removal of sulphur dioxide and sulphates from the atmospheric surface layer during frost formation.
Georgiadis, T., et al, *Water, air and soil pollution*, Feb. 1993, 66(3-4), p.267-276, 20 refs.
Air pollution, Aerosols, Chemical properties, Scavenging, Hoarfrost, Ice sublimation, Ice vapor interface, Sampling.

47-3475
Late Pleistocene ice age scenarios based on observational evidence.
Deblonde, G., et al, *Journal of climate*, Apr. 1993, 6(4), p.709-727, Refs. p.725-727.
Peltier, W.R.
Pleistocene, Paleoclimatology, Climatic changes, Glacier oscillation, Ice volume, Albedo, Periodic variations, Heat flux.

47-3476
Impacts of severe weather during December 1989 in the Lake Erie snowbelt.
Schmidlin, T.W., *Journal of climate*, Apr. 1993, 6(4), p.759-767, 23 refs.
Weather observations, Snowfall, Air temperature, Records (extremes), Snow cover effect, Cold weather operation, Cost analysis.

47-3477
Recent variations of sea ice and air temperature in high latitudes.
Chapman, W.L., et al, *American Meteorological Society. Bulletin*, Jan. 1993, 74(1), p.33-47, 27 refs.
Walsh, J.E.
Polar atmospheres, Sea ice distribution, Air temperature, Temperature variations, Periodic variations, Air ice water interaction, Climatic changes, Global warming, Meteorological data.
Feedbacks resulting from the retreat of sea ice and snow contribute to the polar amplification of the greenhouse warming projected by global climate models. A gridded sea-ice database, for which the record length is now approaching four decades for the Arctic and two decades for the Antarctic, is summarized here. The sea-ice fluctuations derived from the dataset are characterized by temporal scales of several seasons to several years, and spatial scales of 30-180 deg of longitude. The ice data are examined in conjunction with air temperature data for evidence of recent climate change in the polar regions. There is no significant trend of ice extent in the Arctic during winter or in the Antarctic during any season. The seasonal and geographical changes of sea-ice coverage are consistent with the more recent greenhouse experiments performed with coupled atmosphere-ocean models. (Auth. mod.)

47-3478
Report of 1st discussion group: the last interglacial in high latitudes of the northern hemisphere; terrestrial and marine evidence.
Anderson, P., et al, *Quaternary international*, 1991, Vol.10-12, NATO Advanced Research Workshop, Hanstholm, Denmark, Oct. 19-22, 1990. Climate and environment of the last interglacial in the Arctic and subarctic. Edited by N. Rutter et al, p.9-28, Refs. p.23-28.
Paleoclimatology, Quaternary deposits, Polar atmospheres, Climatic changes, Air temperature, Temperature variations, Meteorological factors, Glacier oscillation.

47-3479
Report of 2nd discussion group: inter-relationships and linkages between the land, atmosphere and oceans during the last interglacial.
Anderson, P., et al, *Quaternary international*, 1991, Vol.10-12, NATO Advanced Research Workshop, Hanstholm, Denmark, Oct. 19-22, 1990. Climate and environment of the last interglacial in the Arctic and subarctic. Edited by N. Rutter et al, p.29-48, Refs. p.45-48.
Paleoclimatology, Polar atmospheres, Isotope analysis, Glacier oscillation, Air ice water interaction, Quaternary deposits, Climatic changes, Models, Long range forecasting.

47-3480
Last interglaciation in Alaska: stratigraphy and paleoecology of potential sites.
Hamilton, T.D., et al, *Quaternary international*, 1991, Vol.10-12, NATO Advanced Research Workshop, Hanstholm, Denmark, Oct. 19-22, 1990. Climate and environment of the last interglacial in the Arctic and subarctic. Edited by N. Rutter et al, p.49-71, Refs. p.69-71.
Brigham-Grette, J.
Quaternary deposits, Glaciation, Site surveys, Paleoclimatology, Stratigraphy, Age determination, Climatic changes.

47-3481
Framework for interpreting paleoclimatic variations in eastern Beringia.
Bartlein, P.J., et al. *Quaternary international*, 1991, Vol.10-12, NATO Advanced Research Workshop, Hanstholm, Denmark, Oct. 19-22, 1990. Climate and environment of the last interglacial in the Arctic and subarctic. Edited by N. Rutter et al, p.73-83, 45 refs.
Anderson, P.M., Edwards, M.E., McDowell, P.F.
Paleoclimatology, Glacier oscillation, Climatic changes, Climatic factors, Polar atmospheres, Long range forecasting, Air ice water interaction, Insolation, Simulation.

47-3482
Last (Koy-Yukon) interglaciation in the Yukon: comparisons with Holocene and interstadial pollen records.
Schweger, C.E., et al. *Quaternary international*, 1991, Vol.10-12, NATO Advanced Research Workshop, Hanstholm, Denmark, Oct. 19-22, 1990. Climate and environment of the last interglacial in the Arctic and subarctic. Edited by N. Rutter et al, p.85-94, 51 refs.
Matthews, J.V., Jr.
Paleoclimatology, Climatic changes, Quaternary deposits, Stratigraphy, Palynology, Correlation, Long range forecasting.

47-3483
Paleoenvironments of the last interglacial in northwest North Atlantic region and adjacent mainland Canada.
De Vernal, A., et al. *Quaternary international*, 1991, Vol.10-12, NATO Advanced Research Workshop, Hanstholm, Denmark, Oct. 19-22, 1990. Climate and environment of the last interglacial in the Arctic and subarctic. Edited by N. Rutter et al, p.95-106, 58 refs.
Miller, G.H., Hillaire-Marcel, C.
Paleoclimatology, Pleistocene, Climatic changes, Quaternary deposits, Marine deposits, Stratigraphy, Glacier oscillation, Ice cover effect.

47-3484
Isotope stage 5 (130-74 ka) in Greenland—a review.
Funder, S., et al. *Quaternary international*, 1991, Vol.10-12, NATO Advanced Research Workshop, Hanstholm, Denmark, Oct. 19-22, 1990. Climate and environment of the last interglacial in the Arctic and subarctic. Edited by N. Rutter et al, p.107-122, 72 refs.
Hjort, C., Kelly, M.
Paleoclimatology, Quaternary deposits, Marine deposits, Stratigraphy, Age determination, Climatic changes, Climatic factors, Isotope analysis, Glacier oscillation.

47-3485
Last interglacial as recorded in the Greenland ice sheet and Canadian arctic ice caps.
Reeh, N., *Quaternary international*, 1991, Vol.10-12, NATO Advanced Research Workshop, Hanstholm, Denmark, Oct. 19-22, 1990. Climate and environment of the last interglacial in the Arctic and subarctic. Edited by N. Rutter et al, p.123-142, 62 refs.
Ice sheets, Paleoclimatology, Pleistocene, Climatic changes, Ice cores, Age determination, Glacier oscillation, Drill core analysis, Correlation, Isotope analysis.

47-3486
Review of the Late Pleistocene stratigraphy of Reykjavík, Iceland.
Eiríksson, J., et al. *Quaternary international*, 1991, Vol.10-12, NATO Advanced Research Workshop, Hanstholm, Denmark, Oct. 19-22, 1990. Climate and environment of the last interglacial in the Arctic and subarctic. Edited by N. Rutter et al, p.143-150, 30 refs.
Geirsdóttir, A., Símonarson, L.A.
Pleistocene, Geological surveys, Glaciation, Stratigraphy, Bedrock, Quaternary deposits, Age determination, Paleobotany.

47-3487
Late Quaternary land-sea interactions: Fennoscandia and Svalbard—the Nordic seas.
Larsen, E., et al. *Quaternary international*, 1991, Vol.10-12, NATO Advanced Research Workshop, Hanstholm, Denmark, Oct. 19-22, 1990. Climate and environment of the last interglacial in the Arctic and subarctic. Edited by N. Rutter et al, p.151-159, 41 refs.
Sejrup, H.P., Olsen, L., Miller, G.H.
Paleoclimatology, Climatic factors, Quaternary deposits, Glaciation, Glacier oscillation, Ice water interface, Age determination, Ocean currents, Ice cover effect.

47-3488
Eemian-Early Weichselian N-S temperature gradients; North Atlantic-NW Europe.
Sejrup, H.P., et al. *Quaternary international*, 1991, Vol.10-12, NATO Advanced Research Workshop, Hanstholm, Denmark, Oct. 19-22, 1990. Climate and environment of the last interglacial in the Arctic and subarctic. Edited by N. Rutter et al, p.161-166, 25 refs.
Larsen, E.
Paleoclimatology, Air temperature, Surface temperature, Temperature gradients, Quaternary deposits, Marine deposits, Glacier oscillation, Climatic changes, Long range forecasting.

47-3489
Last interglacial in northernmost Sweden.
Robertsson, A.M., *Quaternary international*, 1991, Vol.10-12, NATO Advanced Research Workshop, Hanstholm, Denmark, Oct. 19-22, 1990. Climate and environment of the last interglacial in the Arctic and subarctic. Edited by N. Rutter et al, p.173-181, 25 refs.
Paleoclimatology, Quaternary deposits, Site surveys, Glaciation, Paleobotany, Stratigraphy, Palynology.

47-3490
Climatic rhythm of the last interglacial in northern Eurasia.
Velichko, A.A., et al. *Quaternary international*, 1991, Vol.10-12, NATO Advanced Research Workshop, Hanstholm, Denmark, Oct. 19-22, 1990. Climate and environment of the last interglacial in the Arctic and subarctic. Edited by N. Rutter et al, p.191-213, 72 refs.
Borisova, O.K., Gurtovaia, E.E., Zelikson, E.M.
Paleoclimatology, Pleistocene, Quaternary deposits, Climatic changes, Periodic variations, Glaciation, Air temperature, Atmospheric circulation, Long range forecasting.

47-3491
Problems of the last interglacial in arctic Siberia.
Sher, A.V., *Quaternary international*, 1991, Vol.10-12, NATO Advanced Research Workshop, Hanstholm, Denmark, Oct. 19-22, 1990. Climate and environment of the last interglacial in the Arctic and subarctic. Edited by N. Rutter et al, p.215-222, 28 refs.
Paleoclimatology, Climatic changes, Pleistocene, Quaternary deposits, Stratigraphy, Permafrost transformation, Paleobotany, Glaciation, Correlation, Age determination.

47-3492
Sensitivity experiments on the effect of orbitally-caused insolation changes on the interglacial climate of high northern latitudes.
Kutzbach, J.E., et al. *Quaternary international*, 1991, Vol.10-12, NATO Advanced Research Workshop, Hanstholm, Denmark, Oct. 19-22, 1990. Climate and environment of the last interglacial in the Arctic and subarctic. Edited by N. Rutter et al, p.223-229, 16 refs.
Gallimore, R.G., Guetter, P.J.
Paleoclimatology, Polar atmospheres, Air temperature, Climatic changes, Climatic factors, Insolation, Ice cover effect, Sea ice distribution, Seasonal variations.

47-3493
General circulation models, palaeoclimatic data and last interglacial climates.
Harrison, S.P., et al. *Quaternary international*, 1991, Vol.10-12, NATO Advanced Research Workshop, Hanstholm, Denmark, Oct. 19-22, 1990. Climate and environment of the last interglacial in the Arctic and subarctic. Edited by N. Rutter et al, p.231-242, Refs. p.240-242.
Kutzbach, J.E., Behling, P.
Paleoclimatology, Climatic changes, Atmospheric circulation, Simulation, Correlation, Accuracy, Long range forecasting.

47-3494
Use of silicone masses to prevent the formation of ice on substrates.
Achtenberg, T., et al. *U.S. Patent Office. Patent*, Sep. 27, 1988, 8 col., USP-4,774,112, 2 refs.
Sattlegger, H.
Ice solid interface, Ice adhesion, Ice prevention, Protective coatings, Polymers, Chemical composition.

47-3495
Method of preparing and molding mortar or like.
Suzuki, T., *U.S. Patent Office. Patent*, Aug. 9, 1988, 8 col., USP-4,762,562, 4 refs.
Mortars, Admixtures, Ice (construction material), Ice melting, Artificial melting, Concrete curing, Mechanical properties.

47-3496
Snow blower with vertical endless belt digger.
Cloutier, R., *U.S. Patent Office. Patent*, Aug. 23, 1988, 6 col., USP-4,765,073, 23 refs.
Snow removal, Equipment, Winter maintenance, Design.

47-3497
Ice dam preventer.
Daniel, G.S., *U.S. Patent Office. Patent*, Aug. 16, 1988, 4 col., USP-4,763,450, 6 refs.
Roofs, Ice dams, Ice prevention, Plates, Radiant heating, Drainage, Heat sinks, Design.

47-3498
Steering system for vehicle such as snowmobile.
Bibollet, J.-C., *U.S. Patent Office. Patent*, Sep. 6, 1988, 6 col., USP-4,768,794, 4 refs.
Snow vehicles, Stability, Performance, Equipment, Design.

47-3499
Snowplow assembly quick block and pin disconnect for a payloader.
Dejana, V., *U.S. Patent Office. Patent*, Sep. 13, 1988, 6 col., USP-4,769,933, 10 refs.
Snow vehicles, Snow removal, Equipment, Design.

47-3500
Apparatus for production of compression-solidified snow.
Tsukada, H., et al, *U.S. Patent Office. Patent*, Sep. 13, 1988, 6 col., USP-4,770,684, 7 refs.
Snow manufacturing, Snow removal, Equipment, Snow compression, Solidification, Design.

47-3501
Method for thawing out road culverts choked with ice.
Olsson, L.U., *U.S. Patent Office. Patent*, Sep. 13, 1988, 8 col., USP-4,770,211, 14 refs.
Culverts, Ice melting, Equipment, Cables (ropes), Design.

47-3502
Method and apparatus for scraping ice and snow and illuminating a scraping area.
Hopkins, E.L., *U.S. Patent Office. Patent*, Sep. 13, 1988, 6 col., USP-4,770,712, 1 ref.
Snow removal, Portable equipment, Illuminating, Vehicles, Windows, Design.

47-3503
Ice detector.
Weinstein, L.M., *U.S. Patent Office. Patent*, Aug. 23, 1988, 8 col., USP-4,766,369, 4 refs.
Electronic equipment, Ice detection, Ice cover thickness, Aircraft icing, Design.

47-3504
Supplying the national economy with oceanographic information. [Obespechenie narodnogo khoziaĭstva okeanograficheskoĭ informatsieĭ],
Shamraev, IU.I., Leningrad, Gidrometeoizdat, 1989, 189p., In Russian. 20 refs.
Oceanography, Economic analysis, Sea ice, Marine transportation, Forecasting.

47-3505
Geography of avalanches. [Geografiia lavin],
Miagkov, S.M., ed, Moscow, Izdatel'stvo Moskovskogo universiteta, 1992, 331p., In Russian. Refs. p.329-331.
Kanaev, L.A., ed.
Avalanches, Avalanche forecasting, Avalanche formation, Countermeasures, USSR.

47-3506
Laws of the kinetic theory of strength of frozen soils.
Konovalov, A.A., *Journal of applied mechanics and technical physics*, May 1993, 33(6), p.892-897, Translated from Prikladnaia mekhanika i tekhnicheskaia fizika. 7 refs.
Soil physics, Frozen ground mechanics, Frozen ground strength, Soil creep, Rheology, Analysis (mathematics), Temperature effects.

47-3507
Review of thunderstorm electrification processes.
Saunders, C.P.R., *Journal of applied meteorology*, Apr. 1993, 32(4), p.642-655, Refs. p.652-655.
Precipitation (meteorology), Cloud physics, Thunderstorms, Cloud electrification, Snow pellets, Ice crystal collision, Charge transfer, Ice water interface.

47-3508
Polarimetric signatures in the stratiform region of a mesoscale convective system.
Zrnic, D.S., et al, *Journal of applied meteorology*, Apr. 1993, 32(4), p.678-693, 25 refs.
Precipitation (meteorology), Radar echoes, Classifications, Ice detection, Ice melting, Graupel, Polarization (waves), Phase transformations.

47-3509
Ice crystals produced by expansion: experiments and application to aircraft-produced ice.
Foster, T.C., et al, *Journal of applied meteorology*, Apr. 1993, 32(4), p.716-728, 32 refs.
Hallett, J.
Cloud physics, Supercooled clouds, Ice crystal growth, Homogeneous nucleation, Weather modification, Aircraft, Propellers, Simulation.

47-3510
Numerical simulations of the 2 August 1981 CCOPE supercell storm with and without ice microphysics.
Johnson, D.E., et al, *Journal of applied meteorology*, Apr. 1993, 32(4), p.745-759, 34 refs.
Wang, P.K., Straka, J.M
Precipitation (meteorology), Thunderstorms, Cloud physics, Ice water interface, Ice formation, Homogeneous nucleation, Hailstone growth, Mathematical models.

47-3511
Squires' penetrative downdraft model.
Reuter, G.W., *Journal of applied meteorology*, Apr. 1993, 32(4), p.794-798, 15 refs.
Cloud physics, Cloud dissipation, Air flow, Air entrainment, Ice vapor interface.

47-3512
Magnitude of error factors in estimates of snow-particle masses from images.
Detwiler, A.G., et al, *Journal of applied meteorology*, Apr. 1993, 32(4), p.804-809, 13 refs.
Knight, N.C., Heymsfield, A.J.
Cloud physics, Precipitation (meteorology), Snow crystals, Probes, Imaging, Particle size distribution, Accuracy, Water content.

47-3513
UV-excited luminescences from amorphous and polycrystalline H2O ices.
Lennon, D., et al, *Chemical physics letters*, Jan. 1, 1993, 201(1-4), p.120-126, 31 refs.
Quickenden, T.I., Freeman, C.G.
Ice physics, Ultraviolet radiation, Radiation absorption, Luminescence, Spectra, Ice crystal optics, Ice crystal structure, Amorphous ice, Defects.

47-3514
Double-diffusive convection during solidification of a binary system.
Nishimura, T., et al, *Heat transfer—Japanese research*, Apr. 1993, 21(6), p.586-600, Translated from Japanese Society of Mechanical Engineers. Transactions, Vol.58B, 1992. 18 refs.
Fujiwara, M., Miyashita, H.
Solutions, Solidification, Ice formation, Convection, Thermal diffusion, Stratification, Mass transfer, Temperature gradients.

47-3515
Remote sensing of sea-ice thickness in the Weddell Sea.
Swift, C.T., et al, *Antarctic journal of the United States*, 1991, 27(5), p.92-93, 7 refs.
St. Germain, K.M., Menashi, J.D.
Sea ice, Ice cover thickness, Radiometry, Remote sensing, Antarctica—Weddell Sea.
As part of the Winter Weddell Gyre Experiment 1989, the feasibility of remotely measuring antarctic sea-ice thickness using passive microwave techniques was investigated. A description of field operations, which involved measuring the brightness temperature of sea ice in the Weddell Sea at 611 megahertz, appeared in the 1990 AJUS review issue (St. Germain and Swift, 1990). The data have now been analyzed and correlated with *in situ* thickness measurements, video recordings, and other passive microwave data. The results of this study indicate that ice thickness can be measured reliably up to 75 cm with the 611 megahertz radiometer. The field measurements were made using an ultra-high-frequency (611 megahertz) radiometer that was mounted on the port side of the *Polarstern*, looking downward to the ice at an angle of 35 deg off nadir. A 10 gigahertz radiometer was mounted on the rail next to the ultra- high-frequency radiometer, operating at a 53 deg incidence angle. Adjacent to the radiometers, a handheld video camera was operated while the ship traveled through the ice, providing a record of ice coverage within the footprint, ice thickness, and details such as ridges and hummocks.

47-3516
Fast-ice properties and structure in McMurdo Sound.
Jeffries, M.O., et al, *Antarctic journal of the United States*, 1991, 27(5), p.94-95, 7 refs.
Weeks, W.F.
Fast ice, Ice cores, Physical properties, Antarctica—McMurdo Sound.
In early Jan. 1991, 15 first-year cores from the fast ice in McMurdo Sound were obtained. Some preliminary results of the ice core analysis program are reported. The mean salinity of the individual fast ice cores ranged from 2.95 to 5.39 parts per thousand. The mean value of all the fast ice salinity measurements was 4.21 parts per thousand. The mean ice thickness at the 16 sites ranged from 1.25 to 2.32 m. The mean value of all the ice thickness measurements was 1.94 m. Congelation ice was observed at all fast ice sites, comprising from 30.4% to 93.6% of the individual cores. This ice type often was characterized by strongly aligned crystals, a feature also observed at many McMurdo Sound locations. Unlike the western Ross Sea pack ice, the lower portions of most fast ice cores comprised layers of congealed, densely packed platelet ice. It is believed that platelet ice growth in McMurdo Sound results from supercooling brought about by adiabatic decompression of low density seawater flowing northward into the sound from below the McMurdo Ice Shelf. The accretion of the platelet ice against the base of the overlying congelation ice sheet and its subsequent consolidation allows increased growth of the fast ice, resulting in a final thickness greater than would otherwise be possible by heat conduction from platelet-free water alone.

47-3517
Summer pack-ice properties and structure in the western Ross Sea.
Jeffries, M.O., et al, *Antarctic journal of the United States*, 1991, 27(5), p.95-97, 10 refs.
Weeks, W.F.
Sea ice, Ice structure, Ice cover thickness, Ice physics, Antarctica—Ross Sea.
Most of the available information on the properties and structure of antarctic sea ice has been collected in studies in the Weddell Sea. This report describes some of the preliminary findings from the first field and laboratory investigation of the properties and structure of western Ross Sea pack ice undertaken during the period from Dec. 1990 to Mar. 1991. Ice thickness, salinities, temperature, and structural-stratigraphic data from 17 cores are discussed.

47-3518
Surface-sediment diatom assemblages from the George V Coast.
Leventer, A., *Antarctic journal of the United States*, 1991, 27(5), p.120-122, 12 refs.
Sea ice, Algae, Sediments, Antarctica—George V Coast.
Diatom distribution in the surface sediments in the waters off the George V Coast is displayed in a series of five charts showing the overall absolute diatom distribution in the area and the percentages of these four species comprising the whole: *Nitzschia curta, Nitzschia Kerguelensis, Thalassiosira* spp. and *Chaetoceros* spp. Explications are given of each chart to emphasize the special features of each species.

47-3519
Glacier inventory and atlas of West Greenland.
Weidick, A., et al, *Grönlands Geologiske Undersögelse. Rapport*, 1992, No.158, 194p., With Danish and Inuit summaries. 101 refs.
Böggild, C.E., Knudsen, N.T.
Glacier surveys, Mountain glaciers, Ice sheets, Glacier oscillation, Glacier mass balance, Maps, Greenland.

47-3520
Overview of the National Institute of Polar Research '92. [Kokuritsu kyokuchi kenkyujo yoran '92].
Tokyo, National Institute of Polar Research, 1992, 32p., In Japanese.
Research projects, Organizations, Antarctica.
The research activities of the National Institute of Polar Research are described. Also included are an organizational chart; the budget for 1992; lists of personnel with their job titles and academic disciplines; photographs of the headquarters in Tokyo and of the Showa, Mizuho, and Asuka stations in Antarctica; and a list of major publication title holdings in Japanese, English, Russian, German, and French. Research activities in Antarctica include upper atmosphere physics, atmosphere-hydrosphere physics, earth sciences, biology, polar construction and engineering, meteorites, climatology, glaciology, geology, geophysics, ecology, and medicine. Observations in Antarctica are summarized pictorially in a sketch diagram.

47-3521
Witness the Arctic. *Arctic Research Consortium of the United States, Fairbanks, AK. Newsletter*, Winter 1993, 1(1), 15p. + insert, Refs. passim.
Research projects, Organizations, Meetings.

47-3522
GCM control run of UK Meteorological Office compared with the real climate in the NW European winter.
Beersma, J.J., *Koninklijk Nederlands Meteorologisch Instituut. Wetenschappelijke rapporten (Scientific reports)*, 1992, WR 92-02, 32p., 26 refs.
Atmospheric circulation, Marine atmospheres, Air water interactions, Precipitation (meteorology), Surface temperature, Computerized simulation.

47-3523
Arctic information and data: a guide to selected resources.
Arctic Research Consortium of the United States, Fairbanks, 1992, 50p., Refs. passim.
Research projects, Organizations, Data processing, Bibliographies, Meetings.

47-3524
Motorist information needs and changeable sign messages for adverse winter travel.
Wilson, E.M., et al, *U.S. Department of Transportation. Mountain Plains Consortium. MPC report*, May 1992, No.92-11, 100p., 17 refs.
Pouliot, S.G.
Road maintenance, Road icing, Cold weather operation, Safety, Visibility.

47-3525
Mire induction, ecosystem dynamics and lateral extension on raised bogs in the southern coastal area of Finland.
Korhola, A., *Fennia*, 1992, 170(2), p.25-94, Refs. p.89-94.
Peat, Paludification, Swamps, Wetlands, Paleoclimatology, Ecosystems, Finland.

47-3526
Ice plugs help in pipeline retrofit. *Oil & gas journal*, Apr. 26, 1993, 91(17), p.67.
Gas pipelines, Maintenance, Underground pipelines, Artificial freezing, Pipeline freezing.

47-3527
Russia's Rosshelf sets timetable for arctic offshore field development. *Oil & gas journal*, Feb. 22, 1993, 91(8), p.31-34.
Petroleum industry, Oil wells, Natural gas, Offshore drilling, Economic development.

47-3528
Russia pins energy hopes on western Siberia gas. *Oil & gas journal*, Sep. 7, 1992, 90(36), p.17-20.
Natural gas, Gas production, Gas pipelines, Economic development, Arctic landscapes.

47-3529
Rime-ice accretion on fixed stranded conductors.
Skelton, P.L.I., et al, *Mechanics research communications*, Jan.-Feb. 1993, 20(1), p.45-52, 9 refs.
Poots, G.
Power line icing, Ice accretion, Hoarfrost, Ice air interface, Supercooled fog, Air flow, Mathematical models.

47-3530
Tropospheric ozone annual variation and possible troposphere-stratosphere coupling in the Arctic and Antarctic as derived from ozone soundings at Resolute and Amundsen-Scott stations.
Gruzdev, A.N., et al, *Tellus*, Apr. 1993, 45B(2), p.89-98, 19 refs.
Sitnov, S.A.
Ozone, Stratosphere, Variations, Antarctica—Amundsen-Scott Station.
The tropospheric ozone annual variation in the northern and southern polar regions is analyzed from ozone sounding data obtained at Resolute Station during a 15-year period (1974-1988) and Amundsen-Scott Station during a 7-year period (1967-1971, 1986-1987). Tropospheric ozone is always less abundant in the southern than in the northern polar region. The difference is greatest in spring in the tropopause layer, where the arctic ozone mixing ratio can be 5 times the mixing ratio in Antarctica. The phase of ozone annual variation above Resolute changes (increases) gradually from the stratosphere across the tropopause to the middle troposphere. Unlike this, the phase of the antarctic ozone annual harmonic has a discontinuity in the layer of the changing tropopause level, so that the annual harmonic in the upper troposphere, lower stratosphere is 4 to 5 months out of phase (earlier) with that above and beneath. Above both the arctic and antarctic stations, the ozone mixing ratio and its vertical gradient evolve in a similar manner in the wide layer from the lower stratosphere to the middle troposphere. Correlation analysis gives no ozone-tropopause correlation in the Antarctic in winter, while in the Arctic there are negative correlation peaks just above the tropopause during all seasons. (Auth. mod.)

47-3531
Some recent results of Russian measurements of surface ozone in Antarctica. A meteorological interpretation.
Gruzdev, A.N., et al, *Tellus*, Apr. 1993, 45B(2), p.99-105, 26 refs.
Elokhov, A.S., Makarov, O.V., Mokhov, I.I.
Ozone, Variations, Wind (meteorology), Meteorological factors, Antarctica—Molodezhnaya Station, Antarctica—Mirnyy Station.
Surface ozone measurements were carried out at Molodezhnaya and Mirnyy stations in spring 1987-autumn 1988 with a Dasibi 1008-AH ozone analyzer. The data show an annual variation with a summer minimum 15 ppbv. The striking features of the surface ozone record are two types of day-to-day variability. One is characterized by day-to-day variations of about 10 ppbv magnitude; the likely mechanism of such variations is the vertical transport induced by cyclonic activity. The other type occurs in synoptically quiet periods (frequent in summer), when the day-to-day ozone variations are less significant; the most likely mechanism of these variations is the slope katabatic wind which transports ozone inside the antarctic continent. The latitudinal distribution of surface ozone for this period, measured aboard an aircraft, showed a slight increase towards Vostok Station. (Auth.)

47-3532
Vertical distribution of tropospheric ozone in Antarctica and in the European Arctic.
Taalas, P., et al, *Tellus*, Apr. 1993, 45B(2), p.106-119, 26 refs.
Ozone, Stratosphere, Meteorological factors, Air pollution, Antarctica—Marambio Station.
A comparison of monthly mean tropospheric ozone profiles was made from ozone soundings performed since 1988 at Marambio Station and at Sodankylä. In midwinter, the difference between the two hemispheres' monthly means is small, < 1 mPa. The general photochemical activation in springtime leads to larger differences: the partial pressures decrease in Antarctica whereas in the Arctic, pronounced production of ozone is seen. In spring and summer the hemispheric differences are about 3 mPa. Exceptionally high and low partial pressures at Sodankylä and Marambio have been studied using 3-dimensional trajectories based on the ECMWF analyses. Episodes of upper tropospheric ozone loss at Marambio have been observed during the stratospheric ozone depletion period in spring. The only cause for especially high tropospheric ozone concentrations in Antarctica has been stratospheric intrusions. Low partial pressures in the boundary layer have been connected with advection of marine air masses to Marambio. (Auth. mod.)

47-3533
Bromoalkane production by antarctic ice algae.
Sturges, W.T., et al, *Tellus*, Apr. 1993, 45B(2), p.120-126, 18 refs.
Ozone, Algae, Chemical composition, Sea water, Atmospheric composition, Microbiology, Antarctica—McMurdo Sound.
Ice microalgae collected from the underside of annual sea ice in McMurdo Sound were found to contain and release to seawater a number of brominated hydrocarbons. These included bromoform, dibromomethane, mixed bromochloromethanes, and methyl bromide. Atmospheric measurements in the McMurdo Sound vicinity revealed the presence of bromoform and methyl bromide in the lower atmosphere, with lowest concentrations inland, further indicating that biogenic activity in the Sound is a source of organic bromine gases to the antarctic atmosphere. This may have important implications for boundary layer chemistry in Antarctica. In the Arctic, the presence of bromoform has been linked to loss of surface ozone in the spring. The authors report here preliminary evidence for similar surface ozone loss at McMurdo Station. (Auth.)

47-3534
Freezing points of H2SO4 aqueous solutions and formation of stratospheric ice clouds.
Ohtake, T., *Tellus*, Apr. 1993, 45B(2), p.138-144, 21 refs.
Stratosphere, Clouds (meteorology), Ice nuclei, Freezing points, Experimentation.
The freezing temperature of H2SO4 aqueous solutions as a function of concentration was experimentally measured in an investigation of the ice nucleation of natural H2SO4 mixed aerosols. Based on these measurements, it is suggested that the formation of ice crystals in cirrus and polar stratospheric clouds is the result of the condensation of water vapor and subsequent freezing of natural H2SO4 aerosols. (Auth.)

47-3535
Fractionation of sea salt and acids during transport across an antarctic ice shelf.
Mulvaney, R., et al, *Tellus*, Apr. 1993, 45B(2), p.179-187, 17 refs.
Coulson, G.F.J., Corr, H.
Snow composition, Sea water, Brines, Aerosols, Antarctica—Fimbul Ice Shelf.
Analyses of Cl-, NO3-, SO42-, Na and Mg made on a series of surface snow samples, collected at 4 km intervals along a 116 km traverse of the Fimbul Ice Shelf, show that fractionation of some of the sea salt species has taken place. There is depletion of Mg compared to Na in the coastal part of the traverse, but the bulk sea water ratio is maintained further inland. Evidence for Cl- fractionation is less clear, with a depletion in some sections and an enrichment in others compared to Na. Taken over the whole data-set of 120 samples, the bulk sea water ratio between the marine ions Na, Mg and Cl appears to be conservatively maintained. For all of the sea-salt components, the general trend in concentration showed an increase from the ice shelf front to a maximum value approximately 45 km inland, before decreasing to a value of 10% of the maximum by the end of the traverse. Non sea-salt sulphate followed a similar trend to 45 km, but the subsequent decrease in concentration was less rapid, suggesting a greater residence time for sulphate derived from marine biogenic activity than for sea-salt aerosol. Relatively high concentrations of nitrate were found in all of the surface snow samples in comparison to samples taken from shallow pits at each end of the traverse. This may indicate a post-depositional loss of nitrate from the snow surface. (Auth.)

47-3536
Particle transport to the snow surface at the South Pole: the beginning of a tropospheric history.
Hogan, A.W., et al, *Tellus*, Apr. 1993, 45B(2), MP 3239, p.188-207, Refs. p.205-207.
Gow, A.J.
Snow composition, Particles, Aerosols, Meteorological factors, Antarctica—Amundsen-Scott Station.
Sodium concentration measurements in recent south polar snow have been compared with surface aerosol measurements made at the Amundsen-Scott Station. When a 180-day lag is applied to allow spring/summer aerosols to be precipitated and incorporated into the autumn/winter snow layer, very good correspondence exists between mean aerosol concentration in air and mean sodium concentration in snow. This paper describes analyses of meteorological and glaciological processes to define glaciological and meteorological years, which justify the use of this 180-day lag. Precipitation of sodium and other particles through coagulation and other ice crystal attachment processes is discussed relative to the meteorological year. The results indicate that additional measurements relative to the gradients of temperature, wind, precipitation, and accumulation on the Polar Plateau are essential to the formal establishment of a theory relating glacio-chemical accumulation to meteorological processes, and formulating tropospheric history from glacial deposition. (Auth. mod.)

47-3537
Rare earth elements in the Arctic Ocean.
Westerlund, S., et al, *Deep-sea research*, Sep. 1992, 39(9A), p.1613-1626, 16 refs.
Öhman, P.
Sea water, Water chemistry, Suspended sediments, Minerals.

47-3538
Laboratory tests of ship structures under ice loading. Volume 1.
Tuhkuri, J., *Helsinki University of Technology. Ship Laboratory. Report*, 1993, M-166, 171p., 19 refs.
Ice solid interface, Ice loads, Ice pressure, Metal ice friction, Ice cover strength, Environmental tests, Impact tests, Mathematical models.

47-3539
Ship in compressive ice. Analysis of the ice failure process. Report from the joint Finnish-Russian project.
Kujala, P., et al, *Helsinki University of Technology. Ship Laboratory. Report*, 1993, M-165, 70p. + appends., 21 refs.
Gol'dshtein, R.V., Osipenko, N.M., Danilenko, V.I.
Ice solid interface, Ice loads, Metal ice friction, Ice pressure, Ice cover strength, Ice breaking, Ice navigation, Ships, Mathematical models.

47-3540
Climate of Finland in relation to its hydrology, ecology and culture.
Solantie, R., *Finnish Meteorological Institute. Contributions*, 1990, No.2, 130p., Refs. p.119-130.
Climatic factors, Plant ecology, Taiga, Soil freezing, Frost penetration, Forest ecosystems, Forest land, Hydrology, Degree days, Regional planning, Finland.

47-3541
Mathematical modeling of melting and freezing processes.
Alexiades, V., et al, Washington, D.C., Hemisphere Publishing Corporation, 1993, 323p., Refs. p.305-319.
Solomon, A.D.
Phase transformations, Liquid solid interfaces, Heat transfer, Stefan problem, Freezing front, Thermodynamics, Solid phases, Liquid phases, Boundary value problems, Mathematical models.

47-3542
Standing seam metal roofing systems in cold regions.
Tobiasson, W., et al, MP 3233, Conference on Roofing Technology, 10th, Gaithersburg, MD, Apr. 22-23, 1993. Proceedings. Problems: issues and answers, Rosemont, IL, National Roofing Contractors Association, 1993, p.34-44, 15 refs.
Buska, J.
Roofs, Cold weather construction, Cold weather performance, Snow slides, Snow loads, Thermal expansion, Ventilation, Waterproofing, Joints (junctions).
Standing seams that are out of the "flood plain" and sliding clips that allow metal panels to expand and contract thermally have significantly improved the performance of metal roofing systems. By fixing the metal panels to the frame only at the eaves, differential movements do not occur at that vulnerable location where all water drains, snow and ice may slide and ice dams may form. When water ponds on metal roofs behind icicles and ice dams, the risk of leaks increases greatly. Such risks can be reduced by using "waterproof" (not "water shedding") systems, by increasing the slope, by reducing the overhang at the eaves, by increasing the amount of roof or attic insulation, and by ventilating between that insulation and the metal to create a "cold" roof. Since it is difficult to properly ventilate a metal roof with a slope of 2 in./ft. or less, there is incentive to use greater slopes in cold regions. Most metal roofing systems are not ventilated, but in cold regions, ventilation may be needed to reduce the risk of condensation problems and ice damming. Small, infrequent ice dams along the eaves of "cold" metal roofs seldom create problems. When large dams develop at the eaves, it may be necessary to install electric heaters. The tendency for snow and ice to slide off slippery metal roofs complicates the installation of electric de-icing systems and may create hazards. Snow guards are needed on some metal roofs to prevent snow and ice from sliding.

47-3543
Glacial stratigraphy, engineering geology and earth construction.
Kauranne, K., ed, *Finland. Geological Survey. Special paper*, 1992, No.15, 167p., Refs. passim. Presented at an international integrated seminar, Finnish Lapland, Sep. 2-4, 1991. For selected papers see 47-3544 through 47-3554.
Glaciation, Glacial geology, Glacial deposits, Quaternary deposits, Stratigraphy, Geochronology, Paleoclimatology, Engineering geology.

47-3544
Deglaciation of Finnish Lapland.
Kujansuu, R., *Finland. Geological Survey. Special paper*, 1992, No.15, Glacial stratigraphy, engineering geology and earth construction. Edited by K. Kauranne, p.21-31, 22 refs.
Glaciation, Moraines, Glacial geology, Outwash, Subglacial drainage, Glacial lakes, Quaternary deposits, Paleoclimatology, Finland.

47-3545
Th/U isochron method on a "dirty" but closed calcitic system: examples of calcareous concretions.
Causse, C., *Finland. Geological Survey. Special paper*, 1992, No.15, Glacial stratigraphy, engineering geology and earth construction. Edited by K. Kauranne, p.33-39, 22 refs.
Glacial deposits, Quaternary deposits, Geochronology, Radioactive age determination, Marine deposits, Lacustrine deposits, Isotope analysis, Paleoclimatology.

47-3546
Glacial stratigraphy in Lapland.
Hirvas, H., *Finland. Geological Survey. Special paper*, 1992, No.15, Glacial stratigraphy, engineering geology and earth construction. Edited by K. Kauranne, p.41-42, 1 ref.
Glaciation, Glacial geology, Glacial deposits, Quaternary deposits, Stratigraphy, Paleoclimatology, Finland.

47-3547
Glacial stratigraphy in Sweden.
Lundqvist, J., *Finland. Geological Survey. Special paper*, 1992, No.15, Glacial stratigraphy, engineering geology and earth construction. Edited by K. Kauranne, p.43-59, 84 refs.
Glaciation, Glacial geology, Glacial deposits, Quaternary deposits, Stratigraphy, Geochronology, Paleoclimatology, Sweden.

47-3548
Glacial stratigraphy in Norway.
Andersen, B.G., *Finland. Geological Survey. Special paper*, 1992, No.15, Glacial stratigraphy, engineering geology and earth construction. Edited by K. Kauranne, p.61-71, 54 refs.
Glaciation, Glacial geology, Glacial deposits, Quaternary deposits, Stratigraphy, Geochronology, Paleoclimatology, Norway.

47-3549
Economic Quaternary geology in Sweden—some comments on the contemporary situation.
Königsson, L.K., *Finland. Geological Survey. Special paper*, 1992, No.15, Glacial stratigraphy, engineering geology and earth construction. Edited by K. Kauranne, p.75-87, 2 refs.
Quaternary deposits, Natural resources, Economic development, Cost analysis, Sweden.

47-3550
Applied quaternary geology in Estonia.
Raukas, A., *Finland. Geological Survey. Special paper*, 1992, No.15, Glacial stratigraphy, engineering geology and earth construction. Edited by K. Kauranne, p.89-96, 26 refs.
Quaternary deposits, Natural resources, Minerals, Peat, Environmental impact, Estonia.

47-3551
Geology and foundation works in Estonia.
Vilo, A., *Finland. Geological Survey. Special paper*, 1992, No.15, Glacial stratigraphy, engineering geology and earth construction. Edited by K. Kauranne, p.109-117, 13 refs.
Quaternary deposits, Engineering geology, Foundations, Soil strength, Soil stabilization, Site surveys, Estonia.

47-3552
Foundation works in winter.
Tammirinne, M., *Finland. Geological Survey. Special paper*, 1992, No.15, Glacial stratigraphy, engineering geology and earth construction. Edited by K. Kauranne, p.119-124.
Foundations, Cold weather construction, Engineering geology, Frozen ground strength.

47-3553
Postglacial history of Kemijoki.
Saarnisto, M., *Finland. Geological Survey. Special paper*, 1992, No.15, Glacial stratigraphy, engineering geology and earth construction. Edited by K. Kauranne, p.151-159, 32 refs.
Glaciation, Glacial geology, Glacial rivers, Glacial lakes, Geochronology, Paleoclimatology, Finland.

47-3554
Ground-penetrating radar applications in road design and construction in Finnish Lapland.
Saarenketo, T., *Finland. Geological Survey. Special paper*, 1992, No.15, Glacial stratigraphy, engineering geology and earth construction. Edited by K. Kauranne, p.161-167, 15 refs.
Road maintenance, Subgrade soils, Subsurface investigations, Radar photography, Engineering geology, Highway planning, Route surveys.

47-3555
Proceedings.
NATO Advanced Research Workshop on The Last Deglaciation: Absolute and Radioactive Chronologies, Erice, Sicily, Dec. 9-13, 1990, NATO Advanced Science Institutes, Series I. Global Environmental Change, Vol.2, Berlin, Springer-Verlag, 1992, 344p., Refs. passim. For selected papers see 47-2863 through 47-2866, and 47-3556 through 47-3561.
Bard, E., ed, Broecker, W.S., ed.
DLC QE697.L292
Paleoclimatology, Pleistocene, Climatic changes, Glacier oscillation, Ice cores, Bottom sediment, Isotope analysis, Radioactive age determination, Sea level, Atmospheric composition, Climatic factors.

47-3556
Clay-varve based Swedish time scale and its relation to the Late Weichselian radiocarbon chronology.
Björck, S., et al, NATO Advanced Research Workshop on the Last Deglaciation, Erice, Sicily, Dec. 9-13, 1990. Proceedings. Absolute and radiocarbon chronologies. Edited by E. Bard et al, NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.2, Berlin, Springer-Verlag, 1992, p.25-44, Refs. p.41-44.
Cato, I., Brunnberg, L., Strömberg, B.
Pleistocene, Quaternary deposits, Glacial geology, Glaciation, Glacial deposits, Radioactive age determination, Correlation.

47-3557
Strength of the Nordic heat pump.
Broecker, W.S., NATO Advanced Research Workshop on the Last Deglaciation, Erice, Sicily, Dec. 9-13, 1990. Proceedings. Absolute and radiocarbon chronologies. Edited by E. Bard et al, NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.2, Berlin, Springer-Verlag, 1992, p.173-181, 15 refs.
Pleistocene, Paleoclimatology, Climatic changes, Glacier melting, Ice cores, Isotope analysis, Ocean currents, Climatic factors, Sea level.

47-3558
(delta) O-18 time-slice reconstruction of meltwater anomalies at termination I in the North Atlantic between 50 and 80 deg N.
Sarnthein, M., et al, NATO Advanced Research Workshop on the Last Deglaciation, Erice, Sicily, Dec. 9-13, 1990. Proceedings. Absolute and radiocarbon chronologies. Edited by E. Bard et al, NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.2, Berlin, Springer-Verlag, 1992, p.183-200, 39 refs.
Pleistocene, Paleoclimatology, Glacier melting, Meltwater, Bottom sediment, Age determination, Climatic changes, Isotope analysis, Ocean currents.

47-3559
New method to reconstruct sea surface salinity: application to the North Atlantic Ocean during the Younger Dryas.
Duplessy, J.-C., et al, NATO Advanced Research Workshop on the Last Deglaciation, Erice, Sicily, Dec. 9-13, 1990. Proceedings. Absolute and radiocarbon chronologies. Edited by E. Bard et al, NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.2, Berlin, Springer-Verlag, 1992, p.201-217, 27 refs.
Labeyrie, L., Juillet-Leclerc, A., Duprat, J.
Pleistocene, Paleoclimatology, Climatic changes, Sea water, Surface waters, Salinity, Isotope analysis, Glacier melting, Bottom sediment.

47-3560
Possible ice-core evidence for a fresh melt water cap over the Atlantic Ocean in the Early Holocene.
Fisher, D.A., NATO Advanced Research Workshop on the Last Deglaciation, Erice, Sicily, Dec. 9-13, 1990. Proceedings. Absolute and radiocarbon chronologies. Edited by E. Bard et al, NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.2, Berlin, Springer-Verlag, 1992, p.267-293, 38 refs.
Pleistocene, Paleoclimatology, Climatic changes, Glacier melting, Meltwater, Sea level, Ice water interface, Ice cores, Isotope analysis.

47-3561
Palynological expression and timing of the Younger Dryas event—Europe versus eastern North America.
Peteet, D.M., NATO Advanced Research Workshop on the Last Deglaciation, Erice, Sicily, Dec. 9-13, 1990. Proceedings. Absolute and radiocarbon chronologies. Edited by E. Bard et al, NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.2, Berlin, Springer-Verlag, 1992, p.327-344, Refs. p.341-344.
Paleoclimatology, Glacier oscillation, Palynology, Pleistocene, Stratigraphy, Correlation, Climatic changes, Radioactive age determination.

47-3562
Anomalous freezing point depression of solvents in a swollen homogeneous rubber network.
Grobler, J.H.A., et al, *Journal of polymer science B*, Apr. 1993, 31(5), p.575-577, 7 refs.
McGill, W.J.
Polymers, Solutions, Molecular structure, Rubber, Freezing points, Temperature effects, Freezing nuclei, Nucleation.

47-3563
Characteristics of two landslide-dammed lakes in a glaciated alpine environment.
Butler, D.R., et al, *Limnology and oceanography*, Mar. 1993, 38(2), p.441-445, 10 refs.
Malanson, G.P.
Limnology, Sampling, Alpine landscapes, Glaciation, Glacial lakes, Landslides, Geomorphology.

47-3564
Ductile ice.
Schulson, E.M., et al, *Philosophical magazine B*, Mar. 1993, 67(3), p.151-157, 15 refs.
Kuehn, G.A.
Ice plasticity, Ice strength, Ice microstructure, Ice creep, Mechanical tests, Strain tests, Phase transformations, Brittleness, Recrystallization.

47-3565
Simple method for specifying snowpack water equivalent in the northeastern United States.
Samelson, D., et al, *Journal of applied meteorology*, May 1993, 32(5), p.965-974, 12 refs.
Wilks, D.S.
Snow cover, Snow water equivalent, Snowmelt, Forecasting, Meteorological data, Statistical analysis, Weather stations.

47-3566
Simple objective method used to forecast convective activity during the 1989 PACE cloud-seeding experiment.
Czys, R.R., et al, *Journal of applied meteorology*, May 1993, 32(5), p.996-1005, 27 refs.
Scott, R.W.
Cloud cover, Cloud physics, Cloud seeding, Weather forecasting, Convection, Weather modification, Supercooling, Analysis (mathematics).

47-3567
Alternative representation of the ice canopy for calculating microwave brightness temperatures over a thunderstorm.
Muller, B.M., et al, *Journal of applied meteorology*, May 1993, 32(5), p.1006-1013, 27 refs.
Fuelberg, H.E., Smith, E.A.
Precipitation (meteorology), Thunderstorms, Ice crystal optics, Snow pellets, Cloud physics, Brightness, Radar echoes, Particle size distribution, Radiometry.

47-3568
Simulation of the Atlantic circulation with a coupled sea ice-mixed layer-isopycnal general circulation model. Part 1: model description.
Oberhuber, J.M., *Journal of physical oceanography*, May 1993, 23(5), p.809-829, 67 refs.
Oceanography, Ocean currents, Sea ice, Ice cover effect, Ice water interface, Mathematical models, Air ice water interaction, Fluid dynamics, Salinity.

47-3569
Simulation of the Atlantic circulation with a coupled sea-ice mixed layer-isopycnal general circulation model. Part 2: model experiment.
Oberhuber, J.M., *Journal of physical oceanography*, May 1993, 23(5), p.830-845, 35 refs.
Oceanography, Ocean currents, Stratification, Bottom topography, Sea ice, Mathematical models, Simulation, Air ice water interaction, Ice cover effect.

47-3570
Comparison of altimetry profiles over East Antarctica from Seasat and Geosat: an interim report.
Bentley, C.R., et al, *Zeitschrift für Gletscherkunde und Glazialgeologie*, 1990, 26(1), p.1-9, With German summary. 21 refs.
Sheehan, D.D.
Ice sheets, Glacier oscillation, Glacier mass balance, Glacier surfaces, Radar, Glacier surveys, Spacecraft, Height finding, Antarctica—East Antarctica.
The Exact Repeat Mission track of Geosat over East Antarctica duplicated to within a kilometer the tracks followed a decade earlier by Seasat. As the two satellites carried similar radar altimeters, it is possible to search for changes in the surface elevation of the ice sheet along these common tracks in the coastal strip north of 72S. Here the sector between 80 and 140E is examined. There are many Geosat passes for each Seasat pass, so the procedure was to define a local surface slope from the group of Geosat tracks, which spread typically over a zone 800 m wide, and to use that slope to extrapolate the Geosat-epoch elevation to the Seasat track. This was done for each elevation point along a Seasat track. Point-by-point differences were then averaged over drainage systems, which might be expected to show a single coherent behavior. Comparisons over the sea ice surrounding the continent were used in an attempt to reduce the effect of errors in orbital heights, but they have not been eliminated. Consequently, though these analyses do show some height changes, they can only be attributed to an undefined combination of orbital error and a secular change in surface elevation associated with a recent increase in surface mass balance. The results do exclude the possibility of any major imbalance, such as would be associated with an actively unstable marine-ice-sheet instability, in any of the 6 drainage systems included in the measured sector, and do suggest a significant positive difference in surface-elevation change between three convergent-flow systems and one divergent-flow system. (Auth. mod.)

47-3571
Local climate and mass balance of a blue-ice area in western Dronning Maud Land, Antarctica.
Jonsson, S., *Zeitschrift für Gletscherkunde und Glazialgeologie*, 1990, 26(1), p.11-29, With German summary. 30 refs.
Glacier mass balance, Glacier oscillation, Glacial meteorology, Glacier surveys, Meteorological factors, Topographic effects, Antarctica—Queen Maud Land.
A detailed study of the glaciological and meteorological characteristics of a small blue-ice area on the downstream side of Heimefrontfjella, western Dronning Maud Land, was initiated in Jan. 1988 and continued during the summer seasons of 1989 and 1990. The study included stake measurements for mass balance and ice velocity, ice thickness measurements, and shallow firn cores for oxygen isotope variations. An automatic weather station at the bottom of the basin registered meteorological data every 3 hours between Jan. 16, 1988 and June 5, 1989. More detailed data were obtained during the 1988 and 1990 field seasons. The local summer climate of the basin was found to be warmer, less humid and above all more gusty than that of the surrounding ice sheet, and a clear relationship between ablation rate, dominant wind direction and topography was recorded. Mass balance measurements showed a maximum net ablation of 22 cm ice by evaporation for the 1988-1989 balance year but only half as much for the succeeding year. This difference is most likely explained by a much lower accumulation during the first year. Most net ablation seems to take place during summer; more than 25% could take place between Mar. 1 and Oct. 30. Most probably this winter ablation occurs when the strength of the boundary layer air flow passes a certain threshold, thereby destroying the pool of cold stagnant air that is regularly formed in the basin during the winter. This periodic variation was superimposed on a larger-scale periodic variation (30-40 days) of the same parameters. The latter, which also could be detected in pressure and temperature data from the Halley Station, was synoptically forced and amplified by the special topography of the Scharffenberg basin. (Auth. mod.)

47-3572
Atmospheric model for simulating the mass balance and temperature on the antarctic ice sheet.
Fortuin, J.P.F., et al, *Zeitschrift für Gletscherkunde und Glazialgeologie*, 1990, 26(1), p.31-56, With German summary. 40 refs.
Oerlemans, J.
Climatology, Polar atmospheres, Temperature variations, Ice air interface, Atmospheric circulation, Glacier mass balance, Glacier oscillation, Mathematical models, Climatic changes.
An attempt is made to simulate the antarctic climate by modelling the atmospheric circulation along an ice flow line of the East Antarctic ice sheet. The model consists of three atmospheric layers: a boundary layer, the free troposphere and the stratosphere, as well as an ice surface layer. The circulation in the troposphere is driven primarily by the buoyancy forcing in the

boundary layer. Temperature, moisture concentration, velocity and boundary layer height are the main prognostic variables, from which surface mass balance along the elevation profile can be calculated. This is done for a parabolic ice sheet profile with and without an ice shelf extension. Erosion or accumulation due to wind-driven snow is also taken into account, but found to be negligible compared to precipitation and evaporation. The resemblance of the model output to annually averaged climatic observations is reasonable, the main discrepancies being depressed precipitation in the interior region and elevated temperatures at the coastal end of the ice sheet profile. The sensitivity of the simulated temperature and mass balance field along the elevation profile is determined for insolation, cloudiness, and meridional -advection and -synoptic pressure gradients. The sensitivity to changes in coastal temperature and in ozone and carbon dioxide concentrations is also presented. (Auth. mod.)

47-3573

Dynamics of ice shelves and their sensitivity to changing mass-balance quantities: model results for Filchner-Ronne Ice Shelf, Antarctica.

Determann, J., et al, *Zeitschrift für Gletscherkunde und Glazialgeologie*, 1990, 26(1), p.57-68, With German summary. 24 refs.

Oerter, H.

Glacier mass balance, Glacier oscillation, Glacier thickness, Ice shelves, Underwater ice, Glacier flow, Ice water interface, Mathematical models, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.

In answering the relevant question for the mass budget of the antarctic ice sheet, the ice shelves fringing the continent play an important role because they largely drain the ice flowing from inland. Using the flow law for ice, a set of differential equations describes ice-shelf flow in the horizontal dimensions. By reproducing the observed flow of the Filchner-Ronne Ice Shelf, the model is used to simulate transient ice-shelf dynamics. This implies solving the equation of mass conservation, involving accumulation rates and ablation rates from the ice-shelf surface and bottom. While glaciological field studies presently represent surface accumulation rates fairly well, there is still little access to bottom melting which seems to be one order higher in magnitude. For the central region of Filchner-Ronne Ice Shelf, rates of basal accumulation in excess of 2 m/y can be derived inversely by maintaining a basal layer of marine ice in its present extent. Analysis of an ice core sampling on Filchner-Ronne Ice Shelf about 30 km inland from the ice front reveals that this basal layer consists of ice which probably grew in the water column beneath the ice shelf. Prognostic studies comprising hypothetical distributions of accumulation and melting reveal that the ice-shelf thickness profile strongly depends on interactions with the ocean. Mass budget estimates suggest that melting at the ice-shelf bottom discharges at least as much ice as does calving at the ice front. (Auth. mod.)

47-3574

Initiation of maritime ice sheets.

Kerr, A.D., *Zeitschrift für Gletscherkunde und Glazialgeologie*, 1990, 26(1), p.69-79, With German summary. 15 refs.

Ice sheets, Ice formation, Ice models, Glaciation, Climatic factors, Marine meteorology, Paleoclimatology.

47-3575

Astronomical theory of the glaciation cycles: calculation of a response model for the global ice volume.

Grieger, B., *Zeitschrift für Gletscherkunde und Glazialgeologie*, 1990, 26(1), p.81-96, With German summary. 20 refs.

Paleoclimatology, Ice sheets, Glacier oscillation, Mathematical models, Quaternary deposits, Marine deposits, Age determination, Insolation, Climatic changes.

47-3576

Multifunctional combined foundations on permafrost soils.

Nekliudov, V.S., et al, *Soil mechanics and foundation engineering*, Mar. 1993, 29(5), p.164-167, Translated from Osnovaniia, fundamenty i mekhanika gruntov.

Targulian, IU.O., Lolaev, A.B.

Cold weather construction, Permafrost beneath structures, Settlement (structural), Design criteria, Foundations, Pile structures, Bearing strength, Ground thawing.

47-3577

Cryogenic deformations of Suluk BAM station building.

Rubinchik, S.B., *Soil mechanics and foundation engineering*, Mar. 1993, 29(5), p.167-169, Translated from Osnovaniia, fundamenty i mekhanika gruntov.

Cold weather construction, Discontinuous permafrost, Buildings, Deformation, Soil freezing, Soil stabilization, Artificial freezing.

47-3578

Contact melting during sliding on ice.

Fowler, A.J., et al, *International journal of heat and mass transfer*, Mar. 1993, 36(5), p.1171-1179, 20 refs.

Bejan, A.

Ice mechanics, Ice friction, Ice melting, Ice solid interface, Sliding, Water films, Heat transfer, Fluid mechanics, Analysis (mathematics).

47-3579

Detection of nonconductive heat transport in soils using spectral analysis.

Hinkel, K.M., et al, *Water resources research*, Apr. 1993, 29(4), p.1017-1023, 18 refs.

Outcalt, S.I.

Soil temperature, Temperature variations, Spectra, Heat transfer, Thermal regime, Soil freezing, Frost penetration, Statistical analysis.

47-3580

Dielectric dispersion of supercooled trimethyleneglycol-water mixtures.

Abe, R., et al, *Physical Society of Japan. Journal*, Nov. 1992, 61(11), p.4204-4211, 3 refs.

Horioka, M., Sakumiya, I.

Solutions, Supercooling, Liquid cooling, Electrical measurement, Dielectric properties, Temperature effects, Low temperature research.

47-3581

Inclusion-exclusion calculation of the dipole-dipole energy of hexagonal ice and of cubic ice.

Huckaby, D.A., et al, *Journal of chemical physics*, May 15, 1993, 98(10), p.8105-8109, 23 refs.

Pitis, R., Kincaid, R.H., Hamilton, C.

Ice physics, Ice electrical properties, Ice crystal structure, Molecular structure, Molecular energy levels, Polarization (charge separation), Hydrogen bonds, Cubic ice.

47-3582

Thermodynamic stability of clathrate hydrate. 2. Simultaneous occupation of larger and smaller cages.

Tanaka, H., et al, *Journal of chemical physics*, May 15, 1993, 98(10), p.8110-8118, 22 refs.

Kiyohara, K.

Clathrates, Hydrates, Molecular structure, Molecular energy levels, Stability, Thermodynamic properties, Natural gas, Simulation, Low temperature research.

47-3583

***Ab initio* studies on the structural and dynamical properties of ice.**

Lee, C.Y., et al, *Physical review B*, Mar. 1, 1993, 47(9)I, p.4863-4872, 56 refs.

Ice physics, Ice crystal structure, Phase transformations, Hydrogen bonds, Molecular structure, Molecular energy levels, High pressure ice, Spectra, Statistical analysis.

47-3584

Homogeneous ice regions in the northeastern Kara Sea. [Odnorodnye ledovye raĭony severo-vostochnoĭ chasti Karskogo moria],

Egorov, A.G., et al, *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.423, p.6-14, In Russian. 3 refs.

Spichkin, V.A.

Pack ice, Sea ice, USSR—Kara Sea.

47-3585

Analysis of the characteristics of decrease in areas of ice massifs in the Novosibirsk region during summer. [Analiz osobennosti letnego umen'sheniia ploshchadi ledianykh massivov v Novosibirskom raĭone],

Egorov, A.G., et al, *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.423, p.15-24, In Russian. 9 refs.

Spichkin, V.A., IUlin, A.V.

Ice cover, Impurities, Ice melting, Drift, Air temperature, Ice cover thickness, USSR—Novosibirsk.

47-3586

Intensity of changes in the areas of ice massifs in the East Siberian Sea during summer. [Intensivnost' izmeneniia ploshchadi ledianikh massivov Vostochnosibirskogo moria v letniĭ period],

IUlin, A.V., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.423, p.25-34, In Russian. 7 refs.

Ice cover, Seasonal variations, Ice melting, Sea ice, USSR—East Siberian Sea.

47-3587

Hydrometeorological conditions characteristic of separated and connected Severnaya Zemlya and Kara Sea ice massifs during the summer. [Gidrometeorologicheskie usloviia, sootvetstvuiushchie raz"edineniiu i soedineniiu Severozemel'skogo i Karskogo ledianykh massivov v letnee vremia],

Egorov, A.G., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.423, p.35-41, In Russian. 1 ref.

Sea ice, Ice cover, Drift, Seasonal variations, Hydrology, Marine meteorology, USSR—Severnaya Zemlya, USSR—Kara Sea.

47-3588

Some characteristics of spatial irregularity in the thickness of stationary and drifting ice. [Nekotorye osobennosti prostranstvennoĭ neravnomernosti tolshchiny nepodvizhnogo i dreĭfuiushchego l'da],

Mironov, E.U., et al, *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.423, p.42-53, In Russian. 8 refs.

Kuznetsov, I.M.

Sea ice, Ice cover thickness, Drift.

47-3589

Problem of calculating and forecasting significant anomalies in ice phenomena. [K probleme rascheta i prognoza krupnykh anomaliĭ ledovykh iavleniĭ],

Spichkin, V.A., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.423, p.54-65, In Russian. 7 refs.

Ice forecasting, Analysis (mathematics).

47-3590

Using short series of estimated values and a large number of predictors to improve ice forecasting methods. [Ob ispol'zovanii korotkikh riadov prediktantov i bol'shogo kolichestva prediktorov s tsel'iu uluchsheniia metodov ledovykh prognozov],

Spichkin, V.A., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.423, p.66-76, In Russian. 3 refs.

Ice forecasting, Accuracy, Mathematical models.

47-3591

One method of analyzing the interdependence of short time series. [Ob odnom iz metodov otsenki sopriazhennosti korotkikh vremennykh riadov],

Chepurina, M.A., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.423, p.77-83, In Russian. 6 refs.

Sea ice, Polynyas, Ice models, Mathematical models, Seasonal variations, Antarctica—Davis Sea.

Using the example of multiyear changes in the ice area of the Davis Sea, the possibility of an objective analysis of the interdependence of their fluctuations in various regions is shown with the aid of an autoregression model. Regularities in the development of polynyas in the surveyed region reflect the characteristics of the development of ice processes through the seasons. The applied method can be used for regionalization and forecasting. (Auth. mod.)

47-3592

Problem of separating gradation of irregularity in a series of hydrometeorological elements. [K voprosu o vydelenii gradatsiĭ anomal'nosti v riadakh gidrometeorologicheskikh elementov],

Brovin, A.I., et al, *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.423, p.84-88, In Russian. 5 refs.

IUlin, A.V.

Statistical analysis, Meteorology, Hydrology, Ice conditions.

47-3593

Possibility of forecasting the conditions of ice edges in the Greenland Sea up to 30 days in advance. [O vozmozhnosti prognozirovaniia polozheniia kromki l'da v Grenlandskom more s zablagovremennost'iu do 30 sutok],

Kuznetsov, I.M., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.423, p.89-93, In Russian. 9 refs.

Long range forecasting, Ice edge, Ice conditions, Ice forecasting, Greenland Sea.

47-3594

Possibility of short term forecasting of sea ice thickness. [O vozmozhnosti kratkosrochnogo prognozirovaniia tolshchiny morskogo l'da],

Kuznetsov, I.M., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.423, p.94-97, In Russian. 4 refs.

Sea ice, Ice cover thickness, Ice forecasting.

47-3595

Experiment in formulating short term numerical ice forecasts for the southwestern Kara Sea. [Opyt sostavleniia kratkosrochnykh chislennykh ledovykh prognozov dlia iugo-zapadnoĭ chasti Karskogo moria],

Nikolaev, S.IU., et al, *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.423, p.98-104, In Russian. 9 refs.

Speranskiĭ, D.A.

Ice forecasting, Sea ice, USSR—Kara Sea.

47-3596
Studying the possibility of a long range forecast of summer ice conditions in the southwestern Kara Sea. [Otsenka vozmozhnosti dolgosrochnogo prognoza letnikh ledovykh uslovit v iugo-zapadnoi chasti Karskogo moria].
Tiurnakov, A.B., *Leningrad. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1990, Vol.423, p.105-111, In Russian. 3 refs.
Long range forecasting, Sea ice, Ice conditions, Ice forecasting, USSR Kara Sea.

47-3597
Results of calculations of changes in the probability density distribution of ice thickness during melting. [Rezul'taty raschetov izmeneniia plotnosti veroiatnosti raspredeleniia tolshchiny l'da pri taianii].
Appel', I.L., *Leningrad. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1990, Vol.423, p.112-116, In Russian. 3 refs.
Ice cover thickness, Ice melting, Ice density.

47-3598
Accounting for atmospheric stratification in the calculation of tangential wind pressure in questions of the dynamics of ice cover. [Uchet stratifikatsii atmosfery pri raschete kasatel'nogo napriazheniia vetra v zadachakh dinamiki ledianogo pokrova].
Pozdnyshev, S.P., *Leningrad. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1990, Vol.423, p.117-125, In Russian. 9 refs.
Wind pressure, Stratification, Ice cover, Analysis (mathematics).

47-3599
Meso-scale characteristics of the distribution of water masses in the Chukchi Sea. [Mezomasshtabnye osobennosti raspredeleniia vodnykh mass v Chukotskom more].
Abramov, V.A., et al, *Leningrad. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1990, Vol.423, p.126-132, In Russian. 10 refs.
Sen'ko, N.P.
Oceanography, Sea ice distribution, Chukchi Sea.

47-3600
Automated processing and analysis of data on cracks in the sea ice cover, made from visual observations from an aircraft. [Avtomatizirovaniia obrabotka i analiz materialov vizual'nykh nabliudenii s samoleta za razryvami v morskom ledianom pokrove].
Brestkin, S.V., et al, *Leningrad. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1990, Vol.423, p.133-147, In Russian. 7 refs.
Porubaev, V.S.
Data processing, Ice cover, Ice cracks, Sea ice, Analysis (mathematics). Aerial surveys.

47-3601
Numerical calculation of the trajectory of ice drift. [O chislennom raschete traektorii dreifa l'da].
Aksenov, E.O., *Leningrad. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1990, Vol.423, p.148-154, In Russian. 2 refs.
Drift, Ice cover, Sea ice, Analysis (mathematics), Ice models.

47-3602
Laboratory studies of the porosity of bottom ice, formed during static ice formation. [Laboratornye issledovaniia poristosti vnutrivodnogo l'da, formiruiushchegosia pri staticheskom l'doobrazovanii].
Tyshko, K.P., et al, *Leningrad. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1990, Vol.423, p.155-159, In Russian. 3 refs.
Lialiagin, N.A.
Bottom ice, Ice formation, Porosity, Supercooling.

47-3603
Extremes of the vertical distribution of hydrochemical indicators in the Norwegian Sea. [Ekstremumy vertikal'nogo raspredeleniia gidrokhimicheskikh pokazatelei v Norvezhskom more].
Pivovarov, S.V., *Leningrad. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1990, Vol.423, p.160-164, In Russian. 4 refs.
Oxygen, Water chemistry, Water structure, Norwegian Sea.

47-3604
Community structure and trophic ecology of zooplankton in the Scotia Sea marginal ice zone in winter (1988).
Hopkins, T.L., et al, *Deep-sea research*, Jan. 1993, 40(1), p.81-105, 52 refs.
Lancraft, T.M., Torres, J.J., Donnelly, J.
Plankton, Sea ice, Ice edge, Nutrient cycle, Scotia Sea, South Orkney Islands.
Zooplankton community structure and trophic ecology were investigated in the marginal ice zone of the southern Scotia Sea during the austral winter of 1988 as part of the AMERIEZ program. In the study area near the South Orkneys, water emerging from the Weddell Sea mixes with Scotia Sea water to form a complex field of mesoscale eddies and meanders. Three primary zooplankton communities were identified: a shallow cold water assemblage typical of Weddell Sea water; a shallow/-upper mesopelagic assemblage of subantarctic species introduced into the southern Scotia Sea with warm core eddies from the Polar Front; and a deep (>400 m) mesopelagic community with circumantarctic species. Diet analysis of 35 dominant species revealed five feeding guilds among the zooplankton. One consisted primarily of small herbivorous copepods. Two closely related guilds consisting of copepods, krill and salps were omnivorous, feeding on phytoplankton, protozoans, metazoans and crustacean debris (molts). Two guilds were constituted by predatory copepods and chaetognaths. A sixth group, all copepods, which included important numerical and biomass dominants of the region was, with two exceptions, trophically inactive. The exceptions were the biomass dominants *C. propinquus* and *M. gerlachei*, which were actively feeding in winter. Phytoplankton biomass was low in winter, averaging two-thirds that in fall. (Auth. mod.)

47-3605
Proceedings.
International Conference on Fly Ash, Silica Fume, Slag, and Natural Pozzolans in Concrete, 4th, Istanbul, Turkey, May 3-8, 1992, Detroit, American Concrete Institute, 1993, 1681p. (2 vols.), ACI SP-132, Refs. passim. For selected papers see 47-3606 through 47-3618.
Malhotra, V.M., ed.
Concrete durability, Concrete aggregates, Cement admixtures, Frost resistance, Mechanical tests, Freeze thaw tests, Cold weather performance, Physical properties, Mechanical properties, Chemical composition.

47-3606
Deicer salt scaling resistance of roller-compacted concrete pavements containing fly ash and silica fume.
Marchand, J., et al, International Conference on Fly Ash, Silica Fume, Slag, and Natural Pozzolans in Concrete, 4th, Istanbul, Turkey, May 3-8, 1992. Proceedings, Vol.1. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1993, p.151-178, ACI SP-132, 21 refs.
Concrete pavements, Concrete aggregates, Concrete durability, Physical properties, Air entrainment, Cold weather performance, Cold weather tests, Frost resistance.

47-3607
Resistance of fly ash concrete to freezing and thawing.
Nasser, K.W., et al, International Conference on Fly Ash, Silica Fume, Slag, and Natural Pozzolans in Concrete, 4th, Istanbul, Turkey, May 3-8, 1992. Proceedings, Vol.1. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1993, p.205-226, ACI SP-132, 8 refs.
Lai, P.S.H.
Concrete strength, Concrete durability, Concrete aggregates, Freeze thaw tests, Frost resistance, Compressive properties, Microstructure.

47-3608
Concrete incorporating high volumes of ASTM Class F fly ashes: mechanical properties and resistance to deicing salt scaling and to chloride-ion penetration.
Bilodeau, A., et al, International Conference on Fly Ash, Silica Fume, Slag, and Natural Pozzolans in Concrete, 4th, Istanbul, Turkey, May 3-8, 1992. Proceedings, Vol.1. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1993, p.319-349, ACI SP-132, 11 refs.
Malhotra, V.M.
Concrete aggregates, Concrete durability, Cement admixtures, Mechanical properties, Mechanical tests, Salt water.

47-3609
Comparative study of natural pozzolans used in blended cement production.
Akman, M.S., et al, International Conference on Fly Ash, Silica Fume, Slag, and Natural Pozzolans in Concrete, 4th, Istanbul, Turkey, May 3-8, 1992. Proceedings, Vol.1. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1993, p.471-494, ACI SP-132, 8 refs.
Mazlum, F., Esenli, F.
Concrete durability, Concrete aggregates, Cement admixtures, Freeze thaw tests, Mechanical tests, Mechanical properties.

47-3610
Evaluation of pozzolanic activity of rice husk ash.
Sugita, S., et al, International Conference on Fly Ash, Silica Fume, Slag, and Natural Pozzolans in Concrete, 4th, Istanbul, Turkey, May 3-8, 1992. Proceedings, Vol.1. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1993, p.495-512, ACI SP-132, 4 refs.
Shoya, M., Tokuda, H.
Concrete aggregates, Concrete durability, Cement admixtures, Freeze thaw tests, Frost resistance, Manufacturing, Chemical properties.

47-3611
Silica fume in concrete—an overview.
Khayat, K.H., et al, International Conference on Fly Ash, Silica Fume, Slag, and Natural Pozzolans in Concrete, 4th, Istanbul, Turkey, May 3-8, 1992. Proceedings, Vol.2. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1993, p.835-872, ACI SP-132, 100 refs.
Aïtcin, P.C.
Concrete durability, Concrete aggregates, Cement admixtures, Cold weather performance, Air entrainment, Physical properties, Mechanical properties, Frost resistance.

47-3612
Influence of different types of silica fume having varying silica content on the microstructure and properties of concrete.
Batrakov, V.G., et al, International Conference on Fly Ash, Silica Fume, Slag, and Natural Pozzolans in Concrete, 4th, Istanbul, Turkey, May 3-8, 1992. Proceedings, Vol.2. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1993, p.943-963, ACI SP-132, 7 refs.
Kaprielov, S.S., Sheĭnfel'd, A.V.
Concrete durability, Cement admixtures, Microstructure, Frost resistance, Mechanical tests, Physical properties, Chemical composition.

47-3613
Durability of high early strength silica fume concretes subjected to accelerated and normal curing.
Johnston, C.D., International Conference on Fly Ash, Silica Fume, Slag, and Natural Pozzolans in Concrete, 4th, Istanbul, Turkey, May 3-8, 1992. Proceedings, Vol.2. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1993, p.1167-1187, ACI SP-132, 10 refs.
Concrete durability, Concrete strength, Concrete aggregates, Concrete curing, Frost resistance, Prestressed concretes, Cold weather performance, Mechanical tests.

47-3614
Wet-mix silica fume shotcrete: effect of silica fume form.
Morgan, D.R., et al, International Conference on Fly Ash, Silica Fume, Slag, and Natural Pozzolans in Concrete, 4th, Istanbul, Turkey, May 3-8, 1992. Proceedings, Vol.2. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1993, p.1251-1271, ACI SP-132, 8 refs.
Wolsiefer, J., Sr.
Concrete durability, Concrete strength, Concrete aggregates, Freeze thaw tests, Frost resistance, Physical properties, Mechanical tests.

47-3615
Silica fume-polymer mortars for rehabilitation of bridge decks.
Bürge, T.A., International Conference on Fly Ash, Silica Fume, Slag, and Natural Pozzolans in Concrete, 4th, Istanbul, Turkey, May 3-8, 1992. Proceedings, Vol.2. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1993, p.1273-1286, ACI SP-132, 7 refs.
Mortars, Concrete durability, Concrete admixtures, Polymers, Bridges, Frost resistance, Compressive properties, Mechanical tests.

47-3616
Performance of portland and blast furnace slag cement concretes in marine environments.
Osborne, G.J., International Conference on Fly Ash, Silica Fume, Slag, and Natural Pozzolans in Concrete, 4th, Istanbul, Turkey, May 3-8, 1992. Proceedings, Vol.2. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1993, p.1303-1323, ACI SP-132, 22 refs.
Concrete durability, Concrete aggregates, Ocean environments, Marine atmospheres, Salt water, Frost resistance, Chemical composition, Cold weather performance.

47-3617
Properties of granulated blast-furnace slag cement concrete.
Sakai, K., et al. International Conference on Fly Ash, Silica Fume, Slag, and Natural Pozzolans in Concrete, 4th, Istanbul, Turkey, May 3-8, 1992. Proceedings, Vol.2. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1993, p.1367-1383, ACI SP-132, 8 refs.
Watanabe, H., Suzuki, M., Hamazaki, K.
Concrete durability, Concrete aggregates, Cement admixtures, Frost resistance, Concrete hardening, Compressive properties.

47-3618
Resistance to freezing and thawing and chloride diffusion of anti-washout underwater concrete containing blast-furnace slag.
Fukudome, K., et al. International Conference on Fly Ash, Silica Fume, Slag, and Natural Pozzolans in Concrete, 4th, Istanbul, Turkey, May 3-8, 1992. Proceedings, Vol.2. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1993, p.1565-1582, ACI SP-132, 5 refs.
Miyano, K., Taniguchi, H., Kita, T.
Concrete durability, Ocean environments, Salt water, Subsurface structures, Cement admixtures, Freeze thaw tests, Frost resistance, Mechanical tests.

47-3619
Oceanographic data in Lützow-Holm Bay of Antarctic Climate Research Programme from March 1990 to January 1991 (JARE-31).
Ushio, S., et al. *Japanese Antarctic Research Expedition. JARE data reports.* Mar 1993, No.184, 34p.
Takizawa, T.
Oceanographic surveys, Water temperature, Ice cover effect, Salinity, Water chemistry, Polynyas, Antarctica—Lützow-Holm Bay.
The report presents tabulated data from observations under the fast ice and polynyas of Lützow-Holm Bay carried out from Mar. 1990 to Jan. 1991. They include water temperature and salinity profiles, dissolved oxygen measurements, and aircraft-deployed expandable bathythermographic data.

47-3620
Oceanographic data of the 32nd Japanese Antarctic Research Expedition from November 1990 to March 1991.
Nakamura, H., et al. *Japanese Antarctic Research Expedition. JARE data reports.* Mar. 1993, No.187, 50p.
Noguchi, K.
Oceanographic surveys, Water pollution, Water temperature, Meteorological data, Ocean currents, Water chemistry, Tides, Antarctica—Showa Station.
The report presents data of oceanographic observations on board the icebreaker *Shirase* and tidal observations at Showa Station. They include surface water temperature measurements and chemical analysis, current vertical profiles, expandable bathythermograph data collected at 202 stations, and conductivity, temperature and depth profiling data collected at 5 stations. Serial observations were made at 6 stations; all results, together with meteorological data, are presented in tables.

47-3621
Oceanographic observation of Lützow-Holm Bay, Antarctica in 1990.
Takizawa, T., *Polar news*, Mar. 1992, No.54, p.22-30, In Japanese.
Expeditions, Research projects, Antarctica—Lützow-Holm Bay.
An account is given of three observation excursions by snow vehicle on the sea ice of Lutzow-Holm Bay, Apr. 24-May 12, Aug. 15-Sep. 4, and Oct. 15-Nov. 2, 1990, as part of the 31st Japanese Antarctic Research Expedition. Activities included installation of an unmanned UHF repeater station and an unmanned sea ice meteorological buoy. Snow depth on the ice at an observation point about 10 km northeast of Padda Island was 65, 135, and 152 cm, respectively in Apr., Aug., and Oct. Ice thickness from a core sample taken in Apr., about 20 km west of Ongul Island, was 190 cm, but in Aug., at an observation point about 50 km west of Ongul Island, the ice thickness was 302 cm. In Aug. the water temperature under the ice was about -1.8 C and the lowest air temperature recorded was -46.3 C.

47-3622
33rd Japanese Antarctic Research Expedition in 1991-93.
Fukuchi, M., *Polar news*, Mar. 1992, No.54, p.31-37, In Japanese.
Expeditions, Research projects, Snow vehicles, Antarctica.
Activities of the 33rd Japanese Antarctic Research Expedition, consisting of a wintering party of 37 and a summer party of 16, scheduled for Dec. 1991-Mar. 1993, are summarized. A photograph of one of two newly introduced SM-100-type, 10.5-ton, 670-cm long, 345-cm wide, 315-cm high tracked snow vehicles is included. Tables are included listing the names, fields of interest, ages, and affiliations of the expedition members, and planned land-based and shipboard scientific observation activities. Research is to include the ionosphere, ocean physics, ocean chemistry, marine biology, earth crustal processes, sea ice bio. s, deep ice core drilling, atmospheric chemistry, atmospheric physics, upper atmosphere, and geomagnetism.

47-3623
Comprehensive protection measures on antarctic environment.
Yoshida, Y., *Polar news*, Mar. 1992, No.54, p.51-56, In Japanese.
Environmental protection, International cooperation, Legislation, Antarctica.
The Protocol on Environmental Protection to the Antarctic Treaty was adopted on Oct. 3, 1991, at the 11th Antarctic Treaty Special Consultative Meeting in Madrid. The history of environmental protection in the Antarctic Treaty, going back to the first consultative meeting in 1961, is summarized. There were four sessions of the 11th Consultative Meeting in 1991, of which one was in Viña del Mar, Chile, and the other three in Madrid. Among the issues discussed were MARPOL 73/78, that is, provisions dealing with marine pollution adopted in 1973 and amended in 1978. The provisions of the Protocol, including IEE (Initial Environmental Evaluation), and CEE (Comprehensive Environmental Evaluation) are summarized.

47-3624
Antarctic science conference, Germany, 1991.
Kanda, H., *Polar news*, Mar. 1992, No.54, p.57-60, In Japanese.
Meetings, Research projects, International cooperation, Antarctica.
The International Conference on Antarctic Science -Global Concerns, Bremen, Germany, Sep. 23-27, 1991, is summarized. The conference was sponsored by SCAR, the Scientific Committee on Antarctic Research. Topics included the Antarctic in the global scene; antarctic research in global change; progress and frontier in antarctic science; Antarctica: clues for planet Earth; the future of antarctic science; conflicts of interest in the use of the Antarctic; new technologies in support of antarctic science; resources and the environment in relation to antarctic science; and science and the Antarctic Treaty System.

47-3625
Finding of antarctic "ozone hole".
Chubachi, S., *Polar news*, Aug. 1991, No.53, p.23-29, In Japanese. 8 refs.
Polar atmospheres, Ozone, Atmospheric composition, Antarctica—Showa Station.
Continuous ozone observations by Dobson spectrophotometer and ozonesonde at Showa Station since 1961, except for interruptions in 1962-1965 and 1974, are summarized. Coinciding with a record low temperature of -45.3 C, a drastic depletion down to 230 Dobson units in total ozone was observed in Sep. 1982 at Showa Station and was subsequently confirmed by observations at the British Halley Station. The "ozone hole" in Antarctica is most pronounced in the local spring, Sep.-Nov. Several graphs are included showing fluctuations in total ozone for 1961-1990.

47-3626
Summer activity of JARE-32.
Kokubun, S., *Polar news*, Aug. 1991, No.53, p.38-42, In Japanese.
Expeditions, Research projects, Antarctica.
The summer activities, Dec. 1990-Feb.1991, of the 32nd Japanese Antarctic Research Expedition, are summarized. The 32,000-cubic-meter, 471-kg PPB-2 Polar Patrol Balloon, to study stratospheric winds, the Earth's magnetic field, and aurora X-ray and electric fields, was launched Jan. 3, reached an altitude of 29.5 km, and landed Feb. 4. A sketch map shows the flight path of the previous balloon, PPB-1, Dec. 25, 1990 to Feb. 1, 1991. Summer ice conditions for navigation in Lützow-Holm Bay, with several kilometers of 5-meter-thick hummocky ice, have become more difficult from 1989 to 1991. It took a record number of about 3000 ramming maneuvers for the icebreaker *Shirase* to break through the ice in Jan. and Feb. 1991, about 2300 in 1990, and about 950 in 1989.

47-3627
Report on the 31st JARE wintering party at Syowa Station.
Naito, Y., *Polar news*, Aug. 1991, No.53, p.43-46, In Japanese.
Expeditions, Research projects, Antarctica—Showa Station.
The activities of the wintering party at Showa Station, Feb. 1990-Jan. 1991, of the 31st Japanese Antarctic Research Expedition are summarized. The wintering party consisted of 30 members. A sketch map shows excursions from Showa Station, for oceanographic and sea ice observations in Lützow-Holm Bay, to an emperor penguin rookery off the Riser Larsen Peninsula, and overland to Mizuho Station for maintenance of unmanned satellite observation data links. Total ozone measured at Showa Station in Sep. and Oct. was down from a normal of 300 Dobson units to 170-180 Dobson units.

47-3628
Winter plankton assemblage in the ice edge zone of the Weddell and Scotia Seas: composition, biomass and spatial distributions.
Garrison, D.L., et al. *Deep-sea research*, Feb. 1993, 40(2), p.311-338, Refs. p.335-338.
Buck, K.R., Gowing, M.M.
Biomass, Ice edge, Plankton, Distribution, Hydrography, Antarctica—Weddell Sea, Scotia Sea.
The biomass and distribution of phytoplankton and protozooplankton at an advancing ice edge in the Weddell and Scotia Seas during the early austral winter were examined. The advance of ice cover, local melting of sea ice and advection of water masses, possibly from lower latitude regions, were the main sources of variability in the physical regime of the ice-edge zone. Autotrophic dinoflagellates dominated phytoplankton stocks, followed by other autotrophic nanoflagellates and diatoms in decreasing biomass. Heterotrophic flagellates dominated protozooplankton biomass followed by ciliates and sarcodines. Although phytoplankton stocks were higher at non ice-covered than at ice-covered stations, there were no distinct differences between ice-edge stations and those north of the furthest ice extent. It is hypothesized that advection of sea ice into water above the freezing point and subsequent melting of ice probably affected much of the study area, so that any effects of "enhanced production" in the ice-edge zone would have been difficult to resolve. It is concluded that neither algal nor bacterial production was sufficient to produce an enrichment of protozooplankton stocks in the ice-edge zone. Calculations of a carbon budget suggested that bacterial production was a significant proportion of total production and that the nano- and microheterotrophs must predominate in the utilization of both phyto- and bacterioplankton production at the winter ice edge. (Auth. mod.)

47-3629
Stratospheric ozone in the Arctic and Antarctic (Review).
Danilov, A.D., et al. *Geomagnetism and aeronomy*, 1992(Pub. Aug. 92), 32(1), p.1-10, Translated from Geomagnetizm i aeronomiia. 73 refs.
Avdiushin, S.I.
Ozone, Stratosphere, Atmospheric composition.
A review is given of works completed during the past 4 to 5 years on the study of ozone in the stratosphere of the Northern and Southern Hemispheres. Main stress is placed on the results of the composite international studies of 1987 and 1989, in which a large amount of information was obtained on the behavior of ozone and other minor components of the atmospheres of the Arctic and Antarctica. The present mechanisms for the formation of the ozone hole in the Antarctic are discussed, and the reasons for its absence in the Arctic are given. (Auth.)

47-3630
Workshop on Antarctic Studies, May 3-5, 1988, National Physical Laboratory: seven years of antarctic research.
India. Department of Ocean Development, New Delhi, Department of Ocean Development, [1988], 54p.
DLC G845.5.W67
Research projects, Expeditions, Antarctica—Dakshin Gangotri Station.
Scientific research projects in different disciplines, carried out during 7 Indian antarctic expeditions between 1981 and 1987, with 141 participating scientists and 342 logistic personnel, are reviewed. A summary of the Interim Report of the 7th Indian Expedition to Antarctica is included. Participating organizations in the Indian antarctic program are listed.

47-3631
Nitrate signal of solar flares in polar snow and ice.
Dreschhoff, G.A.M., et al. *U.S. Air Force Office of Scientific Research. Technical report*, Nov. 1, 1992, AFOSR-TR-92-0999, 23p., ADA-260 559, 20 refs.
Zeller, E.J.
Snow composition, Firn stratification, Ice composition, Solar activity, Ice cores, Antarctica—Windless Bight.
The operations described in this report are separated into 2 sections, one involving the high-resolution sampling, analysis, and interpretation of a firn core from Windless Bight, Antarctica, and a second section concerned with the acquisition of a 120 m firn core from the GISP2 site in Central Greenland. Most of the antarctic work is involved with detailed correlation with records from two-drill cores located 10 km apart on the Ross Ice Shelf, where snow deposition involves little mixing and highly precise correlations are possible with known solar flare events. In Greenland, a much longer time period of roughly 400 years has been sampled. The core drilling was completed in June 1992 and the cores have been shipped to the National Ice Core Storage Facility in Denver, CO. The upper 12 m of firn core was analyzed on site in Greenland and shows that a high quality ice core record can be obtained. (Auth.)

47-3632
Multifractal cloud properties data assessment.
Gautier, C., et al. *U.S. Department of Energy. Report*, May 6, 1992, DOE/ER/61062-T1, 15p., DE93 002638, 8 refs.
Ozone, Clouds (meteorology), Radiation, Data processing, Fractals.
A number of data sets, analyzed to characterize multifractal cloud properties and to assess the effects of clouds on surface radiation properties (spectral and broadband), include: AVHRR observations of clouds over the ocean, SPOT observations of clouds over the ocean, SSM/I observations of clouds over the ocean, pyranometer data with all-sky photographs, pyrgeometer data all-sky photographs, and spectral surface irradiance all-sky photographs. A number of radiative transfer computations have been performed to help in the interpretation of these observations or provide theoretical guidance for their analysis. Finally, a number of radiative transfer models have been acquired and tested to prepare for the interpretation of ARM CART data. (Auth.)

47-3633
Freeze safe valve.
Roper, B.G., *U.S. Patent Office. Patent.* Aug. 30, 1988, 8 col., USP-4,766,923, 8 refs.
Water pipelines, Water flow, Valves, Pipeline freezing, Drainage, Countermeasures, Design.

47-3634
Apparatus for changing artificial snow to wet snow.
Suga, N., et al, *U.S. Patent Office. Patent.* Aug. 30, 1988, 6 col., USP-4,767,054, 9 refs.
Katayanagi, S.
Artificial snow, Snow manufacturing, Snow accumulation, Test equipment, Design.

47-3635
Method and apparatus for constructing an ice structure.
Erwin, R.E., *U.S. Patent Office. Patent.* Aug. 30, 1988, 6 col., USP-4,767,239, 10 refs.
Vehicles, Ice grinders, Ice makers, Cold weather construction, Ice (construction material), Ice islands, Design.

47-3636
Swing wheel snowthrower.
Friberg, N.J., et al, *U.S. Patent Office. Patent.* July 12, 1988, 10 col., USP-4,756,101, 16 refs.
Svoboda, S.J.
Snow vehicles, Stability, Snow removal, Blowing snow, Design, Traction.

47-3637
Optical precipitation detection and identification system using scintillation detection.
Wang, T.I., *U.S. Patent Office. Patent.* July 26, 1988, 14 col., USP-4,760,272, 6 refs.
Precipitation (meteorology), Remote sensing, Scintillation, Meteorological instruments, Electronic equipment, Infrared equipment, Ice detection, Snow optics, Classifications, Design.

47-3638
Device for comminuting small ice bodies.
Wessa, T., *U.S. Patent Office. Patent.* Aug. 9, 1988, 4 col. USP-4,762,282, 8 refs.
Ice grinders, Ice solid interface, Design.

47-3639
Icebreaking defense buoy.
Coleman, R.K., *U.S. Patent Office. Patent.* July 5, 1988, 4 col., USP-4,755,157, 13 refs.
Offshore structures, Protection, Floating structures, Moorings, Ice breaking, Design.

47-3640
Interfacial separator for concrete structures.
Dahowski, D.E., *U.S. Patent Office. Patent.* Apr. 5, 1988, 8 col., USP-4,735,395, 25 refs.
Concrete structures, Interfaces, Settlement (structural), Frost heave, Countermeasures, Relaxation (mechanics), Design.

47-3641
Water freezing enhancement for thermal storage brine tube.
Holowczenko, A., et al, *U.S. Patent Office. Patent.* July 19, 1988, 6 col., USP-4,757,690, 5 refs.
Schoch, S.A., Sibley, H.W.
Air conditioning, Storage tanks, Ice formation, Artificial nucleation, Pipes (tubes), Surface properties, Ice *(water storage), Heat recovery, Design.*

47-3642
De-icer for a transducer assembly.
Fox, C.D., *U.S. Patent Office. Patent.* July 19, 1988, 6 col., USP-4,757,718, 5 refs.
Engines, Equipment, Ice prevention, Vapor transfer, Thermal conductivity, Temperature control, Design.

47-3643
Track maintenance vehicle with vertically adjustable track conditioner implement, particularly a snow tiller apparatus.
Haug, W., *U.S. Patent Office. Patent.* Apr. 19, 1988, 6 col., USP-4,738,037, 7 refs.
Snow vehicles, Snow removal, Equipment, Tracked vehicles, Cold weather performance, Stability, Design.

47-3644
Character of clasts in glaciomarine sediments as an indicator of transport and depositional processes, Weddell and Lazarev Seas, Antarctica.
Kuhn, G., et al, *Journal of sedimentary petrology,* May 1993, 63(3), p.477-487, 31 refs.
Melles, M., Ehrmann, W.U., Hambrey, M.J., Schmiedl, G.
Pleistocene, Glacial geology, Marine deposits, Glacial deposits, Bottom sediment, Classifications, Sediment transport, Ice solid interface, Lithology, Antarctica—Weddell Sea.
The gravel component in marine sediments on the continental margin of Antarctica is almost entirely from transport by grounded ice, ice shelves, ice tongues, and icebergs. About 2000 gravel clasts from about 40 sites were examined for roundness, Zingg shape, and Krumbein sphericity. Surface characteristics, like faceting, striations, and other specific glacigenic shapes, were recorded together with lithology. The samples were from both shallow and deep waters along >1500 km of the antarctic margin bordering the eastern Weddell Sea and Lazarev Sea. In addition, onshore observations were made in ice-marginal areas at Schirmacher Oasis. Few systematic differences in clast shape in modern sediments could be detected among the various glaciological environments; variation in shape within a given environment is greater than that between different environments. Abrasion of clasts at the interface between glacier and bedrock, before transport into the ocean, is less important than in temperate regions. This reflects the cold thermal regime of antarctic glaciers, a view confirmed by the similarity in shape of debris from basal ice and from sandy basal tills at Schirmacher Oasis. More angular debris was recovered off grounded-ice margins in Coats Land, but given the absence of supraglacial sources, this debris seems to be the product of rock fracturing at a relatively dry frozen ice bed. More than half, and sometimes nearly all, the clasts are faceted. Faceting, roundness, and sphericity are independent of lithology. In contrast, striae on clasts are strongly dependent on lithology: few gneissic clasts have striae, but nearly half the clasts of fine-grained basic igneous or metavolcanic rocks are striated. Each area studied has a distinct population of rock types of limited variety, suggesting that deposition is predominantly from the nearest land-ice source, and that mixing of sediment with that from far-traveled icebergs is negligible. (Auth.)

47-3645
Opportunities to improve hydrologic data.
Dozier, J., *Reviews of geophysics,* Nov. 1992, 30(4), p.315-331, 44 refs.
Hydrology, Hydrologic cycle, Geophysical surveys, Remote sensing, Research projects, Air ice water interaction.

47-3646
Comments on "The density of natural ice accretions related to non-dimensional icing parameters" by K.F. Jones.
Levi, L., et al, *Royal Meteorological Society. Quarterly journal,* Apr. 1993, 119(511), MP 3240, p.599-609, 13 refs. Includes reply. For paper under comment see 44-3570.
Prodi, F., Jones, K.F.
Ice accretion, Meteorological factors, Hoarfrost, Cloud droplets, Ice density, Analysis (mathematics), Ice forecasting, Heat flux, Accuracy.

47-3647
Seasonal variations in dissolved inorganic nitrogen utilization in a subarctic Alaskan lake.
Gu, B.H., et al, *Archiv für Hydrobiologie,* 1993, 126(3), p.273-288, 53 refs.
Alexander, V.
Limnology, Plankton, Growth, Nutrient cycle, Subarctic landscapes, Water chemistry, Seasonal variations, Ice cover effect.

47-3648
Optical study of surface melting on ice.
Elbaum, M., et al, *Journal of crystal growth,* Apr. 1993, 129(3-4), p.491-505, 34 refs.
Lipson, S.G., Dash, J.G.
Ice physics, Ice melting, Water films, Ice vapor interface, Liquid phases, Wettability, Surface properties, Refractivity.

47-3649
Temperature dependence of the growth form of negative crystal in an ice single crystal and evaporation kinetics for its surfaces.
Furukawa, Y., et al, *Journal of crystal growth,* Apr. 1993, 129(3-4), p.571-581, 17 refs.
Kohata, S.
Ice physics, Ice crystal growth, Ice crystal structure, Ice vapor interface, Evaporation, Temperature effects, Ice sublimation.

47-3650
Identification and yield of carbonic acid and formaldehyde in irradiated ices.
DelloRusso, N., et al, *Journal of geophysical research,* Mar. 25, 1993, 98(E3), p.5505-5510, 18 refs.
Khanna, R.K., Moore, M.H.
Ice physics, Extraterrestrial ice, Simulation, Ice crystal optics, Infrared radiation, Radiation absorption, Ice sublimation, Chemical composition, Spectra.

47-3651
Temperature dependence of (nu)3 and (nu)4 bandwidths and complex refractive indices for crystalline methane.
Ngoh, M.A., et al, *Journal of geophysical research,* Mar. 25, 1993, 98(E3), p.5511-5515, 16 refs.
Khanna, R.K., Fox, K.
Extraterrestrial ice, Simulation, Cryogenics, Hydrocarbons, Infrared radiation, Radiation absorption, Spectra, Temperature effects, Refractivity.

47-3652
Evidence for an antarctic winter coastal polynya.
Anderson, P.S., *Antarctic science,* June 1993, 5(2), p.221-226, 16 refs.
Polynyas, Spaceborne photography, Image processing, Meteorological data, Ice shelves, Antarctica—Brunt Ice Shelf, Antarctica—Weddell Sea.
Satellite infrared imagery and meteorological data suggest the presence of winter open water (polynya) in the coastal pack ice to the north and west of the Brunt Ice Shelf. Satellite imagery, although only available for a limited number of occasions, provided evidence for the polynya during the austral winter of 1991. Indirect meteorological observations from Halley Station provide very strong supporting evidence of open water to the west of the ice shelf in previous years. (Auth.)

47-3653
Calculating the circulation and thermobarometric background in long range meteorological forecasts. [K uchetu tsirkuliatsionnogo i termobaricheskogo fona v dolgosrochnykh meteorologicheskikh prognozakh],
Vinogradov, N.D., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1989, Vol.416, p.6-11, In Russian. 8 refs.
Atmospheric circulation, Atmospheric pressure, Long range forecasting, Synoptic meteorology, Climatic changes, Weather forecasting, Polar atmospheres.

47-3654
Nature of the annual variation in the circumpolar eddy and its calculation in weather forecasting in the Arctic. [Kharakter vnutrigodovoĭ izmenchivosti tsirkumpoliarnogo vikhria i uchet ee v prognozakh pogody po Arktike],
Dmitriev, A.A., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1989, Vol.416, p.12-25, In Russian. 6 refs.
Atmospheric circulation, Atmospheric pressure, Polar atmospheres, Weather forecasting.

47-3655
Objectivization of the analysis and diagnosis of near *surface and high altitude mean ESP fields.* [Ob"ektivizatsiia analiza i diagnoza prizemnykh i vysotnykh srednikh poleĭ ESP],
Sel'tser, P.A., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1989, Vol.416, p.26-42, In Russian. 7 refs.
Synoptic meteorology, Atmospheric circulation, Polar atmospheres, Statistical analysis.

47-3656
Characteristics of synoptic processes in homogeneous groups of macro-changes in the Arctic. [Osobennosti sinopticheskikh protsessov v gruppakh odnorodnykh makropreobrazovaniĭ v Arktike],
Kuznetsov, A.V., et al, *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1989, Vol.416, p.43-52, In Russian. 4 refs.
Mozalevskaia, M.V., Sharshun, N.L.
Synoptic meteorology, Atmospheric disturbances, Polar atmospheres, Statistical analysis.

47-3657
Numerical experiment in hydrodynamic forecasting of pressure fields 5 days in advance in the Arctic, based on an atmospheric processes analogy. [Chislennyĭ eksperiment gidrodinamicheskogo prognoza poleĭ davleniia na 5 sutok po Arktike s uchetom analogii atmosfernykh protsessov],
Evseev, M.P., et al, *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1989, Vol.416, p.53-65, In Russian. 5 refs.
Rudiaev, A.S.
Atmospheric pressure, Polar atmospheres, Long range forecasting, Weather forecasting, Mathematical models, Statistical analysis.

47-3658
High-latitude zonal index as an informative quantitative indicator of large-scale hydrometeorological processes in the Arctic. [Vysokoshirotnyĭ zonal'nyĭ indeks kak informativnyĭ kolichestvennyĭ pokazatel' krupnomasshtabnykh gidrometeorologicheskikh protsessov v Arktike],
Dmitriev, A.A., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1989, Vol.416, p.66-75, In Russian. 8 refs.
Long range forecasting, Synoptic meteorology, Weather forecasting.

47-3659
Quantitative characteristics of mid-latitude air exchange during basic types of transformations. [Kolichestvennaia kharakteristika mezhshirotnogo vozdukhoobmena pri osnovnykh tipovykh preobrazovaniiakh].
Sel'tser, P.A., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1989, Vol.416, p.76-87, In Russian. 1 ref.
Atmospheric circulation, Polar atmospheres, Seasonal variations, Transformations.

47-3660
Diagnosis and forecasting of significant 10-year anomalies in air temperatures in the western part of the Arctic during the spring and fall, with the aid of a spectral hydrodynamic model. [O diagnoze i prognoze znachitel'nykh dekadnykh anomaliĭ temperatury vozdukha v zapadnoĭ chasti Arktiki vesnoĭ i osen'iu s pomoshch'iu spektral'noĭ gidrodinamicheskoĭ modeli].
Grakhovskiĭ, G.N., et al, *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1989, Vol.416, p.88-96, In Russian. 6 refs.
Evseev, M.P.
Air temperature, Mathematical models, Atmospheric circulation, Weather forecasting, Temperature variations.

47-3661
Diagnosis of large-scale reconstructions in the troposphere of the Northern Hemisphere. [Diagnoz krupnomasshtabnykh perestroek v troposfere severnogo polushariia].
Kurazhov, V.K., et al, *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1989, Vol.416, p.97-103, In Russian. 13 refs.
Koshkin, A.G.
Polar atmospheres, Atmospheric circulation, Analysis (mathematics).

47-3662
Manifestation of intensive latitudinal and meridional air exchange in the northern hemisphere in the nature of atmospheric processes in the Arctic. [Proiavlenie intensivnosti shirotnogo i meridional'nogo vozdukhoobmena severnogo polushariia v kharaktere atmosfernykh protsessov v Arktike].
Sel'tser, P.A., et al, *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1989, Vol.416, p.104-112, In Russian. 6 refs.
Dmitriev, A.A.
Polar atmospheres, Atmospheric circulation.

47-3663
Using hydrodynamic surface fields at a geopotential of 500 gPa for medium-range forecasting of a surface pressure field. [Ispol'zovanie gidrodinamicheskikh poleĭ poverkhnosti 500 gPa dlia prognoza prizemnogo polia davleniia na srednie sroki].
Baranov, G.I., et al, *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1989, Vol.416, p.113-117, In Russian. 2 refs.
Chaĭkina, S.A.
Hydrodynamics, Atmospheric pressure, Weather forecasting, Polar atmospheres, Mathematical models.

47-3664
Dependence of the formation of anomalies in air temperature above arctic seas during the autumn period on the H500 field. [Zavisimost' formirovaniia anomaliĭ temperatury vozdukha nad arkticheskimi moriami v osenniĭ period ot polia H500].
Korzhikov, A.IA., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1989, Vol.416, p.122-127, In Russian. 5 refs.
Air temperature, Air water interactions, Temperature variations, Polar atmospheres.

47-3665
Analyzing the thermal effect of the Atlantic on variation in the barometric field during winter. [Otsenka teplovogo vliianiia Atlantiki na izmenchivost' baricheskogo polia v zimniĭ period].
Vangengeĭm, T.G., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1989, Vol.416, p.128-137, In Russian. 19 refs.
Atmospheric pressure, Temperature effects, Air water interactions.

47-3666
Some climatic characteristics of precipitation in the Asian Arctic for medium-range weather forecasting. [Nekotorye klimaticheskoe kharakteristiki osadkov v aziatskoĭ chasti Arktiki dlia tseleĭ srednesrochnogo prognoza pogody].
Kuchin, V.A., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1989, Vol.416, p.138-147, In Russian. 8 refs.
Precipitation (meteorology), Weather forecasting, Statistical analysis, Climatic factors.

47-3667
Static stability parameter and the variation of barometric formations. [Parametr staticheskoĭ ustoichivosti i peremeshchenie baricheskikh obrazovaniĭ].
Golev, D.A., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1989, Vol.416, p.148-151, In Russian. 4 refs.
Atmospheric pressure, Polar atmospheres, Weather forecasting.

47-3668
Processes that block zonal flow in the atmosphere. [O protsessakh blokirovaniia zonal'nykh techeniĭ v atmosfere].
Tsvetkov, A.S., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1989, Vol.416, p.152-157, In Russian. 2 refs.
Air flow, Atmospheric circulation, Polar atmospheres, Atmospheric disturbances.

47-3669
Conditions for formation of significant anomalies in pressure and air temperature during December-February. [Usloviia formirovaniia krupnykh anomaliĭ davleniia i temperatury vozdukha v dekabre-fevrale].
Vangengeĭm, T.G., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1989, Vol.416, p.158-162, In Russian. 8 refs.
Air temperature, Atmospheric pressure, Polar atmospheres.

47-3670
Problem of climatic standards of temperature and air pressure in the Northern Hemisphere. [K voprosu o klimaticheskikh normakh temperatury i davleniia vozdukha severnogo polushariia].
Bolotinskaia, M.Sh., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1989, Vol.416, p.163-169, In Russian. 12 refs.
Air temperature, Atmospheric pressure, Polar atmospheres.

47-3671
American arctic lichens. 1. The macrolichens.
Thomson, J.W., New York, Columbia University Press, 1984, 504p., Refs. passim.
Lichens, Tundra, Forest tundra, Plant ecology, Biogeography.

47-3672
Permafrost bibliography update 1988-1992.
Brennan, A.M., ed, *World Data Center A for Glaciology. Glaciological data. Report*, May 1993, GD-26, 401p., Contains over 3000 citations.
Permafrost, Frozen ground, Bibliographies.

47-3673
Polar low dynamics.
Montgomery, M.T., et al, *Journal of the atmospheric sciences*, Dec. 15, 1992, 49(24), p.2484-2505, 75 refs.
For another version see 47-2373.
Farrell, B.F.
Atmospheric physics, Atmospheric circulation, Atmospheric disturbances, Turbulent boundary layer, Theories, Mathematical models.

47-3674
Hail growth hysteresis.
Johnson, D.B., et al, *Journal of the atmospheric sciences*, Dec. 15, 1992, 49(24), p.2525-2532, 33 refs.
Rasmussen, R.M.
Cloud physics, Hailstone growth, Snow pellets, Phase transformations, Ice water interface, Water content, Spongy ice, Ice density.

47-3675
Sludges from cold regions lagoons.
Schneiter, R.W., et al, *Water environment research*, Mar.-Apr. 1993, 65(2), MP 3241, p.146-155, 37 refs.
Middlebrooks, E.J., Sletten, R.S., Reed, S.C.
Waste treatment, Water treatment, Ponds, Cold weather operation, Sludges, Chemical composition, Sedimentation, Temperature effects.

47-3676
Front Range blizzard of 1990. Part 1: synoptic and mesoscale structure.
Marwitz, J.D., et al, *Monthly weather review*, Feb. 1993, 121(2), p.402-415, 18 refs.
Toth, J.
Snowstorms, Precipitation (meteorology), Fronts (meteorology), Synoptic meteorology, Topographic effects, Wind direction, Ice melting, Cooling.

47-3677
Analysis of strong wind events simulated in a GCM near Casey in the Antarctic.
Murphy, B.F., et al, *Monthly weather review*, Feb. 1993, 121(2), p.522-534, 24 refs.
Simmonds, I.
Wind (meteorology), Ice cover effect, Ice air interface, Wind direction, Synoptic meteorology, Topographic effects, Atmospheric pressure, Simulation, Antarctica.

47-3678
Distribution of enteric bacteria in antarctic seawater surrounding a sewage outfall.
McFeters, G.A., et al, *Water research*, Apr. 1993, 27(4), p.645-650, 19 refs.
Barry, J.P., Howington, J.P.
Water pollution, Soil pollution, Sewage, Bacteria, Sea ice, Antarctica—McMurdo Station.
The spatial distribution and movement of the sewage plume from McMurdo Station was investigated in the ocean under the early summer sea ice. Ocean currents were also examined to determine their effect on the movement of the plume. Samples of sea water were obtained via holes drilled through the ice and analyzed for coliform bacteria. Coliform densities in ice cores were also determined. Densities of coliform bacteria as high as 100,000/100 ml were found along the *c.* 1 km shoreline of McMurdo Station, and the plume extended 200-300 m seaward. The relocation of the outfall from a surface configuration to the subsurface (11 m deep) had little influence on the distribution of the plume that sometimes reached the seawater intake station, 400 m to the south. Ocean current measurements in the study area confirmed that, while the prevailing advection was to the north and away from the intake area, episodic reversals of flow at some current meter stations coincided with pulses of sewage that moved to the intake. These findings support the use of bacterial indicators as one means to map the distribution and movement of recent sewage contamination in cold (-1.8 C) sea water, and provide evidence that the disposal and movement of domestic wastes deserves attention in coastal polar environments. (Auth.)

47-3679
Analysis and interpretation of patterns within and between hydroclimatological time series in an alpine glacier basin.
Gurnell, A.M., et al, *Earth surface processes and landforms*, Dec. 1992, 17(8), p.821-839, 18 refs.
Clark, M.J., Hill, C.T.
Alpine landscapes, River basins, Mountain glaciers, Glacier ablation, Glacial hydrology, Meltwater, Climatic factors, Runoff forecasting, Periodic variations.

47-3680
Ways to help bridges and deicers coexist.
Miller, W.L., *Better roads*, Feb. 1993, 63(2), p.18-19.
Winter maintenance, Bridges, Ice removal, Salting, Corrosion, Countermeasures.

47-3681
How to design snow fences.
Shelquist, K., *Better roads*, Feb. 1993, 63(2), p.22.
Road maintenance, Winter maintenance, Snow fences, Blowing snow, Design.

47-3682
Study finds 88.3% crash reduction after deicing. *Better roads*, Jan. 1993, 63(1), p.22.
Road icing, Winter maintenance, Salting, Accidents, Safety, Ice removal, Statistical analysis, Cost analysis.

47-3683
How Arizona handles winter roads. *Better roads*, Apr. 1993, 63(4), p.19.
Road maintenance, Winter maintenance, Snow removal, Salting.

47-3684
Defect theory for the glass transition and residual entropy of hyperquenched water.
Johari, G.P., *Journal of chemical physics*, May 1, 1993, 98(1), p.7324-7329, 40 refs.
Water structure, Molecular structure, Molecular energy levels, Hydrogen bonds, Thermodynamic properties, Phase transformations, Defects, Low temperature research, Statistical analysis.

47-3685
Propagation of M2 waves in the Arctic Ocean. [Rasprostranenie volny M2 v Severnom Ledovitom Okeane]
Proshutinskiĭ, A.IU., et al, *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1991, Vol.424, p.6-13, In Russian. 11 refs.
Dmitriev, N.E., Mandel', S.Z.
Water waves, Ocean waves, Hydrodynamics, Mathematical models, Ice cover effect.

47-3686
Calculating tidal movements in the Kara Sea. [K raschetu prilivnykh dvizheniĭ vody v Karskom more]
Dmitriev, N.E., et al, *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1991, Vol.424, p.14-21, In Russian. 7 refs.
Proshutinskiĭ, A.IU.
Tidal currents, Ocean currents, Mathematical models, Ocean waves, USSR—Kara Sea, Arctic Ocean.

47-3687
Parametrization of the coefficient of vertical turbulent viscosity in modeling of water circulation in arctic seas. [Parametrizatsiia koeffitsienta vertikal'noĭ turbulentnoĭ viazkosti pri modelirovanii tsirkuliatsii vod arkticheskikh moreĭ]
Kulakov, M.IU., et al, *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1991, Vol.424, p.22-33, In Russian. 7 refs.
Pavlov, V.K.
Mathematical models, Ocean currents, Turbulent exchange, Turbulent flow, Viscosity.

47-3688
Problem of water circulation in the Kara Sea. [K voprosu o tsirkuliatsii vod Karskogo moria]
Doronin, N.IU., et al, *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1991, Vol.424, p.34-41, In Russian. 10 refs.
Kuznetsov, V.L., Proshutinskiĭ, A.IU.
Ocean currents, Seasonal variations, Salt water, USSR—Kara Sea.

47-3689
Thermohaline water circulation in the Norwegian energy-active zone during spring 1987. [Termokhalinnaia tsirkuliatsiia vod Norvezhskoĭ energoaktivnoĭ zony vesnoĭ 1987 g.]
Proshutinskiĭ, A.IU., et al, *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1991, Vol.424, p.42-49, In Russian.
Usatenko, S.G.
Salt water, Ocean currents, Ice cover effect, Norwegian Sea, Greenland Sea.

47-3690
Problem of the baroclinic instability of integral circulation of waters in the Norwegian Sea. [K voprosu o baroklinnoĭ neustoĭchivosti integral'noĭ tsirkuliatsii vod Norvezhskogo moria]
Pavlov, V.K., et al, *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1991, Vol.424, p.50-58, In Russian. 4 refs.
Ivanov, M.V.
Ocean currents, Ocean waves, Mathematical models, Norwegian Sea.

47-3691
Analysis of factors determining the circulation of waters in the Chukchi Sea, based on data from a test area with heated buoy stations. [Otsenka faktorov, opredelaiiushchikh tsirkuliatsiiu vod Chukotskogo moria, po dannym poligona PBS]
Kulakov, M.IU., et al, *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 991, Vol.424, p.59-64, In Russian.
Pavlov, V.K.
Ocean currents, Analysis (mathematics), Turbulent exchange, Chukchi Sea.

47-3692
Predictability of large-scale thermohaline anomalies in surface waters of the arctic basin. [Predskazuemost' krupnomasshtabnykh termokhalinnykh anomaliĭ poverkhnostnykh vod Arkticheskogo basseina]
Artem'ev, A.O., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1991, Vol.424, p.65-75, In Russian. 11 refs.
Salt water, Surface waters, Analysis (mathematics), Salinity, Water temperature, Forecasting, Arctic Ocean.

47-3693
Probability method of forecasting surge level oscillations in the example of the East Siberian Sea. [Veroiatnostnyĭ metod prognoza sgonno-nagonnykh kolebaniĭ urovnia na primere Vostochno-Sibirskogo moria]
Andriushchenko, V.I., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1991, Vol.424, p.76-85, In Russian. 3 refs.
Sea level, Forecasting, Analysis (mathematics), USSR—East Siberian Sea.

47-3694
Methodical plan for compiling hydrometeorological forecasts and results of its use. [Metodicheskaia skhema sostavleniia gidrometeorologicheskikh prognozov i rezul'taty ee ispol'zovaniia]
Ashik, I.M., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1991, Vol.424, p.86-95, In Russian. 12 refs.
Hydrology, Ice cover effect, Long range forecasting, Mathematical models, Weather forecasting.

47-3695
Using piecewise polynomial smoothing in statistical series analysis. [Primenenie kusochno-polinomial'nogo sglazhivaniia pri analize statisticheskikh riadov]
Lashov, E.S., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1991, Vol.424, p.96-100, In Russian. 3 refs.
Analysis (mathematics), Water level, Lake water.

47-3696
Estimates of parameters of vertical turbulent exchange in the Chukchi Sea based on observational data. [Nekotorye otsenki parametrov vertikal'nogo turbulentnogo obmena v Chukotskom more po dannym nabliudeniĭ]
Pavlov, V.K., et al, *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1991, Vol.424, p.101-106, In Russian. 3 refs.
Kulakov, M.IU., Sen'ko, N.P.
Turbulent exchange, Analysis (mathematics), Ocean currents, Chukchi Sea.

47-3697
Method of carrying out profiling observations of currents with the aid of moored, heated buoy stations (PPBS). [Metod provedeniia profil'nykh nabliudeniĭ za techeniiami s pomoshch'iu priviaznykh pritoplennykh buĭkovykh stantsiĭ (PPBS)]
Pavlov, V.K., et al, *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1991, Vol.424, p.107-116, In Russian. 3 refs.
Papin, V.A., Sen'ko, N.P.
Ocean currents, Channels (waterways).

47-3698
Some results of the arctic expedition of the scientific research vessel *Akademik Shokal'skiĭ*. [Nekotorye itogi arkticheskikh ekspeditsiĭ na NIS *Akademik Shokal'skiĭ*]
Dunaev, A.L., et al, *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1991, Vol.424, p.117-121, In Russian.
Pavlov, V.K.
Expeditions, Hydrology.

47-3699
Fluctuations in the water level of the Yenisey estuary during the summer-fall navigation period. [Kolebaniia urovnei vody Eniseĭskoĭ ust'evoĭ oblasti v letne-osenniĭ navigatsionnyĭ period]
Ivanova, A.A., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1991, Vol.424, p.122-127, In Russian. 11 refs.
Water level, Rivers, Navigation, USSR—Yenisey River.

47-3700
Analysis of snow loads due to drifting on multilevel roofs.
Speck, R.S., Jr., Troy, NY, Rensselaer Polytechnic Institute, 1984, 92p., M.Eng. thesis. 30 refs.
Snow loads, Roofs, Snowdrifts, Building codes, Design criteria, Statistical analysis, Mathematical models.

47-3701
On the world's ice ages and changing environments.
Eronen, M., et al, *Helsinki. Voimayhtiöiden Ydinjätetoimikunta (Nuclear Waste Commission of Finnish Power Companies). Report*, July 1990, YJT-90-13, 72p., DE93-602354, With Finnish summary. Refs. p.62-72.
Olander, H.
Ice age theory, Glaciation, Paleoclimatology, Global change, Continental drift, Geochronology.

47-3702
Spatial analysis of avalanche hazards. First developments of a decision support system. [L'analyse spatiale des risques d'avalanches. Premiers développements d'un environment informatique d'aide à la décision]
Bolognesi, R., Grenoble, Université Joseph Fourier, 1991, 217p., Ph.D. thesis. In French with English summary. Refs. p.177-192.
Avalanche forecasting, Avalanche modeling, Computerized simulation, Computer programs, Data processing, Statistical analysis.

47-3703
Characterization of massive ground ice at Yaya Lake, Northwest Territories using radar stratigraphy techniques.
Robinson, S.D., et al, *Canada. Geological Survey. Current Research, Part B. Paper*, 1993, No.93-1B, p.23-32, With French summary. 20 refs.
Moorman, B.J., Judge, A.S., Dallimore, S.R.
Ground ice, Fossil ice, Glacial deposits, Thermokarst lakes, Ice detection, Subsurface investigations, Radar echoes, Canada—Northwest Territories—Mackenzie River Delta.

47-3704
Characteristics of an ice-scoured river bank near Keele River confluence, Mackenzie Valley, Northwest Territories.
Brooks, G.R., *Canada. Geological Survey. Current Research, Part B. Paper*, 1993, No.93-1B, p.39-43, With French summary. 10 refs.
River ice, Ice scoring, Banks (waterways), Ice erosion, Slope stability, Canada—Northwest Territories—Mackenzie River.

47-3705
Preliminary study of the surficial geology of Virden area, southwestern Manitoba.
Sun, S., *Canada. Geological Survey. Current Research, Part B. Paper*, 1993, No.93-1B, p.57-61, With French summary. 17 refs.
Glaciation, Glacial geology, Glacial lakes, Moraines, Quaternary deposits, Geochronology, Canada—Manitoba.

47-3706
Quaternary geology of the Bissett area, southeastern Manitoba: applications to drift prospecting.
Henderson, P.J., *Canada. Geological Survey. Current Research, Part B. Paper*, 1993, No.93-1B, p.63-69, With French summary. 21 refs.
Glacial geology, Quaternary deposits, Exploration, Glaciation, Glacial deposits, Minerals, Geochronology, Canada—Manitoba.

47-3707
Degree-day glacier mass balance modelling with applications to glaciers in Iceland and Norway.
Jóhannesson, T., et al, Nordic Hydrological Programme. NHP report, No.33, Reykjavik, 1993, 40p., 28 refs.
Sigurdsson, O., Laumann, T., Kennett, M.
Glacier mass balance, Glacier oscillation, Mountain glaciers, Degree days, Global warming, Computerized simulation, Mathematical models, Iceland, Norway.

47-3708
Marine geologic investigations of Disenchantment Bay, Alaska, after breakup of 1986 Hubbard Glacier ice dam.
Carlson, P.R., et al, *U.S. Geological Survey. Open-file report*, 1992, No.92-706, MP 3242, 41p., 24 refs.
Powell, R.D., Cowan, E.A., Lawson, D.E.
Ice dams, Lake bursts, Glacier oscillation, Bottom sediment, Bottom topography, Coastal topographic features, Glacial lakes, Moraines, Subsurface investigations, United States—Alaska—Hubbard Glacier.

47-3709
Model ice forces on an upward breaking multifaceted cone.
Lau, M., et al, *National Research Council Canada. Institute for Marine Dynamics. Test report*, Apr. 1993, Tr-1993-07, 52p. + appends., 8 refs.
Tucker, J.R., Jones, S.J., Muggeridge, D.B.
Ice loads, Ice solid interface, Ice cover strength, Ice pressure, Offshore structures, Pressure ridges, Ice floes, Environmental tests, Mathematical models.

47-3710
Studies on the process of frost damages to stone remains under cold environments and its preservation methods.
Akagawa, S., *Shimizu technical research bulletin*, Mar. 1993, No.12, p.23-40, 31 refs. For another version see 46-4590.
Frost weathering, Frost action, Frost heave, Frozen rock strength, Soil freezing, Frost protection.

47-3711
Yukon Territory snow survey bulletin and water supply forecast, May 15, 1993.
Canada. Indian and Northern Affairs. Water Resources Division, Whitehorse, 1993, 27p.
Snow surveys, Runoff forecasting, Snow depth, Snow water equivalent, Stream flow, Canada—Yukon Territory.

47-3712
Glacier mass balance bulletin. Bulletin No.2 (1990-1991).
World Glacier Monitoring Service, Zurich, 1993, 73p.
Haeberli, W., ed, Herren, E., ed, Hoelzle, M., ed.
Glacier mass balance, Glacier oscillation, Glacier surveys, Mountain glaciers.

47-3713
Stratospheric ozone variations in the Northern and Southern Hemisphere during the period 1957-1990.
Xanthakis, J., et al, *Earth, moon, and planets*, Feb. 1993, 60(2), p.109-125, 10 refs.
Poulakos, C., Zerefos, C.S.
Atmospheric composition, Meteorological data, Stratosphere, Ozone, Periodic variations.
Fluctuations and periodicities of the total atmospheric ozone layer for the period 1957-1990 are studied. Monthly total ozone data from 32 ground-based stations have been analyzed. It is shown that the maxima and the minima of the monthly values of total ozone for each year and for the entire period in question range from Mar till July and from Sep till Dec respectively. Periodicities of 3, 4 and 6 months have been revealed. Finally, the maxima and minima of the total ozone data were examined, and their variations analytically expressed. With the help of an algebraic formula, the observed monthly ozone variations are represented with an accuracy of 97%. (Auth. mod.)

47-3714
Identification of deep groundwater discharge areas in the Boggy Creek catchment, southeastern Manitoba, using excess aqueous helium.
Stephenson, M., et al, *Canadian journal of earth sciences*, Dec. 1992, 29(12), p.2640-2652, With French summary. 32 refs.
Schwartz, W.J., Evenden, L.D., Bird, G.A.
Watersheds, Hydrogeology, Limnology, Sampling, Chemical analysis, Ice cover effect, Ground water, Seepage.

47-3715
Sedimentary record and Neoglacial history of Tide Lake, northwestern British Columbia.
Clague, J.J., et al, *Canadian journal of earth sciences*, Nov. 1992, 29(11), p.2383-2396, With French summary. 15 refs.
Mathews, W.H.
Pleistocene, Quaternary deposits, Lacustrine deposits, Stratigraphy, Glacier melting, Radioactive age determination, Sediment transport, Glacier oscillation, Moraines.

47-3716
Observations of postglacial uplift at Churchill, Manitoba.
Tushingham, A.M., *Canadian journal of earth sciences*, Nov. 1992, 29(11), p.2418-2425, With French summary. 39 refs.
Isostasy, Ice sheets, Pleistocene, Glacier melting, Sea level, Tides, Rheology.

47-3717
Episodic fluxes of methane from subarctic fens.
Windsor, J., et al, *Canadian journal of soil science*, Nov. 1992, 72(4), p.441-452, With French summary. 24 refs.
Moore, T.R., Roulet, N.T.
Wetlands, Peat, Subarctic landscapes, Soil air interface, Natural gas, Vapor transfer, Seasonal variations, Seasonal freeze thaw, Water level.

47-3718
Snow crystals, natural and man made.
Mason, B.J., *Contemporary physics*, 1992, 33(4), p.227-243, 19 refs.
Snow physics, Snow crystal structure, Snow crystal growth, Ice nuclei, Theories, Phase transformations, Falling snow, Artificial nucleation, Analysis (mathematics).

47-3719
Urban snow dump quality and pollutant reduction in snowmelt by sedimentation.
Droste, R.L., et al, *Canadian journal of civil engineering*, 1993, 20(1), p.9-21, With French summary. 16 refs.
Johnston, J.C.
Snow disposal, Snowmelt, Runoff, Snow impurities, Water pollution, Chemical composition, Environmental impact, Sedimentation, Waste treatment.

47-3720
Numerical computation of river ice jams.
Beltaos, S., *Canadian journal of civil engineering*, 1993, 20(1), p.88-99, With French summary. 28 refs.
River ice, River flow, Ice jams, Ice forecasting, Water level, Ice water interface, Seepage, Grounded ice, Mathematical models.

47-3721
State of the arctic environment: updated draft proposal for AMAP.
Reiersen, L.O., *Deutsche hydrographische Zeitschrift*, 1991-92, 44(5-6), p.391-403, With German summary.
Environmental protection, Monitors, Climatology, Organizations, International cooperation.

47-3722
Shear-induced folding in Arsia Mons aureole: evidence for low-latitude Martian glaciations.
Anguita, F., et al, *Earth, moon, and planets*, Oct. 1992, 59(1), p.11-22, 21 refs.
Moreno, F.
Extraterrestrial ice, Mars (planet), Glaciation, Paleoclimatology, Landforms, Moraines, Tectonics.

47-3723
Empirical comparison of evidential reasoning, linear discriminant analysis, and maximum likelihood algorithms for alpine land cover classification.
Peddle, D.R., *Canadian journal of remote sensing*, Jan. 1993, 19(1), Canadian Symposium on Remote Sensing, 15th, Toronto, Canada, June 1-4, 1992, p.31-44, With French summary. 48 refs.
Alpine landscapes, Remote sensing, Classifications, Data processing, Image processing, Computer programs, Permafrost surveys, Permafrost distribution, Accuracy.

47-3724
Scale and remotely sensed data for change detection in the James Bay, Ontario, coastal wetlands.
McNairn, H., et al, *Canadian journal of remote sensing*, Jan. 1993, 19(1), Canadian Symposium on Remote Sensing, 15th, Toronto, Canada, June 1-4, 1992, p.45-49, With French summary. 12 refs.
Protz, R., Duke, C.
Wetlands, Littoral zone, Spaceborne photography, Classifications, Image processing, Climatic changes, Environmental impact, Ecology, Accuracy.

47-3725
Mapping partial snowcover during the melt season using C-band SAR imagery.
Donald, J.R., et al, *Canadian journal of remote sensing*, Jan. 1993, 19(1), Canadian Symposium on Remote Sensing, 15th, Toronto, Canada, June 1-4, 1992, p.68-76, With French summary. 30 refs.
Snow cover distribution, Imaging, Snowmelt, Synthetic aperture radar, Airborne radar, Microwaves, Sensor mapping, Classifications, Accuracy.

47-3726
Study of the North Water polynya using passive microwave and infrared imagery.
Press, M.J., et al, *Canadian journal of remote sensing*, Jan. 1993, 19(1), Canadian Symposium on Remote Sensing, 15th, Toronto, Canada, June 1-4, 1992, p.92-101, With French summary. 32 refs.
Blais, R.
Polynyas, Sea ice distribution, Wind factors, Air ice water interaction, Spaceborne photography, Image processing, Radiometry, Infrared reconnaissance.

47-3727
Growth habits and growth rates of snow crystals.
Mason, B.J., *Royal Society of London. Proceedings A*, 1993, Vol.441, p.3-16, 18 refs.
Snow physics, Snow crystal growth, Snow crystal structure, Temperature effects, Snow air interface, Nucleation rate, Vapor diffusion, Analysis (mathematics).

47-3728
Methanesulfonic acid in coastal antarctic snow related to sea-ice extent.
Welch, K.A., et al, *Geophysical research letters*, Mar. 19, 1993, 20(6), p.443-446, 26 refs.
Mayewski, P.A., Whitlow, S.I.
Polar atmospheres, Sea ice distribution, Climatic changes, Ice cores, Atmospheric composition, Biomass, Snow composition, Correlation, Antarctica—Ross Sea, Antarctica—Newall Glacier.
Proxy records of biogenic sulfur gas obtained from ice cores suggest that variability in marine biogenic sulfur emissions may reflect changes in climate. Increased sea-ice extent has previously been proposed as one cause of relatively high methanesulfonic acid (MSA) in glacial-age ice core samples. In this paper, MSA, one of the oxidation products of the biogenic sulfur gas dimethylsulfide as recovered from snowpit samples from a coastal site in southern Victoria Land, is analyzed. Time series of MSA correlate significantly with the longest continuous record available of southern ocean sea-ice extent (two decades). (Auth. mod.)

47-3729
High ice crystal production in winter cumuli over the Japan Sea.
Takahashi, T., *Geophysical research letters*, Mar. 19, 1993, 20(6), p.451-454, 23 refs.
Marine atmospheres, Cloud physics, Aerial surveys, Ice crystal growth, Ice crystal collision, Snow pellets, Particle size distribution, Meteorological factors.

47-3730
Singularity of liquid water—data analysis and modeling.
Sato, H., *Fluid phase equilibria*, Nov. 25, 1992, Vol.79, Symposium on Thermophysical Properties, 11th, Boulder, CO, June 23-27, 1991. Proceedings, Pt.3. Edited by J.F. Ely, p.89-101, 28 refs.
Water, Liquid phases, Fluid dynamics, Thermodynamic properties, Temperature effects, Supercooling, Density (mass/volume), Mathematical models.

47-3731
Inference of cirrus cloud properties using satellite-observed visible and infrared radiances. Part 1: parameterization of radiance fields.
Minnis, P., et al, *Journal of the atmospheric sciences*, May 1, 1993, 50(9), p.1279-1304, 46 refs.
Liou, K.N., Takano, Y.
Cloud cover, Cloud physics, Radiometry, Ice crystal optics, Light scattering, Radiance, Remote sensing, Cloud height indicators, Mathematical models.

47-3732
Inference of cirrus cloud properties using satellite-observed visible and infrared radiances. Part 2: verification of theoretical cirrus radiative properties.
Minnis, P., et al, *Journal of the atmospheric sciences*, May 1, 1993, 50(9), p.1305-1322, 20 refs.
Heck, P.W., Young, D.F.
Cloud cover, Cloud physics, Cloud height indicators, Radiance, Light scattering, Radiometry, Spaceborne photography, Ice crystal optics, Correlation.

47-3733
Dependence of the thickness of non-freezing water interlayers on the external pressure.
Bardasov, S.A., et al, *Colloid journal of the Russian Academy of Sciences*, Sep. 1992, 54(2), p.160-166, Translated from Kolloidnī zhurnal. 14 refs.
Sobolev, V.D., Churaev, N.V.
Colloids, Porous materials, Ice water interface, Phase transformations, Water films, Thickness, Unfrozen water content, Temperature effects, Atmospheric pressure.

47-3734
Optical techniques for the measurement of frazil ice.
Pegau, W.S., et al, *SPIE-The International Society for Optical Engineering. Proceedings*, 1992, Vol.1750, Ocean optics 11. Edited by G.D. Gilbert, p.498-507, 8 refs.
Paulson, C.A., Zaneveld, J.R.V.
DLC GC177.6.O27
Sea ice, Frazil ice, Ice detection, Sensors, Infrared equipment, Radiation absorption, Ice crystal optics, Backscattering, Design.

47-3735
Measuring the point spread function of sea ice *in situ*.
Voss, J.M., et al, *SPIE-The International Society for Optical Engineering. Proceedings*, 1992, Vol.1750, Ocean optics 11. Edited by G.D. Gilbert, p.517-526, 5 refs.
Honey, R.C., Gilbert, G.D., Buntzen, R.R.
DLC GC177.6.O27
Sea ice, Optical properties, Light transmission, Scattering, Diffusion, Albedo, Cold weather tests, Subglacial observations, Photographic techniques.

47-3736
Influence of particulate matter on spectral irradiance fields and energy transfer in the eastern Arctic Ocean.
Fritsen, C.H., et al, *SPIE-The International Society for Optical Engineering. Proceedings*, 1992, Vol.1750, Ocean optics 11. Edited by G.D. Gilbert, p.527-541, 29 refs.
Iturriaga, R., Sullivan, C.W.
DLC GC177.6.O27
Sea ice, Ice composition, Particles, Radiance, Ice cover effect, Optical properties, Subglacial observations, Radiation absorption, Ice melting, Ice water interface.

47-3737
Ice mechanics—1993.
Dempsey, J.P., ed. Applied Mechanics Division, AMD-Vol.163, New York, American Society of Mechanical Engineers, 1993, 281p., Refs. passim. Presented at the first joint ASCE/ASME/SES meeting, Charlottesville, VA, June 6-9, 1993, MEET'N'93. For individual papers see 47-3738 through 47-3760.
Bažant, Z.P., ed. Rajapakse, Y.D.S., ed. Shyam Sunder, S., ed.
Ice deformation, Ice cracks, Ice strength, Ice pressure, Ice elasticity, Ice loads, Ice crystal structure, Ice breaking, Ice creep, Crack propagation.

47-3738
Micromechanical damage descriptor for polycrystalline ice.
Elvin, A.A., et al. Ice mechanics—1993. Edited by J.P. Dempsey, Z.P. Bažant, Y.D.S. Rajapakse, and S. Shyam Sunder, New York, American Society of Mechanical Engineers, 1993, p.1-14, 15 refs.
Shyam Sunder, S.
Ice deformation, Ice cracks, Ice pressure, Ice microstructure, Ice crystal structure, Ice strength, Mathematical models.

47-3739
Viscoelastic deformation behavior of ice based on micromechanical models.
Schapery, R.A., Ice mechanics—1993. Edited by J.P. Dempsey, Z.P. Bažant, Y.D.S. Rajapakse, and S. Shyam Sunder, New York, American Society of Mechanical Engineers, 1993, p.15-33, 22 refs.
Ice deformation, Ice cracks, Ice pressure, Ice elasticity, Ice microstructure, Ice crystal structure, Ice creep, Ice strength, Viscoelasticity, Mathematical models.

47-3740
Prediction of ice failure by micromechanics.
Wu, M.S., et al, Ice mechanics—1993. Edited by J.P. Dempsey, Z.P. Bažant, Y.D.S. Rajapakse, and S. Shyam Sunder, New York, American Society of Mechanical Engineers, 1993, p.35-47, 17 refs.
Niu, J.
Ice deformation, Ice cracks, Ice pressure, Ice elasticity, Ice microstructure, Ice crystal structure, Statistical analysis, Mathematical models.

47-3741
Interpretation of results of the fracture toughness tests on ice.
Abdel-Tawab, K., et al, Ice mechanics—1993. Edited by J.P. Dempsey, Z.P. Bažant, Y.D.S. Rajapakse, and S. Shyam Sunder, New York, American Society of Mechanical Engineers, 1993, p.49-59, 13 refs.
Rodin, G.J.
Ice deformation, Ice cracks, Ice elasticity, Ice strength, Ice crystal structure, Brittleness, Strain tests.

47-3742
Failure envelopes and the ductile to brittle transition in columnar saline ice under biaxial compression.
Nickolayev, O.Y., et al, Ice mechanics—1993. Edited by J.P. Dempsey, Z.P. Bažant, Y.D.S. Rajapakse, and S. Shyam Sunder, New York, American Society of Mechanical Engineers, 1993, p.61-69, 9 refs.
Schulson, E.M.
Ice deformation, Ice pressure, Ice cover strength, Salt ice, Ice crystal structure, Strain tests.

47-3743
Application of fractal/chaos concepts to ice mechanics: a review.
Parsons, B.L., Ice mechanics—1993. Edited by J.P. Dempsey, Z.P. Bažant, Y.D.S. Rajapakse, and S. Shyam Sunder, New York, American Society of Mechanical Engineers, 1993, p.71-84, 36 refs.
Ice deformation, Ice cracks, Ice solid interface, Ice breaking, Ice loads, Fractals, Mathematical models.

47-3744
Mesoscale simulation of the arctic ice pack.
Hopkins, M.A., MP 3243, Ice mechanics—1993. Edited by J.P. Dempsey, Z.P. Bažant, Y.D.S. Rajapakse, and S. Shyam Sunder, New York, American Society of Mechanical Engineers, 1993, p.85-96, 16 refs.
Ice deformation, Pack ice, Sea ice distribution, Ice floes, Ice openings, Pressure ridges, Ice cover strength, Ice cover thickness, Ice models, Computerized simulation, Mathematical models.
The large-scale processes and properties of the arctic ice pack depend on the granular nature of the pack, particularly on the size and distribution of areas of thin ice and open water surrounding multiyear ice floes. Global climate models and ice-ocean models of the Arctic Basin depend on the use of continuum approximations to define the internal strength of the ice pack, the ice thickness distribution, the surface roughness, and the amount of ridging and lead creation under a given deformation field. At present, empirical data on which to base the continuum approximations are scarce. To obtain better estimates of continuum approximations characterizing the ice pack, a mesoscale (10-100 km) numerical model of the central arctic ice pack has been developed. The mesoscale model is based on a dynamic particle simulation in which individual multiyear ice floes and surrounding areas of first-year ice are explicitly modeled as discrete, convex polygons in a two-dimensional control area. Deformation of the control area produces regions of localized failure and areas of open water. The regions of localized failure are modeled as pressure ridging events using the results of numerical experiments performed with a computer simulation of the ridging process. Initial experiments performed with the model provide crude estimates of the strength of the arctic ice pack and the redistribution of ice thicknesses under various strain fields.

47-3745
Remote sensing of damage in ice using electromagnetic emission from cracks: theoretical background and preliminary experimental results.
Gluschenkov, O.V., et al, Ice mechanics—1993. Edited by J.P. Dempsey, Z.P. Bažant, Y.D.S. Rajapakse, and S. Shyam Sunder, New York, American Society of Mechanical Engineers, 1993, p.97-111, 22 refs.
Petrenko, V.F.
Ice deformation, Ice cracks, Ice electrical properties, Crack propagation, Remote sensing, Mathematical models.

47-3746
Stress-optic effects in ice.
Ravi-Chandar, K., et al, Ice mechanics—1993. Edited by J.P. Dempsey, Z.P. Bažant, Y.D.S. Rajapakse, and S. Shyam Sunder, New York, American Society of Mechanical Engineers, 1993, p.113-117, 5 refs.
Adamson, B., Lazo, J., Dempsey, J.P.
Ice deformation, Ice strength, Ice optics, Ice crystal optics.

47-3747
Crack dynamics in a plate under bending.
Slepyan, L.I., Ice mechanics—1993. Edited by J.P. Dempsey, Z.P. Bažant, Y.D.S. Rajapakse, and S. Shyam Sunder, New York, American Society of Mechanical Engineers, 1993, p.119-129, 15 refs.
Ice deformation, Ice cracks, Ice water interface, Ice elasticity, Ice cover strength, Crack propagation, Mathematical models.

47-3748
Fracture analysis of penetration through floating sea ice plate and size effect.
Bažant, Z.P., et al, Ice mechanics—1993. Edited by J.P. Dempsey, Z.P. Bažant, Y.D.S. Rajapakse, and S. Shyam Sunder, New York, American Society of Mechanical Engineers, 1993, p.131-144, 9 refs.
Li, Y.N.
Ice deformation, Ice cracks, Ice breaking, Ice elasticity, Ice cover strength, Ice loads, Crack propagation.

47-3749
Response of a floating ice sheet to rapid edge loading.
Fox, C., Ice mechanics—1993. Edited by J.P. Dempsey, Z.P. Bažant, Y.D.S. Rajapakse, and S. Shyam Sunder, New York, American Society of Mechanical Engineers, 1993, p.145-150, 6 refs.
Ice deformation, Ice breaking, Ice elasticity, Ice cover strength, Ice loads, Ice solid interface, Ice water interface, Mathematical models.

47-3750
Planar forcing of floating ice sheets.
Zhao, Z.G., et al, Ice mechanics—1993. Edited by J.P. Dempsey, Z.P. Bažant, Y.D.S. Rajapakse, and S. Shyam Sunder, New York, American Society of Mechanical Engineers, 1993, p.151-164, 10 refs.
Dempsey, J.P.
Ice deformation, Ice elasticity, Ice cover strength, Ice water interface, Ice loads, Hydrodynamics, Mathematical models.

47-3751
Indentation and splitting of freshwater ice floes.
Sodhi, D.S., et al, MP 3244, Ice mechanics—1993. Edited by J.P. Dempsey, Z.P. Bažant, Y.D.S. Rajapakse, and S. Shyam Sunder, New York, American Society of Mechanical Engineers, 1993, p.165-175, 15 refs.
Chin, S.N., Stanley, J.M.
Ice deformation, Ice cracks, Ice breaking, Ice solid interface, Ice cover strength, Ice floes, Ice pressure, Ice loads.
Small-scale indentation and floe-splitting experiments were conducted on columnar ice floes of various sizes and at different speeds. During low-speed indentation (0.2-8 mm/s), the ice floes always split apart, while at higher indentation speeds (>100 mm/s) they did not. The reason is attributed to differences in the process of deformation and failure. At low speed, a large zone of microcracked ice forms in front of the indentor. Development of compressive stresses in the microcracked ice zone leads to buildup of transverse forces that drive crack propagation. These zones of microcracked ice are not observed during high-speed indentation. Rather, the ice fails by continuous crushing. The theoretical effective pressure required to split an ice floe agrees to some extent with those measured during experiments.

47-3752
Influence of crystallographic and structural properties on the flexural strength of small sea ice beams.
Shapiro, L.H., et al, Ice mechanics—1993. Edited by J.P. Dempsey, Z.P. Bažant, Y.D.S. Rajapakse, and S. Shyam Sunder, New York, American Society of Mechanical Engineers, 1993, p.177-188, 7 refs.
Weeks, W.F.
Ice deformation, Ice cover strength, Ice crystal structure, Ice pressure, Ice loads, Sea ice.

47-3753
On the effect of phase transformations and dislocation density gradients on saline ice compliance.
McKittrick, L.R., et al, Ice mechanics—1993. Edited by J.P. Dempsey, Z.P. Bažant, Y.D.S. Rajapakse, and S. Shyam Sunder, New York, American Society of Mechanical Engineers, 1993, p.189-198, 12 refs.
Brown, R.L.
Ice deformation, Ice strength, Ice crystal structure, Ice crystal growth, Salt ice, Sea water freezing, Ice density, Brines, Phase transformations, Dislocations (materials), Mathematical models.

47-3754
Crack nucleation mechanism in saline ice.
Gupta, V., et al, Ice mechanics—1993. Edited by J.P. Dempsey, Z.P. Bažant, Y.D.S. Rajapakse, and S. Shyam Sunder, New York, American Society of Mechanical Engineers, 1993, p.199-216, 29 refs.
Picu, R.C., Frost, H.J.
Ice deformation, Ice cracks, Ice strength, Salt ice, Ice crystal structure, Ice crystal growth, Ice pressure, Brines, Crack propagation, Mathematical models.

47-3755
Fracture process zone analysis in saline ice.
DeFranco, S.J., et al, Ice mechanics—1993. Edited by J.P. Dempsey, Z.P. Bažant, Y.D.S. Rajapakse, and S. Shyam Sunder, New York, American Society of Mechanical Engineers, 1993, p.217-227, 21 refs.
Dempsey, J.P.
Ice deformation, Ice cracks, Ice strength, Salt ice, Ice loads, Ice pressure, Fracture zones, Crack propagation, Mathematical models.

47-3756
Ductile-to-brittle transition in ice under compression: grain size effect.
Batto, R.A., et al, Ice mechanics—1993. Edited by J.P. Dempsey, Z.P. Bažant, Y.D.S. Rajapakse, and S. Shyam Sunder, New York, American Society of Mechanical Engineers, 1993, p.229-234, 17 refs.
Schulson, E.M.
Ice deformation, Ice cracks, Ice pressure, Ice strength, Ice loads, Ice creep, Ice crystal size.

47-3757
Crack nucleation mechanisms and fracture toughness measurements in freshwater ice.
Frost, H.J., et al, Ice mechanics—1993. Edited by J.P. Dempsey, Z.P. Bažant, Y.D.S. Rajapakse, and S. Shyam Sunder, New York, American Society of Mechanical Engineers, 1993, p.235-250, 50 refs.
Gupta, V.
Ice deformation, Ice cracks, Ice strength, Ice elasticity, Ice crystal structure, Ice crystal size, Crack propagation, Mathematical models.

47-3758
Fracture and damage of ice: towards practical implementation.
Jordaan, I.J., et al, Ice mechanics—1993. Edited by J.P. Dempsey, Z.P. Bažant, Y.D.S. Rajapakse, and S. Shyam Sunder, New York, American Society of Mechanical Engineers, 1993, p.251-260, 25 refs.
Xiao, J., Zou, B.
Ice deformation, Ice cracks, Ice solid interface, Ice loads, Ice breaking, Ice cover strength, Ice pressure.

47-3759
Effect of creep on the constitutive behavior of saline ice at low strains.
Cole, D.M., MP 3245, Ice mechanics—1993. Edited by J.P. Dempsey, Z.P. Bažant, Y.D.S. Rajapakse, and S. Shyam Sunder, New York, American Society of Mechanical Engineers, 1993, p.261-271, 16 refs.
Ice deformation, Ice creep, Ice strength, Ice pressure, Ice loads, Salt ice, Ice microstructure, Ice elasticity.
This work examines the cyclic loading response of saline ice brought about formation. The combination of cyclic and creep techniques provides a means to quantify the effects of ge on mechanical behavior. Although it is clearly important to quantify the microstructural damage associated with creep deformation, a complete understanding of the problem requires that the effects of that damage on constitutive behavior be understood as well. To address this issue, two types of loading sequences were applied to specimens of laboratory-grown ice. In the first the specimen was de-

formed to specific levels of total strain under constant-load creep conditions and allowed to fully recover upon unloading. A series of zero-mean-stress 0.1-Hz cyclic loads were applied prior to each creep loading and after the final creep loading. The second consisted of a single creep loading, with zero-mean-stress cycles being applied before and after the creep deformation. In addition, load cycles were superimposed on the creep stress at several points during the experiment. All experiments were performed at -10 C, with the creep stress being either 0.5 or 0.75 MPa, and the peak cyclic stress generally varied from 0.1 to 0.4 MPa in increments of 0.1 MPa. The creep results demonstrate the manner in which the anelastic strain builds to an apparent saturation level. The cyclic loading results indicate that the progressive creep damage has a consistent but minor effect in reducing the initial modulus. The specimen compliance, as indicated by the hysteresis loop width, increased monotonically and to a significant degree with increasing levels of creep strain. The experimental results are examined in detail and interpreted in a micromechanical context, with particular attention being paid to the anelastic processes.

47-3760
Preliminary experiments on creep crack growth in freshwater ice.
Nixon, W.A., et al. Ice mechanics—1993. Edited by J.P. Dempsey, Z.P. Bažant, Y.D.S. Rajapakse, and S. Shyam Sunder. New York, American Society of Mechanical Engineers, 1993, p.273-280, 15 refs.
Weber, L.J.
Ice deformation, Ice creep, Ice cracks, Ice strength, Ice pressure, Ice loads, Crack propagation.

47-3761
MEET'N'93.
American Society of Civil Engineers, Charlottesville, University of Virginia, 1993. 2 vols. (Pertinent p.352-374), Refs. passim. Abstracts only, of the first joint ASCE/ASME/SES meeting, Charlottesville, VA, June 6-9, 1993.
Herakovich, C.T., ed. Duva, J.M., ed.
Organizations, Meetings, Ice mechanics.

47-3762
Process and measuring probe for the determination of ice or snow formation.
Meyer, F., *U.S. Patent Office. Patent.* July 5, 1988, 6 col., USP-4,755,062, 11 refs.
Ice detection, Indicating instruments, Hoarfrost, Probes, Thermostats, Thermistors, Ice solid interface, Thermal conductivity, Temperature measurement, Design.

47-3763
Removable bottom founded structure.
Beskow, R.H., et al. *U.S. Patent Office. Patent.* July 5, 1988, 16 col., USP-4,755,082, 6 refs.
Dunn, P.J., Fine, W.S.
Moorings, Offshore structures, Hydraulic structures, Concrete structures, Floating structures, Icebergs, Countermeasures, Buoyancy, Design.

47-3764
Anti-icing and deicing device.
Bird, L., *U.S. Patent Office. Patent.* Mar. 22, 1988, 8 col., USP-4,732,351, 5 refs.
Aircraft icing, Ice prevention, Ice removal, Synthetic materials, Deformation, Plastic properties, Electronic equipment, Design.

47-3765
Deicer control system.
Phillips, R.W., II, *U.S. Patent Office. Patent.* Mar. 29, 1988, 6 col., USP-4,733,834, 9 refs.
Aircraft icing, Ice control, Ice removal, Inflatable structures, Electric equipment, Atmospheric pressure, Air flow, Design.

47-3766
Lamp mounting.
Klaus, D.A., *U.S. Patent Office. Patent.* Mar. 1, 1988, 6 col., USP-4,729,073, 5 refs.
Illuminating, Supports, Covering, Plastics, Ice prevention, Design.

47-3767
Tire chain device for automobiles travelling on snow-covered terrain.
Yang, M.F., *U.S. Patent Office. Patent.* Mar. 15, 1988, 4 col., USP-4,730,655, 3 refs.
Tires, Covering, Cold weather performance, Traction, Ice solid interface, Design.

47-3768
Stern apron for ice breakers.
Varges, G., *U.S. Patent Office. Patent.* Mar. 22, 1988, 4 col., USP-4,732,101, 11 refs.
Icebreakers, Propellers, Ice solid interface, Protection, Subsurface structures, Design.

47-3769
Method and apparatus for piled foundation improvement with freezing using down-hole refrigeration units.
Spalding, A.V., et al, *U.S. Patent Office. Patent.* Feb. 9, 1988, 6 col., USP-4,723,876, 19 refs.
Offshore structures, Foundations, Pile structures, Refrigeration, Bearing strength, Sea water freezing, Soil freezing, Artificial freezing.

47-3770
Device and attendant equipment for converting a motor-scooter into a vehicle suitable for operating on snowy ground.
Bruzzone, R., *U.S. Patent Office. Patent.* Jan. 19, 1988, 4 col., USP-4,719,983, 4 refs.
Snow vehicles, Tracked vehicles, Modification, Cold weather performance, Equipment, Design.

47-3771
Apparatus for converting a road vehicle into a snowmobile.
Shaver, A.L., *U.S. Patent Office. Patent.* Jan. 19, 1988, 8 col., USP-4,719,982, 12 refs.
Snow vehicles, Tracked vehicles, Modification, Skis, Cold weather performance, Equipment, Design.

47-3772
Application of microholography for ground-based *in situ* measurements in stratus cloud layers: a case study.
Borrmann, S., et al, *Journal of atmospheric and oceanic technology.* June 1993, 10(3), p.277-293, 40 refs.
Jaenicke, R.
Cloud physics, Aerosols, Cloud droplets, Snow pellets, Holography, Imaging, Velocity measurement, Particle size distribution.

47-3773
***In situ* observations of cirrus cloud microphysical properties using the counterflow virtual impactor.**
Noone, K.B., et al, *Journal of atmospheric and oceanic technology.* June 1993, 10(3), p.294-303, 30 refs.
Cloud physics, Climatology, Aerial surveys, Probes, Aerosols, Water content, Ice crystal size, Particle size distribution.

47-3774
Constraints on the repetitivity of the orbit of an altimetric satellite: estimation of the cross-track slope.
Minster, J.F., et al, *Journal of atmospheric and oceanic technology.* June 1993, 10(3). [illegible]9, 19 refs.
Remy, F., Normant, E.
Geophysical surveys, Ice shee[illegible]ding, Topographic surveys, Remote sens[illegible]raft, Accuracy, Antarctica—Adélie Coast.
The effect of a poorly constrained repetitivity of the orbit of an altimetric satellite is analyzed. From existing data, 35% of the marine geoid slopes are found to exceed 1.5 cm/km, due either to short-distance-scale features or to the large-scale geoid. A geoid cross-track slope (CTS) can be calculated locally from the tracks inside the repetitivity band with a precision of 0.2-2 cm/km, depending on the orbit cycle and on the width of the band. This can be used as a correction but increases the noise level by at least 50%. Alternatively, the CTS can be derived from a mean sea surface. This adequately corrects for the large-scale signals but, with present mean sea surfaces, it is inadequate for the short-distance-scale features. Above continental ice, larger than 0.3% along-track slopes were encountered for more than 10% of the time above an altitude of 500 m. These slopes result mostly from undulations of the ice topography. Over one year, a median height profile inside the repetitivity band can be derived at 8-16 cm precision, depending on the number of tracks used and assuming that the measurement noise is 50 cm. From one year to the next, a CTS correction needs to be applied to compare the yearly median height profiles. In each case, the precision is comparable with the expected signals (e.g., mesoscale variability of the ocean dynamic topography or climatic variation of the snow accumulation rate). These signals can, however, be recovered by space-time analysis of the data. Ice sheet topography is illustrated by reference to the Adélie Coast region of the Antarctic. (Auth. mod.)

47-3775
Field performance of a spinning-reflector microwave radiometer.
Demoz, B.B., et al, *Journal of atmospheric and oceanic technology.* June 1993, 10(3), p.420-427, 14 refs.
Huggins, A.W., Warburton, J.A., Smith, R.L.
Meteorological instruments, Radiometry, Precipitation (meteorology), Cold weather performance, Snow cover effect, Snow melting, Countermeasures, Design.

47-3776
Brittle compressive failure of fresh-water columnar ice under biaxial loading.
Smith, T.R., et al, *Acta metallurgica et materialia.* Jan. 1993, 41(1), p.153-163, 33 refs. For another version see 45-3171.
Schulson, E.M.
Ice strength, Ice mechanics, Ice deformation, Cracking (fracturing), Ice solid interface, Stress concentration, Dynamic loads, Mechanical tests.

47-3777
Novel processes of dislocation multiplication observed in ice.
Shearwood, C., et al, *Acta metallurgica et materialia.* Jan. 1993, 41(1), p.205-210, 14 refs.
Whitworth, R.W.
Ice physics, Ice crystal structure, Orientation, Ice deformation, Plastic deformation, Stress concentration, X ray analysis, Dislocations (materials).

47-3778
Creep closure of channels in deforming subglacial till.
Fowler, A., et al, *Royal Society of London. Proceedings A.* Apr. 8, 1993, 441(1911), p.17-31, 25 refs.
Walder, J.
Glacial hydrology, Glacier flow, Glacier beds, Sliding, Glacial erosion, Subglacial drainage, Water pressure, Rheology, Analysis (mathematics).

47-3779
Calorimetric investigation of the glass transition and relaxation in 60:40 ethylene glycol: water. Part 1. Isothermal annealing experiments.
Mehl, P.M., *Thermochimica acta.* Jan. 14, 1993, Vol.213, p.177-197, 28 refs.
Solutions, Antifreezes, Temperature measurement, Phase transformations, Low temperature research, Cryobiology, Relaxation (mechanics), Temperature effects.

47-3780
Problem of palaeokarst in Tibet.
Sweeting, M.M., et al, *Geographical journal.* Nov. 1991, 157(3), p.316-325, 13 refs.
Bao, H.S., Zhang, D.
Karst, Geologic processes, Paleoclimatology, Geomorphology, Theories, Periglacial processes.

47-3781
Intercomparison of artificial intelligence approaches for polar scene identification.
Tovinkere, V.R., et al, *Journal of geophysical research.* Mar. 20, 1993, 98(D3), p.5001-5016, 33 refs.
Geophysical surveys, Terrain identification, Cloud cover, Ice cover effect, Snow cover effect, Classifications, Radiometry, Spaceborne photography, Image processing, Accuracy.

47-3782
Winter biotic activity and production of CO2 in Siberian soils: a factor in the greenhouse effect.
Zimov, S.A., et al, *Journal of geophysical research.* Mar. 20, 1993, 98(D3), p.5017-5023, 35 refs.
Atmospheric composition, Active layer, Vapor transfer, Soil air interface, Carbon dioxide, Greenhouse effect, Frozen ground chemistry, Soil microbiology, Unfrozen water content.

47-3783
New parameterizations and sensitivities for simple climate models.
Graves, C.E., et al, *Journal of geophysical research.* Mar. 20, 1993, 98(D3), p.5025-5036, 35 refs.
Lee, W.H., North, G.R.
Climatology, Climatic changes, Radiation balance, Surface temperature, Periodic variations, Snow line, Snow cover effect, Albedo, Cloud cover, Mathematical models.

47-3784
Interactive coupling of a lake thermal model with a regional climate model.
Hostetler, S.W., et al, *Journal of geophysical research.* Mar. 20, 1993, 98(D3), p.5045-5057, 26 refs.
Bates, G.T., Giorgi, F.
Climatology, Climatic changes, Air ice water interaction, Lake ice, Lake effects, Ice cover thickness, Water temperature, Surface temperature, Diurnal variations, Mathematical models.

47-3785
Evidence for winter/spring denitrification of the stratosphere in the nitrate record of antarctic firn cores.
Mulvaney, R., et al, *Journal of geophysical research.* Mar. 20, 1993, 98(D3), p.5213-5220, 34 refs.
Wolff, E.W.
Polar atmospheres, Atmospheric composition, Ozone, Scavenging, Stratosphere, Polar stratospheric clouds, Snow composition, Chemical properties, Ice cores, Antarctica—Coats Land.

A firn core from within the polar vortex in the Weddell Sea sector of Antarctica reveals nitrate peaks that occur in the spring or early summer. Such peaks are less prominent in two other cores from sites that are further north. Although further data are needed, circumstantial evidence suggests that the peak may be due to sedimentation of polar stratospheric clouds from the stratosphere during winter and spring. No change in the form of the peak is seen over the last three decades. It may be possible to observe past stratospheric conditions over longer time scales from ice cores, but other sources may obliterate the signal in ice from the glacial periods. (Auth. mod.)

47-3786
Proper determination of the (delta)O-18-(delta)D relationship for ice and water by least-squares cubic regression.
Burn, C.R., et al, *Canadian journal of earth sciences*, Jan. 1993, 30(1), p.109-112, With French summary. 26 refs.
Maxwell, M.G.
Geochemistry, Hydrologic cycle, Glaciology, Isotope analysis, Oxygen isotopes, Ice composition, Analysis (mathematics), Accuracy.

47-3787
Seismostratigraphy of the middle St. Lawrence estuary: a late Quaternary glacial marine to estuarine depositional/erosional record.
Praeg, D., et al, *Géographie physique et Quaternaire*, 1992, 46(2), p.133-150, With French summary. 64 refs.
d'Anglejan, B., Syvitski, J.P.M.
Glacial geology, Marine geology, Bottom sediment, Quaternary deposits, Glacial deposits, Pleistocene, Estuaries, Bedrock, Stratigraphy.

47-3788
Postglacial paleophytogeography and paleoclimates in the western St. Lawrence River region, Quebec. [Paléophytogéographie et paléoclimats postglaciaires dans l'ouest du Bas-Saint-Laurent, Québec],
Richard, P.J.H., et al, *Géographie physique et Quaternaire*, 1992, 46(2), p.151-172, In French with English summary. 74 refs.
Larouche, A.C., Lortie, G.
Pleistocene, Lacustrine deposits, Palynology, Paleoclimatology, Paleobotany, Tundra, Vegetation patterns.

47-3789
Ice scours in the sediments of glacial Lake Iroquois, Prince Edward County, eastern Ontario.
Gilbert, R., et al, *Géographie physique et Quaternaire*, 1992, 46(2), p.189-194, With French and Russian summaries. 21 refs.
Handford, K.J., Shaw, J.
Pleistocene, Glacial lakes, Lacustrine deposits, Bottom sediment, Ice scoring, Lake ice, Wind factors.

47-3790
Paleoecological interpretation of sand dunes at the tree line, northeast sector of Hudson Bay, Quebec. [Interprétation paléoécologique des dunes á la limite des arbres, secteur nord-est de la Mer d'Hudson, Québec],
Saint-Laurent, D., et al, *Géographie physique et Quaternaire*, 1992, 46(2), p.209-220, In French with English and German summaries. 53 refs.
Filion, L.
Paleoecology, Paleoclimatology, Forest lines, Forest tundra, Landscape development, Eolian soils, Forest fires.

47-3791
Sediment dynamics in the St. Lawrence estuary. [Dynamique sédimentaire des littoraux de l'estuaire du Saint-Laurent],
Drapeau, G., *Géographie physique et Quaternaire*, 1992, 46(2), p.233-242, In French with English summary. 59 refs.
Estuaries, Littoral zone, Shoreline modification, Sediment transport, Suspended sediments, Hydrodynamics, Ice rafting, Ice cover effect, Vegetation factors.

47-3792
Freezing characteristics along a horizontal cooled tube immersed in aqueous binary solution with main flow.
Yamada, M., et al, *Journal of engineering materials and technology*, Jan. 1993, 115(1), p.54-62, 18 refs.
Fukusako, S., Tago, M., Horibe, A.
Solutions, Solidification, Phase transformations, Liquid cooling, Temperature effects, Flow rate, Liquid solid interfaces, Heat transfer coefficient.

47-3793
Mountain structure and glaciation of the Caucasus Mountains. [Gebirgsbau und Vergletscherung des Kaukasus],
Marcinek, J., et al, *Geographische Berichte*, 1990, 35(4), p.242-251,270, In German with English summary. 26 refs.
Nitz, B., Baume, O.
Geologic processes, Geomorphology, Glaciation, Mountain glaciers, Glacier oscillation.

47-3794
Shock response of snow.
Johnson, J.B., et al, *Journal of applied physics*, May 15, 1993, 73(10), MP 3246, p.4852-4861, 21 refs.
Solie, D.J., Brown, J.A., Gaffney, E.S.
Snow physics, Snow compaction, Snow deformation, Snow density, Impact tests, Shock waves, Wave propagation, Loading, Attenuation, Avalanche mechanics.

47-3795
Aerial roof moisture surveys.
Tobiasson, W., *APWA reporter*, June 1993, MP 3247, p.18-19.
Roofs, Moisture detection, Infrared photography, Airborne radar.

47-3796
Snow conditions during MLRS-TGW BBS European Captive Flight Program, Hessen, Germany, February 1992.
Fisk, D.J., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Feb. 1993, SR 93-02, 37p., ADB-173 343, 8 refs.
Military equipment, Military operation, Radar, Airborne radar, Snow cover effect, Computer programs, Computers, Data processing, Cold weather performance.
A version of the proposed Multiple Launch Rocket System-Terminally Guided Warhead's (MLRS-TGW) radar system was tested in central Germany. The radar system (Brassboard Seeker) was mounted on an airplane and, during flight, scanned the ground for various targets. The background of the targets (soil, vegetation, water and snow) affects the ability of the radar system to differentiate between targets or even to see the targets, and snow, in some forms, is an especially troublesome background. The purpose of the flight test was to further refine the radar hardware and software to reduce the effects of a snow background, or to develop criteria for the use of the MLRS-TGW. To do this, radar performance must be correlated with snow conditions. Therefore, while the radar was flying, CRREL measured snow conditions: vertical profiles of depth, density, wetness, and crystal sizes and types, and surface roughness. Those data are reported here.

47-3797
Canadian experience with air cushion vehicle skirts.
Sullivan, P.A., et al, *Canadian aeronautics and space journal*, Mar. 1993, 39(1), p.23-34, With French summary. 19 refs.
Jones, D.
Air cushion vehicles, Supports, Ice breaking, Stability, Performance, Modification, Design.

47-3798
Energy conservation in commercial air conditioning through ice storage and cold air distribution design.
Tassou, S.A., et al, *Heat recovery systems & CHP*, Sep. 1992, 12(5), p.419-425, 5 refs.
Leung, Y.K.
Air conditioning, Cold storage, Performance, Ice (water storage), Cost analysis, Air temperature, Temperature control.

47-3799
Cryogenic (frost-related) systems of some gold-quartz deposits.
Taĭsaev, T.T., *USSR Academy of Sciences. Transactions. Earth science sections*, Mar.-Apr. 1991, 317A(3), p.178-182, 15 refs. For Russian original see 47-2008.
Geocryology, Geochemistry, Permafrost weathering, Soil water migration, Gold, Snow cover effect, Mineralogy.

47-3800
Numerical modeling of heat transfer in irregular solidification of a liquid.
Nikitenko, N.I., et al, *Heat transfer research*, Apr. 1993, 24(4), p.519-528, Translated from Promyshlennaia teplotekhnika, 1990, Vol.12, No.1. 3 refs.
Kol'chik, IU.N.
Liquid cooling, Solidification, Density (mass/volume), Phase transformations, Heat transfer, Ice water interface, Temperature variations, Mathematical models, Pipeline freezing.

47-3801
Prairie Blowing Snow Model: characteristics, validation, operation.
Pomeroy, J.W., et al, *Journal of hydrology*, Apr. 1993, 144(1-4), p.165-192, 26 refs.
Gray, D.M., Landine, P.G.
Plains, Snow cover stability, Snow accumulation, Blowing snow, Mass transfer, Surface roughness, Sublimation, Wind factors, Mathematical models, Vegetation factors.

47-3802
Sensitivity of streamflow simulation to changes in climatic inputs.
Ng, H.Y.F., et al, *Nordic hydrology*, 1992, 23(4), p.257-272, 24 refs.
Marsalek, J.
Stream flow, River basins, Climatic changes, Precipitation (meteorology), Periodic variations, Snow hydrology, Snowmelt, Runoff forecasting, Simulation.

47-3803
Prospects for the development of methods for forecasting climatic changes in polar regions. [Perspektivy razvitiia metodov prognoza izmenchivosti klimata poliarnykh oblastei],
Alekseev, G.V., *St. Petersburg. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1992, Vol.430, p.5-21, In Russian. 62 refs.
Weather forecasting, Climatic changes, Synoptic meteorology, Carbon dioxide, Polar atmospheres.

47-3804
Stochastic regime of large-scale atmospheric waves. [Stokhasticheskiĭ rezhim krupnomasshtabnykh atmosfernykh voln],
Bekriaev, R.V., *St. Petersburg. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1992, Vol.430, p.22-49, In Russian. 30 refs.
Mathematical models, Atmospheric pressure, Atmospheric circulation, Turbulent exchange, Air temperature, Air flow, Polar atmospheres.

47-3805
Modeling spectra of weather noise. [Modelirovanie spektrov pogodnogo shuma],
Alekseev, G.V., *St. Petersburg. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1992, Vol.430, p.50-55, In Russian. 10 refs.
Noise (sound), Spectra, Mathematical models, Atmospheric circulation, Polar atmospheres.

47-3806
Sparse parameter quasi-solenoidal model of large-scale atmospheric movements. [Maloparametricheskaia kvazisolenoidal'naia model' krupnomasshtabnykh dvizheniĭ atmosfery],
Bekriaev, R.V., *St. Petersburg. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1992, Vol.430, p.56-74, In Russian. 27 refs.
Mathematical models, Atmospheric circulation, Turbulent exchange, Atmospheric pressure, Turbulent flow, Hydrodynamics, Polar atmospheres.

47-3807
Effect of a meridional profile of surfaces on the characteristics of large-scale atmospheric waves. [Vliianie meridional'nogo profilia podstilaiushchei poverkhnosti na kharakteristiki krupnomasshtabnykh atmosfernykh voln],
Bekriaev, R.V., et al, *St. Petersburg. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1992, Vol.430, p.75-86, In Russian. 7 refs.
Savchenko, V.G.
Mathematical models, Polar atmospheres, Atmospheric pressure, Atmospheric circulation, Spectra, Climate, Air temperature.
The effect of a meridional profile of relief on the characteristics of large-scale waves in the atmosphere is investigated, based on an ageostrophic model of atmospheric circulation. An adiabatic linear variant of the model is studied. The role of relief in the formation of climatic characteristics of the northern and southern hemispheres is discussed. (Auth. mod.)

47-3808
Problem of nonlinear interaction of Rossby waves with zonal flow. [K voprosu o nelineĭnom vzaimodeĭstvii voln Rossbi i zonal'nogo potoka],
Podgornyĭ, I.A., *St. Petersburg. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1992, Vol.430, p.87-99, In Russian. 8 refs.
Mathematical models, Polar atmospheres, Atmospheric circulation.

47-3809
Convergence of the solution to certain models of climatic systems. [O skhodimosti reshenii nekotorykh modelei klimaticheskoi sistemy].
Liubich, M.IU., *St. Petersburg. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1992, Vol.430, p.100-104, In Russian. 4 refs.
Mathematical models, Climatology, Polar atmospheres, Air water interactions.

47-3810
Cause-effect relationships in the interactive processes of the ocean and atmosphere in the North Atlantic. [Prichinno-sledstvennye sviazi v protsessakh vzaimodeistviia okeana i atmosfery v Severnoi Atlantike].
Zablotskii, G.A., et al, *St. Petersburg. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1992, Vol.430, p.105-115, In Russian. 10 refs.
Sviashchennikov, P.N.
Air water interactions, Thermodynamics, Albedo, Cloud cover, Air temperature, Water temperature, Radiation balance, North Atlantic Ocean.

47-3811
Sensitivity of a thermodynamic model of sea ice to parametrization of short-wave and long-wave radiation. [Chuvstvitel'nost' termodinamicheskoi modeli morskogo l'da k parametrizatsii korotkovolnovoi i dlinnovolnovoi radiatsii].
Makshtas, A.P., et al, *St. Petersburg. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1992, Vol.430, p.116-137, In Russian. 28 refs.
Timachev, V.F.
Sea ice, Ice cover thickness, Ice models, Thermodynamics, Radiation balance, Analysis (mathematics), Albedo, Heat balance, Solar radiation.

47-3812
Formation mechanism of the vertical structure of the Greenland convective gyre. [O mekhanizme formirovaniia vertikal'noi struktury Grenlandskogo konvektivnogo krugovorota].
Bogorodskii, P.V., et al, *St. Petersburg. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1992, Vol.430, p.138-144, In Russian. 4 refs.
Marchenko, A.V.
Mathematical models, Hydrodynamics, Ocean currents, Greenland Sea.

47-3813
Effect of deep Atlantic waters on the ice-hydrological processes in the northern Barents Sea. [O vliianii glubinnykh Atlanticheskikh vod na ledovo-gidrologicheskie protsessy v severnoi chasti Barentseva moria].
Lebedev, I.A., *St. Petersburg. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1992, Vol.430, p.145-156, In Russian. 15 refs.
Hydrology, Sea ice, Ice cover, Ice water interface, Water temperature, Barents Sea.

47-3814
Evaluating the role of the West Spitsbergen current in the formation of a sea ice boundary. [Otsenka roli Zapadno-Shpitsbergenskogo techeniia v formirovanii granitsy morskikh l'dov].
Makshtas, A.P., et al, *St. Petersburg. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1992, Vol.430, p.157-164, In Russian. 8 refs.
Podgornyi, I.A.
Ocean currents, Sea ice distribution, Water temperature, Salinity, Salt water, Heat balance, Drift, Norway—Spitsbergen, Fram Strait.

47-3815
Initial instrument measurements of the current in the region of the cold bottom water dome in the Greenland Sea. [Pervye instrumental'nye izmereniia techenii v oblasti kupola kholodnykh donnykh vod v Grenlandskom more].
Alekseev, G.V., et al, *St. Petersburg. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1992, Vol.430, p.165-168, In Russian. 3 refs.
Bogorodskii, P.V., Doronin, N.IU., Zablotskii, G.A.
Ocean currents, Water temperature, Flow measurement, Temperature distribution, Isotherms, Greenland Sea.

47-3816
Some results of a statistical analysis of synoptic mesoscale variabilities in the water temperature of the Barents Sea. [Nekotorye rezul'taty statisticheskogo analiza sinopticheskoi i mezomasshtabnoi izmenchivosti temperatury vody v Barentsevom more].
Lebedev, I.A., *St. Petersburg. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1992, Vol.430, p.169-181, In Russian. 11 refs.
Statistical analysis, Water temperature, Temperature variations, Correlation, Barents Sea.

47-3817
Circulation and hydrography in the northwestern Gulf of Alaska.
Musgrave, D.L., et al, *Deep-sea research*, Sep. 1992, 39(9A), p.1499-1519, 27 refs.
Weingartner, T.J., Royer, T.C.
Ocean currents, Water transport, Air water interactions, Water temperature, Salinity, Wind factors, Hydrography, United States—Alaska—Gulf of Alaska.

47-3818
Misawa snow accumulation study.
Schaub, W.R., Jr., *U.S. Air Force Environmental Technical Applications Center. Project report*, Feb. 1991, USAFETAC/PR-91/001, 20p., ADA-233 113, 9 refs.
Snowstorms, Snow accumulation, Weather forecasting, Airports, Military facilities, Statistical analysis, Japan—Misawa Air Base.

47-3819
Edge waves and ice ride-up on shorelines.
Murty, T.S., et al, Natural and man-made hazards, Dordrecht, D. Reidel Publishing Company, 1988, p.429-434, 7 refs. Presented at an international symposium, Rimouski, Quebec, Aug. 3-9, 1986.
El-Sabh, M.I.
DLC GB5001.N36 1987
Ice pileup, Ice override, Shore erosion, Ice push, Water waves.

47-3820
Iceberg movement prediction off the Canadian east coast.
Marko, J.R., et al, Natural and man-made hazards, Dordrecht, D. Reidel Publishing Company, 1988, p.435-462, 54 refs. Presented at an international symposium, Rimouski, Quebec, Aug. 3-9, 1986.
Fissel, D.B., Miller, J.D.
DLC GB5001.N36 1987
Icebergs, Ice forecasting, Drift, Ice models, Sea ice distribution, Statistical analysis.

47-3821
Natural hazards data resources directory.
Hennig, L.M., ed, *Colorado. University. Natural Hazards Research and Applications Information Center. NHRAIC special publication*, Mar. 1990, No.21, 247p. (Pertinent p.7-8,82-84).
DLC Z6004.N3H46 1990
Organizations, Data processing, Bibliographies, Avalanches, Snowstorms.

47-3822
Satellite image atlas of glaciers of the world. Glaciers of the Middle East and Africa.
Williams, R.S., Jr., ed, *U.S. Geological Survey. Professional paper*, 1991, No.1386-G, 70p., Refs. passim. For individual papers see 47-3823 through 47-3825.
Ferrigno, J.G., ed.
DLC GB2401.72.R42S28 1988
Glacier surveys, Mountain glaciers, Glacier oscillation, Alpine glaciation, Spaceborne photography.

47-3823
Glaciers of Turkey.
Kurter, A., *U.S. Geological Survey. Professional paper*, 1991, No.1386-G, Satellite image atlas of glaciers of the world. Glaciers of the Middle East and Africa. Edited by R.S. Williams, Jr., and J.C. Ferrigno, p.G1-G30, 58 refs.
DLC GB2401.72.R42S28 1988
Glacier surveys, Mountain glaciers, Glacier oscillation, Alpine glaciation, Spaceborne photography, Volcanoes, Turkey.

47-3824
Glaciers of Iran.
Ferrigno, J.G., *U.S. Geological Survey. Professional paper*, 1991, No.1386-G, Satellite image atlas of glaciers of the world. Glaciers of the Middle East and Africa. Edited by R.S. Williams, Jr., and J.C. Ferrigno, p.G31-G47, 32 refs.
DLC GB2401.72.R42S28 1988
Glacier surveys, Mountain glaciers, Glacier oscillation, Alpine glaciation, Spaceborne photography, Iran.

47-3825
Glaciers of Africa.
Young, J.A.T., et al, *U.S. Geological Survey. Professional paper*, 1991, No.1386-G, Satellite image atlas of glaciers of the world. Glaciers of the Middle East and Africa. Edited by R.S. Williams, Jr., and J.C. Ferrigno, p.G49-G70, 81 refs.
Hastenrath, S.
DLC GB2401.72.R42S28 1988
Glacier surveys, Mountain glaciers, Glacier oscillation, Alpine glaciation, Spaceborne photography, Africa.

47-3826
Effect of snow-free duration on leaf life-span of four alpine plant species.
Kudo, G., *Canadian journal of botany*, Aug. 1992, 70(8), p.1684-1688, With French summary. 19 refs.
Alpine landscapes, Plants (botany), Phenology, Snow cover effect, Growth, Photosynthesis, Cold weather survival.

47-3827
Elastohydrodynamic response of an ice sheet to forced sub-surface uplift.
Dempsey, J.P., et al, *Journal of the mechanics and physics of solids*, Mar. 1993, 41(3), p.487-506, 25 refs.
Zhao, Z.G.
Ice mechanics, Ice sheets, Floating ice, Bearing strength, Ice deformation, Ice elasticity, Hydrodynamics, Ice water interface, Dynamic loads, Analysis (mathematics).

47-3828
Three-dimensional modeling study of trace species in the arctic lower stratosphere during winter 1989-1990.
Chipperfield, M.P., et al, *Journal of geophysical research*, Apr. 20, 1993, 98(D4), p.7199-7218, 49 refs.
Polar atmospheres, Stratosphere, Atmospheric composition, Atmospheric attenuation, Ozone, Polar stratospheric clouds, Chemical properties, Heterogeneous nucleation, Simulation.

47-3829
TOVS observations of a stratospheric cooling during the CHEOPS 3 campaign: February 4-6, 1990, over Scandinavia.
Claud, C., et al, *Journal of geophysical research*, Apr. 20, 1993, 98(D4), p.7229-7243, 20 refs.
Ovarlez, J., Chedin, A., Scott, N.A.
Polar atmospheres, Atmospheric composition, Air temperature, Cooling, Atmospheric attenuation, Ozone, Sounding, Radiometry, Stratosphere.

47-3830
Quasi-decadal modulation of the influence of equatorial quasi-biennial oscillation on the north polar stratospheric temperatures.
Kodera, K., *Journal of geophysical research*, Apr. 20, 1993, 98(D4), p.7245-7250, 24 refs.
Polar atmospheres, Stratosphere, Air temperature, Temperature variations, Periodic variations, Atmospheric circulation, Statistical analysis, Correlation.

47-3831
Sensitivity of Asian and African climate to variations in seasonal insolation, glacial ice cover, sea surface temperature, and Asian orography.
deMenocal, P.B., et al, *Journal of geophysical research*, Apr. 20, 1993, 98(D4), p.7265-7287, 90 refs.
Rind, D.
Paleoclimatology, Climatic changes, Pleistocene, Glacier oscillation, Insolation, Ice cover effect, Air ice water interaction, Atmospheric circulation.

47-3832
Stratigraphy and sedimentation of a terminal moraine deposited in a marine environment—two examples from the Ra-ridge in Ostfold, southeast Norway.
Brandal, M.K., et al, *Norsk geologisk tidsskrift*, 1991, 71(1), p.3-14, 36 refs.
Heder, E.
Marine geology, Glacial geology, Glacial deposits, Marine deposits, Moraines, Stratigraphy, Pleistocene.

47-3833
Cryolithogenesis: advances, promising trends, and research problems.
Ershov, E.D., et al, *Moscow University geology bulletin*, 1992, 47(1), p.76-84, Translated from Vestnik Moskovskogo Universiteta. Geologiia. 33 refs.
Danilov, I.D.
Geocryology, Lithology, Soil formation, Theories, Terminology.

47-3834
Long-term deformation of freeze saline soils.
Alifanova, A.A., *Moscow University geology bulletin*, 1992, 47(2), p.74-79, Translated from Vestnik Moskovskogo Universiteta. Geologiia. 5 refs.
Frozen ground mechanics, Frozen ground strength, Saline soils, Soil tests, Plastic deformation, Foundations, Design criteria, Cold weather construction.

47-3835
Martian permafrost. [Le pergélisol martien].
Costard, F., *International journal of refrigeration*, Mar. 1993, 16(2), p.91-100. In French with English summary. 47 refs.
Planetary environments, Mars (planet), Geocryology, Ground ice, Stability, Permafrost distribution, Temperature effects.

47-3836
Fencing pays off big for arctic community.
Weber, S., *Civic public works*, July-Aug. 1992, 44(6), p.8-11.
Municipal engineering, Snowdrifts, Snow fences, Winter maintenance, Cold weather construction, Cold weather performance.

47-3837
Vegetation of stressed calcareous screes and slopes on Sverdrup Pass, Ellesmere Island, Canada.
Maycock, P.F., et al, *Canadian journal of botany*, Dec. 1992, 70(12), p.2359-2377, With French summary. 40 refs.
Fahselt, D.
Plant ecology, Lichens, Distribution, Arctic landscapes, Site surveys, Deserts, Slopes, Vegetation patterns, Cold weather survival.

47-3838
Perturbation analysis of transient freezing of a laminar liquid flow in a cooled two-dimensional channel.
Weigand, B., et al, *Journal of heat transfer*, May 1993, 115(2), p.294-301, 15 refs.
Höhn, W., Beer, H.
Laminar flow, Fluid dynamics, Ice formation, Heat transfer, Freezing front, Temperature distribution, Liquid solid interfaces, Thickness, Boundary layer, Analysis (mathematics).

47-3839
Central pit and dome craters: exposing the interiors of Ganymede and Callisto.
Schenk, P.M., *Journal of geophysical research*, Apr. 25, 1993, 98(E4), p.7475-7498, 77 refs.
Extraterrestrial ice, Satellites (natural), Regolith, Pit and mound topography, Impact, Frozen ground mechanics, Geomorphology, Geocryology, Rheology.

47-3840
Correction to "Secondary-electron yields of solar system ices" by David M. Suszcynsky, Joseph E. Borovsky, and Christoph K. Goertz. *Journal of geophysical research*, Apr. 25, 1993, 98(E4), p.7499, 3 refs.
For pertinent paper see 46-2592.
Extraterrestrial ice, Ice electrical properties, Radiation absorption, Electric charge, Accuracy.

47-3841
Analysis of freezing buds of Douglas-fir seedlings by simultaneous detection of ultrasonic emissions and differential thermal analysis.
Stushnoff, C., et al, *Canadian journal of forest research*, Sep. 1992, 22(9), p.1305-1309, With French summary. 10 refs.
Tinus, R.W., Esensee, V.D.
Forestry, Trees (plants), Plant tissues, Damage, Detection, Thermal analysis, Ultrasonic tests, Cold stress.

47-3842
Snow ablation in small forest openings in southwest Alberta.
Berry, G.J., et al, *Canadian journal of forest research*, Sep. 1992, 22(9), p.1326-1331, With French summary. 25 refs.
Rothwell, R.L.
Forestry, Snowmelt, Snow retention, Snow evaporation, Vegetation factors, Ablation, Forest canopy, Microclimatology, Radiation balance.

47-3843
Frost, canker, and dieback of Douglas-fir in the central interior of British Columbia.
Reich, R.W., et al, *Canadian journal of forest research*, Mar. 1993, 23(3), p.373-379, With French summary. 13 refs.
van der Kamp, B.J.
Forestry, Trees (plants), Plant tissues, Growth, Damage, Topographic effects, Frost, Fungi.

47-3844
Influence of cultural practices on the relationship between frost tolerance and water content of containerized black spruce, white spruce, and jack pine seedlings.
Calmé, S., et al, *Canadian journal of forest research*, Mar. 1993, 23(3), p.503-511, With French summary. 43 refs.
Margolis, H.A., Bigras, F.J.
Forestry, Trees (plants), Growth, Irrigation, Plant tissues, Water content, Frost resistance, Acclimatization.

47-3845
Lifesaving craft.
Kraft, U., *U.S. Patent Office. Patent*, Jan. 5, 1988, 4 col., USP-4,717,362, 10 refs.
Rescue equipment, Iceboats, Sleds, Cold weather survival, Design.

47-3846
Floating drilling platform.
Mäkinen, E., et al, *U.S. Patent Office. Patent*, Jan. 5, 1988, 4 col., USP-4,716,972, 9 refs.
Heideman, T.
Offshore drilling, Offshore structures, Floating structures, Ice loads, Protection, Ice breaking, Design.

47-3847
Snow chains for vehicles.
Artzi, G.B., *U.S. Patent Office. Patent*, Nov. 24, 1987, 4 col., USP-4,708,035, 3 refs.
Vehicle wheels, Covering, Portable equipment, Cold weather maintenance, Design.

47-3848
Snow plow attachment.
Steinhoff, K., *U.S. Patent Office. Patent*, Nov. 24, 1987, 4 col., USP-4,707,936, 4 refs.
Snow vehicles, Snow removal, Portable equipment, Modification, Cold weather performance, Design.

47-3849
Method and apparatus for deicing a leading edge.
Briscoe, J.A., et al, *U.S. Patent Office. Patent*, Nov. 17, 1987, 14 col., USP-4,706,911, 11 refs.
Putt, J.C., Phillips, R.W., II.
Aircraft icing, Ice removal, Inflatable structures, Ice deformation, Ice solid interface, Design.

47-3850
Trustworthy simplified vacuum systems.
Henry, R.D., *U.S. Patent Office. Patent*, Nov. 10, 1987, 6 col., USP-4,705,233, 11 refs.
Aircraft icing, Indicating instruments, Protection, Ice prevention, Ice removal, Pipes (tubes), Fluid dynamics, Design.

47-3851
Silicone emulsion having improved freeze/thaw resistance.
Bakken, K.L., *U.S. Patent Office. Patent*, Nov. 3, 1987, 8 col., USP-4,704,422, 3 refs.
Construction materials, Polymers, Stability, Sealing, Admixtures, Synthetic materials, Frost resistance, Freeze thaw cycles, Chemical composition, Design.

47-3852
Cargo container lift device.
Hatley, J.F., *U.S. Patent Office. Patent*, Aug. 25, 1987, 6 col., USP-4,688,839, 13 refs.
Cargo, Storage tanks, Ice removal, Snow removal, Pipes (tubes), Air flow, Design.

47-3853
Swirl anti-ice system.
Rosenthal, H.A., *U.S. Patent Office. Patent*, Aug. 25, 1987, 6 col., USP-4,688,745, 15 refs.
Aircraft icing, Jet engines, Ice prevention, Ice removal, Pipes (tubes), Air flow, Turbulent flow, Heating, Design.

47-3854
Microwave ice accretion measuring instruments.
Magenheim, B., et al, *U.S. Patent Office. Patent*, Aug. 18, 1987, 20 col., USP-4,688,185, 8 refs.
Rocks, J.K.
Aircraft icing, Measuring instruments, Electronic instruments, Ice detection, Ice accretion, Ice cover thickness, Design.

47-3855
Cold answers to hot issues.
Peel, D.A., *Nature*, June 3, 1993, 363(6428), p.403-404.
Meetings, Ice cores, Ice composition.
The item reports some of the highlights of a NATO workshop held in March 1993 in Annecy, France, addressing the recovery of atmospheric data held in Greenland and antarctic ice cores and comparing the results from both areas. Emphasis is placed on the need for a greater research effort to learn more about the sulphur family of anthropogenic chemicals in both polar regions.

47-3856
Digital photogrammetric approach to ice-flow determination in Antarctica.
Tseng, Y.H., Columbus, Ohio State University, 1992, 139p., University Microfilms order No. AAD92-38289, Ph.D. thesis. Refs. p.137-139.
Glacier flow, Data processing, Imaging, Spaceborne photography.
Monitoring and understanding motions of large ice streams in Antarctica requires vast, continuous, and accurate observations of ice flow. However, existing measuring technologies are inefficient or inaccurate in determining ice motion. An automatic, accurate, and economic method was developed to determine the parameters of ice motion (velocity, strain rates, and rotation rate) by matching multi-temporal digital images. A two-step matching process (cross-correlation followed by least-squares matching) was devised to achieve automation. Modifying traditional least-squares matching to determine the parameters of ice motion directly is one of the major achievements of this study. In order to control data quality, the tests of signal-to-noise-ratio, similarity, uniqueness, and consistency were designed to reject data resulting from mismatches. This image-matching approach has been applied to two SPOT images and two digitized aerial photographs successfully. The results show a nice consistency with manually measured data. (Auth. mod.)

47-3857
Ostrova De-Longa: an analysis of palaeoenvironmental data.
Makeev, V., et al, *Polar record*, 1992, 28(167), p.301-306, 16 refs.
Pitul'ko, V., Kasparov, A.
Glaciology, Paleobotany, Paleoecology, USSR—De Long Islands.

47-3858
Engineering geology of the USSR; platform regions in European USSR. [Inzhenernaia geologiia SSSR; platformennye regiony evropeiskoĭ chasti SSSR].
Komarov, I.S., ed, Moscow, Nedra, 1992, 2 vols., In Russian. Vol.1, 1992; vol.2, 1991. 94 refs.
Ziling, D.G., ed, Trofimov, V.T., ed.
Engineering geology, Geocryology, Municipal engineering, Construction, Roads, Railroads, Economic development, Land reclamation, Mining, Electric power.

47-3859
Breaking the ice.
Goldsack, B., *Geographical magazine*, Feb. 1992, 64(2), p.22-27.
Ice navigation, Icebreakers, Marine transportation, Expeditions, Northwest Passage.

47-3860
Gulags and goldmines.
Louis, N., *Geographical magazine*, Feb. 1992, 64(2), p.28-34.
Economic development, Environmental impact, Natural resources, USSR—Siberia.

47-3861
Rock of ages.
Harrison, S., *Geographical magazine*, Feb. 1992, 64(2), p.1-4.
Seasonal freeze thaw, Permafrost, United Kingdom.

47-3862
Novaya Zemlya: analyzing radiation safety and ecological consequences of nuclear tests. [Novaia Zemlia: otsenka radiatsionnoĭ bezopasnosti i ekologicheskikh posledstviĭ iadernykh ispytaniĭ].
Kharitonov, K.V., et al, *Informatsionnyĭ biulleten'*, 1992, No.8, p.65-74, In Russian. 13 refs.
Shipko, IU.E.
Fallout, Soil pollution, Environmental impact, Ecology, USSR—Novaya Zemlya.

47-3863
Nonstationary heat and mass transfer in disturbed rock massifs. [Nestatsionarnyĭ teplomassoperenos v razrushaemykh massivakh gornykh porod].
Cherniak, V.P., et al, Kiev, Naukova Dumka, 1992, 224p., In Russian. 110 refs.
Kireev, V.A., Polubinskiĭ, A.S.
Heat transfer, Heat transfer coefficient, Mass transfer, Mathematical models, Thermal conductivity, Frozen rock temperature, Rock drilling.

47-3864
Results of the Third Joint US-USSR Bering & Chukchi Seas Expedition (BERPAC), Summer 1988.
Nagel, P.A., ed, Washington, D.C., U.S. Fish and Wildlife Service, 1988, 415p., Refs. passim.
International cooperation, Expeditions, Ecology, Microbiology, Plankton, Marine biology, Biomass, Geochemical cycles, Environmental impact, Water pollution, Animals, Bering Sea, Chukchi Sea.

47-3865
Arctic exploration & international relations 1900-1932.
Fogelson, N., Fairbanks, University of Alaska Press, 1992, 220p., Refs. p.195-213.
Expeditions, Exploration, International cooperation, History.

47-3866
Studying engineering-geocryological and hydrogeological conditions of the upper zones of rocks in oil- and gas-bearing regions of the cryolithozone. Manual. [Izuchenie inzhenerno-geokriologicheskikh i gidrogeologicheskikh usloviĭ verkhnikh gorizontov porod v neftegazonosnykh raĭonakh kriolitozony. Metodicheskoe rukovodstvo].
Mel'nikov, E.S., ed, Moscow, Nedra, 1992, 288p., In Russian. 39 refs.
Grechishchev, S.E., ed, Pavlov, A.V., ed.
Geocryology, Engineering geology, Lithology, Frozen rocks, Ground water, Manuals.

47-3867
Quaternary engineering geology.
Forster, A., ed. *London, Geological Society. Engineering geology special publication*, 1991, No.7, 724p., Refs. passim. Proceedings of the 25th Annual Conference of the Engineering Group of the Geological Society, Edinburgh, Sep. 10-14, 1989. For selected papers see 47-3868 through 47-3897.
DLC QE696.G413 1989
Quaternary deposits, Glacial deposits, Soil strength, Periglacial processes, Slope processes, Engineering geology, Cryogenic soils.

47-3868
Engineering geology of Quaternary soils: I. Processes and properties.
Culshaw, M.G., et al. *London, Geological Society. Engineering geology special publication*, 1991, No.7, Quaternary engineering geology. Edited by A. Forster, et al, p.3-38, Refs. p.34-38.
Cripps, J.C., Bell, F.G., Moon, C.F.
DLC QE696.G413 1989
Quaternary deposits, Glacial deposits, Engineering geology, Cryogenic soils, Periglacial processes, Soil strength.

47-3869
Engineering geology of Quaternary soils: II. Methods of treatment.
Bell, F.G., *London, Geological Society. Engineering geology special publication*, 1991, No.7, Quaternary engineering geology. Edited by A. Forster, et al, p.39-62, 4 refs.
DLC QE696.G413 1989
Quaternary deposits, Engineering geology, Soil stabilization, Soil freezing, Artificial freezing.

47-3870
Quaternary engineering geology.
Fookes, P.G., *London, Geological Society. Engineering geology special publication*, 1991, No.7, Quaternary engineering geology. Edited by A. Forster, et al, p.73-98, 24 refs.
DLC QE696.G413 1989
Quaternary deposits, Glaciation, Paleoclimatology, Engineering geology, Pleistocene, Ice age theory, Geochronology, Sea level, Global change.

47-3871
Influence of stratigraphy on the variation in geotechnical properties of the offshore Quaternary succession, Scotland.
Bone, B.D., et al, *London, Geological Society. Engineering geology special publication*, 1991, No.7, Quaternary engineering geology. Edited by A. Forster, et al, p.119-126, 13 refs.
Long, D., Stoker, M.S.
DLC QE696.G413 1989
Quaternary deposits, Glacial deposits, Bottom sediment, Soil strength, Engineering geology, Marine deposits, Ocean bottom, Stratigraphy, United Kingdom—Scotland.

47-3872
Some influences of ice thrusting in geotechnical engineering.
Cruden, D.M., et al, *London, Geological Society. Engineering geology special publication*, 1991, No.7, Quaternary engineering geology. Edited by A. Forster, et al, p.127-134, 26 refs.
Tsui, P.C.
DLC QE696.G413 1989
Glaciation, Moraines, Ice push, Glacial geology, Glacial deposits, Glacial erosion, Soil strength, Slope stability, Engineering geology.

47-3873
Glacially deformed bedrock at Wylfa Head, Anglesey, North Wales.
Harris, C., *London, Geological Society. Engineering geology special publication*, 1991, No.7, Quaternary engineering geology. Edited by A. Forster, et al, p.135-142, 14 refs.
DLC QE696.G413 1989
Quaternary deposits, Glacial deposits, Glacial erosion, Bedrock, Soil strength, Engineering geology, United Kingdom—Wales.

47-3874
Discussion of Session 1a. [Processes and materials properties of glacially derived deposits].
Hawkins, A.B., et al, *London, Geological Society. Engineering geology special publication*, 1991, No.7, Quaternary engineering geology. Edited by A. Forster, et al, p.171-180, 4 refs.
DLC QE696.G413 1989
Glacial deposits, Moraines, Glacial geology, Glacier flow, Glacier beds, Glacial erosion, Marine deposits, Bedrock.

47-3875
Report on Session 1b. [Engineering implications of glacially derived deposits].
Little, J.A., *London, Geological Society. Engineering geology special publication*, 1991, No.7, Quaternary engineering geology. Edited by A. Forster, et al, p.183-193, 63 refs.
DLC QE696.G413 1989
Quaternary deposits, Glacial deposits, Soil strength, Engineering geology, Cryogenic soils, Moraines.

47-3876
Importance of multidisciplinary geoscience investigations for engineering projects in the Oseberg, Brage and Troll fields.
Butenko, G., et al, *London, Geological Society. Engineering geology special publication*, 1991, No.7, Quaternary engineering geology. Edited by A. Forster, et al, p.195-202, 2 refs.
Östmo, S.R.
DLC QE696.G413 1989
Quaternary deposits, Glacial deposits, Bottom sediment, Soil strength, Offshore drilling, Engineering geology, Stratigraphy, Site surveys, Seismic surveys, Norway.

47-3877
Highway embankment construction across the Strathearn buried valley.
Cochrane, G.A., et al, *London, Geological Society. Engineering geology special publication*, 1991, No.7, Quaternary engineering geology. Edited by A. Forster, et al, p.203-209, 3 refs.
Carter, P.G.
DLC QE696.G413 1989
Glacial deposits, Soil strength, Embankments, Engineering geology, United Kingdom—Scotland.

47-3878
Waste disposal site selection techniques in Quaternary terraine Ontario, Canada.
Cooper, A.J., *London, Geological Society. Engineering geology special publication*, 1991, No.7, Quaternary engineering geology. Edited by A. Forster, et al, p.211-217, 10 refs.
DLC QE696.G413 1989
Waste disposal, Site surveys, Quaternary deposits, Stratigraphy, Canada—Ontario.

47-3879
Geotechnical properties of Quaternary deposits in the Belfast area.
Gregory, B.J., et al, *London, Geological Society. Engineering geology special publication*, 1991, No.7, Quaternary engineering geology. Edited by A. Forster, et al, p.219-228, 11 refs.
Bell, A.L.
DLC QE696.G413 1989
Quaternary deposits, Glacial deposits, Soil strength, Engineering geology, United Kingdom—Northern Ireland.

47-3880
Field and laboratory investigations of the clay tills at the test bed site at the Building Research Establishment, Garston, Hertfordshire.
Marsland, A., et al, *London, Geological Society. Engineering geology special publication*, 1991, No.7, Quaternary engineering geology. Edited by A. Forster, et al, p.229-238, 28 refs.
Powell, J.J.M.
DLC QE696.G413 1989
Glacial deposits, Clay soils, Soil strength, Soil tests, Engineering geology, United Kingdom.

47-3881
Suitability and acceptability for earthworking with reference to glacial tills in Scotland.
Matheson, G.D., et al, *London, Geological Society. Engineering geology special publication*, 1991, No.7, Quaternary engineering geology. Edited by A. Forster, et al, p.239-249, 17 refs.
Oliphant, J.
DLC QE696.G413 1989
Glacial deposits, Soil strength, Earthwork, Road maintenance, Engineering geology, United Kingdom—Scotland.

47-3882
Origins and engineering hazards of Swedish glaciomarine and marine clays.
Stevens, R.L., et al, *London, Geological Society. Engineering geology special publication*, 1991, No.7, Quaternary engineering geology. Edited by A. Forster, et al, p.257-264, 36 refs.
Rosenbaum, M.S., Hellgren, L.G.
DLC QE696.G413 1989
Glacial deposits, Marine deposits, Soil strength, Quaternary deposits, Clays, Landslides, Engineering geology, Sweden.

47-3883
Lateral stress measurements in a glaciomarine silty clay.
Sully, J.P., et al, *London, Geological Society. Engineering geology special publication*, 1991, No.7, Quaternary engineering geology. Edited by A. Forster, et al, p.265-270, 13 refs.
Campanella, R.G.
DLC QE696.G413 1989
Glacial deposits, Marine deposits, Soil strength, Clays, Soil tests, Strain tests, Engineering geology.

47-3884
Discussion of Session 1b. [Engineering implications of glacially derived deposits].
Atkinson, J.H., et al, *London, Geological Society. Engineering geology special publication*, 1991, No.7, Quaternary engineering geology. Edited by A. Forster, et al, p.271-279.
DLC QE696.G413 1989
Glacial deposits, Moraines, Soil strength, Quaternary deposits, Engineering geology.

47-3885
Theme lecture: Periglacial and slope processes.
Hutchinson, J.N., *London, Geological Society. Engineering geology special publication*, 1991, No.7, Quaternary engineering geology. Edited by A. Forster, et al, p.283-331, Refs. p.325-331.
DLC QE696.G413 1989
Periglacial processes, Slope processes, Cryogenic soils, Paleoclimatology, Quaternary deposits, Solifluction, Thermokarst, Terrain identification, Permafrost indicators, Permafrost depth, United Kingdom.

47-3886
Report on Session 2a. [Periglacial and slope processes: processes and materials properties].
Privett, K.D., *London, Geological Society. Engineering geology special publication*, 1991, No.7, Quaternary engineering geology. Edited by A. Forster, et al, p.335-337.
DLC QE696.G413 1989
Periglacial processes, Slope processes, Solifluction, Soil creep, Mass movements (geology), Landforms.

47-3887
Influence of late and post glacial slope development on the engineering geology of Wenlock Shale near Ironbridge, Salop.
Gostelow, T.P., et al, *London, Geological Society. Engineering geology special publication*, 1991, No.7, Quaternary engineering geology. Edited by A. Forster, et al, p.349-359, 15 refs.
Hamblin, R.J.O., Harris, D.I., Hight, D.W.
DLC QE696.G413 1989
Periglacial processes, Slope processes, Cryogenic soils, Soil strength, Clay soils, Slope stability, Quaternary deposits, Engineering geology, United Kingdom.

47-3888
Identification of features due to former permafrost in the North Sea.
Long, D., *London, Geological Society. Engineering geology special publication*, 1991, No.7, Quaternary engineering geology. Edited by A. Forster, et al, p.369-372, 9 refs.
DLC QE696.G413 1989
Subsea permafrost, Bottom sediment, Cryogenic soils, Quaternary deposits, Periglacial processes, Terrain identification, Permafrost indicators, United Kingdom.

47-3889
Review of the mechanisms of cambering and valley bulging.
Parks, C.D., *London, Geological Society. Engineering geology special publication*, 1991, No.7, Quaternary engineering geology. Edited by A. Forster, et al, p.373-380, 41 refs.
DLC QE696.G413 1989
Periglacial processes, Slope processes, Cryoturbation, Landforms, Mass movements (geology), Soil creep, Valleys.

47-3890
Solifluction shears at Carsington, Derbyshire.
Skempton, A.W., et al, *London, Geological Society. Engineering geology special publication*, 1991, No.7, Quaternary engineering geology. Edited by A. Forster, et al, p.381-387, 6 refs.
Norbury, D., Petley, D.J., Spink, T.W.
DLC QE696.G413 1989
Quaternary deposits, Clay soils, Solifluction, Soil strength, Cryogenic soils, United Kingdom.

47-3891
Periglacial discontinuities in Eocene clays near Denham, Buckinghamshire.
Spink, T.W., *London. Geological Society. Engineering geology special publication*, 1991, No.7, Quaternary engineering geology. Edited by A. Forster, et al, p.389-396, 14 refs.
DLC QE696.G413 1989
Periglacial processes, Clay soils, Solifluction, Soil strength, Cryogenic soils, United Kingdom.

47-3892
Discussion of Session 2a. [Periglacial and slope processes: processes and materials properties].
Chandler, R., et al, *London, Geological Society. Engineering geology special publication*, 1991, No.7, Quaternary engineering geology. Edited by A. Forster, et al, p.397-405.
DLC QE696.G413 1989
Periglacial processes, Slope processes, Solifluction, Slope stability, Engineering geology.

47-3893
Report on Session 2b. [Periglacial and slope processes: engineering implications].
Petley, D.J., *London, Geological Society. Engineering geology special publication*, 1991, No.7, Quaternary engineering geology. Edited by A. Forster, et al, p.409-414, 10 refs.
DLC QE696.G413 1989
Periglacial processes, Slope processes, Quaternary deposits, Soil strength, Cryogenic soils, Engineering geology.

47-3894
Glacigenic soils of the Taff Valley, South Wales: their geomorphology, geology and engineering properties.
Lewis, J.D., *London, Geological Society. Engineering geology special publication*, 1991, No.7, Quaternary engineering geology. Edited by A. Forster, et al, p.423-430, 12 refs.
DLC QE696.G413 1989
Cryogenic soils, Periglacial processes, Glacial deposits, Soil strength, Moraines, Quaternary deposits, United Kingdom—Wales.

47-3895
Pleistocene deposits of the South Wales coalfield and their engineering significance.
Wright, M.D., *London, Geological Society. Engineering geology special publication*, 1991, No.7, Quaternary engineering geology. Edited by A. Forster, et al, p.441-448, 39 refs.
DLC QE696.G413 1989
Quaternary deposits, Glacial deposits, Periglacial processes, Slope stability, Engineering geology, United Kingdom—Wales.

47-3896
Discussion of Session 2b. [Periglacial and slope processes: engineering implications].
Clayton, C., et al, *London, Geological Society. Engineering geology special publication*, 1991, No.7, Quaternary engineering geology. Edited by A. Forster, et al, p.449-455.
DLC QE696.G413 1989
Periglacial processes, Slope processes, Soil strength, Slope stability, Cryogenic soils, Engineering geology.

47-3897
Evaluation of seismic and borehole data available from onshore and offshore site investigations of relict glaciated areas.
Stewart, F.S., *London, Geological Society. Engineering geology special publication*, 1991, No.7, Quaternary engineering geology. Edited by A. Forster, et al, p.573-578, 9 refs.
DLC QE696.G413 1989
Site surveys, Glaciation, Glacial deposits, Bottom sediment, Quaternary deposits, Marine deposits, Soil surveys, Paleoclimatology.

47-3898
Wetland properties of permafrost soils in Alaska.
Ping, C.L., et al, International Soil Correlation Meeting, 8th, 1992. Proceedings, Lincoln, NE, U.S. Soil Conservation Service, 1992, p.198-205, 28 refs.
Moore, J.P., Clark, M.H.
Wetlands, Cryogenic soils, Permafrost distribution, Permafrost hydrology, Soil water, United States—Alaska.

47-3899
Late Pleistocene vertebrates and other fossils from Epiguruk, northwestern Alaska.
Hamilton, T.D., et al, *Quaternary research*, 1993, Vol.39, p.381-389, 23 refs.
Ashley, G.M., Reed, K.M., Schweger, C.E.
Paleoclimatology, Paleoecology, Fossils, Pleistocene, United States—Alaska.

47-3900
Small-scale wetland restoration in the high Arctic: a long-term perspective.
Forbes, B.C., *Restoration ecology*, Mar. 1993, Vol.1, p.59-68, 50 refs.
Wetlands, Tundra, Revegetation, Land reclamation, United States—Alaska.

47-3901
Discussion of deep snow mobility models.
Richmond, P.W., MP 3248, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, 1993, 10p., 27 refs. Presented at the NATO Reference Mobility Model (NRMM) Technical Management Committee Meeting, Trier, Germany, May 12-13, 1993.
Rubber snow friction, Snow strength, Snow hardness, Traction, Trafficability, Motor vehicles, Mathematical models.
This report discusses deep snow mobility (trafficability) models. Investigations into the trafficability of vehicles in deep snow have been ongoing since as early as 1954. Modeling of vehicle performance under these conditions began shortly thereafter. Completely acceptable models have not yet been developed. The primary purpose of these models, as with all trafficability models, is to predict net traction. This is generally done by predicting the gross traction available to the vehicle and subtracting a prediction of the resistance to motion caused by the terrain. Vehicle sinkage is also a desirable value, to determine if the vehicle undercarriage is dragging (which will increase resistance), and to determine if the vehicle is truly in a deep snow condition. Recently, a shallow snow mobility model was developed that seems to produce excellent results. Due to the apparent lack of an acceptable deep snow model, it seemed reasonable to attempt some comparisons between shallow and deep snow algorithms and to compare the results with available data. A short description of deep snow is provided, and the basic algorithms and assumptions of various models are described and compared with each other and with test data. These results indicate that, of the models examined, sinkage can be predicted marginally well, but the extent of the deformation bulb cannot be determined. The shallow snow relationships for resistance and traction seem promising for use in deep snow, but more confirmation is required. The existing deep snow models require extensive snow characterization, which is acceptable for design comparisons, but not for use as tactical decision aids.

47-3902
Winter maintenance (1991-1993).
Transport Research Laboratory Library Services, Current topics in transport, No.35, Berkshire, England, 1993, 33p., Consists of 95 citations with abstracts.
Road maintenance, Snow removal, Road icing, Bibliographies.

47-3903
Snow depth and density measurements, Norman Wells pipeline study sites, Mackenzie Valley 1985 to 1991.
Burgess, M.M., *Canada. Geological Survey. Open file*, 1993, No.2626, 13p. + appends., 10 refs.
Snow surveys, Snow depth, Snow density, Pipelines.

47-3904
Apparatus and method for low temperature thermal stripping of volatile organic compounds from soil and waste materials with non-oxidative cross-sweep gases.
Noland, J., et al, *U.S. Patent Office. Patent*, Jan. 5, 1993, 12 col. USP-5,176,087.
Velazquez, L.A., Cosmos, M.
Soil pollution, Waste treatment, Evaporation.

47-3905
Meteorological data at Asuka Station, Antarctica in 1991.
Sukegawa, Y., et al, *Japanese Antarctic Research Expedition. JARE data reports*, Mar. 1993, No.190, 101p., 2 refs.
Yamanouchi, T.
Weather observations, Meteorological data, Air temperature, Humidity, Wind velocity, Antarctica—Asuka Station.

47-3906
Variation of perennial snow patch "Hamaguri-yuki" from 1967 to 1991.
Ohata, T., et al, *Nagoya University. Institute for Hydrospheric-Atmospheric Sciences. IHAS research report*, 1993, No.1, 43p., 10 refs.
Snow cover distribution, Snow air interface, Seasonal ablation, Alpine landscapes, Japan.

47-3907
Clive's recipe for successful snow and ice control.
Wray, W.J., Jr., *Better roads*, June 1993, 63(6), p.17.
Road maintenance, Snow removal, Road icing.

47-3908
Winter equipment maintenance: tips you need to know. *Better roads*, June 1993, 63(6), p.18,20,21.
Winter maintenance, Cold weather performance, Motor vehicles, Diesel engines, Fuels, Lubricants.

47-3909
Influence of damage on mechanical properties of woven composites at low temperatures.
Kriz, R.D., *Journal of composites technology and research*, Summer 1985, 7(2), p.55-58, 13 refs.
Thermal insulation, Composite materials, Low temperature research, Cryogenics, Geotextiles, Cold stress, Cracks.

47-3910
Fluctuations of glaciers 1985-1990. Volume VI.
World Glacier Monitoring Service, Paris, UNESCO, 1993, 319p. + maps, Refs. p.105-118.
Haeberli, W., ed, Hoelzle, M., ed.
Glacier surveys, Glacier oscillation, Glacier mass balance.

47-3911
Navy tactical applications guide. Volume 8, Part 2. Arctic East Siberian/Chukchi/Beaufort seas weather analysis and forecast applications, meteorological satellite systems.
Tett, R.W., ed, *U.S. Naval Research Laboratory. Marine Meteorology Division. Report*, 1992, NRL/PU/7541—92-0005, Var. p., Refs. passim.
Polar atmospheres, Marine meteorology, Weather forecasting, Storms, Atmospheric circulation, Atmospheric pressure, Fronts, Air ice water interaction, Polynyas, Spaceborne photography.

47-3912
Field screening methods for TNT, RDX and 2,4-DNT in soil and water.
Jenkins, T.F., et al, MP 3249, Environmental Symposium and Exhibition, 19th, Albuquerque, NM, Mar. 22-25, 1993. Proceedings, Arlington, VA, American Defense Preparedness Association, 1993, p.282-287, 15 refs.
Walsh, M.E.
Soil pollution, Water pollution, Explosives, Environmental impact, Soil chemistry, Water chemistry, Chemical analysis.
Development and validation of field screening techniques for explosives residues in soil and water originating from munitions wastes are discussed. Simple colorimetric tests have been developed to detect 2,4,6-TNT, 2,4-DNT and RDX in soil water. Soils are extracted by manually shaking with acetone. Water samples are extracted by passage through a solid phase extraction cartridge and eluting with acetone. The acetone extracts from each procedure are then subjected to the following reactions. For TNT and 2,4-DNT, the extracts are reacted with potassium hydroxide and sodium sulfite to form the red-colored Janowsky complex when TNT is present or the blue-purple complex when 2,4-DNT is present. For RDX, extracts are passed through an anion exchange resin to remove nitrate and nitrite, acidified, and RDX is reduced with zinc to form nitrous acid. The nitrous acid is detected by reaction with a Hach Nitri Ver 3 powder pillow, which produces a highly colored azo dye. Detection of these analytes can be obtained visually and concentrations estimated from absorbance measurements at 540, 570 and 507 nm for TNT, 2,4-DNT and RDX, respectively. Detection limits in soil are about 1 microgram/g for TNT and RDX and about 2 microgram/g for 2,4-DNT. Detection limits in water have been estimated at 5 microgram/L for TNT and RDX. Results indicate that the field screening methods do not suffer from false negatives and the rate of false positives is low.

47-3913
Comparison of solid phase extraction with salting-out solvent extraction for preconcentration of nitroaromatic and nitramine explosives from water.
Jenkins, T.F., et al, MP 3250, Environmental Symposium and Exhibition, 19th, Albuquerque, NM, Mar. 22-25, 1993. Proceedings, Arlington, VA, American Defense Preparedness Association, 1993, p.316-321, 19 refs.
Miyares, P.H.
Soil pollution, Water pollution, Explosives, Environmental impact, Ground water, Soil chemistry, Water chemistry, Chemical analysis.
Residues of high explosives are one of the most significant pollution problems at DOD facilities. Recently the EPA has lowered the concentration at which these compounds are thought to be harmful to human health. Because TNT, RDX and HMX, as well as several manufacturing impurities and environmental transformation products, are quite mobile in the soil and have caused ground water pollution, there is an increasing demand for low-level analysis of these compounds in ground water from installation boundary wells. RDX and HMX are very polar, and normal liquid-liquid extraction/preconcentration techniques result in poor recovery. Two innovative preconcentration techniques have been reported that appear to offer improved recovery and adequate preconcentration: solid phase extraction (SPE) and salting-out solvent extraction (SOE). This paper compares cartridge-SPE, membrane-SPE, and SOE using a series of reagent-grade water samples fortified with low concentrations of 11 nitroaromatics and nitramines and a set of ground water samples from an explosives-contaminated DOD facility. Results indicated that the three methods were comparable with respect to low-level detection capability, which ranged from 0.05 to 0.30 mg/L.

47-3914
Anthropogenic tundra disturbance and patterns of response in the eastern Canadian Arctic.
Forbes, B.C., Montreal, McGill University, 1993, 333p. + appends., Ph.D. thesis. With French and Russian summaries. Refs. p.298-324.
Tundra, Revegetation, Plant ecology, Soil erosion, Vegetation patterns, Environmental impact, Human factors, Canada.

47-3915
Erecting seismically stable dams under the conditions of the northern construction-climatic zone. [O vozvedenii seismostoikikh plotin v usloviiakh severnoĭ stroitel'no-klimaticheskoĭ zony].
Shatygin, V.A., *Izvestiia vysshikh uchebnykh zavedeniĭ. Stroitel'stvo*, July-Aug. 1992, No.7-8, p.90-94, In Russian. 5 refs.
Dams, Cold weather construction, Earthquakes.

47-3916
Improved formulas for concrete mix temperature, required for winter concreting. [Utochennye formuly temperatury betonnoĭ smesi, neobkhodimoĭ dlia zimnego betonirovaniia].
Panfilov, D.F., *Izvestiia vysshikh uchebnykh zavedeniĭ. Stroitel'stvo*, July-Aug. 1992, No.7-8, p.115-118, In Russian. 2 refs.
Winter concreting, Analysis (mathematics), Accuracy, Concretes.

47-3917
Evaluation of multichannel Wiener filters applied to fine resolution passive microwave images of first-year sea ice.
Full, W.E., et al, *Remote sensing of environment*, Apr. 1993, 44(1), p.1-23, 26 refs.
Eppler, D.T.
Sea ice, Aerial surveys, Surface properties, Classifications, Photographic reconnaissance, Radiometry, Sensors, Image processing, Data processing, Resolution.

47-3918
Classification of permafrost active layer depth from remotely sensed and topographic evidence.
Peddle, D.R., et al, *Remote sensing of environment*, Apr. 1993, 44(1), p.67-80, 34 refs.
Franklin, S.E.
Permafrost surveys, Permafrost distribution, Permafrost thickness, Active layer, Spaceborne photography, Radiometry, Image processing, Classifications, Computer programs, Topographic features.

47-3919
Estimating snow grain size using AVIRIS data.
Nolin, A.W., et al, *Remote sensing of environment*, May-June 1993, 44(2-3), p.231-238, 17 refs.
Dozier, J.
Snow cover distribution, Snow depth, Snow surveys, Aerial surveys, Infrared reconnaissance, Image processing, Snow optics, Snow cover effect, Grain size, Reflectivity.

47-3920
Modelling of rock mass responses to glaciation at Finnsjön, central Sweden.
Rosengren, L., et al, *Tunnelling and underground space technology*, Jan. 1993, 8(1), p.75-82, 15 refs.
Stephansson, O.
Nuclear power, Waste disposal, Underground storage, Glaciation, Bedrock, Ice solid interface, Ice loads, Stress concentration, Rock mechanics, Mathematical models.

47-3921
Icing on a small horizontal-axis wind turbine—part 1: glaze ice profiles.
Bose, N., *Journal of wind engineering and industrial aerodynamics*, Dec. 1992, 45(1), p.75-85, 11 refs.
Wind power generation, Electric equipment, Propellers, Ice accretion, Ice air interface, Glaze, Profiles, Ice loads, Performance, Ice cover effect.

47-3922
Icing on a small horizontal-axis wind turbine—part 2: three dimensional ice and wet snow formations.
Bose, N., *Journal of wind engineering and industrial aerodynamics*, Dec. 1992, 45(1), p.87-96, 10 refs.
Wind power generation, Electric equipment, Propellers, Ice accretion, Ice air interface, Glaze, Surface structure, Ice loads, Ice cover effect, Snow cover effect, Performance.

47-3923
Vertical structure and size distributions of Martian aerosols from solar occultation measurements.
Chassefière, E., et al, *Icarus*, May 1992, 97(1), p.46-69, 40 refs.
Mars (planet), Atmospheric composition, Cloud physics, Infrared spectroscopy, Aerosols, Particle size distribution, Ice nuclei, Heterogeneous nucleation, Hydrologic cycle, Extraterrestrial ice.

47-3924
Hail: the white plague.
Hughes, P., et al, *Weatherwise*, Apr.-May 1993, 46(2), p.16-21, 2 refs.
Wood, R.
Precipitation (meteorology), Weather observations, Hail, Ice storms, Thunderstorms, Damage.

47-3925
Breakup of shore fast sea ice.
Squire, V.A., *Cold regions science and technology*, May 1993, 21(3), p.211-218, 27 refs.
Sea ice, Fast ice, Ice breakup, Ocean waves, Ice water interface, Ice deformation, Wave propagation, Damping, Ice cover thickness, Mathematical models.

47-3926
Comparison of the mass-loading and elastic plate models of an ice field.
Squire, V.A., *Cold regions science and technology*, May 1993, 21(3), p.219-229, 33 refs.
Sea ice, Ocean waves, Ice water interface, Ice edge, Wave propagation, Boundary value problems, Damping, Ice models, Ice elasticity, Ice cover effect, Mathematical models.

47-3927
Ice pressures on vertical and sloping structures through dimensional analysis and similarity theory.
Arunachalam, V.M., et al, *Cold regions science and technology*, May 1993, 21(3), p.231-245, 61 refs.
Muggeridge, D.B.
Sea ice, Offshore structures, Ice solid interface, Ice pressure, Ice mechanics, Forecasting, Design criteria, Analysis (mathematics), Topographic effects.

47-3928
Sea ice flexural rigidity: a comparison of methods.
DiMarco, R.L., et al, *Cold regions science and technology*, May 1993, 21(3), MP 3251, p.247-255, 16 refs.
Dugan, J.P., Martin, W.W., Tucker, W.B.
Sea ice, Ice water interface, Ice mechanics, Mechanical tests, Flexural strength, Elastic waves, Wave propagation, Accuracy, Analysis (mathematics).
Mechanical properties of sea ice are typically determined from a static test using the physical and chemical properties of small samples. Measurements of flexural properties of multi-year sea ice were made recently using both a static and a dynamic geophysical technique. This paper presents the results of a comparison between the ice flexural rigidity determined by the two methods. The dynamic method is shown to yield a very precise determination of the flexural rigidity based upon the propagation of low frequency (1 to 70 Hz) waves. Values determined by the static method are shown to be consistently higher.

47-3929
Effect of fatigue on the bearing capacity of floating ice sheets.
Haynes, F.D., et al, *Cold regions science and technology*, May 1993, 21(3), MP 3252, p.257-263, 8 refs.
Kerr, A.D., Martinson, C.R.
Floating ice, Ice cover strength, Bearing strength, Mechanical tests, Oscillations, Dynamic loads, Static loads, Correlation, Fatigue (materials).
In this paper laboratory tests on floating freshwater ice covers with specially built pulsators are described. Preliminary tests showed that the creep deflections were very small and that the pulsator used did not cause a breakthrough in the time frame considered. Therefore, a breakthrough method was used to determine the effect of the oscillatory load on the bearing capacity of an ice cover. After a prescribed time (or a number of accumulated cycles) both loading devices, the pulsator and its static control, were subjected to a constant downward deflection rate by means of screwjacks until breakthrough occurred. Two series of tests were conducted, one at an oscillating frequency of 21.5 Hz and the other at 15 Hz. Results of both series of tests showed that the oscillations substantially lowered the bearing capacity of the ice covers tested.

47-3930
Dielectric properties of frozen clay and silt soils.
Moore, J.C., et al, *Cold regions science and technology*, May 1993, 21(3), p.265-273, 20 refs.
Maeno, N.
Frozen ground physics, Permafrost physics, Soil tests, Electrical measurement, Dielectric properties, Low temperature research, Temperature effects, Water content, Phase transformations, Polarization (charge separation).

47-3931
Subsurface temperatures and geothermal gradients on the North Slope of Alaska.
Collett, T.S., et al, *Cold regions science and technology*, May 1993, 21(3), p.275-293, 17 refs.
Bird, K.J., Magoon, L.B.
Permafrost surveys, Permafrost depth, Geothermal prospecting, Frozen ground temperature, Temperature gradients, Subsurface investigations, Well logging, Hydrates.

47-3932
Constitutive equation for temperate firn derived from strain rates of two firn pits (Kesselwandferner, Oetztal Alps, 1967-1989).
Ambach, W., et al, *Cold regions science and technology*, May 1993, 21(3), p.295-303, 11 refs.
Huber, J., Eisner, H., Schneider, H.
Firn, Glacier flow, Snow mechanics, Snow deformation, Pits (excavations), Strain tests, Analysis (mathematics).

47-3933
Ice detector estimation of atmospheric icing on a cable.
McComber, P., et al, *Cold regions science and technology*, May 1993, 21(3), p.305-316, 12 refs.
Druez, J., Laflamme, J.
Power line icing, Ice loads, Ice detection, Icing rate, Indicating instruments, Performance, Cold weather tests, Ice forecasting.

47-3934
Spacing of icicles.
Makkonen, L., et al, *Cold regions science and technology*, May 1993, 21(3), p.317-322, 5 refs.
Fujii, Y.
Power line icing, Ice solid interface, Ice air interface, Ice growth, Drops (liquids), Physical properties, Dendritic ice, Wind factors, Ice forecasting, Theories.

47-3935
Effects of climatic perturbations on the equilibrium-line altitude, West Greenland.
Ambach, W., *Journal of glaciology*, 1993, 39(131), p.5-9, 19 refs.
Glaciology, Ice sheets, Glacier heat balance, Glacier mass balance, Glacier ablation, Climatic changes, Greenhouse effect, Analysis (mathematics).

47-3936
Topological approach to the strain-rate pattern of ice sheets.
Nye, J.F., *Journal of glaciology*, 1993, 39(131), p.10-14, 4 refs.
Glaciology, Ice sheets, Glacier flow, Stability, Glacier surfaces, Topographic maps, Strains, Analysis (mathematics).

47-3937
Mechanisms of fast flow in Jakobshavns Isbrae, West Greenland: Part 1. Measurements of temperature and water level in deep boreholes.
Iken, A., et al, *Journal of glaciology*, 1993, 39(131), p.15-25, 15 refs.
Echelmeyer, K.A., Harrison, W., Funk, M.
Glaciology, Ice sheets, Glacier flow, Glacial hydrology, Ice temperature, Temperature measurement, Boreholes, Subglacial drainage, Water level, Ice deformation.

47-3938
Consolidation of sediments by glaciers: relations between sediment geotechnics, soft-bed glacier dynamics and subglacial ground-water flow.
Boulton, G.S., et al, *Journal of glaciology*, 1993, 39(131), p.26-44, 24 refs.
Dobbie, K.E.
Glaciology, Pleistocene, Glacial geology, Glacier flow, Glacial hydrology, Ice solid interface, Glacier beds, Sediments, Deformation, Glacier melting, Subglacial drainage.

47-3939
Glaciation and deglaciation mechanisms in a coupled two-dimensional climate—ice-sheet model.
Berger, A., et al, *Journal of glaciology*, 1993, 39(131), p.45-49, 11 refs.
Gallée, H., Tricot, C.
Glaciology, Paleoclimatology, Insolation, Climatic changes, Glaciation, Glacier oscillation, Periodic variations, Simulation.

47-3940
Internal melting and ice accretion at the bottom of temperate glaciers.
Lliboutry, L.A., *Journal of glaciology*, 1993, 39(131), p.50-64, 26 refs.
Glaciology, Glacier melting, Ice temperature, Glacier flow, Glacier beds, Ice accretion, Basal sliding, Interfacial tension, Ice water interface, Stress concentration, Analysis (mathematics).

47-3941
Thermo-mechanically coupled ice-sheet response—cold, polythermal, temperate.
Hutter, K., *Journal of glaciology*, 1993, 39(131), p.65-86, 73 refs.
Glaciology, Ice sheets, Glacier flow, Glacial hydrology, Glacier oscillation, Basal sliding, Water content, Ice thermal properties, Thermodynamics, Mathematical models.

47-3942
Mass balance of a cirque glacier in the Italian Alps (Ghiacciaio dell Sforzellina, Ortles-Cevedale Group).
Catasta, G., et al, *Journal of glaciology*, 1993, 39(131), p.87-90, 7 refs.
Smiraglia, C.
Glaciology, Cirque glaciers, Mountain glaciers, Glacier oscillation, Glacier mass balance, Glacier surveys, Periodic variations, Climatic factors.

47-3943
Tutorial on the use of control methods in ice-sheet modeling.
MacAyeal, D.R., *Journal of glaciology*, 1993, 39(131), p.91-98, 8 refs.
Glaciology, Ice sheets, Glacier flow, Basal sliding, Internal friction, Forecasting, Velocity measurement, Mathematical models.

47-3944
Solar-heating rates and temperature profiles in antarctic snow and ice.
Brandt, R.E., et al, *Journal of glaciology*, 1993, 39(131), p.99-110, 40 refs.
Warren, S.G.
Glaciology, Snow cover effect, Insolation, Radiation absorption, Snow temperature, Snow heat flux, Temperature gradients, Snow optics, Analysis (mathematics).
Observations of temperature maxima at about 10 cm depth in cold antarctic snow during summer have previously been explained by a model which proposes that solar heating is distributed with depth whereas thermal infrared cooling is localized at the surface (the "solid-state greenhouse"). When the model's spectral resolution is improved, solving for solar radiative fluxes separately in 118 wavelength bands instead of just one "average" wavelength, the temperature difference at the surface to 10 cm depth shrinks from approx. 4 K to 0.2 K and moves toward the surface, indicating that the solid-state greenhouse is largely an artifact of inadequate spectral resolution. The reason that the solid-state greenhouse effect is insignificant in the case of antarctic snow is that the wavelengths which do penetrate deeply into snow (visible light) are essentially not absorbed and are scattered back to the surface, whereas the wavelengths that are absorbed by snow (near-infrared) are absorbed in the top few millimeters. The conditions needed to obtain a significant solid- state greenhouse are examined. The phenomenon becomes important if the scattering coefficient is small (as in blue ice) or if the thermal conductivity is low (as in low-density snow, such as near- surface depth hoar). (Auth. mod.)

47-3945
TV-videc observations of bed and basal sliding on Storglaciären, Sweden.
Pohjola, V.A., *Journal of glaciology*, 1993, 39(131), p.111-118, 25 refs.
Glaciology, Glacier flow, Glacier beds, Basal sliding, Boreholes, Photographic techniques.

47-3946
Analysis of synthetic aperture radar data collected over the southwestern Greenland ice sheet.
Jezek, K.C., et al, *Journal of glaciology*, 1993, 39(131), p.119-132, 15 refs.
Glaciology, Glacier surfaces, Remote sensing, Synthetic aperture radar, Surface structure, Snow cover effect, Snowmelt, Sensor mapping, Backscattering.

47-3947
Statistics of firn closure: a simulation study.
Enting, I.G., *Journal of glaciology*, 1993, 39(131), p.133-142, 22 refs.
Glaciology, Firn, Ice composition, Atmospheric composition, Ice air interface, Gas inclusions, Bubbles, Age determination, Mathematical models, Latticed structures.

47-3948
Geometry and flow conditions of subglacial water at South Cascade Glacier, Washington State, U.S.A.; an analysis of tracer injections.
Fountain, A.G., *Journal of glaciology*, 1993, 39(131), p.143-156, 41 refs.
Glaciology, Mountain glaciers, Glacial hydrology, Subglacial drainage, Water flow, Flow measurement, Hydraulics.

47-3949
Basal ice accretion and debris entrainment within the coastal ice margin, Law Dome, Antarctica.
Goodwin, I.D., *Journal of glaciology*, 1993, 39(131), p.157-166, 27 refs.
Glaciology, Glacier ice, Grounded ice, Bottom ice, Ice composition, Stratigraphy, Ice accretion, Isotope analysis, Sediment transport, Subglacial observations, Antarctica—Law Dome.
Basal ice stratigraphy in coastal ice cliffs at the Law Dome margin has revealed the basal accretion of clean and debris-bearing ice, marine congelation ice and granular marine ice inland of the margin. Co-isotopic analysis of *delta*O-18 and *delta*D isotopes together with solute chemistry were applied to determine the modes of accretion and debris entrainment. The marine congelation ice and the granular marine ice were formed from the basal freezing of desalinated sea water and the episodic mixture of basal meltwater and sea water, respectively. Two different debris-entrainment mechanisms were identified. Debris- band ice with debris concentrations of 6.3-33% (by volume) was formed from proglacial raised beach and shallow marine sediment incorporated by an over-riding advance of the margin. Two other debris-bearing ice types, dispersed debris-poor ice with debris concentrations <0.3% (by volume) and laminated debris ice with debris concentration 0.9-19% (by volume) were accreted further inland from the margin by basal regelation processes associated with the Robin (1976) heat-pump effect. (Auth.)

47-3950
Steady flow of a viscous ice stream across a no-slip/-free-slip transition at the bed.
Barcilon, V., et al, *Journal of glaciology*, 1993, 39(131), p.167-185, 19 refs.
MacAyeal, D.R.
Glaciology, Glacier flow, Velocity measurement, Glacier beds, Glacier surfaces, Correlation, Ice solid interface, Basal sliding, Rheology, Analysis (mathematics).

47-3951
Particulate matter in pack ice of the Beaufort Gyre.
Reimnitz, E., et al, *Journal of glaciology*, 1993, 39(131), p.186-198, 43 refs.
Barnes, P.W., Weber, W.S.
Sea ice, Pack ice, Drift, Sediment transport, Ice rafting, Ice composition, Sampling, Sediments, Geologic processes.

47-3952
New ice mill allows precise concentration determination of methane and most probably also other trace gases in the bubble air of very small ice samples.
Fuchs, A., et al, *Journal of glaciology*, 1993, 39(131), p.199-203, 17 refs.
Schwander, J., Stauffer, B.
Glaciology, Glacier ice, Ice composition, Gas inclusions, Natural gas, Bubbles, Measuring instruments, Ice cutting, Design, Chemical analysis.

47-3953
Rapid advance of Pumarikish Glacier, Hispar Glacier basin, Karakoram Himalaya.
Wake, C.P., et al, *Journal of glaciology*, 1993, 39(131), p.204-207, 10 refs.
Searle, M.P.
Glaciology, Mountain glaciers, Glacier flow, Glacier surveys, Glacier surges, Glacier oscillation.

47-3954
Multi-year fluctuations in air temperature in the northern European basin. [Mnogoletnie kolebaniia temperatury vozdukha v Severo-Evropeĭskom bassĕine],
Dement'ev, A.A., *Problemy Arktiki i Antarktiki*, 1991, Vol.65, p.6-13, In Russian. 17 refs.
Air temperature, Temperature variations.

47-3955
Structure and circulation of waters in the area of the anticyclonic gyre in the northeastern Norwegian Sea. [Struktura i tsirkuliatsiia vod v oblasti antitsiklonicheskogo krugovorota na severo-vostoke Norvezhskogo moria],
Alekseev, G.V., et al, *Problemy Arktiki i Antarktiki*, 1991, Vol.65, p.14-23, In Russian. 6 refs.
Ocean currents, Water structure, Water temperature, Salinity, Temperature distribution, Norwegian Sea.

47-3956
Space and time regularities in the thermal state of waters in the northern European basin. [Prostranstvennye i vremennye zakonomernosti teplovogo sostoianiia vod Severo-Evropeĭskogo bassĕina],
Romantsov, V.A., et al, *Problemy Arktiki i Antarktiki*, 1991, Vol.65, p.24-43, In Russian. 25 refs.
Afanas'ev, B.V., Lebedev, N.V.
Thermal properties, Sea water, Water temperature, Seasonal variations, Isotherms.

47-3957
Deep and bottom waters of the Greenland Sea—formation and transformation processes. [Glubinnye i donnye vody Grenlandskogo moria—protsessy obrazovaniia i transformatsii],
Popov, A.V., *Problemy Arktiki i Antarktiki*, 1991, Vol.65, p.44-55, In Russian. 22 refs.
Sea water, Water temperature, Salinity, Ocean currents, Air water interactions, Greenland Sea.

47-3958
Large-scale variations in the thermal regime of the Norwegian Sea during 1959-1984. [Krupnomasshtabnye kolebaniia termicheskogo rezhima Norvezhskogo moria v 1959-1984 gg.],
Shevchenko, A.V., *Problemy Arktiki i Antarktiki*, 1991, Vol.65, p.56-65, In Russian. 26 refs.
Thermal regime, Sea water, Surface temperature, Surface waters, Water temperature, Temperature variations, Air water interactions, Ocean currents, Norwegian Sea.

47-3959
Variability of the heat balance component in the northern Norwegian Sea. [Ob izmenchivosti komponent teplovogo balansa na severe Norvezhskogo moria],
Seriakov, E.I., et al, *Problemy Arktiki i Antarktiki*, 1991, Vol.65, p.66-74, In Russian. 15 refs.
Romantsov, V.A.
Heat balance, Advection, Heat transfer, Enthalpy, Air water interactions, Norwegian Sea.

47-3960
Large-scale structure and characteristics of the average circulation of waters. [Krupnomasshtabnaia struktura i osobennosti srednei tsirkuliatsii vod],
Romantsov, V.A., *Problemy Arktiki i Antarktiki*, 1991, Vol.65, p.75-97, In Russian. 56 refs.
Ocean currents, Water structure, Greenland Sea, Norwegian Sea.

47-3961
Large-scale changes in the temperature field of the surface layer of water in the North Atlantic and the Norwegian Sea. [Krupnomasshtabnye izmeneniia polei temperatury vody poverkhnostnogo sloia v Severnoĭ Atlantike i Norvezhskom more],
Seriakov, E.I., *Problemy Arktiki i Antarktiki*, 1991, Vol.65, p.98-109, In Russian. 15 refs.
Water temperature, Sea water, Surface temperature, Surface waters, North Atlantic Ocean, Norwegian Sea.

47-3962
Forecasting the temperature of water in the Norwegian Sea. [Prognoz temperatury vody v Norvezhskom more],
Zhevnovatyĭ, V.T., et al, *Problemy Arktiki i Antarktiki*, 1991, Vol.65, p.110-120, In Russian. 5 refs.
Karpova, I.P., Sustavov, IU.V., IAkovlev, L.F.
Sea water, Water temperature, Forecasting, Air water interactions, Advection, Norwegian Sea.

47-3963
Large-scale oceanographic surveys and their methodological significance in a comprehensive investigation of the Barents Sea (in the example of the "BAREKS-84" expedition). [Krupnomasshtabnye okeanograficheskie s"emki i ikh metodologicheskoe znachenie dlia kompleksnogo izucheniia Barentseva moria (na primere ekspeditsii "BAREKS-84")],
Denisov, V.V., et al, *Problemy Arktiki i Antarktiki*, 1991, Vol.65, p.121-132, In Russian. 6 refs.
Zuev, A.N., Lebedev, I.A.
Oceanographic surveys, Expeditions, Barents Sea.

47-3964
Effect of bottom relief on the circulation of water in the northern European basin. [O vliianii rel'efa dna na tsirkuliatsiiu vod Severo-Evropeĭskogo bassĕina],
Semenov, G.A., *Problemy Arktiki i Antarktiki*, 1991, Vol.65, p.133-144, In Russian. 15 refs.
Bottom topography, Ocean currents, Ocean bottom, Mathematical models, Greenland Sea, Norwegian Sea.

47-3965
Experiment in organizing the automated gathering and processing of hydrometeorological information for scientific-research ships, equipped with ES computers. [Opyt organizatsii avtomatizirovannogo sbora i obrabotki gidrometeorologicheskoĭ informatsii dlia nauchno-issledovatel'skikh sudov, oborudovannykh ES EVM].
Safronov, V.A., *Problemy Arktiki i Antarktiki.* 1991, Vol.65, p.145-152, In Russian. 5 refs.
Computer applications, Computers, Data processing, Navigation.

47-3966
Movement of icebreakers in complicated ice conditions. [Dvizhenie ledokolov v slozhnykh ledovykh usloviiakh].
Rubanov, A.N., *Problemy Arktiki i Antarktiki.* 1991, Vol.65, p.153-156, In Russian. 1 ref.
Icebreakers, Ice navigation, Ice conditions, Ice cover thickness, Ice solid interface.

47-3967
Position, structure and characteristics of the dynamics of the polar frontal zone. [Polozhenie, struktura i osobennosti dinamiki poliarnoĭ frontal'noĭ zony].
Romantsov, V.A., *Problemy Arktiki i Antarktiki.* 1991, Vol.65, p.157-181, In Russian. 30 refs.
Water temperature, Salinity, Ocean currents, Fronts (meteorology).

47-3968
Proceedings.
Symposium on Joint Siberian Permafrost Studies between Japan and Russia, 1st, Sapporo, Japan, 1992, Sapporo, Hokkaido University, Institute of Low Temperature Science, 1993, 112p., Refs. passim. For selected papers see 47-3969 through 47-3982.
Fukuda, M., ed.
Atmospheric composition, Soil air interface, Nutrient cycle, Permafrost, Taiga, Tundra, Plant ecology.

47-3969
Geochemical study of atmospheric aerosols in Yakutsk.
Ohta, S., et al, Symposium on Joint Siberian Permafrost Studies between Japan and Russia, 1st, Sapporo, Japan, 1992. Proceedings. Edited by M. Fukuda, Sapporo, Hokkaido University, Institute of Low Temperature Science, 1993, p.4-9.
Murao, N., Makarov, V.N.
Aerosols, Atmospheric composition, Air pollution, USSR—Yakutsk.

47-3970
Measurements of methane flux in Yakutsk.
Ohta, S., et al, Symposium on Joint Siberian Permafrost Studies between Japan and Russia, 1st, Sapporo, Japan, 1992. Proceedings. Edited by M. Fukuda, Sapporo, Hokkaido University, Institute of Low Temperature Science, 1993, p.10-17.
Murao, N., Fukasawa, T., Makarov, V.N.
Atmospheric composition, Soil air interface, Wetlands, Nutrient cycle, USSR—Yakutsk.

47-3971
Aircraft measurement of atmospheric CO2 over Siberia.
Izumi, K., et al, Symposium on Joint Siberian Permafrost Studies between Japan and Russia, 1st, Sapporo, Japan, 1992. Proceedings. Edited by M. Fukuda, Sapporo, Hokkaido University, Institute of Low Temperature Science, 1993, p.21-29.
Atmospheric composition, Nutrient cycle, Taiga, Carbon dioxide, USSR—Siberia.

47-3972
Measurement of methane concentration in the atmosphere over Siberia.
Uchiyama, M., Symposium on Joint Siberian Permafrost Studies between Japan and Russia, 1st, Sapporo, Japan, 1992. Proceedings. Edited by M. Fukuda, Sapporo, Hokkaido University, Institute of Low Temperature Science, 1993, p.30-35, In Japanese.
Atmospheric composition, Nutrient cycle, Soil air interface, USSR—Siberia.

47-3973
Springtime ozone depletion and volatile organic compounds in the lower Arctic atmosphere.
Yokouchi, Y., Symposium on Joint Siberian Permafrost Studies between Japan and Russia, 1st, Sapporo, Japan, 1992. Proceedings. Edited by M. Fukuda, Sapporo, Hokkaido University, Institute of Low Temperature Science, 1993, p.40-41.
Polar atmospheres, Atmospheric composition, Ozone.

47-3974
Feedback of global warming in Siberian permafrost regions. Carbon storage and carbon dioxide budget in forest ecosystems.
Takahashi, K., Symposium on Joint Siberian Permafrost Studies between Japan and Russia, 1st, Sapporo, Japan, 1992. Proceedings. Edited by M. Fukuda, Sapporo, Hokkaido University, Institute of Low Temperature Science, 1993, p.47-50.
Atmospheric composition, Nutrient cycle, Taiga, Permafrost, Forest ecosystems, Global warming, Carbon dioxide, USSR—Siberia.

47-3975
Dendroclimatological analysis of tree growth patterns.
Osawa, A., Symposium on Joint Siberian Permafrost Studies between Japan and Russia, 1st, Sapporo, Japan, 1992. Proceedings. Edited by M. Fukuda, Sapporo, Hokkaido University, Institute of Low Temperature Science, 1993, p.55-58, 3 refs.
Taiga, Phenology, Paleoclimatology, Climatic changes, Growth.

47-3976
Soil characteristics and C and N storage in soil.
Ohta, S. et al, Symposium on Joint Siberian Permafrost Studies between Japan and Russia, 1st, Sapporo, Japan, 1992. Proceedings. Edited by M. Fukuda, Sapporo, Hokkaido University, Institute of Low Temperature Science, 1993, p.59-65, 2 refs.
Matsuura, Y., Sanada, M.
Nutrient cycle, Soil air interface, Forest soils, Soil chemistry, USSR—Yakutia.

47-3977
Trial of the measurement of CO2 concentration in a forest and photosynthesis of woody species native to eastern Siberia.
Koike, T., et al, Symposium on Joint Siberian Permafrost Studies between Japan and Russia, 1st, Sapporo, Japan, 1992. Proceedings. Edited by M. Fukuda, Sapporo, Hokkaido University, Institute of Low Temperature Science, 1993, p.69-74, 4 refs.
Tabuchi, R.
Nutrient cycle, Photosynthesis, Plant physiology, Atmospheric composition, Plant ecology, Forest ecosystems, Soil air interface, Growth, Carbon dioxide.

47-3978
Analysis of spermatophytes flora of Sakha SSR (Yakutskaya), eastern Siberia.
Takahashi, H., Symposium on Joint Siberian Permafrost Studies between Japan and Russia, 1st, Sapporo, Japan, 1992. Proceedings. Edited by M. Fukuda, Sapporo, Hokkaido University, Institute of Low Temperature Science, 1993, p.82-86.
Tundra, Plant ecology, Biogeography.

47-3979
Leaf characteristics and survivorship in an evergreen shrub, *Ledum palustre* ssp. decumbens in accordance with latitudinal change.
Kudo, G., Symposium on Joint Siberian Permafrost Studies between Japan and Russia, 1st, Sapporo, Japan, 1992. Proceedings. Edited by M. Fukuda, Sapporo, Hokkaido University, Institute of Low Temperature Science, 1993, p.87-94, 21 refs.
Tundra, Plant ecology, Plant physiology, Biogeography, Growth.

47-3980
Genesis and occurrence of Ice Complex (Edoma) in lowland area along arctic coast of east Siberia near Tiksi.
Fukuda, M., Symposium on Joint Siberian Permafrost Studies between Japan and Russia, 1st, Sapporo, Japan, 1992. Proceedings. Edited by M. Fukuda, Sapporo, Hokkaido University, Institute of Low Temperature Science, 1993, p.101-103.
Ice wedges, Fossil ice, Ground ice, Paleoclimatology, Permafrost dating, Ice dating, USSR—Tiksi.

47-3981
Grain-size distribution of the Edoma deposits on Cape Bykovskiy.
Nagaoka, D., Symposium on Joint Siberian Permafrost Studies between Japan and Russia, 1st, Sapporo, Japan, 1992. Proceedings. Edited by M. Fukuda, Sapporo, Hokkaido University, Institute of Low Temperature Science, 1993, p.104-109, 4 refs.
Loess, Eolian soils, Alluvium, Quaternary deposits, Soil texture, Grain size, Particle size distribution, USSR—Tiksi.

47-3982
Measurement of methane flux in Tiksi, Siberia.
Nakayama, T., Symposium on Joint Siberian Permafrost Studies between Japan and Russia, 1st, Sapporo, Japan, 1992. Proceedings. Edited by M. Fukuda, Sapporo, Hokkaido University, Institute of Low Temperature Science, 1993, p.110-112.
Atmospheric composition, Soil air interface, Wetlands, Nutrient cycle, USSR—Tiksi.

47-3983
Observations and theoretical studies of microwave emission from thin saline ice.
Wensnahan, M.R., et al, *Journal of geophysical research*, May 15, 1993, 98(C5), p.8531-8545, 44 refs.
Grenfell, T.C., Winebrenner, D.P., Maykut, G.A.
Sea ice, Young ice, Salt ice, Ice detection, Microwaves, Remote sensing, Surface temperature, Radiometry, Brightness, Spectra, Optical properties.

47-3984
Monte Carlo simulations of water-ice layers on a model silver iodide substrate: a comparison with bulk ice systems.
Taylor, J.H., et al, *Physical review B*, Apr. 15, 1993, 47(15), p.9732-9741, 68 refs.
Hale, B.N.
Ice physics, Cloud physics, Cloud seeding, Computerized simulation, Water films, Molecular structure, Ice formation, Heterogeneous nucleation, Silver iodide, Nucleation rate.

47-3985
Rapid spectroscopic determination of per cent aromatics, per cent saturates and freezing point of JP-4 aviation fuel.
Lysaght, M.J., et al, *Fuel*, May 1993, 72(5), p.623-631, 27 refs.
Kelly, J.J., Callis, J.B.
Aircraft, Hydrocarbons, Fuels, Fuel additives, Freezing points, Spectroscopy, Chemical composition, Chemical analysis, Statistical analysis.

47-3986
Dynamic observations of dislocation generation at grain boundaries in ice.
Liu, F., et al, *Philosophical magazine A*, May 1993, 67(5), p.1261-1276, 29 refs.
Baker, I., Dudley, M.
Ice physics, Ice microstructure, Boundary layer, Strain tests, X ray analysis, Stress concentration, Ice deformation, Dislocations (materials).

47-3987
Cretaceous chemosynthetic carbonate mounds in the Canadian Arctic.
Beauchamp, B., et al, *Palaios*, Aug. 1992, 7(4), p.434-450, 29 refs.
Savard, M.
Arctic landscapes, Landforms, Marine geology, Paleoecology, Ocean bottom, Bacteria, Geochemistry.

47-3988
Estimation of cloud resources for dispersion over the USSR territory.
Belova, L.K., et al, *Soviet meteorology and hydrology*, 1992, No.4, p.13-18, Translated from Meteorologiia i gidrologiia. 17 refs.
Litvinov, I.V., Tsverava, V.G.
Clouds (meteorology), Cloud cover, Weather modification, Cloud seeding, Cloud dissipation, Supercooled clouds, Meteorological data.

47-3989
Size distribution of particles in precipitation and river waters in the Baikal Lake region.
Anokhin, IU.A., et al, *Soviet meteorology and hydrology*, 1992, No.4, p.19-26, Translated from Meteorologiia i gidrologiia. 5 refs.
Precipitation (meteorology), Hydrologic cycle, Air pollution, Particle size distribution, Rivers, Suspended sediments, Snow impurities, Sampling.

47-3990
Free meandering in the conditions of a cryolithic zone of the Yamal Peninsula.
Savitskiĭ, V.A., *Soviet meteorology and hydrology*, 1992, No.4, p.27-33, Translated from Meteorologiia i gidrologiia. 5 refs.
Permafrost hydrology, Geocryology, River flow, Hydrogeology, Banks (waterways), Deformation.

47-3991
Changes of characteristics of arctic sea ice in case of a doubling of carbon dioxide.
Kolomeev, M.P., et al. *Soviet meteorology and hydrology*, 1992, No.4, p.34-40, Translated from Meteorologiia i gidrologiia. 20 refs.
Malyshev, S.L.
Sea ice distribution, Ice cover thickness, Seasonal variations, Air ice water interaction, Ice melting, Global warming, Heat balance, Carbon dioxide, Atmospheric composition, Mathematical models.

47-3992
Method for short-term forecasting of the position of the close pack ice edge in the northern Caspian Sea.
Bukharitsin, F.I., et al. *Soviet meteorology and hydrology*, 1992, No.4, p.58-63, Translated from *Meteorologiia i gidrologiia*. 12 refs.
Vasyanin, M.F., Kalinichenko, L.A.
Sea ice distribution, Pack ice, Ice edge, Ice forecasting, Statistical analysis, Wind factors, Marine meteorology, Temperature effects.

47-3993
Analysis of conditions and long-term forecast of ice-dam levels on the Lena.
Kilmianinov, V.V., *Soviet meteorology and hydrology*, 1992, No.4, p.64-69, Translated from Meteorologiia i gidrologiia. 10 refs.
River ice, River flow, Freezeup, Ice dams, Water level, Flood forecasting, Long range forecasting, Analysis (mathematics).

47-3994
Once more on calculations of maximum spring flood runoff.
Vodogretskiĭ, V.E., *Soviet meteorology and hydrology*, 1992, No.4, p.74-78, Translated from Meteorologiia i gidrologiia. 8 refs.
Hydrology, River basins, Runoff forecasting, Snowmelt, Mathematical models, Accuracy.

47-3995
Effects of deicing salt on visible symptoms, element concentrations and membrane damage in first-year needles of roadside Scots pine *(Pinus sylvestris)*.
Hautala, E.L., et al. *Annales botanici fennici*, 1992, 29(3), p.179-185, 30 refs.
Wulff, A., Oksanen, J.
Plants (botany), Trees (plants), Plant tissues, Damage, Road maintenance, Salting, Environmental impact, Chemical analysis.

47-3996
Strongly temperature dependent microphysical processes and the atmosphere.
Stewart, R.E., et al. *Contributions to atmospheric physics*, Nov. 1992, 65(4), p.309-315, With German summary. 13 refs.
Lin, C.A.
Atmospheric physics, Air temperature, Snow melting, Ice air interface, Temperature effects, Homogeneous nucleation, Thermodynamics, Analysis (mathematics).

47-3997
Regelation of ice through debris at glacier beds: implications for sediment transport.
Iverson, N.R., *Geology*, June 1993, 21(6), p.559-562, 16 refs.
Glacier ice, Glacier flow, Glacier beds, Regelation, Sediment transport, Abrasion, Ice solid interface, Mechanical tests, Simulation.

47-3998
Dielectric study of frozen aqueous solutions of ionic materials by means of thermally stimulated depolarization currents.
Laudát, J., et al. *Zeitschrift für Physikalische Chemie*, 1991, 174(pt.2), p.211-224, With German summary. 24 refs.
Laudát, F.
Solutions, Frozen liquids, Ice relaxation, Dielectric properties, Electrical measurement, Low temperature research, Polarization (charge separation), Ion density (concentration), Temperature effects.

47-3999
Pneumatic deicers with inextensible threads.
Kageorge, P.W., *U.S. Patent Office. Patent*, Aug. 18, 1987, 8 col., USP-4,687,159, 7 refs.
Aircraft icing, Ice removal, Ice deformation, Inflatable structures, Ice solid interface, Design.

47-4000
Road marking provided with protruding elements capable of resisting to snow plowing implements.
Eigenmann, L., *U.S. Patent Office. Patent*, Aug. 11, 1987, 6 col., USP-4,685,824, 8 refs.
Roads, Winter maintenance, Markers, Compressive properties, Protection, Visibility, Snow removal, Design.

47-4001
Snowplow and implement attachment means for a vehicle.
Quenzi, P.J., *U.S. Patent Office. Patent*, Apr. 21, 1987, 14 col., USP-4,658,519, 49 refs.
Snow removal, Equipment, Winter maintenance, Cold weather performance, Design.

47-4002
Apparatus for deicing exterior parts of a railway vehicle.
Björklund, B., *U.S. Patent Office. Patent*, Aug. 4, 1987, 6 col., USP-4,683,870, 17 refs.
Railroad cars, Ice removal, Equipment, Air flow, Heating, Dehumidification, Ventilation, Design.

47-4003
Snow-removing machine.
Gisler, H., et al. *U.S. Patent Office. Patent*, Aug. 11, 1987, 8 col., USP-4,685,228, 2 refs.
Boschung, M.
Snow removal, Snow vehicles, Road maintenance, Machinery, Design.

47-4004
Pipeline insulation system.
Patterson, M.M., *U.S. Patent Office. Patent*, Apr. 14, 1987, 4 col., USP-4,657,050, 1 ref.
Petroleum industry, Underground pipelines, Offshore structures, Pipeline insulation, Subsea permafrost, Permafrost preservation, Design.

47-4005
Ice preparation machine for ice tracks.
Schiehe, H., *U.S. Patent Office. Patent*, Apr. 14, 1987, 4 col., USP-4,656,762, 13 refs.
Machinery, Ice cover, Maintenance, Ice cutting, Snow removal, Design.

47-4006
Passive transponder for locating avalanche victims.
Leuenberger, C.E., *U.S. Patent Office. Patent*, Apr. 7, 1987, 8 col., USP-4,656,478, 5 refs.
Avalanches, Rescue equipment, Radio beacons, Antennas, Resonance, Design.

47-4007
Arctic structure of composite wall construction.
Birdy, J.N., et al. *U.S. Patent Office. Patent*, Apr. 7, 1987, 14 col., USP-4,655,642, 14 refs.
Watt, B.J., Chen, J.
Petroleum industry, Offshore structures, Subsurface structures, Ice loads, Walls, Plates, Bearing strength, Design, Composite materials.

47-4008
System for measuring glaze-ice by microprocessor with new release mechanism incorporated.
Provencal, G., et al. *U.S. Patent Office. Patent*, Jan. 26, 1988, 8 col., USP-4,721,949, 7 refs.
Côté, Y.
Power line icing, Glaze, Ice detection, Measuring instruments, Electronic equipment, Computer applications, Ice prevention, Accuracy, Design.

47-4009
Glaciers.
Hambrey, M.J., et al. Cambridge, UK, Cambridge University Press, 1992, 207p.
Alean, J.
Glacier surveys, Glacier oscillation, Icebergs, Cirque glaciers, Mountain glaciers, Glacial deposits, Crevasses, Glacier surges, Ecology, Antarctica.
This work describes and explains glaciers in all their variety, as well as the landscapes they are creating throughout six continents, including Antarctica. The climatic record of glaciers and ice sheets, and the global implications if major changes in the ice cover were to occur are also considered. The chapter on wildlife in glacial environments discusses how some animals and plants have adapted to severe climatic conditions. Over 80 full color photographs taken by the authors are included. (Auth. mod.)

47-4010
Acidification potential of snowpack in Sierra Nevada —discussion.
Bales, R.C., et al. *Journal of environmental engineering*, Mar.-Apr. 1993, 119(2), p.399-403, Includes reply. 6 refs. For article under discussion see 46-3116.
Snow hydrology, Snow composition, Snowmelt, Runoff, Chemical properties, Watersheds, Ion diffusion, Accuracy.

47-4011
Modeling the temperature regime of an arctic soil.
Richeva, T.A., et al. *Eurasian soil science*, May 1993, 24(8), p.1-11, Translated from Pochvovedenie, 1992, No.4. 18 refs.
Kapinos, V.A., Gil'manov, T.G.
Frozen ground thermodynamics, Frozen ground temperature, Thermal regime, Forecasting, Snow cover effect, Temperature variations, Meteorological data, Mathematical models.

47-4012
Effects of a straw mulch on the thermal conditions in soil after snow-cover loss.
Gusev, E.M., et al. *Eurasian soil science*, May 1993, 24(8), p.12-23, Translated from Pochvovedenie, 1992, No.5. 13 refs.
Busarova, O.E., Shurkhno, A.A., Yasinskiĭ, S.V.
Agriculture, Seasonal freeze thaw, Ground thawing, Soil temperature, Thaw depth, Biomass, Vapor diffusion, Insulation, Thermal conductivity, Mathematical models.

47-4013
Roller compacted concrete with high values of strength, frost resistance, and impermeability.
Osipov, A.D., et al. *Hydrotechnical construction*, Jan. 1993, 26(7), p.400-404, Translated from Gidrotekhnicheskoe stroitel'stvo. 2 refs.
Sharkunov, S.V., Semenenok, S.N., Magiton, A.S.
Concrete strength, Concrete aggregates, Compaction, Frost resistance, Chemical composition, Physical properties.

47-4014
Effect of the water-exchange index on the temperature regime of hydrostation pools.
Gotlib, IA.L., et al. *Hydrotechnical construction*, Jan. 1993, 26(7), p.462-468, Translated from Gidrotekhnicheskoe stroitel'stvo. 14 refs.
Khudiakova, A.I.
Reservoirs, Water temperature, Thermal regime, Hydrothermal processes, Freezeup, Ice cover effect, Water flow, Polynyas.

47-4015
***Assessing the completeness of the deglacial-marine* stratigraphy record on west Spitsbergen by accelerator mass spectrometry radiocarbon dating.**
Forman, S.L., et al. *Boreas*, Mar. 1993, 22(1), p.1-6, 26 refs.
Lehman, S.J., Briggs, W.M.
Quaternary deposits, Arctic landscapes, Marine deposits, Glacial deposits, Glacier oscillation, Radioactive age determination, Stratigraphy, Permafrost indicators.

47-4016
Exceptionally long, narrow drumlins formed in subglacial cavities, North Dakota.
Bluemle, J.P., et al. *Boreas*, Mar. 1993, 22(1), p.15-24, 21 refs.
Lord, M.L., Hunke, N.T.
Glacial deposits, Glacial geology, Glacier beds, Landscape development, Geomorphology, Sediment transport, Stratigraphy, Ice solid interface, Topographic features.

47-4017
Glacigenic deposits of the Central Deep: a key to the Late Quaternary evolution of the eastern Barents Sea.
Gataullin, V., et al. *Boreas*, Mar. 1993, 22(1), p.47-58, 35 refs.
Poliak, L., Epstein, O., Romaniuk, B.
Pleistocene, Quaternary deposits, Marine deposits, Glaciation, Marine geology, Glacial deposits, Drill core analysis, Stratigraphy.

47-4018
Physical signatures of ice advance in a Younger Dryas ice-contact delta, Troms, northern Norway: implications for glacier-terminus history.
Lönne, I., *Boreas*, Mar. 1993, 22(1), p.59-70, 39 refs.
Pleistocene, Glacial geology, Marine geology, Glacial deposits, Glaciation, Deltas, Geomorphology, Stratigraphy.

47-4019
Collision between graupel particles: a field observation and theory.
Mizuno, H., et al. *Meteorological Society of Japan. Journal*, Dec. 1992, 70(6), p.1037-1043, With Japanese summary. 28 refs.
Matsuo, T.
Precipitation (meteorology), Snow pellets, Ice crystal collision, Impact tests, Charge transfer, Particle size distribution, Velocity measurement, Cloud electrification.

47-4020
Cleanup in the Arctic.
Josephson, J., *Environmental science & technology*, Apr. 1993, 27(4), p.585.
Polar atmospheres, Environmental impact, Air pollution, Economic development, Countermeasures.

47-4021
Drag reduction of a cylinder/endwall junction using the ice formation method.
LaFleur, R.S., et al, *Journal of fluids engineering*, Mar. 1993, 115(1), p.26-32, 28 refs.
Langston, L.S.
Fluid dynamics, Design, Fluid flow, Unsteady flow, Joints (junctions), Ice formation, Ice water interface, Boundary layer, Topographic effects.

47-4022
Constraints on ice-sheet thickness over Tibet during the last 40,000 years.
Gupta, S.K., et al, *Journal of quaternary science*, Dec. 1992, 7(4), p.283-290, 43 refs.
Sharma, P., Shah, S.K.
Paleoclimatology, Quaternary deposits, Ice sheets, Glacier oscillation, Ice cover thickness, Snow cover effect, Ice cores, Isotope analysis, Climatic factors.

47-4023
Post-glacial loess deposition in a montane environment: South Thompson River valley, British Columbia, Canada.
Roberts, M.C., et al, *Journal of quaternary science*, Dec. 1992, 7(4), p.291-301, 36 refs.
Cunningham, F.F.
Quaternary deposits, Lacustrine deposits, Loess, Sediment transport, Stratigraphy, Landscape development, Eolian soils, Wind factors.

47-4024
Long-term studies of snow-vegetation interactions.
Walker, D.A., et al, *BioScience*, May 1993, 43(5), p.287-301, 53 refs.
Halfpenny, J.C., Walker, M.D., Wessman, C.A.
Alpine landscapes, Ecosystems, Vegetation patterns, Snow cover effect, Snow cover distribution, Periglacial processes, Geobotanical interpretation, Climatic changes.

47-4025
Computation of maximum ice-dam water levels of specified exceedence probability in the absence or lack of observation data.
Buzin, V.A., *Soviet meteorology and hydrology*, 1992, No.3, p.56-62, Translated from Meteorologiia i gidrologiia. 7 refs.
River flow, Hydraulics, Water level, Ice dams, Ice breakup, Flood forecasting, Ice cover effect, Statistical analysis, Accuracy.

47-4026
Proceedings of the 49th annual Eastern Snow Conference, Oswego, NY, June 3-4, 1992.
Eastern Snow Conference, MP 3253, 1992, 273p., Refs. passim. For individual papers see 47-4027 through 47-4058.
Ferrick, M.G., ed, Pangburn, T., ed.
DLC QC929.S7E34
Snowstorms, Snowfall, Snowmelt, Snow hydrology, Snow air interface, Lake effects, Runoff, River ice.

47-4027
Environmental isotope hydrograph separation during snowmelt in a suburban catchment.
Buttle, J.M., et al, *Eastern Snow Conference. Proceedings*, 1992, 49th, p.1-12, 18 refs.
Taylor, C.H., Vonk, A.M.
Snowmelt, Runoff, Snow hydrology, Stream flow, Snow composition, Water chemistry, Isotope analysis.

47-4028
Modeling the redistribution of snow in alpine areas using geographic information processing techniques.
Cline, D.W., *Eastern Snow Conference. Proceedings*, 1992, 49th, p.13-24, 17 refs.
Snow cover distribution, Snow air interface, Snowdrifts, Alpine landscapes, Snow erosion, Wind erosion, Wind factors, Statistical analysis.

47-4029
Snow hedge design guidelines: preliminary results and implications.
Perchanok, M.S., *Eastern Snow Conference. Proceedings*, 1992, 49th, p.25-30, 7 refs.
Snow hedges, Snowdrifts, Snow retention, Windbreaks, Road maintenance.

47-4030
Some experiences in assessing aircraft anti-icing fluid under various snow conditions.
Stamm, A., et al, *Eastern Snow Conference. Proceedings*, 1992, 49th, p.31-37, 2 refs.
Chermack, E.C., Thomas, M.
Aircraft icing, Chemical ice prevention, Snowstorms.

47-4031
Preliminary evaluation of thermal infrared aircraft data for mapping snow cover in the Sierra Nevada Mountains.
Hall, D.K., et al, *Eastern Snow Conference. Proceedings*, 1992, 49th, p.39-46, 20 refs.
Ormsby, J.P., Chien, J.Y.L.
Snow surveys, Snow cover distribution, Alpine landscapes, Aerial surveys, Infrared mapping, Radiometry, United States—California—Sierra Nevada.

47-4032
Acoustic pulse propagation over a seasonal snow cover.
Albert, D.G., *Eastern Snow Conference. Proceedings*, 1992, 49th, MP 3254, p.47-53, 19 refs.
Snow acoustics, Snow cover effect, Snow permeability, Snow air interface, Sound transmission, Attenuation, Seasonal variations.
The absorption of sound energy by the ground has been studied extensively because of its importance in understanding noise propagation through the atmosphere. Snow is of interest in this regard because it is the most absorptive naturally occurring ground cover. To quantify the effect of snow, measurements of acoustic pulse propagation were conducted in the 5- to 500-Hz frequency band over various snow covers and over snow-free grass and frozen ground. Blank pistol shots fired 1 m above the snow surface were the source of the acoustic pulses, and geophones and microphones arranged in a linear array were used to record the resultant waveforms. The peak pulse amplitudes decayed much faster with distance over snow than over snow-free grass; an order of magnitude difference in the sound pressure levels was recorded after 100 m of propagation. The acoustic waveforms were also markedly changed after propagating over snow, with broadened pulses and enhanced low frequencies. The pulse shapes and peak amplitude decay rates were successfully predicted theoretically using a layered, rigid-frame, porous medium model of the snow. The effective flow resistivity of the snow was determined by matching theoretical and observed waveforms, and this method gives promise of becoming a useful method of estimating the intrinsic permeability of the snow.

47-4033
Induced flow channels in a natural snowpack.
Albert, M.R., et al, *Eastern Snow Conference. Proceedings*, 1992, 49th, MP 3255, p.55-60, 7 refs.
McGilvary, W.R., Greenan, H.J.
Snowmelt, Snow hydrology, Seepage, Runoff.
Preliminary results from the response of two snowmelt lysimeters are examined in order to investigate the outflow differences between a disturbed and undisturbed natural snow cover. The lysimeters are located 5 m apart on level ground and are identical, except that one has instrumentation that induces vertical flow channels, while the other does not. The number of vertical flow paths in shallow, layered snowpacks has a large influence on snowmelt discharge. In ripe, homogeneous snowpacks with high discharge rates, induced vertical flow paths have little influence on discharge. Layering in shallow snow can influence snowmelt discharge through a significant portion of the snowmelt season.

47-4034
Air Force snowfall statistics for engineering applications.
Snelling, H.J., *Eastern Snow Conference. Proceedings*, 1992, 49th, p.61-69, 3 refs.
Snowfall, Snowstorms, Snow removal, Meteorological data, Airports, Military facilities, Statistical analysis.

47-4035
Numerical simulation model of cable icing in freezing rain conditions.
McComber, P., et al, *Eastern Snow Conference. Proceedings*, 1992, 49th, p.71-80, 14 refs.
Druez, J.
Power line icing, Ice storms, Ice accretion, Ice loads, Wind pressure, Mathematical models.

47-4036
Preliminary analysis of historical snow data using a geographic information system.
Loiselle, M.C., et al, *Eastern Snow Conference. Proceedings*, 1992, 49th, p.81-88, 2 refs.
Cowing, D.J., Keezer, G.R.
Snow surveys, Snow water equivalent, Runoff forecasting, Meteorological data, Statistical analysis, United States—Maine.

47-4037
Use of high resolution data from the nested grid model for the prediction of lake-effect snows.
Niziol, T.A., et al, *Eastern Snow Conference. Proceedings*, 1992, 49th, p.89-99, 13 refs. For another source see 47-2138.
McLaughlin, S.
Lake effects, Snowstorms, Weather forecasting, Meteorological data, Computerized simulation, Great Lakes.

47-4038
"Tea kettle" effect snow.
Woolley, R., et al, *Eastern Snow Conference. Proceedings*, 1992, 49th, p.101-106, 5 refs.
Caiazza, R., Galletta, T.A.
Lake effects, Snowstorms, Snowfall, Great Lakes.

47-4039
Coastal influences on winter precipitation events in southeast Labrador.
Newell, J.P., *Eastern Snow Conference. Proceedings*, 1992, 49th, p.107-114, 6 refs.
Marine meteorology, Precipitation (meteorology), Storms, Canada—Labrador.

47-4040
Preliminary numerical simulations of the 31 January 1991 lake-effect snowstorm.
Ballentine, R.J., et al, *Eastern Snow Conference. Proceedings*, 1992, 49th, p.115-123, 3 refs.
Chermack, E.C., Stamm, A., Frank, D., Thomas, M., Beck, G.
Lake effects, Snowstorms, Snowfall, Great Lakes.

47-4041
Role of multiple lake interaction in the western New York lake-effect snowstorm of 24-26 November 1991.
Byrd, G., et al, *Eastern Snow Conference. Proceedings*, 1992, 49th, p.125-134, 9 refs.
Restivo, M., Kraaijenbrink, G.
Lake effects, Snowstorms, Snowfall, Great Lakes.

47-4042
February 1972 Eastern Snow Conference weather experience at Oswego, New York.
Sykes, R.B., Jr., et al, *Eastern Snow Conference. Proceedings*, 1992, 49th, p.135-144, 9 refs.
Ferlito, J.
Lake effects, Snowstorms, Snowfall, Great Lakes.

47-4043
Does lake-effect snow extend to the mountains of West Virginia.
Schmidlin, T.W., *Eastern Snow Conference. Proceedings*, 1992, 49th, p.145-148, 15 refs.
Lake effects, Snowstorms, Snowfall, United States—West Virginia.

47-4044
Observations of lake-induced convection during the Lake Ontario Winter Storms Project (LOWS).
Penc, R.S., *Eastern Snow Conference. Proceedings*, 1992, 49th, p.149-159, 18 refs.
Lake effects, Snowstorms, Snowfall, Great Lakes.

47-4045
Characterization of hillslope thermal and hydrologic processes at the Sleepers River Research Watershed.
Pangburn, T., et al, *Eastern Snow Conference. Proceedings*, 1992, 49th, MP 3256, p.161-167, 13 refs.
Albert, M.R., Hardy, J.P., McGilvary, W.R., Shanley, J.B.
Snowmelt, Snow hydrology, Snow thermal properties, Snow heat flux, Seepage, Runoff, Slope processes, Watersheds.
Measurements for the characterization of thermal and hydrologic processes at the hillslope scale were made within the W-9 subwatershed at the Sleepers River Research Watershed during the 1991-92 winter season. Three soil pits were instrumented on a predominantly south-facing slope with a deciduous cover type. Soil and snow temperature sensors, soil moisture sensors, and soil water lysimeters were installed at each pit. Meteorologic data (air temperature, relative humidity, wind speed and direction, incoming and reflected short- and long-wave radiation) and snowpack characteristics were also measured throughout the study period. Streamwater and streambed temperatures were measured at the toe of the slope. These data are being used to study hillslope-scale thermal and hydrologic processes as an intermediate scale between point and basin modeling. Results of this study suggest that source areas are best defined by a field accounting of the thermal mechanisms in the snow/soil/stream system. These observed thermal mechanisms have a large effect on the internal snowmelt processes, the relative flow paths of surface, subsurface and ground water and the total outflow to the stream channel.

47-4046
Nitrogen dynamics and sub-ice meltwater patterns in a small boreal lake during snowmelt.
Jones, H.G., et al, *Eastern Snow Conference. Proceedings*, 1992, 49th, p.169-180, 24 refs.
Roberge, J.
Snowmelt, Snow hydrology, Runoff, Ice cover effect, Lake water, Water chemistry, Hydrogeochemistry, Nutrient cycle, Water pollution.

47-4047
Does detailed areal distribution of snow cover improve the utility of a hydrological model for watershed management.
Schroeter, H.O., et al, *Eastern Snow Conference. Proceedings*, 1992, 49th, p.181-192, 21 refs.
Whiteley, H.R.
Snow surveys, Snow cover distribution, Snowmelt, Snow hydrology, Runoff forecasting, Stream flow, Watersheds.

47-4048
Stream cooling by heat transfer to partially-submerged rocks.
Davis, R.E., *Eastern Snow Conference. Proceedings*, 1992, 49th, MP 3257, p.193-201, 25 refs.
River ice, Freezeup, Ice formation, Ice heat flux, Ice water interface, Heat transfer, Streams, Water temperature, Rock properties.
This study tested the hypothesis that partially submerged rocks in small streams contribute significantly to the heat loss from the stream during icing episodes. The experiment took place in a small stream on the eastern border of the Sierra Nevada mountains in California. Thermistors were placed in granite and quartz monzonite rocks, and the rocks were placed along transects across the stream. Rock, stream and air temperatures were measured along with other meteorologic variables during freezing events. The components of the energy balance over the stream and heat transfer rates between the rocks and the stream were estimated. Exposed rocks in a pool reached temperatures below stream temperatures during icing events, particularly when the stream temperature dropped to the melting point of ice. The energy loss rates from the stream to some of the rocks were the same magnitude for short periods as the energy losses from the surface of the stream. On the other hand, rock temperatures closely tracked the stream temperatures during daily warming. Analysis of one of the freezing episodes is presented here.

47-4049
Development of a field technique for measuring fresh water ice density.
Mulherin, N.D., et al, *Eastern Snow Conference. Proceedings*, 1992, 49th, MP 3258, p.203-212, 9 refs.
Ferrick, M.G., Weyrick, P.B., Perron, N.M., Hunnewell, S.
River ice, Lake ice, Ice density, Ice breakup, Ice deterioration, Ice surveys.
Warming and subsequent deterioration of river and lake ice during the spring thaw cause dramatic changes in its material properties. This paper investigates whether the ice porosity or, alternatively, the drained density can be quantified in the field. The accuracy and precision of field mass/volume measurement of cylindrical ice cores were obtained by comparing with mass/volume measurements made on the same samples after careful machining in the laboratory. In addition, some of the ice samples were later analyzed using a submersion weighing method that is highly accurate for bubble-free ice, and these results were compared with the two mass/volume methods. This preliminary analysis indicates that the field method may be adequate for characterizing both the spatial variability of ice density and the temporal changes in this density distribution.

47-4050
Improvements to expulsive separation ice protection blankets.
Goldberg, J., et al, *Eastern Snow Conference. Proceedings*, 1992, 49th, p.213-218, 3 refs.
Lardiere, B., Jr.
Aircraft icing, Ice removal, Ice breaking, Electrical properties.

47-4051
Some illustrations of roles of lake ice in limnology.
Adams, W.P., et al, *Eastern Snow Conference. Proceedings*, 1992, 49th, p.219-226, 10 refs.
Ecclestone, M.
Lake ice, Icebound lakes, Frozen lakes, Ice water interface, Ice cover effect, Limnology.

47-4052
Lake-Effect Snow Observation Network (LESON) report for the 1991-1992 snow season.
Ferlito, J., et al, *Eastern Snow Conference. Proceedings*, 1992, 49th, p.227-234, 6 refs.
Osborne, S., Sykes, R.B., Jr., Eichorn, D.
Lake effects, Snowstorms, Snowfall, Great Lakes.

47-4053
Look at lake effect snow cloudbands with satellite imagery.
Niziol, T.A., et al, *Eastern Snow Conference. Proceedings*, 1992, 49th, p.235-242, 11 refs.
Levan, J.M.
Lake effects, Snowstorms, Snowfall, Cloud cover, Spaceborne photography, Great Lakes.

47-4054
Local influences on winter minimum air temperatures.
Hogan, A.W., et al, *Eastern Snow Conference. Proceedings*, 1992, 49th, MP 3259, p.243-246, 7 refs.
Ferrick, M.G.
Snow air interface, Snow cover effect, Air temperature, Surface temperature, Atmospheric boundary layer, Soil air interface.
Previous experiments have developed the hypothesis that a frozen, snow-covered river impoundment can provide an air temperature reference plane in complex terrain. This reference plane facilitates analysis of surface temperature variability and the temperature-height structure of the boundary layer with respect to slope and aspect in the vicinity of the plane. The authors apply these results to analysis of the influence of local surface snow cover on the morning air temperature, and the vertical temperature structure observed.

47-4055
Borehole jack indentor test: recent advances at NHRI.
Demuth, M.N., et al, *Eastern Snow Conference. Proceedings*, 1992, 49th, p.247-253, 19 refs.
Prowse, T.D.
River ice, Ice cover strength, Ice hardness, Ice surveys, Borehole instruments, Hardness tests.

47-4056
Effects of temperature and snowfall on winter low flows in New England.
Hartley, S., *Eastern Snow Conference. Proceedings*, 1992, 49th, p.255-261, 6 refs.
Snowfall, Snowmelt, River flow, Stream flow, Runoff forecasting, Air temperature, Statistical analysis.

47-4057
Suspended sediment concentration during river ice break-up.
Prowse, T.D., *Eastern Snow Conference. Proceedings*, 1992, 49th, p.263-267, 20 refs.
River ice, Ice breakup, Ice erosion, Suspended sediments, Ice scoring, Banks (waterways).

47-4058
Snow surface temperature variation near a snow pit.
Gwilliam, B.L., *Eastern Snow Conference. Proceedings*, 1992, 49th, p.269-272, 5 refs.
Snow surface temperature, Snow air interface, Snow heat flux, Snow cover effect, Detection, Statistical analysis.

47-4059
Biogeochemical inductions of gold-dispersion trains of gold-quartz deposits in the permafrost zone.
Taisaev, T.T., et al, *USSR Academy of Sciences. Transactions. Earth science sections*, Feb. 1993, 317(2), p.215-220, 8 refs. For Russian original see 46-6.
Arent'eva, A.G.
Permafrost surveys, Permafrost weathering, Soil water migration, Tailings, Gold, Dispersions, Plant physiology, Geochemistry.

47-4060
Compressive strength of ice cubes of different sizes.
Kuehn, G.A., et al, *Journal of offshore mechanics and arctic engineering*, May 1993, 115(2), p.142-148, 17 refs. For another source see 46-4177.
Schulson, E.M., Jones, D.E., Zhang, J.
Ice mechanics, Ice strength, Ice volume, Ice deformation, Compressive properties, Stress concentration, Strain tests, Brittleness.

47-4061
Schooling behaviour of arctic cod, *Boreogadus saida*, in relation to drifting pack ice.
Crawford, R.E., et al, *Environmental biology of fishes*, Apr. 1993, 36(4), p.345-357, 30 refs.
Jorgenson, J.K.
Marine biology, Biomass, Distribution, Pack ice, Drift, Underwater acoustics, Ice cover effect.

47-4062
Ice depolarizations on K(a) band (20 GHz) satellite-to-ground path and correlation with radar observations.
Maekawa, Y., et al, *Radio science*, May-June 1993, 28(3), p.249-259, 25 refs.
Chang, N.S., Miyazaki, A.
Telecommunication, Satellites, Radio waves, Radar echoes, Wave propagation, Precipitation (meteorology), Attenuation, Polarization (waves), Ice crystal optics.

47-4063
Numerical calculation of the course of solidification in aqueous salt solutions, with reference to cryobiology.
(Numerische Berechnungen zum Erstarrungsverlauf in wäbrigen Salzlösungsproben mit Bezug sur Kryobiologie),
Heschel, I., et al, *Chemie-Ingenieur-Technik*, Jan. 1993, 65(1), p.63-66, In German. 12 refs.
Rau, G.
Cryobiology, Salt water, Solutions, Solidification, Phase transformations, Temperature effects, Ice water interface, Analysis (mathematics).

47-4064
Melting heat transfer along a horizontal heated tube immersed in a fluidized liquid ice bed.
Fukusako, S., et al, *Experimental thermal and fluid science*, May 1993, 6(4), p.353-359, 8 refs.
Yamada, M., Morizane, H., Kim, M.H.
Cold storage, Air conditioning, Bubbling, Pipes (tubes), Slush, Phase transformations, Ice melting, Solutions, Ice solid interface, Heat transfer coefficient.

47-4065
Validation of local thermal equilibrium in unsaturated porous media with simultaneous flow and freezing.
Tao, Y.X., et al, *International communications in heat and mass transfer*, May-June 1993, 20(3), p.323-332, 6 refs.
Gray, D.M.
Porous materials, Phase transformations, Frozen ground thermodynamics, Snowmelt, Seepage, Ice water interface, Heat balance, Heat transfer, Mathematical models.

47-4066
Effect of selective withdrawal on the annual thermal regime of a deep water body.
Bocharov, O.B., et al, *Water resources*, July 1993, 19(5), p.384-390, Translated from Vodnye resursy, 10 refs.
Zinov'ev, A.T.
Reservoirs, Thermal regime, Water temperature, Temperature control, Water flow, Flow control, Ice control, Mathematical models.

47-4067
Method of calculating and predicting the thickness of rafted ice in open regions of the North Caspian.
Bukharitsin, P.I., *Water resources*, July 1993, 19(5), p.390-394, Translated from Vodnye resursy. 9 refs.
Sea ice, Ice floes, Thickness, Forecasting, Air temperature, Wind factors, Air ice water interaction, Degree days.

47-4068
Chemical composition of precipitation in Uzbekistan.
Kulmatov, R.A., et al, *Water resources*, July 1993, 19(5), p.413-419, Translated from Vodnye resursy. 3 refs.
Savenko, V.S., Dalonov, N.
Precipitation (meteorology), Chemical composition, Sampling, Snow melting, Glacier melting, Meltwater, Water pollution, Air pollution, Neutron activation analysis.

47-4069
Rime- and glaze-ice accretion due to freezing rain falling vertically on a horizontal thermally insulated overhead line conductor.
Poots, G., et al, *International journal on heat and fluid flow*, Dec. 1992, 13(4), p.390-398, 17 refs.
Skelton, P.L.I.
Power line icing, Ice accretion, Ice growth, Raindrops, Glaze, Ice air interface, Ice water interface, Heat transfer, Analysis (mathematics), Temperature effects.

47-4070
Infrared emissivities of arctic land cover types.
Rees, W.G., *International journal of remote sensing*, Mar. 20, 1993, 14(50), p.1013-1017, 8 refs.
Arctic landscapes, Remote sensing, Landscape types, Surface temperature, Brightness, Infrared reconnaissance, Radiometry, Ice optics, Accuracy.

47-4071
Modeling and numerical simulations of dendritic crystal growth.
Kobayashi, R., *Physica D*, Mar. 15, 1993, 63(3-4), p.410-423, 22 refs.
Crystal growth, Mathematical models, Liquid solid interfaces, Dendritic ice, Ice crystal structure, Phase transformations, Anisotropy.

47-4072
Holocene water-level fluctuations of a subarctic lake at the tree line in northern Quebec.
Payette, S., et al, *Boreas*, Mar. 1993, 22(1), p.7-14, 24 refs.
Filion, L.
Limnology, Subarctic landscapes, Paleoecology, Lacustrine deposits, Water level, Radioactive age determination, Stratigraphy, Permafrost structure.

47-4073
Swedish varve chronology—a review.
Boygle, J., *Progress in physical geography*, Mar. 1993, 17(1), p.1-19, 51 refs.
Quaternary deposits, Glacial deposits, Glacial lakes, Geochronology, Paleoclimatology, Glacier oscillation, Climatic changes, Accuracy.

47-4074
Small vertical supercooled cloud tunnel system for the study of ice (snow) crystal growth.
Gong, N.H., et al, *Chinese journal of atmospheric sciences*, 1992, 16(3), p.254-262, 9 refs.
Tao, S.W., Niu, Y.Q.
Snow physics, Cloud physics, Ice crystal structure, Snowfall, Cloud chambers, Wind tunnels, Design, Supercooled fog.

47-4075
High-pressure melting—solidification of a substance.
Zelenetskiĭ, A.B., et al, *Journal of engineering physics and thermophysics*, Apr. 1993, 63(4), p.1037-1044, Translated from Inzhenerno-fizicheskiĭ zhurnal. 18 refs.
Kolesnichenko, V.I., Tsaplin, A.I.
Liquids, Thermodynamic properties, High pressure ice, Liquid phases, Phase transformations, Heat transfer, Mathematical models.

47-4076
Morphosedimentological dynamics and coastal evolution in the Kongsfjorden area, Spitsbergen.
Héquette, A., *Polar geography and geology*, Oct.-Dec. 1992, 16(4), p.321-328, 33 refs. Reprinted from Inter-nord, 1991, No.19.
Arctic landscapes, Geomorphology, Shoreline modification, Littoral zone, Moraines, Marine deposits, Outwash, Sedimentation, Sea level.

47-4077
Plant colonization and geodynamics of slopes in a polar oceanic environment (Svalbard, 79 deg N).
André, M.F., *Polar geography and geology*, Oct.-Dec. 1992, 16(4), p.329-347, 36 refs. Reprinted from Inter-nord, 1991, No.19.
Slope processes, Rock glaciers, Arctic landscapes, Geomorphology, Site surveys, Vegetation patterns, Lichens, Plant ecology, Age determination.

47-4078
Oden—a new concept in icebreaker design. *Naval architect*, Feb. 1989, p.E71-E74.
Icebreakers, Design, Specifications, Performance.

47-4079
Arctic bases to get cleanup.
Carr, F.H., *Engineering news-record*, May 31, 1993, 230(22), p.20.
Radar, Military facilities, Stations, Waste disposal, Cold weather operation.

47-4080
Relative dispersion of ice crystals in seeded cumuli.
Weil, J.C., et al, *Journal of applied meteorology*, June 1993, 32(6), p.1055-1073, 59 refs.
Lawson, R.P., Rodi, A.R.
Cloud physics, Cloud seeding, Dispersions, Ice crystals, Ice nuclei, Dry ice (trademark), Turbulent diffusion, Ice air interface.

47-4081
Method for determining cirrus cloud particle sizes using lidar and radar backscatter technique.
Intrieri, J.M., et al, *Journal of applied meteorology*, June 1993, 32(6), p.1074-1082, 33 refs.
Stephens, G.L., Eberhard, W.L., Uttal, T.
Cloud physics, Remote sensing, Ice crystal optics, Particle size distribution, Radar echoes, Lidar, Backscattering.

47-4082
Recultivation of disturbed land in permafrost regions. [Rekul'tivatsiia narushennykh zemel' v raĭonakh vechnoĭ merzloty],
Younkin, W.E., *Stroitel'stvo truboprovodov*, Aug. 1991, No.8, p.42-45, In Russian.
Revegetation, Environmental protection, Permafrost.

47-4083
Site surveys of pipelines in the Far North. [Poligonnye issledovaniia truboprovodov Kraĭnego Severa],
Kharionovskiĭ, V.V., *Stroitel'stvo truboprovodov*, Jan. 1993, No.1, p.30-35, In Russian.
Pipelines, Cold weather operation, Gas pipelines, USSR—Far North.

47-4084
Calculating the dynamics of snow avalanches. [Uchet dinamiki snezhnykh lavin],
IAdroshnikov, V.I., *Transportnoe stroitel'stvo*, Feb. 1993, No.2, p.4-8, In Russian. 9 refs.
Avalanche mechanics, Analysis (mathematics).

47-4085
Basic principles for the design of a roadbed and small man-made structures on permafrost on the Tommot-Yakutsk railroad line. [Ob osnovnykh polozheniiakh po proektirovaniiu zemlianogo polotna i malykh iskusstvennykh sooruzheniĭ na vechnomerzlykh gruntakh zheleznodorozhnoĭ linii Tommot- IAkutsk],
Kondrat'ev, V.G., et al, *Transportnoe stroitel'stvo*, Feb. 1993, No.2, p.11-13, In Russian.
Sholin, V.V.
Roadbeds, Design criteria, Permafrost beneath structures.

47-4086
Improving the technology for building a roadbed in Southern Yakutia. [Sovershenstvovanie tekhnologii pri sooruzhenii zemlianogo polotna v IUzhnoĭ IAkutii],
Maksimov, A.V., et al, *Transportnoe stroitel'stvo*, Nov.-Dec. 1992, No.11-12, p.3-5, In Russian. 2 refs.
Alekseev, A.A., Minaĭlov, G.P., Glushchenko, A.S.
Roadbeds, Cold weather construction, USSR—Yakutia.

47-4087
Effective structural design plan for a marine steel platform in sea ice conditions. [Effektivnaia konstruktivno-komponovochnaia skhema stal'noĭ morskoĭ platform v usloviiakh ledovogo rezhima moria],
Berniker, IA.S., et al, *Izvestiia vysshikh uchebnykh zavedeniĭ. Stroitel'stvo*, May-June 1993, No.5-6, p.12-15, In Russian. 3 refs.
Azhermachev, G.A.
Design, Offshore structures, Ice solid interface, Sea ice.

47-4088
Thermophysical properties of carbamide insulation in the temperature range of -20 to +50 deg. [Teplofizicheskie svoĭstva karbamidnogo uteplitelia v intervale temperatur ot -20 do +50 grad.],
Balukh, V.L., et al, *Izvestiia vysshikh uchebnykh zavedeniĭ. Stroitel'stvo*, Mar. 1993, No.3, p.55-56, In Russian. 4 refs.
Thermal properties, Thermal insulation.

47-4089
Nuclear lighter "Sevmorput". [Atomnyĭ likhterovoz "Sevmorput"],
Smirnov, V., et al, *Morskoĭ flot*, Nov. 1990, No.11, p.22-23, In Russian.
Rodionov, N.
Ships, Ice navigation, Marine transportation, Petroleum products.

47-4090
Transport of small consignments of petroleum products to Arctic points. [Perevozka malykh partiĭ nefteproduktov v arkticheskie punkty],
Kazimirov, A., *Morskoĭ flot*, Sep. 1990, No.9, p.5-6, In Russian.
Marine transportation, Tanker ships, Ice navigation.

47-4091
Variable pitch propellers for ice navigating ships. [Sudam ledovogo plavaniia—VRSh],
Ivanov, S., *Morskoĭ flot*, Mar. 1990, No.3, p.38-40, In Russian.
Ships, Ice navigation, Design, Propellers.

47-4092
Power plants of future icebreakers. [Energeticheskaia ustanovka ledokola budushchego],
Kulikov, A., *Morskoĭ flot*, Jan. 1990, No.1, p.43-44, In Russian.
Icebreakers, Electric power, Steam, Nuclear power.

47-4093
Ecological analysis of pigment content in the leaves of mountain-tundra dwarf shrubs. [Ekologicheskiĭ analiz soderzhaniia pigmentov v list'iakh gorno-tundrovykh kustarnichkov],
Korniushenko, G.A., et al, *Botanicheskiĭ zhurnal*, Aug. 1992, 77(8), p.55-77, In Russian with English summary. Refs. p.75-77.
Solov'eva, L.V.
Plant ecology, Plant physiology, Plants (botany), Plant tissues, Alpine tundra, USSR—Khibiny Mountains.

47-4094
"Panarctic Flora and Fauna" Workshop (Moscow, 25 Feb.- 1 Mar.; Leningrad, 4-6 Mar. 1991). [Rabochee soveshchanie "Panarkticheskie flory i fauny" (Moskva, 25 II-1 III; Leningrad, 4-6 III 1991)],
IUrtsev, B.A., *Botanicheskiĭ zhurnal*, Aug. 1992, 77(8), p.140-144, In Russian. 5 refs.
Meetings, Plant ecology, Plants (botany), Animals.

47-4095
Icing of turbine intake louvers.
Walsh, M.R., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Apr. 1993, SR 93-04, 37p. ADA-265 714.
Garfield, D.E., Morse, J.S., Knuth, K.V., Mulherin, N.D., Lemieux, G.E.
Ship icing, Ice accretion, Icing rate, Ice solid interface, Design, Ice density, Sea spray, Ice salinity.
Superstructure icing can have debilitating effects on the operation of any ship. When designing ships that will operate in environments where icing may occur, careful consideration must be given to minimizing the accumulation and effect of shipboard icing. Such consideration was given to the Navy DDG-51 class destroyer when new turbine intake louvers were proposed. To ensure that sufficient air would be available to the vessel's gas turbines and ventilation system during an icing event, the U.S. Navy tasked the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) to conduct a series of comparative icing tests between standard intake louvers and a new louver design. Using a test matrix and design parameters supplied by a Navy contractor, CRREL designed a test apparatus and instrumentation suite to carry out the tests. Testing conducted with reconstituted seawater at the CRREL facility demonstrated that, under various icing conditions, the rate of ice accumulation of the two louver designs was very similar. However, the increased number of louver vanes of the proposed design led to more rapid restriction of ice accumulation on the vanes.

47-4096
U.S. rangeland technology: rehabilitating Russia's oil, gas production sites.
McKendrick, J.D., et al, *Agroborealis*, 1993, 25(1), p.4-7, 1 ref.
Masalkin, S.D.
Revegetation, Environmental impact, Natural resources, Gas production, Oil recovery, USSR.

47-4097
Wetlands: an editorial perspective.
Knight, C.W., *Agroborealis*, 1993, 25(1), p.13-16, 14 refs.
Wetlands, Environmental protection, United States—Alaska.

47-4098
Rear swing arm assembly for three or four wheeled off-the-road vehicle track conversion unit.
Yochum, M., *U.S. Patent Office. Patent*, Oct. 21, 1986, 10 col., USP-4,618,015, 5 refs.
All terrain vehicles, Tracked vehicles, Equipment, Modification, Snow vehicles, Design.

47-4099
Snowblower.
Swanson, J.L., *U.S. Patent Office. Patent*, Oct. 28, 1986, 4 col., USP-4,619,061, 20 refs.
Snow removal, Augers, Design.

47-4100
Pipeline launching module.
Hemphill, D.P., *U.S. Patent Office. Patent*, Oct. 14, 1986, 4 col., USP-4,616,956, 3 refs.
Pipe laying, Pipelines, Offshore structures, Floating structures, Equipment, Floating ice, Ice surface, Design.

47-4101
Ice deflector.
Marthinsen, A., *U.S. Patent Office. Patent*, Apr. 19, 1988, 4 col., USP-4,738,566, 24 refs.
Offshore structures, Protection, Floating structures, Ice control, Design.

47-4102
Thin profile snow, sleet and moisture sensing detector.
Murphy, J.P., *U.S. Patent Office. Patent*, Apr. 7, 1987, 10 col., USP-4,656,333, 4 refs.
Sensors, Probes, Moisture detection, Ice detection, Ice control, Electronic equipment, Design.

47-4103
Basic genetic patterns of peaty-podzolic-gleyey soils. [Osnovnye geneticheskie cherty torfianisto-podzolisto-gleevatykh pochv].
Zaboeva, I.V., *Akademiia nauk SSSR. Ural'skoe otdelenie. Komi nauchnyi tsentr. Trudy*, 1991, No.122, p.4-12, In Russian.
Clay soils, Podsol, Peat, Soil surveys, Soil classification, Cryogenic soils.

47-4104
Current processes in slightly soddy-podzolic loamy soils. [Sovremennye protsessy v slabodernovo-podzolistykh suglinistykh pochvakh].
Kanev, V.V., *Akademiia nauk SSSR. Ural'skoe otdelenie. Komi nauchnyi tsentr. Trudy*, 1991, No.122, p.13-29, In Russian. 14 refs.
Cryogenic soils, Podsol, Loams, Soil profiles, Soil chemistry, Soil formation, USSR - Komi ASSR.

47-4105
Using drained land and some examples of its improvement. [Ispol'zovanie osushennykh zemel' i nekotorye priemy ikh uluchsheniia].
Gil', A.F., *Akademiia nauk SSSR. Ural'skoe otdelenie. Komi nauchnyi tsentr. Trudy*, 1991, No.122, p.30-40, In Russian.
Cryogenic soils, Agriculture, Drainage, Land reclamation, USSR - Komi ASSR.

47-4106
Regulating the thermal regime of soils in the northern taiga subzone of the Komi ASSR. [Regulirovanie teplovogo rezhima pochv severo-taezhnoi podzony Komi SSR].
Mokiev, V.V., *Akademiia nauk SSSR. Ural'skoe otdelenie. Komi nauchnyi tsentr. Trudy*, 1991, No.122, p.41-55, In Russian. 2 refs.
Taiga, Thermal regime, Soil temperature, Cryogenic soils, Agriculture, USSR - Komi ASSR.

47-4107
Effect of fertilization and liming on the potassium condition of soils. [Vliianie udobrenii i izvestkovaniia na kalilnoe sostoianie pochv].
Kuznetsova, E.G., et al, *Akademiia nauk SSSR. Ural'skoe otdelenie. Komi nauchnyi tsentr. Trudy*, 1991, No.122, p.56-65, In Russian. 11 refs.
El'kina, G.IA.
Cryogenic soils, Microelement content, Soil chemistry, Liming, Podsol, Soil physics.

47-4108
Using schist and schist ash as a means of improving cultivated podzol soils. [Ispol'zovanie slantsev i slantsevoi zoly v kachestve meliorantov na pakhotnykh podzolistykh pochvakh].
[Udintseva, I.I., et al, *Akademiia nauk SSSR. Ural'skoe otdelenie. Komi nauchnyi tsentr. Trudy*, 1991, No.122, p.66-75, In Russian. 2 refs.
Kononenko, A.V.
Podsol, Agriculture, Soil chemistry, Cryogenic soils.

47-4109
Effectiveness of applying meliorative agents on tundra soils. [Effektivnost' primeneniia melioriruiushchikh veshchestv na tundrovykh pochvakh].
Kononenko, A.V., et al, *Akademiia nauk SSSR. Ural'skoe otdelenie. Komi nauchnyi tsentr. Trudy*, 1991, No.122, p.76-88, In Russian. 4 refs.
Stenina, T.A., Antonov, N.A.
Tundra, Land reclamation, Soil physics, Soil temperature, Surface temperature, Agriculture.

47-4110
Effect of fertilizer on the percentage of protein and amino acid composition of feed crops. [Vliianie udobrenii na soderzhanie belka i aminokislotnyi sostav kormovykh kul'tur].
El'kina, G.IA., et al, *Akademiia nauk SSSR. Ural'skoe otdelenie. Komi nauchnyi tsentr. Trudy*, 1991, No.122, p.89-97, In Russian. 5 refs.
Zabolotskaia, T.G.
Agriculture, Land reclamation, Cryogenic soils.

47-4111
Role of nitrogen in podzol soils in the formation of a crop of annual agrocenoses. [Rol' azota podzolistykh pochv v formirovanii urozhaia odnoletnikh agrotsenozov].
Beznosikov, V.A., *Akademiia nauk SSSR. Ural'skoe otdelenie. Komi nauchnyi tsentr. Trudy*, 1991, No.122, p.98-106, In Russian. 12 refs.
Nutrient cycle, Podsol, Agriculture, Cryogenic soils.

47-4112
Effect of manure-lignin compost on soil and agricultural crop yields. [Vliianie pometno-ligninovogo komposta na pochvu i urozhai sel'skokhoziaistvennykh kul'tur].
Shvetsova, V.M., et al, *Akademiia nauk SSSR. Ural'skoe otdelenie. Komi nauchnyi tsentr. Trudy*, 1991, No.122, p.107-113, In Russian.
Agriculture, Podsol, Cryogenic soils, Soil chemistry.

47-4113
Sapropel of Don-ty Lake. [Sapropel' ozera Don-ty].
Kazakov, V.G., *Akademiia nauk SSSR. Ural'skoe otdelenie. Komi nauchnyi tsentr. Trudy*, 1991, No.122, p.114-121, In Russian. 15 refs.
Bottom sediment, Lakes, Chemical composition, USSR - Don-ty Lake.

47-4114
Frost in geotechnical engineering.
Phukan, A., ed, Rotterdam, A.A. Balkema, 1993, 191p., Refs. passim. Preprint volume of proceedings of the 2nd International Symposium, Anchorage, AK, June 28-July 1, 1993. For individual papers see 47-4115 through 47-4135.
Frost heave, Frozen ground strength, Frost protection, Soil freezing, Soil strength, Soil stabilization, Road maintenance, Road icing.

47-4115
Sensitivity analysis of frost heave—a theoretical study.
Sheng, D., et al, Frost in geotechnical engineering. Edited by A. Phukan, Rotterdam, A.A. Balkema, 1993, p.3-16, 31 refs.
Knutsson, S.
Frost heave, Soil freezing, Frozen ground thermodynamics, Ice lenses, Freezing front, Soil pressure, Unfrozen water content, Mathematical models.

47-4116
Dielectric properties of road aggregates and their effect on GPR surveys.
Ravaska, O., et al, Frost in geotechnical engineering. Edited by A. Phukan, Rotterdam, A.A. Balkema, 1993, p.17-22, 9 refs.
Saarenketo, T.
Soil aggregates, Subgrade soils, Road maintenance, Frozen ground strength, Soil strength, Subsurface investigations, Dielectric properties, Electromagnetic prospecting.

47-4117
Freezing pressure development on a buried chilled pipeline.
Ladanyi, B., et al, Frost in geotechnical engineering. Edited by A. Phukan, Rotterdam, A.A. Balkema, 1993, p.23-33, 14 refs.
Shen, M.
Underground pipelines, Frost heave, Soil freezing, Frozen ground strength, Soil pressure.

47-4118
Thermal behavior of rip rap in a cross-drainage structure.
Lozano, N., Frost in geotechnical engineering. Edited by A. Phukan, Rotterdam, A.A. Balkema, 1993, p.35-43, 24 refs.
Permafrost beneath roads, Permafrost preservation, Road maintenance, Culverts, Drainage, Soil stabilization, Channel stabilization.

47-4119
Where does the water go during ice lense thaw.
Dysli, M., Frost in geotechnical engineering. Edited by A. Phukan, Rotterdam, A.A. Balkema, 1993, p.45-50, 4 refs.
Road maintenance, Ice lenses, Ground thawing, Drainage, Frost protection.

47-4120
Contribution of sonic propagation to the study of frost process and thermal degradation of frozen soils.
Thimus, J.F., Frost in geotechnical engineering. Edited by A. Phukan, Rotterdam, A.A. Balkema, 1993, p.51-57, 10 refs.
Soil freezing, Frozen ground strength, Clay soils, Frost resistance, Acoustic measurement.

47-4121
Analytical solutions for modelling of ice structure interaction.
Koreneva, E.B., Frost in geotechnical engineering. Edited by A. Phukan, Rotterdam, A.A. Balkema, 1993, p.59-61, 3 refs.
Ice solid interface, Ice loads, Ice cover strength, Offshore structures, Mathematical models.

47-4122
Determination of the elastic stiffness of thawing subgrade soil.
Palolahti, A., et al, Frost in geotechnical engineering. Edited by A. Phukan, Rotterdam, A.A. Balkema, 1993, p.65-68, 3 refs.
Slunga, E., Saarelainen, S.M.I.
Subgrade soils, Frozen ground strength, Soil strength, Thaw weakening, Soil tests.

47-4123
Laboratory study of the compaction properties of frozen soils.
Viklander, P., et al, Frost in geotechnical engineering. Edited by A. Phukan, Rotterdam, A.A. Balkema, 1993, p.69-77, 17 refs.
Knutsson, S.
Frozen ground strength, Soil strength, Soil compaction, Embankments, Soil tests.

47-4124
Use of steel meshes against longitudinal frost cracks in flexible pavements.
Salmenkaita, S., Frost in geotechnical engineering. Edited by A. Phukan, Rotterdam, A.A. Balkema, 1993, p.79-82, 2 refs.
Pavements, Road icing, Road maintenance, Frost action, Frost protection, Geotextiles.

47-4125
Evaluation of factors affecting frost susceptibility in soils.
Kujala, K., Frost in geotechnical engineering. Edited by A. Phukan, Rotterdam, A.A. Balkema, 1993, p.83-87, 3 refs.
Frost heave, Frozen ground strength, Soil strength, Frost resistance.

47-4126
Experiments with frost-heave prevention in concrete troughs.
Kubo, H., et al, Frost in geotechnical engineering. Edited by A. Phukan, Rotterdam, A.A. Balkema, 1993, p.89-96, 5 refs.
Suzuki, T.
Frost heave, Frost protection, Concrete freezing, Channel stabilization, Drainage, Soil stabilization.

47-4127
Swelling of cyclic frozen expansive clay soils in the environment contaminated by sodium chloride.
Kumor, M.K., Frost in geotechnical engineering. Edited by A. Phukan, Rotterdam, A.A. Balkema, 1993, p.97-102, 7 refs.
Clay soils, Frozen ground strength, Frozen ground expansion, Frost heave, Soil pollution.

47-4128
Field and laboratory tests on adfreeze strength of ground to model concrete piles.
Suzuki, T., et al, Frost in geotechnical engineering. Edited by A. Phukan, Rotterdam, A.A. Balkema, 1993, p.103-109, 6 refs.
Sawada, S., Liu, C.
Concrete piles, Frozen ground strength, Frost heave, Ice adhesion.

47-4129
Use of frost insulation in the repair of frost heave damages.
Saarelainen, S.M.I., Frost in geotechnical engineering. Edited by A. Phukan, Rotterdam, A.A. Balkema, 1993, p.113-116, 10 refs.
Frost heave, Road icing, Road maintenance, Thermal insulation, Frost protection.

47-4130
Frost penetration beneath cleared pavements.
McCormick, G., Frost in geotechnical engineering. Edited by A. Phukan, Rotterdam, A.A. Balkema, 1993, p.117-126, 18 refs.
Pavements, Frost penetration, Freezing indexes, Road icing, Road maintenance, Runways.

47-4131
Creep movements in soils at shallow depths and their effects on engineering structures.
Eigenbrod, K.D., Frost in geotechnical engineering. Edited by A. Phukan, Rotterdam, A.A. Balkema, 1993, p.127-136, 14 refs.
Soil creep, Permafrost beneath structures, Slope stability, Piles, Soil pressure, Soil stabilization, Frozen ground strength.

47-4132
Tire chips as insulation beneath gravel surfaced roads.
Humphrey, D.N., et al, MP 3260, Frost in geotechnical engineering. Edited by A. Phukan, Rotterdam, A.A. Balkema, 1993, p.137-149, 15 refs.
Eaton, R.A.
Road icing, Road maintenance, Thermal insulation, Frost protection, Waste disposal, Gravel.

47-4133
Seasonal deformations of underground utilidors on permafrost in Norilsk.
Grebenets, V.I., et al, Frost in geotechnical engineering. Edited by A. Phukan, Rotterdam, A.A. Balkema, 1993, p.151-155.
Sadovskiĭ, A.V.
Underground pipelines, Frost heave, Permafrost beneath structures, Frost protection.

47-4134
Work report of ISSMFE T-C8 1990-1993.
Slunga, E., Frost in geotechnical engineering. Edited by A. Phukan, Rotterdam, A.A. Balkema, 1993, p.159-170, 30 refs.
Thaw weakening, Ground thawing, Soil tests, Frozen ground strength, Soil strength, Frost resistance.

47-4135
Frost heave theories and design measures against frost heave.
Phukan, A., Frost in geotechnical engineering. Edited by A. Phukan, Rotterdam, A.A. Balkema, 1993, p.173-189, 60 refs.
Frost heave, Soil freezing, Frost protection, Soil stabilization, Engineering geology, Cold weather construction.

47-4136
Is the Greenland ice sheet getting thicker.
Braithwaite, R.J., *Climatic change*, Apr. 1993, 23(4), p.379-381, 6 refs.
Glaciology, Ice sheets, Glacier mass balance, Ice cover thickness, Periodic variations, Climatic changes, Accuracy.

47-4137
Interpretation of short-term ice-sheet elevation changes inferred from satellite altimetry.
Van der Veen, C.J., *Climatic change*, Apr. 1993, 23(4), p.383-405, 25 refs.
Glaciology, Ice sheets, Glacier mass balance, Ice cover thickness, Snow accumulation, Height finding, Periodic variations, Climatic changes, Mathematical models, Accuracy.

47-4138
Green icebergs formed by freezing of organic-rich seawater to the base of antarctic ice shelves.
Warren, S.G., et al, *Journal of geophysical research*, Apr. 15, 1993, 98(C4), p.6921-6928, 56 refs.
Sea ice, Ice shelves, Ice bottom surface, Icebergs, Colored ice, Isotope analysis, Biomass, Ice formation, Sea water freezing, Ice optics, Antarctica—Amery Ice Shelf.
Although most icebergs are blue, green icebergs are seen occasionally in the antarctic ocean. Chemical and isotopic analysis of samples from green icebergs indicate that the ice consists of desalinated frozen seawater, as does the basal ice from the Amery Ice Shelf. Spectral reflectance of a green iceberg measured near 67S 6°E, confirms that the color is inherent to the ice, not an artifact of the illumination. Analysis of samples by fluorescence spectroscopy indicates that the blue absorption, and hence the inherent green color, is due to the presence of marine-derived organic matter in the green iceberg, basal ice, and seawater. Thick accumulations of green ice, in icebergs and at the base of ice shelves, indicate that high concentrations of organic matter exist in seawater for centuries at the depth of basal freezing. (Auth. mod.)

47-4139
Simulated antarctic fast ice ecosystem.
Arrigo, K.R., et al, *Journal of geophysical research*, Apr. 15, 1993, 98(C4), p.6929-6946, 65 refs.
Kremer, J.N., Sullivan, C.W.
Sea ice, Fast ice, Marine biology, Ice shelves, Ice growth, Ecosystems, Biomass, Seasonal variations, Light effects, Mathematical models, Antarctica—McMurdo Sound.
This paper presents a simple two-dimensional model of first-year sea ice structure and dynamics coupled to a high resolution, time-dependent model of microalgal growth in which simulated physiological responses are determined by ambient temperature, spectral irradiance, nutrient concentration, and salinity. Results indicate that land-fast sea ice in McMurdo Sound can support a production rate of approximately 0.5 g C sq m d under optimal conditions, 76% of which is associated with the platelet layer where rates of nutrient exchange are relatively high. While adjustments in any biological coefficient will alter the magnitude of production in the model, the range of results permitted by uncertainty in their values is well within the bounds likely to result from normal variations in snow cover, or from the uncertainty in the rate of nutrient flux. (Auth. mod.)

47-4140
Effect of competitive adsorption on polar stratospheric cloud reactions.
Mozurkewich, M., *Geophysical research letters*, Mar. 5, 1993, 20(5), p.355-358, 15 refs.
Polar stratospheric clouds, Cloud physics, Aerosols, Ozone, Chemical properties, Adsorption, Heterogeneous nucleation, Ice vapor interface, Vapor pressure.
In an analysis relevant to the formation of polar stratospheric clouds, existing laboratory data for reaction rates on ice and nitric acid trihydrate are interpreted in terms of a simple speculative mechanism for these reactions. The mechanism assumes that the solid phase is either pure H2O or pure HNO3(H2O)3 and that the state of the surface depends largely on the gas phase composition. This dependence is described by Langmuir adsorption isotherms. The adsorption of a nonreactive species can affect the rate of reaction by inhibiting the adsorption of reactive species. In particular, differences in reaction rates observed on ice and HNO3(H2O)3 are attributed to the adsorption of gas phase HNO3 produced by the decomposition of HNO3(H2O)3. The interpretation of heterogeneous reaction rates requires detailed measurements of the rates as a function of gas phase composition. (Auth. mod.)

47-4141
Laboratory simulations of PSC particle formation.
Marti, J., et al, *Geophysical research letters*, Mar. 5, 1993, 20(5), p.359-362, 15 refs.
Mauersberger, K.
Polar stratospheric clouds, Chemical properties, Heterogeneous nucleation, Vapor pressure, Ozone, Cloud physics, Simulation.

47-4142
Survey and new measurements of ice vapor pressure at temperatures between 170 and 250K.
Marti, J., et al, *Geophysical research letters*, Mar. 5, 1993, 20(5), p.363-366, 22 refs.
Mauersberger, K.
Polar stratospheric clouds, Cloud physics, Ice vapor interface, Vapor pressure, Simulation, Temperature effects.
Saturated vapor pressures of ice at temperatures below 200K have become more important since the discovery of ice clouds in the polar stratosphere and upper mesosphere. Direct measurements of ice vapor pressures at such low temperatures are sparse and unreliable. This paper summarizes published vapor pressure data and presents new measurements at temperatures between 170 and 250K, extending the range of measured ice vapor pressures by three orders of magnitude. A simple empirical vapor pressure equation is derived which permits prediction of vapor pressures between 170K and the triple point of water, with an accuracy within about 2%. Predictions by this empirical equation agree, within experimental uncertainty, with the most reliable equation derived from thermodynamic principles. (Auth. mod.)

47-4143
Decadal timescale links between Antarctic Peninsula ice-core oxygen-18, deuterium and temperature.
Jones, P.D., et al, *Holocene*, 1993, 3(1), p.14-26, 34 refs.
Marsh, R., Wigley, T.M.L., Peel, D.A.
Climatology, Ice sheets, Ice cores, Isotope analysis, Climatic changes, Air temperature, Global warming, Correlation, Periodic variations, Antarctica—Dolleman Island.
The Antarctic Peninsula region has experienced a long-term warming trend over the twentieth century. For the period prior to 1900, there is conflicting evidence from different data sources. An initial interpretation of isotopic data from ice cores suggests that the nineteenth century was warmer than the twentieth century, although snow accumulation rate data for the nineteenth century from the same ice cores suggest lower temperatures. This paper studies the links among atmospheric temperature over the Antarctic Peninsula, circulation parameters and isotopic data over the period of instrumental records. The correlations between temperature and *delta*O-18 and *delta* D are generally of the order r=0.5 or less on timescales of one to five years. Conflicts between evidence from accumulation rate and isotopic data appear to reflect the influence of source-region effects on the isotope records. To clarify the complex isotopic records available for the Peninsula region, additional cores must be analyzed for both *delta*O-18 and *delta*D at the same site. (Auth. mod.)

47-4144
2000-year lichen-snowkill chronology for the Colorado Front Range, USA.
Benedict, J.B., *Holocene*, 1993, 3(1), p.27-33, 27 refs.
Plant ecology, Alpine landscapes, Lichens, Age determination, Cold weather survival, Snow cover effect, Climatic changes, Periodic variations, Paleoecology.

47-4145
Debris in tills and moraines as a source of glaciological and paleoenvironmental information: methodology and applications in the Caucasus.
Serebriannyĭ L.R., et al, *Holocene*, 1993, 3(1), p.63-69, 10 refs.
Orlov, A.V.
Mountain glaciers, Glacial deposits, Glacial erosion, Moraines, Sediment transport.

47-4146
Climate and permafrost.
Gavrilova, M.K., *Permafrost and periglacial processes*, Apr.-June 1993, 4(2), p.99-111, With French summary. 21 refs.
Climatic changes, Air temperature, Frozen ground temperature, Permafrost transformation, Temperature effects, Global warming.

47-4147
Changes in the extent of permafrost during the Late Quaternary period in the territory of the former Soviet Union.
Kondratieva, K.A., et al, *Permafrost and periglacial processes*, Apr.-June 1993, 4(2), p.113-119, With French summary. 13 refs.
Khrutzhĭ, S.F., Romanovskiĭ, N.N.
Permafrost distribution, Permafrost thickness, Permafrost surveys, Pleistocene, Paleoclimatology, Frozen rock temperature, Temperature variations, Climatic changes, Boreholes.

47-4148
Permafrost changes in Europe during the last Glacial.
Vandenberghe, J., et al, *Permafrost and periglacial processes*, Apr.-June 1993, 4(2), p.121-135, With French summary. 88 refs.
Pissart, A.
Pleistocene, Permafrost distribution, Periglacial processes, Permafrost indicators, Geomorphology, Climatic changes, Geocryology.

47-4149
Permafrost zonation in Russia under anthropogenic climatic change.
Nelson, F.E., et al, *Permafrost and periglacial processes*, Apr.-June 1993, 4(2), p.137-148, With French summary. 46 refs.
Anisimov, O.A.
Permafrost distribution, Mapping, Permafrost forecasting, Global warming, Climatic changes, Greenhouse effect, Ground thawing, Freezing indexes.

47-4150
Climate warming and the carbon cycle in the permafrost zone of the former Soviet Union.
Kolchugina, T.P., et al, *Permafrost and periglacial processes*, Apr.-June 1993, 4(2), p.149-163, With French summary. 52 refs.
Vinson, T.S.
Continuous permafrost, Global warming, Climatic changes, Permafrost transformation, Soil air interface, Vegetation patterns, Organic soils, Decomposition, Temperature effects.

47-4151
Mountain permafrost and climatic change.
Haeberli, W., et al, *Permafrost and periglacial processes*, Apr.-June 1993, 4(2), p.165-174, With French summary. 58 refs.
Cheng, G.D., Gorbunov, A.P., Harris, S.A.
Mountain soils, Geocryology, Permafrost distribution, Permafrost transformation, Ground thawing, Temperature effects, Periglacial processes, Climatic changes, Global warming, Rock glaciers.

47-4152
Paleoclimate record for Northwind Ridge, western Arctic Ocean.
Poore, R.Z., et al, *Paleoceanography*, Apr. 1993, 8(2), p.149-159, 30 refs.
Phillips, R.L., Rieck, H.J.
Oceanographic surveys, Pleistocene, Paleoclimatology, Marine deposits, Bottom sediment, Age determination, Stratigraphy, Glacier oscillation, Periodic variations, Climatic changes.

47-4153
Microfaunal evidence for elevated Pliocene temperatures in the Arctic Ocean.
Cronin, T.M., et al, *Paleoceanography*, Apr. 1993, 8(2), p.161-173, 95 refs.
Oceanography, Marine deposits, Paleoecology, Paleoclimatology, Sea ice distribution, Water temperature, Climatic changes.

47-4154
Patterns of ice-rafted detritus in the glacial North Atlantic (40-55 deg N).
Grousset, F.E., et al, *Paleoceanography*, Apr. 1993, 8(2), p.175-192, 46 refs.
Oceanography, Pleistocene, Ice rafting, Sedimentation, Marine deposits, Drill core analysis, Periodic variations, Glacier oscillation, Climatic changes.

47-4155
Erosion of bedrock by subglacial meltwater, Georgian Bay, Ontario: a regional view.
Kor, P.S.G., et al, *Canadian journal of earth sciences*, Apr. 1991, 28(4), p.623-642, With French summary. 40 refs.
Shaw, J., Sharpe, D.R.
Pleistocene, Glacier flow, Glacial erosion, Water erosion, Bedrock, Topographic features, Meltwater, Subglacial drainage, Glacial geology.

47-4156
Holocene emergence at Cape Herschel, east-central Ellesmere Island, arctic Canada: implications for ice sheet configuration.
Blake, W., Jr., *Canadian journal of earth sciences*, Sep. 1992, 29(9), p.1958-1980, With French summary. Refs. p.1976-1980.
Glacial geology, Marine geology, Geomorphology, Glacier oscillation, Arctic landscapes, Glacial deposits, Marine deposits, Radioactive age determination.

47-4157
Quaternary stratigraphy, paleoecology, and glacial geology, Iles de la Madeleine, Quebec.
Dredge, L.A., et al, *Canadian journal of earth sciences*, Sep. 1992, 29(9), p.1981-1996, With French summary. 30 refs.
Mott, R.J., Grant, D.R.
Quaternary deposits, Coastal topographic features, Glacial geology, Geomorphology, Paleoclimatology, Paleoecology, Stratigraphy.

47-4158
Late Wisconsinan glaciation of the Glenlyon Range, Pelly Mountains, Yukon Territory, Canada.
Ward, B.C., et al, *Canadian journal of earth sciences*, Sep. 1992, 29(9), p.2007-2012, With French summary. 15 refs.
Jackson, L.E., Jr.
Glaciation, Glacial geology, Moraines, Geomorphology, Pleistocene, Mountain glaciers, Climatic factors.

47-4159
Reconstruction of glacial events in southeastern New Brunswick.
Foisy, M., et al, *Canadian journal of earth sciences*, Oct. 1991, 28(10), p.1594-1612, With French summary. 42 refs.
Prichonnet, G.
Glaciation, Glacial geology, Pleistocene, Glacial deposits, Stratigraphy, Bedrock, Glacial erosion, Striations.

47-4160
On the extent and thickness of the Innuitian Ice Sheet: a postglacial-adjustment approach.
Tushingham, A.M., *Canadian journal of earth sciences*, Feb. 1991, 28(2), p.231-239, With French summary. 50 refs.
Ice sheets, Pleistocene, Ice cover thickness, Glacier oscillation, Arctic landscapes, Geomorphology, Sea level, Glacial geology, Quaternary deposits.

47-4161
Test of airborne, side-looking synthetic-aperture radar in central Newfoundland for geological reconnaissance.
Graham, D.F., et al, *Canadian journal of earth sciences*, Feb. 1991, 28(2), p.257-265, With French summary. 24 refs.
Grant, D.R.
Geological surveys, Radar photography, Airborne radar, Side looking radar, Synthetic aperture radar, Terrain identification, Glacial erosion, Bedrock, Performance.

47-4162
Field pile load tests in saline permafrost. 1. Test procedures and results
Biggar, K.W., et al, *Canadian geotechnical journal*, Feb. 1993, 30(1), p.34-45, With French summary. 47 refs.
Sego, D.C.
Pile load tests, Piles, Surface roughness, Permafrost beneath structures, Frozen ground strength, Soil stabilization, Saline soils, Grouting, Permafrost physics, Design criteria.

47-4163
Field pile load tests in saline permafrost. 2. Analysis of results.
Biggar, K.W., et al, *Canadian geotechnical journal*, Feb. 1993, 30(1), p.46-59, With French summary. 39 refs.
Sego, D.C.
Pile load tests, Saline soils, Permafrost physics, Frozen ground strength, Stress concentration, Dislocations (materials), Grouting, Soil stabilization, Design criteria.

47-4164
Determination of creep properties of frozen soils by means of the borehole stress relaxation test.
Ladanyi, B., et al, *Canadian geotechnical journal*, Feb. 1993, 30(1), p.170-186, With French summary. 32 refs.
Melouki, M.
Frozen ground mechanics, Soil creep, Rheology, Soil tests, Boreholes, Relaxation (mechanics), Analysis (mathematics).

47-4165
Wind-profile estimation by conventional radars.
Fabry, F., *Journal of applied meteorology*, Jan. 1993, 32(1), p.40-49, 26 refs.
Precipitation (meteorology), Wind velocity, Radar echoes, Profiles, Snowfall, Ice crystal optics, Weather forecasting.

47-4166
Measurements of cloud-droplet-size distributions in polluted and unpolluted stratiform.
Alkezweeny, A.J., et al, *Journal of applied meteorology*, Jan. 1993, 32(1), p.106-115, 19 refs.
Burrows, D.A., Grainger, C.A.
Cloud physics, Supercooled clouds, Aircraft icing, Ice formation, Air pollution, Condensation nuclei, Cloud droplets, Particle size distribution.

47-4167
Ammonium to sulphate ratio in aerosol and snow of Greenland and antarctic regions.
Silvente, E., et al, *Geophysical research letters*, Apr. 23, 1993, 20(8), p.687-690, 17 refs.
Legrand, M.R.
Atmospheric composition, Snow composition, Polar atmospheres, Aerosols, Chemical properties, Scavenging, Snow air interface, Air pollution.
The NH4 + to SO4 ratio of Greenland's atmospheric aerosols and snows are investigated. Data suggest that the atmospheric NH4 + and SO4 signals are well preserved in snow and that previous discrepancies observed between the composition of the air and that of the snow were likely due to NH4 + artifacts. This study leads to the conclusion that NH3 is not able to neutralize the acidity of the high latitude atmosphere, particularly in the Southern Hemisphere (Auth. mod.)

47-4168
Origin of rock glaciers: stagnant ice or ice segregation?. (Origine des glaciers rocheux: glace morte ou ségrégation de glace?),
Tricart, J., *Revue géomorphologie dynamique*, 1992, 41(3), p.96-98, In French. 2 refs.
Rock glaciers, Geocryology, Periglacial processes, Geomorphology, Ice lenses, Sediment transport, Slope processes.

47-4169
Acclimation of photosynthesis and dark respiration of a submersed angiosperm beneath ice in a temperate lake.
Spencer, W.E., et al, *Plant physiology*, Mar. 1993, 101(3), p.985-991, 24 refs.
Wetzel, R.G.
Plant physiology, Acclimatization, Photosynthesis, Lake ice, Ice cover effect, Subglacial observations, Cold stress, Temperature effects.

47-4170
Hydrology of a prairie slough.
Woo, M.K., et al, *Journal of hydrology*, June 1, 1993, 146(1-4), p.175-207, 39 refs.
Rowsell, R.D.
Plains, Wetlands, Water balance, Seasonal variations, Snow hydrology, Snowmelt, Seepage, Topographic effects, Analysis (mathematics).

47-4171
Character and causes of a pronounced snowmelt-induced "acidic episode" in a stream in a Scottish subarctic catchment.
Davies, T.D., et al, *Journal of hydrology*, June 1, 1993, 146(1-4), p.267-300, Refs. p.297-300.
Tranter, M., Blackwood, I.L., Abrahams, P.W.
Stream flow, Subarctic landscapes, Water pollution, Hydrogeochemistry, Snow impurities, Snowmelt, Snow cover effect, Snow hydrology, Chemical properties, Ion exchange, Alpine soils.

47-4172
Static analysis of floating ice block stability.
Coutermarsh, B.A., et al, *Journal of hydraulic research*, 1993, 31(2), MP 3261, p.147-160, With French summary. 7 refs.
McGilvary, W.R.
Floating ice, Static stability, Mechanical tests, Ice water interface, Ice bottom surface, Fluid dynamics, Water pressure, Topographic effects, Analysis (mathematics).
A laboratory study was performed to measure the pressures caused by fluid acceleration beneath a floating parallelepiped block. Dynamic fluid pressure was measured at discrete points beneath the block for various fluid velocities, block angles of attack and block thickness-to-depth ratios. Some of these pressures tended to stabilize the block while others tended to underturn it. The measured pressures were used to calculate block underturning moments and a hydrostatic analysis was used to calculate a block righting moment. From this, a densimetric Froude underturning criterion is presented.

47-4173
Prepriats.
Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988, Boston, American Meteorological Society, 1988, 160p., Refs. passim.
For selected papers see 43-1492 through 43-1497 and 47-4174 through 47-4207, or I-38585, I-40901, I-40902, F-48555, and I-48547 through I-48554.
Polar atmospheres, Air ice water interaction, Sea ice distribution, Ice surveys, Atmospheric circulation.
Of about 50 papers presented at the conference, 11 are pertinent to Antarctica. The latter include discussions of katabatic winds, their effect on blowing snow, and their interaction with ice; aerosols and their significance to air pollution and cloud droplets; synoptic and mesoscale atmospheric circulation; satellite tracking of clouds; the El Niño and Southern Oscillation; prediction of restricted visibility; snow albedos; and weather forecasting.

47-4174
Arctic sea ice 1973-1986: seasonal and interannual variability.
Parkinson, C.L., et al, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.4-7, 6 refs.
Cavalieri, D.J.
Ice surveys, Sea ice distribution, Air ice water interaction.

47-4175
Arctic sea ice 1973-1986: interregional comparisons.
Cavalieri, D.J., et al, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.8-10, 2 refs.
Parkinson, C.L.
Ice surveys, Sea ice distribution, Air ice water interaction.

47-4176
Wind, current and swell influences on the ice extent and flux in the Grand Banks-Labrador Sea area as observed in the LIMEX '87 experiment.
Argus, S.D., et al, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.11-14, 12 refs.
Carsey, F., Carsey, F.D.
Ice surveys, Sea ice distribution, Ice edge, Air ice water interaction, Ocean currents, Atmospheric circulation, Labrador Sea.

47-4177
Seasonal variations of atmospheric circulation and sea ice motion in the Arctic.
McLaren, A.S., et al, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.20-23, 27 refs.
Serreze, M.C., Barry, R.G.
Ice surveys, Sea ice distribution, Drift, Air ice water interaction, Atmospheric circulation, Polar atmospheres.

47-4178
Interannual variability of short-period changes in sea ice and atmospheric synoptic conditions in the Canada Basin.
Maslanik, J.A., et al, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.28-31, 8 refs.
Barry, R.G.
Sea ice distribution, Air ice water interaction, Ice conditions, Ice surveys, Polar atmospheres, Synoptic meteorology.

47-4179
North Atlantic sea ice sensitivities of monthly dynamical forecasts.
Walsh, J.E., et al, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.32-35, 11 refs.
Ross, B.
Sea ice distribution, Air ice water interaction, Ice conditions, Ice surveys, Polar atmospheres, Atmospheric circulation, Long range forecasting, Computerized simulation.

47-4180
Synoptic ice melt from Nimbus-7 SMMR.
Crane, R.G., et al, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.36-39, 5 refs.
Anderson, M.R.
Sea ice distribution, Air ice water interaction, Ice conditions, Ice surveys, Ice melting, Polar atmospheres, Spaceborne photography, Radiometry.

47-4181
Lead patterns in arctic sea ice from remote sensing data: characteristics, controls and atmospheric interactions.
Barry, R.G., et al, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.40-43, 17 refs.
Miles, M.W.
Sea ice distribution, Ice openings, Air ice water interaction, Ice surveys, Polar atmospheres, Remote sensing.

47-4182
Summer cryospheric and atmospheric variability in the Arctic Basin.
Robinson, D.A., et al, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.44-47, 16 refs.
Scharfen, G.
Sea ice distribution, Air ice water interaction, Ice conditions, Polar atmospheres, Snow ice interface.

47-4183
Long-range forecasts of arctic sea level pressure.
Ross, B., et al, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.48-51, 8 refs.
Walsh, J.E.
Sea ice distribution, Air ice water interaction, Ice conditions, Polar atmospheres, Atmospheric pressure, Long range forecasting.

47-4184
Synoptic activity in the Arctic Basin in summer, 1979-1985.
Serreze, M.C., et al, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.52-55, 16 refs.
Barry, R.G.
Polar atmospheres, Atmospheric circulation, Atmospheric disturbances, Atmospheric pressure, Storms.

47-4185
Atmospheric boundary layer features observed in the spring marginal ice zone.
Guest, P.S., et al, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.73-74, 1 ref.
Davidson, K.L., Vaucher, C.A.
Ice edge, Air ice water interaction, Ice surveys, Polar atmospheres, Atmospheric boundary layer.

47-4186
Correlation of SAR-derived roughness parameters with air drag coefficients over MIZ sea ice.
Burns, B.A., et al, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.75-78, 8 refs.
Kellner, G.
Ice edge, Ice surface, Ice air interface, Ice surveys, Synthetic aperture radar, Statistical analysis.

47-4187
Use of the 500 mb SL (planetary scale component) in monthly/seasonal forecasting of arctic ice conditions.
Englebretson, R.E., Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.79-82, 11 refs.
Sea ice distribution, Air ice water interaction, Ice conditions, Ice forecasting, Polar atmospheres, Atmospheric circulation, Atmospheric pressure, Statistical analysis.

47-4188
Polar low sensitivity to sea surface temperature and horizontal grid resolution in a numerical model.
Langland, R.H., et al, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.83-86, 6 refs.
Miller, R.J.
Polar atmospheres, Atmospheric circulation, Atmospheric disturbances, Atmospheric pressure, Air ice water interaction, Surface temperature, Computerized simulation.

47-4189
Simple coupled steady-state arctic ice-ocean model.
Willmott, A.J., et al, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.87-88, 6 refs.
Mysak, L.A.
Sea ice distribution, Ice water interface, Ice models.

47-4190
High-latitude processes in a coupled ocean-atmosphere general circulation model.
Roberts, D.L., Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.89-91, 10 refs.
Sea ice distribution, Air ice water interaction, Ice cover thickness, Polar atmospheres, Atmospheric circulation, Ocean currents, Computerized simulation.

47-4191
Measuring blowing snow in Adélie Land, eastern Antarctica.
Wendler, G., Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.93-96, 20 refs.
Blowing snow, Snow air interface, Sastrugi, Snow erosion, Wind erosion, Wind (meteorology), Antarctica—Adélie Coast.
A photoelectric snow particle counter was used to measure blowing snow at a site about 110 km south of Dumont d'Urville Station in Adélie Land in Dec. 1985. Snow suspended in the air increases the density of the air, and so increases the katabatic force. Stronger winds transport not only more snow particles but larger ones. Sublimation of snow particles in the air cools the air which also further strengthens the wind. The particular event measured wind speeds of about 8.5 to 12.5 m/s, snow particle frequencies from about 1100 to 2200 particles per sq cm s, and mean particle sizes from about 98 to 128 microns in diameter. It was found that the flux in g/sq cm/s at a specific height equals the density of the snow (assumed at 0.9 g/cu cm), times the instrument constant (which depends on the distance between the two slits and the distance between the sender and receiver), times the frequency of the particles, times pi/4, times d cubed (where d is the mean diameter of the particles). A linear relationship between the logarithm of the flux and the wind speed was observed.

47-4192
Numerical simulation of antarctic drainage flows.
Parish, T.R., et al, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.97-99, 9 refs.
Pickett, J.L.
Wind (meteorology), Ice air interface, Atmospheric circulation, Antarctica—Adélie Coast.
It is suggested that numerical simulations of katabatic winds in Adélie Land should take into account the importance of confluence zones in the continental hinterland where drainage flows of air from a vast area converge and become focused on a restricted section of coastline. It is also suggested that the forcing of drainage winds is the result of strong radiational cooling by the sloping ice terrain. The intensity of katabatic winds is proportional to the steepness of the ice slopes and the intensity of the diabatic cooling in the lowest portion of the atmosphere. Numerical simulations indicate that the level of maximum wind speeds of approximately 20 m/s occur at a height of 175 m above the ground.

47-4193
Submicron size aerosols and weather forecasting in East Antarctica.
Lal, M., Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.105-107, 3 refs.
Polar atmospheres, Aerosols, Air pollution, Weather forecasting, Antarctica—Maitri Hills Station, Antarctica—Dakshin Gangotri Station.
Observations of atmospheric aerosols were made in Jan. and Feb. 1987 at the Indian stations of Maitri Hills and Dakshin Gangotri. Forty-six percent of the Aitken nuclei, that is, the smallest aerosols of .001 to .1 micron in radius, were in the concentration range of 250 to 500/cu cm. It was found that the Aitken nuclei concentration increased about 12-16 hours in advance of an approaching frontal weather system, resulting in overcast conditions. It is suggested that the study of aerosols in Antarctica could serve as an indicator of background pollution on a global scale.

47-4194
Experimental studies of clouds and aerosols along the antarctic coast.
Saxena, V.K., et al, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.108-111, 23 refs.
Ruggiero, F.H.
Polar atmospheres, Cloud droplets, Aerosols, Antarctica.
Observations of cloud droplet size distribution were carried out at McMurdo Station during Nov. 1980, and Dec. 1982-Jan. 1983, and aerosols were sampled at Palmer Station during all of 1983. Coastal stratus clouds had an average droplet diameter of 9-13 microns, a liquid water content of 0.07-0.18%, and a total droplet concentration of 52-101 per cubic cm. All clouds showed a bimodal size distribution with an initial peak in concentration at a diameter around 4 microns and a second peak at a diameter varying with the height of the cloud base. The second peak was at 20 microns in clouds with a base height of 1450 m a.s.l. The mass contributions of elements to the aerosols averaged approximately as chlorine 21%, aluminum 21%, sodium 13%, silicon 12%, phosphorus 12%, sulfur 12%, potassium 3.7%, calcium 2.4%, titanium 1%, chromium 0.5%, and manganese, iron, cobalt, nickel, copper, and zinc, each less than 0.5%.

47-4195
"Major" arctic haze event north of Point Barrow, Alaska, April 1986.
Schnell, R.C., et al, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.112-115, 2 refs.
Kahl, J.D., Bridgman, H.A., Herbert, G.A.
Polar atmospheres, Haze, Air pollution.

47-4196
Summary of atmospheric transport to Barrow, Alaska during the Arctic Gas and Aerosol Sampling Program (March 1983 and April 1986).
Herbert, G.A., et al, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.116-118, 11 refs.
Harris, J.M., Bodhaine, B.A., Schnell, R.C.
Polar atmospheres, Aerosols, Haze, Air pollution.

47-4197
High latitude wind velocities derived from polar orbiting satellite imagery.
Warren, D., et al, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.119-121, 3 refs.
Turner, J.
Polar atmospheres, Wind velocity, Cloud cover, Spaceborne photography, Radiometry.

47-4198
Retrieval of mesoscale meteorological parameters from NOAA9 over Greenland and Barents seas for three consecutive days of June 1986.
Claud, C., et al, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.122-125, 5 refs.
Chedin, A., Scott, N.A., Gascard, J.C., Prangsma, G.J.
Polar atmospheres, Atmospheric circulation, Sea ice distribution, Spaceborne photography, Radiometry.

47-4199
Structure of sub-synoptic-scale vortices in polar airstreams from AVHRR and TOVS data.
Turner, J., et al, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.126-128, 3 refs.
Warren, D.
Polar atmospheres, Atmospheric circulation, Spaceborne photography, Radiometry.

47-4200
Passive microwave data for snow and ice research: planned products from the DMSP SSM/I system.
Weaver, R.L.S., Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.129-132, 10 refs.
Sea ice distribution, Ice reporting, Spaceborne photography, Radiometry.

47-4201
Satellite observation of high latitude surface and cloud types using pattern recognition.
Ebert, E.E., Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.133-136, 11 refs.
Polar atmospheres, Cloud cover, Image processing, Spaceborne photography, Radiometry.

47-4202
Clouds over both polar regions from the ISCCP pilot data sets.
Raschke, E., et al, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.137-140, 4 refs.
Bauer, P., Mölders, N.
Polar atmospheres, Cloud cover, Image processing, Spaceborne photography, Radiometry.

In this paper, cloud cover over both polar regions is analyzed by reference to satellite-derived radiometric data. This study demonstrates the utility of spaceborne photography in mapping cloud cover and albedo variations at the synoptic scale.

47-4203
Southern Oscillation signal in Antarctica.
Savage, M.L., et al, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.141-144, 12 refs.
Stearns, C.R., Weidner, G.A.
Polar atmospheres, Atmospheric circulation, Air temperature, Surface temperature, Global change, Antarctica.
The El Niño/Southern Oscillation (ENSO) signal in Antarctica is discussed. Temperatures appear to fall the year following an ENSO. The coldest temperature on record, -89.6 C, at Vostok Station on July 21, 1983, occurred a year after the ENSO of 1982. The coldest July at the South Pole, -64.4 C in 1969, was also an ENSO year. It is also suggested that the anomalously low temperatures enhance drainage flow. While wind speeds were anomalously low at the South Pole in 1983, they were anomalously high at McMurdo Station on the coast.

47-4204
Observation of recurrent temperature lapse near the surface at the South Pole.
Obremski, J.S., et al, MP 3262, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.145-147, 12 refs.
Samson, J.A., Barnard, S.C., Murphey, B.B., Hogan, A.W.
Polar atmospheres, Air temperature, Surface temperature, Temperature inversions, Snow air interface, Antarctica—Amundsen-Scott Station.
In Nov. 1983, a 30 m meteorological tower was erected at the South Pole to measure temperatures and winds. As used here, temperature lapse refers to the variation of temperature with height. Temperatures were measured in Jan. 1985 at the air-firn interface and at heights on the tower of 2, 6, 10, 14, 18, 22, and 26 m. The temperature minima often occurred several meters above the surface. Temperatures from day to day ranged from -18 to -28 C, but the temperatures usually varied less than a degree with height.

47-4205
Statistical approach to prediction of restricted visibility at McMurdo and Williams Field, Antarctica.
Hale, R.A., et al, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.148-150, 6 refs.
Renard, R.J.
Polar atmospheres, Visibility, Weather forecasting, Aircraft landing areas, Antarctica—McMurdo Station.
Discriminate and persistence forecasting are compared for predicting restricted visibility, that is, probabilities of visibilities less than 0.5 or 3.0 mi, in the warm season (Nov.-Feb.), and the cold season (Aug., Sep., Oct., and Mar.), for McMurdo Station and Williams Field, located about 5 km from McMurdo Station. The months of Apr.-July, in which the airfield is not in operation, are not considered. Tables are included which show the climatological probabilities for the two seasons; probabilities with initial-time weather conditions as precursors; and verification scores of the probabilities for discriminate and persistence forecasting. It is indicated that discriminate forecasting has a higher rate of correct prediction, but also a higher rate of falsely predicting restricted visibility, than does persistence forecasting.

47-4206
Absorption of solar radiation at the antarctic snow surface.
Grenfell, T.C., et al, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.151-152.
Warren, S.G., Mullen, P.C.
Albedo, Snow optics, Snow surface, Solar radiation, Antarctica—Amundsen-Scott Station.
Snow albedos across the solar spectrum were measured at the South Pole in Jan.-Feb. 1986. It was found that albedo values in the visible were 98-99% and were relatively unaffected by grain size, but grain size was the most important variable controlling albedo in the infrared. Pollution was found to be very minor. At 500 m upwind of the station, there was normally less than 1 nanogram of carbon per gram of snow (1 ppb) which reduced snow albedo by only 0.1% at the most sensitive wavelength. A graph is included which shows the observed and calculated albedos for grain sizes of 50 and 100 micron radius at wavelengths of 0.5 to 2.5 microns.

47-4207
Physical modeling of conductive and convective energy transfer in ventilated low-temperature snow.
Lax, J., Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.153-157, 11 refs.
Snow air interface, Snow heat flux, Snow thermal properties, Firn, Mathematical models.

47-4208
Snow in north and east Tyrol 1897-1991. [Der Schnee in Nord- und Osttirol 1895-1991].
Fliri, F., Innsbruck, Universitätsverlag Wagner, 1992, 2 vols.
Snow accumulation, Snow depth, Snowfall, Austria—Tyrol.

47-4209
Historical overview of the DEW system in Alaska, and documentation of facilities at POW-3, Bullen Point, Alaska.
U.S. Air Force. Air Force Materiel Command. Electronic Systems Center, Wakefield, MA, Mar. 1993, 96p., 8 refs.
Cold weather performance, Military equipment, Military operation, Radar, History, United States—Alaska—Bullen Point.

47-4210
Northern Sea Route and the policy of new Russia.
Granberg, A.G., *International challenges*, 1992, 12(1), p.5-14.
Marine transportation, Ice navigation, Northern Sea Route, USSR.

47-4211
Chronology of the International Northern Sea Route Project.
Simonsen, H., *International challenges*, 1992, 12(1), p.26-33.
Marine transportation, Ice navigation, International cooperation, Research projects, Northern Sea Route.

47-4212
History of the Northern Sea Route.
Armstrong, T., *International challenges*, 1992, 12(1), p.34-42.
History, Marine transportation, Ice navigation, Northern Sea Route, USSR.

47-4213
Northern Sea Route—rosy prospects for commercial shipping?.
Wergeland, T., *International challenges*, 1992, 12(1), p.43-57.
Marine transportation, Ice navigation, Cost analysis, Northern Sea Route.

47-4214
Use of trees and shrubs for control of blowing snow in select locations along Wyoming highways.
Powell, K., et al, *Wyoming. Department of Transportation. Research* [report], Jan. 1992, FHWA-92-WY-001, 30p., 8 refs.
Reed, C., Lanning, L., Perko, D.
Snow fences, Blowing snow, Countermeasures, Introduced plants, Trees (plants), United States—Wyoming.

47-4215
1992 annual report on Alaska's mineral resources.
Bohn, D., ed, *U.S. Geological Survey. Circular*, 1992, No.1091, 65p., Refs. p.54-62.
Schneider, J.L., ed.
Natural resources, Minerals, Natural gas, Crude oil, United States—Alaska.

47-4216
Solvation, freezing, and the crystal/liquid interface: modern theories and computer simulation.
Haymet, A.D.J., *Fluid phase equilibria*, 1993, No.83, p.415-426, 21 refs.
Ice water interface, Theories, Computerized simulation, Ice crystals, Thermodynamics, Analysis (mathematics), Phase transformations.

47-4217
Northern Sea Route: a new era in Soviet policy?.
Östreng, W., *Ocean development and international law*, 1991, Vol.22, p.259-287, 113 refs.
Marine transportation, International cooperation, Ice navigation, Northern Sea Route.

47-4218
Effects of variable eddy viscosity on wave-induced currents under ice.
Melsom, A., *Annales geophysicae*, 1993, No.11, p.78-88, 28 refs.
Subglacial observations, Viscosity, Ocean currents, Water waves, Analysis (mathematics).

47-4219
Glaciers of the Swiss Alps 1985/86 and 1986/87. [Die Gletscher der Schweizer Alpen 1985/86 und 1986/87].
Aellen, M., et al, *Schweizerische Akademie der Naturwissenschaften. Gletscherkommission. Jahrbuch. Bericht*, 1992, No.107/108, 140p., In German and French with English summary. 33 refs.
Herren, E.
Mountain glaciers, Glacier surveys, Glacier oscillation, Glacier mass balance, Switzerland.

47-4220
East Siberian Arctic Region Expedition '92: the Laptev Sea—its significance for arctic sea-ice formation and transpolar sediment flux.
Dethleff, D., et al, *Berichte zur Polarforschung*, 1993, No.120, p.3-44, Refs. p.34-36.
Sea ice, Polynyas, Sediments, Sediment transport, Ice air interface, Fast ice, USSR—Laptev Sea.

47-4221
Expedition to Novaja Zemlja and Franz Josef Land with RV "Dalnie Zelentsy".
Nürnberg, D., et al, *Berichte zur Polarforschung*, 1993, p.49-74, 9 refs.
Groth, E.
Expeditions, Bottom sediment, Sediments, Water pollution, Radioactive wastes, USSR—Novaya Zemlya, USSR—Franz Josef Land.

47-4222
Non-destructive high resolution density measurements of marine sediments. [Zerstörungsfreie hochauflösende Dichteuntersuchungen mariner Sedimente].
Gerland, S., *Berichte zur Polarforschung*, 1993, No.123, 130p., In German with English summary. Refs. p.119-125.
Ice rafting, Sediments, Marine deposits, Density (mass/volume), Remote sensing.

47-4223
Proceedings. Vol.4. Arctic/polar technology.
International Conference on Offshore Mechanics and Arctic Engineering, 12th, Glasgow, Scotland, June 20-24, 1993, MP 3263, New York, American Society of Mechanical Engineers, 1992, 219p., Refs. passim.
For individual papers see 47-4224 through 47-4249.
Nixon, W.A., ed, Sodhi, D.S., ed, Sinha, N.K., ed, Ayorinde, O.A., ed.
Ice solid interface, Ice mechanics, Ice models, Ice crystals, Ice creep, Loading, Impact tests, Ice strength, Ice loads.

47-4224
Creep and creep damage of polycrystalline ice under multi-axial variable loading.
Wu, Z., et al, International Conference on Offshore Mechanics and Arctic Engineering, 12th, Glasgow, Scotland, June 20-24, 1993. Proceedings. Vol.4. Edited by W.A. Nixon, D.S. Sodhi, N.K. Sinha and O.A. Ayorinde, New York, American Society of Mechanical Engineers, 1993, p.1-10, 23 refs.
Mahrenholtz, O.
Ice crystals, Ice creep, Dynamic loads, Static loads, Ice mechanics, Ice models, Mathematical models.

47-4225
Flow properties of crushed ice.
Singh, S.K., et al, International Conference on Offshore Mechanics and Arctic Engineering, 12th, Glasgow, Scotland, June 20-24, 1993. Proceedings. Vol.4. Edited by W.A. Nixon, D.S. Sodhi, N.K. Sinha and O.A. Ayorinde, New York, American Society of Mechanical Engineers, 1993, p.11-19, 18 refs.
Jordaan, I.J., Xiao, J., Spencer, P.A.
Ice pressure, Ice crystals, Ice solid interface, Ice mechanics, Viscous flow, Ice models.

47-4226
Experimental study of the behaviour of columnar grained ice subjected to cyclic loading.
Derradji-Aouat, A., et al, International Conference on Offshore Mechanics and Arctic Engineering, 12th, Glasgow, Scotland, June 20-24, 1993. Proceedings. Vol.4. Edited by W.A. Nixon, D.S. Sodhi, N.K. Sinha and O.A. Ayorinde, New York, American Society of Mechanical Engineers, 1993, p.21-28, 24 refs.
Sinha, N.K., Evgin, E.
Ice crystals, Loading, Ice models, Ice mechanics, Ice creep.

47-4227
Size-effect in indentation-induced splitting floe experiments.
Gupta, V., et al, International Conference on Offshore Mechanics and Arctic Engineering, 12th, Glasgow, Scotland, June 20-24, 1993. Proceedings. Vol.4. Edited by W.A. Nixon, D.S. Sodhi, N.K. Sinha and O.A. Ayorinde, New York, American Society of Mechanical Engineers, 1993, p.29-34, 33 refs.
Picu, R.C.
Ice cracks, Crack propagation, Ice floes, Ice cover, Impact tests, Analysis (mathematics).

47-4228
Measurement of cleavage strength in freshwater ice crystals by a laser spallation technique.
Gupta, V., et al, International Conference on Offshore Mechanics and Arctic Engineering, 12th, Glasgow, Scotland, June 20-24, 1993. Proceedings. Vol.4. Edited by W.A. Nixon, D.S. Sodhi, N.K. Sinha and O.A. Ayorinde, New York, American Society of Mechanical Engineers, 1993, p.35-44, 22 refs.
Tian, X.F.
Ice crystals, Tensile properties, Lasers, Surface energy.

47-4229
Flow properties of crushed ice: crushing plus extrusion tests.
Spencer, P.A., et al, International Conference on Offshore Mechanics and Arctic Engineering, 12th, Glasgow, Scotland, June 20-24, 1993. Proceedings. Vol.4. Edited by W.A. Nixon, D.S. Sodhi, N.K. Sinha and O.A. Ayorinde, New York, American Society of Mechanical Engineers, 1993, p.45-51, 10 refs.
Masterson, D.M., Metge, M.
Ice pressure, Strain tests, Ice cover strength, Ice mechanics.

47-4230
Air containing propeller stream and its application in ice clearance.
Wang, S.L., et al, International Conference on Offshore Mechanics and Arctic Engineering, 12th, Glasgow, Scotland, June 20-24, 1993. Proceedings. Vol.4. Edited by W.A. Nixon, D.S. Sodhi, N.K. Sinha and O.A. Ayorinde, New York, American Society of Mechanical Engineers, 1993, p.53-58, 4 refs.
Hsiung, C.C., Shih, L.Y.
Ice removal, Mathematical models, Bubbles, Propellers, Velocity, Channels (waterways), Ice navigation, Models.

47-4231
Stochastic modelling of icicle formation.
Szilder, K., et al, International Conference on Offshore Mechanics and Arctic Engineering, 12th, Glasgow, Scotland, June 20-24, 1993. Proceedings. Vol.4. Edited by W.A. Nixon, D.S. Sodhi, N.K. Sinha and O.A. Ayorinde, New York, American Society of Mechanical Engineers, 1993, p.59-64, 7 refs.
Lozowski, E.P.
Mathematical models, Ice formation, Ice models.

47-4232
Effect of boundary conditions on borehole indentor test results.
Sinha, N.K., et al, International Conference on Offshore Mechanics and Arctic Engineering, 12th, Glasgow, Scotland, June 20-24, 1993. Proceedings. Vol.4. Edited by W.A. Nixon, D.S. Sodhi, N.K. Sinha and O.A. Ayorinde, New York, American Society of Mechanical Engineers, 1993, p.65-72, 9 refs.
Zhan, C., Evgin, E.
Sea ice, Ice strength, Boreholes, Anisotropy.

47-4233
Analysis of data from indentation tests on freshwater ice.
Chin, S.N., et al, MP 3264, International Conference on Offshore Mechanics and Arctic Engineering, 12th, Glasgow, Scotland, June 20-24, 1993. Proceedings. Vol.4. Edited by W.A. Nixon, D.S. Sodhi, N.K. Sinha and O.A. Ayorinde, New York, American Society of Mechanical Engineers, 1993, p.73-81, 7 refs.
Sodhi, D.S.
Ice cover strength, Ice mechanics, Ice solid interface, Impact tests.
Indentation tests were conducted using a segmented indentor at different indentation velocities against freshwater ice. To determine the nature of ice failure at different rates, the effective pressure was measured on each segment of the indentor. The variation of pressure on each segment of the indentor was simultaneous at low-velocity indentation, whereas it was random during high-velocity indentation. Spectral and correlation plots of the data show that the degree of randomness in the measured pressure signal increased with an increase in indentation velocity. Plots of the mean, the maximum and the standard deviation of the measured pressure ar given with respect to the indentation velocity and the aspect ratio. For brittle ice failure, the actual contact of the ice with the indentor is over many small contiguous zones where brittle flaking originates because of high pressure. The trends of decreasing standard deviation with increasing indentation velocity and increasing aspect ratio are attributed to a decrease in the size and an increase in the number of the failure zones, respectively.

47-4234
Elastic analysis of stresses in ice structure interactions.
Nixon, W.A., et al, International Conference on Offshore Mechanics and Arctic Engineering, 12th, Glasgow, Scotland, June 20-24, 1993. Proceedings. Vol.4. Edited by W.A. Nixon, D.S. Sodhi, N.K. Sinha and O.A. Ayorinde, New York, American Society of Mechanical Engineers, 1993, p.83-88, 2 refs.
Marcellus, R.W., Weber, L.J.
Ice mechanics, Ice solid interface, Ice elasticity, Stresses, Strains, Analysis (mathematics).

47-4235
Computer model of glaze accretion on wires.
Draganoiu, G., et al, International Conference on Offshore Mechanics and Arctic Engineering, 12th, Glasgow, Scotland, June 20-24, 1993. Proceedings. Vol.4. Edited by W.A. Nixon, D.S. Sodhi, N.K. Sinha and O.A. Ayorinde, New York, American Society of Mechanical Engineers, 1993, p.89-95, 23 refs.
Lamarche, L., McComber, P.
Glaze, Computerized simulation, Ice accretion, Mathematical models, Power line icing, Aircraft icing, Heat transfer coefficient, Ice loads.

47-4236
Primary creep of ice plate under constant loading.
Mahrenholtz, O., et al, International Conference on Offshore Mechanics and Arctic Engineering, 12th, Glasgow, Scotland, June 20-24, 1993. Proceedings. Vol.4. Edited by W.A. Nixon, D.S. Sodhi, N.K. Sinha and O.A. Ayorinde, New York, American Society of Mechanical Engineers, 1993, p.97-104, 21 refs.
Wu, Z.
Ice creep, Ice crystals, Mathematical models, Ice models, Static loads.

47-4237
Dynamic analysis of the medium scale hydraulic ice indentation apparatus.
Spencer, P.A., et al, International Conference on Offshore Mechanics and Arctic Engineering, 12th, Glasgow, Scotland, June 20-24, 1993. Proceedings. Vol.4. Edited by W.A. Nixon, D.S. Sodhi, N.K. Sinha and O.A. Ayorinde, New York, American Society of Mechanical Engineers, 1993, p.105-111, 9 refs.
Masterson, D.M.
Mathematical models, Models, Test equipment, Ice strength, Impact tests.

47-4238
Geometrical model for pressure aspect-ratio effects in ice-structure interaction.
Spencer, P.A., et al, International Conference on Offshore Mechanics and Arctic Engineering, 12th, Glasgow, Scotland, June 20-24, 1993. Proceedings. Vol.4. Edited by W.A. Nixon, D.S. Sodhi, N.K. Sinha and O.A. Ayorinde, New York, American Society of Mechanical Engineers, 1993, p.113-117, 8 refs.
Masterson, D.M.
Ice solid interface, Ice strength, Ice models, Ice cover strength, Ice pressure.

47-4239
Modelling for ice-structure interactions.
Morsy, U.A., et al, International Conference on Offshore Mechanics and Arctic Engineering, 12th, Glasgow, Scotland, June 20-24, 1993. Proceedings. Vol.4. Edited by W.A. Nixon, D.S. Sodhi, N.K. Sinha and O.A. Ayorinde, New York, American Society of Mechanical Engineers, 1993, p.119-125, 20 refs.
Brown, T.G.
Ice solid interface, Ice models, Mathematical models.

47-4240
Investigation of the icebreaking pattern at the bow of the IB Kapitan Sorokin on the Yenisei River estuary in May 1991.
Valanto, P.U., International Conference on Offshore Mechanics and Arctic Engineering, 12th, Glasgow, Scotland, June 20-24, 1993. Proceedings. Vol.4. Edited by W.A. Nixon, D.S. Sodhi, N.K. Sinha and O.A. Ayorinde, New York, American Society of Mechanical Engineers, 1993, p.127-134, 7 refs.
Icebreakers, Ice breaking, Design criteria, Ice solid interface, Ice floes, Ice mechanics.

47-4241
Load transmission through ice rubble on the Gulf Molikpaq.
Timco, G.W., International Conference on Offshore Mechanics and Arctic Engineering, 12th, Glasgow, Scotland, June 20-24, 1993. Proceedings. Vol.4. Edited by W.A. Nixon, D.S. Sodhi, N.K. Sinha and O.A. Ayorinde, New York, American Society of Mechanical Engineers, 1993, p.135-143, 22 refs.
Ice solid interface, Offshore structures, Ice loads, Grounded ice.

47-4242
Description of multi-year ice indentation tests at Hobson's Choice Ice Island—1990.
Masterson, D.M., et al, International Conference on Offshore Mechanics and Arctic Engineering, 12th, Glasgow, Scotland, June 20-24, 1993. Proceedings. Vol.4. Edited by W.A. Nixon, D.S. Sodhi, N.K. Sinha and O.A. Ayorinde, New York, American Society of Mechanical Engineers, 1993, p.145-155, 8 refs.
Frederking, R.M.W., Jordaan, I.J., Spencer, P.A.
Ice solid interface, Ice mechanics, Impact tests, Ice navigation.

47-4243
Ice and rubble failure loads on sloping structures by two-dimensional upper-bound plastic limit analysis.
Luk, C.H., et al, International Conference on Offshore Mechanics and Arctic Engineering, 12th, Glasgow, Scotland, June 20-24, 1993. Proceedings. Vol.4. Edited by W.A. Nixon, D.S. Sodhi, N.K. Sinha and O.A. Ayorinde, New York, American Society of Mechanical Engineers, 1993, p.157-168, 5 refs.
Chao, J.C.
Ice loads, Ice solid interface, Ice mechanics, Analysis (mathematics), Flexural strength, Ice cover strength, Ice cover thickness.

47-4244
Stopping criteria for discrete event simulations.
Wang, A.T., International Conference on Offshore Mechanics and Arctic Engineering, 12th, Glasgow, Scotland, June 20-24, 1993. Proceedings. Vol.4. Edited by W.A. Nixon, D.S. Sodhi, N.K. Sinha and O.A. Ayorinde, New York, American Society of Mechanical Engineers, 1993, p.169-176, 18 refs.
Ice loads, Ice solid interface, Analysis (mathematics), Computerized simulation.

47-4245
Results from indentation tests in sea ice.
Kärnä, T., et al, International Conference on Offshore Mechanics and Arctic Engineering, 12th, Glasgow, Scotland, June 20-24, 1993. Proceedings. Vol.4. Edited by W.A. Nixon, D.S. Sodhi, N.K. Sinha and O.A. Ayorinde, New York, American Society of Mechanical Engineers, 1993, p.177-185, 24 refs.
Järvinen, E., Nyman, T., Vuorio, J.
Sea ice, Ice solid interface, Ice deformation, Penetration tests, Loading, Statistical analysis, Ice strength.

47-4246
Model for the construction of artificial ice islands.
Chouinard, L.E., International Conference on Offshore Mechanics and Arctic Engineering, 12th, Glasgow, Scotland, June 20-24, 1993. Proceedings. Vol.4. Edited by W.A. Nixon, D.S. Sodhi, N.K. Sinha and O.A. Ayorinde, New York, American Society of Mechanical Engineers, 1993, p.187-198, 13 refs.
Ice islands, Ice (construction material), Ice models.

47-4247
Analysis for dynamic ice structure interaction involving finite difference model and damage considerations.
Iyer, S.H., et al, International Conference on Offshore Mechanics and Arctic Engineering, 12th, Glasgow, Scotland, June 20-24, 1993. Proceedings. Vol.4. Edited by W.A. Nixon, D.S. Sodhi, N.K. Sinha and O.A. Ayorinde, New York, American Society of Mechanical Engineers, 1993, p.199-206, 16 refs.
Kivisild, H.R.
Ice solid interface, Damage, Ice cutting, Analysis (mathematics), Fracturing.

47-4248
Influence of filling charge, evaporator length and condenser length on the performance of a right-angled thermosyphon.
Lock, G.S.H., et al, International Conference on Offshore Mechanics and Arctic Engineering, 12th, Glasgow, Scotland, June 20-24, 1993. Proceedings. Vol.4. Edited by W.A. Nixon, D.S. Sodhi, N.K. Sinha and O.A. Ayorinde, New York, American Society of Mechanical Engineers, 1993, p.207-211, 10 refs.
Fu, J.
Pipes (tubes), Heat pipes, Heat transfer, Design criteria, Performance, Ice removal, Ice prevention.

47-4249
Influence of evaporator and condenser inclination on the performance of a right-angled thermosyphon.
Lock, G.S.H., et al, International Conference on Offshore Mechanics and Arctic Engineering, 12th, Glasgow, Scotland, June 20-24, 1993. Proceedings. Vol.4. Edited by W.A. Nixon, D.S. Sodhi, N.K. Sinha and O.A. Ayorinde, New York, American Society of Mechanical Engineers, 1993, p.213-217, 10 refs.
Fu, J.
Pipes (tubes), Heat pipes, Performance, Heat transfer, Heat flux, Ice removal, Ice prevention.

47-4250
Mega-scale glacial lineations and cross-cutting ice-flow landforms.
Clark, C.D., *Earth surface processes and landforms*, Feb. 1993, 18(1), p.1-29, 42 refs.
Pleistocene, Glacial erosion, Glacier flow, Glacier beds, LANDSAT, Spaceborne photography, Terrain identification, Landforms, Geomorphology, Classifications.

47-4251
Decrease in total ozone concentration in the polar cap following solar proton flares.
Shumilov, O.I., et al, *USSR Academy of Sciences. Transactions. Earth science sections*, May-June 1991, 319(5), p.17-21, 15 refs. For Russian original see 46-1329.
Polar atmospheres, Atmospheric composition, Atmospheric physics, Atmospheric disturbances, Weather modification, Ozone, Solar activity, Solar radiation, Protons, Correlation.

47-4252
Climatic changes in the Barents Sea area.
Borisov, S.B., et al, *USSR Academy of Sciences. Transactions. Earth science sections*, May-June 1991, 319(5), p.46-50, Translated from Akademiia nauk SSSR. Transactions, Vol.318, No.6. 4 refs.
Monin, A.S.
Marine atmospheres, Climatic changes, Air ice water interaction, Sea ice distribution, Ice cover effect, Air temperature, Correlation.

47-4253
Effects of polar ice on the earth's rotation and gravitational potential.
Trupin, A.S., *Geophysical journal international*, May 1993, 113(2), p.273-283, 30 refs.
Ice sheets, Ice cover thickness, Glacier mass balance, Periodic variations, Gravity, Ice cover effect.
In this paper, gridded values of net surface accumulation rates for the Antarctic and Greenland ice sheets are used to estimate the contributions these two regions make to the earth's gravity and rotation. Results suggest very approximate upper and lower limits for both inter-annual and secular contributions of polar-ice mass balance to earth rotation and gravity. These limits are useful where they fall with,n the range of detectability when using satellites. (Auth. mod.)

47-4254
Dynamic modeling of the spatial distribution of precipitation in remote mountainous areas.
Barros, A.P., et al, *Monthly weather review*, Apr. 1993, 121(4), p.1195-1214, 37 refs.
Lettenmaier, D.P.
Precipitation (meteorology), Mountains, Topographic effects, Snow accumulation, Weather forecasting, Hydrologic cycle, Mathematical models.

47-4255
Annual snowpack patterns across the Rockies: long-term trends and associated 500-mb synoptic patterns.
Changnon, D., et al, *Monthly weather review*, Mar. 1993, 121(3), p.633-647, 20 refs.
McKee, T.B., Doesken, N.J.
Synoptic meteorology, Atmospheric circulation, Snow surveys, Snow depth, Snow cover distribution, Periodic variations, Water storage, Water reserves, Long range forecasting.

47-4256
Case study of heavy snowfall in Oklahoma.
Marwitz, J.D., et al, *Monthly weather review*, Mar. 1993, 121(3), p.648-660, 29 refs.
Toth, J.
Precipitation (meteorology), Fronts (meteorology), Snowstorms, Snowfall, Snow accumulation, Synoptic meteorology, Sounding, Radar echoes, Turbulent boundary layer.

47-4257
Preconsolidation pressures in the Battleford Formation, southern Saskatchewan, Canada.
Sauer, E.K., et al, *Canadian journal of earth sciences*, Oct. 1991, 28(10), p.1613-1623, With French summary. 28 refs.
Christiansen, E.A.
Pleistocene, Glacial deposits, Stratigraphy, Glacial geology, Glacial hydrology, Subglacial drainage, Clay soils, Frozen ground mechanics, Soil compaction.

47-4258
Snow tiller.
Haug, W., *U.S. Patent Office. Patent*, Feb. 23, 1988, 10 col., USP-4,726,129, 8 refs.
Railroad tracks, Railroad equipment, Snow removal, Design.

47-4259
Composite platform for petroleum workings in polar seas.
Michel, D., et al, *U.S. Patent Office. Patent*, Oct. 21, 1986, 6 col., USP-4,618,286, 11 refs.
Offshore drilling, Offshore structures, Concrete structures, Subsurface structures, Protection, Ice control, Design.

47-4260
Method of attenuating sea ice flexure noise during seismic surveys of permafrost regions.
Ostrander, W.J., *U.S. Patent Office. Patent*, Oct. 7, 1986, 14 col., USP-4,616,348, 6 refs.
Acoustic measurement, Seismic surveys, Oceanographic surveys, Exploration, Seismic reflection, Ice acoustics, Pressure ridges, Attenuation, Design.

47-4261
Mobile marine operations structure.
Bhalaik, A., et al, *U.S. Patent Office. Patent*, Feb. 16, 1988, 30 col., USP-4,725,166, 5 refs. For another version see 47-3323.
Braddick, P.W., Brittin, D.S., Johnson, G.L.
Offshore structures, Concrete structures, Subsurface structures, Walls, Protection, Ice breaking, Ice solid interface, Design.

47-4262
Pipeline trenching.
Langner, C.G., *U.S. Patent Office. Patent*, Oct. 7, 1986, 4 col., USP-4,615,645, 15 refs.
Pipe laying, Pipelines, Offshore structures, Augers, Trenching, Ice surface, Design.

47-4263
Wing slat anti-ice air duct system.
Knowler, J.C., *U.S. Patent Office. Patent*, Oct. 7, 1986, 6 col., USP-4,615,499, 5 refs.
Aircraft icing, Ice prevention, Ice removal, Ducts, Air flow, Design.

47-4264
Snowplow mounted on longitudinal frame attachable to chassis.
Racicot, G., *U.S. Patent Office. Patent*, Oct. 7, 1986, 14 col., USP-4,615,130, 16 refs.
Snow removal, Equipment, All terrain vehicles, Modification, Design, Stability.

47-4265
Snow-disposal unit and method.
Jackson, P.H., *U.S. Patent Office. Patent*, Oct. 7, 1986, 8 col., USP-4,615,129, 10 refs.
Snow removal, Tanks (containers), Snow melting, Heat transfer, Vapor transfer, Steam, Design.

47-4266
Bio-optical observations of first-year arctic sea ice.
Perovich, D.K., et al, *Geophysical research letters*, June 7, 1993, 20(11), MP 3265, p.1059-1062, 16 refs.
Cota, G.F., Maykut, G.A., Grenfell, T.C.
Marine biology, Sea ice, Optical properties, Solar radiation, Light transmission, Attenuation, Spectra, Biomass, Snow cover effect.
This paper presents the first direct *in situ* measurements of biomass specific diffuse attenuation spectra for arctic ice algae. The data show *in situ* attenuation values that are about 3 times larger than those obtained from corresponding *in vivo* absorption measurements, apparently reflecting differences in the geometrical distribution of the algae or the influence of skeletal ice and dissolved organic material. Observations also confirm that maximal algal accumulation occurs when there is a thin layer of snow covering the ice. A new technique to separate the effects of snow and algae in observed transmission spectra is presented. The ratio of transmittance between 600 nm and 450 nm is a sensitive indicator of biomass, while the 700 nm to 600 nm ratio is strongly affected by snow depth.

47-4267
Proceedings.
Canada-France Seminar—Gas Pipelines, Oil Pipelines and Civil Engineering in Arctic Climates, Caen and Paris, France, Oct. 2-4, 1991, Ottawa, Carleton University, Geotechnical Science Laboratories, 1993, 170p., Refs. passim. For individual papers see 47-4268 through 47-4279.
Williams, P.J., ed.
Gas pipelines, Underground pipelines, Frost heave, Soil freezing, Soil mechanics, Frozen ground mechanics, Freeze thaw cycles.

47-4268
Gas pipelines and the challenge of the cold regions: an experimental study.
Williams, P.J., Canada-France Seminar—Gas Pipelines, Oil Pipelines and Civil Engineering in Arctic Climates, Caen and Paris, France, Oct. 2-4, 1991. Proceedings. Edited by P.J. Williams, Ottawa, Carleton University, Geotechnical Science Laboratories, 1993, p.5-18, 13 refs.
Gas pipelines, Underground pipelines, Soil freezing, Frost heave, Deformation, Freeze thaw cycles.

47-4269
Development of natural gas resources in northwest Siberia, Russia—field observations of permafrost and environmental concerns.
Michel, F.A., Canada-France Seminar—Gas Pipelines, Oil Pipelines and Civil Engineering in Arctic Climates, Caen and Paris, France, Oct. 2-4, 1991. Proceedings. Edited by P.J. Williams, Ottawa, Carleton University, Geotechnical Science Laboratories, 1993, p.19-24.
Natural gas, Natural resources, Gas pipelines, Gas production, Environmental impact, Permafrost preservation, USSR—Siberia.

47-4270
Soil-pipeline interaction associated with a large diameter chilled pipeline in temperate climates.
Greene, D.P., et al, Canada-France Seminar—Gas Pipelines, Oil Pipelines and Civil Engineering in Arctic Climates, Caen and Paris, France, Oct. 2-4, 1991. Proceedings. Edited by P.J. Williams, Ottawa, Carleton University, Geotechnical Science Laboratories, 1993, p.25-33, 3 refs.
Kettle, R.J.
Cracking (fracturing), Gas pipelines, Frost heave, Soil mechanics, Underground pipelines.

47-4271
Stress history and vertical displacement matching for the pipeline at Caen, France subjected to frost heave.
Rajani, B., et al, Canada-France Seminar—Gas Pipelines, Oil Pipelines and Civil Engineering in Arctic Climates, Caen and Paris, France, Oct. 2-4, 1991. Proceedings. Edited by P.J. Williams, Ottawa, Carleton University, Geotechnical Science Laboratories, 1993, p.34-47, 11 refs.
Morgenstern, N.
Frost heave, Sands, Underground pipelines, Soil mechanics, Frozen ground mechanics.

47-4272
Thermomechanical modelling of freezing soil.
Frémond, M., et al, Canada-France Seminar—Gas Pipelines, Oil Pipelines and Civil Engineering in Arctic Climates, Caen and Paris, France, Oct. 2-4, 1991. Proceedings. Edited by P.J. Williams, Ottawa, Carleton University, Geotechnical Science Laboratories, 1993, p.48-60, 8 refs.
Mikkola, M.
Mathematical models, Frozen ground thermodynamics, Soil freezing, Frost heave, Frozen ground mechanics.

47-4273
Stress-strain behaviour of frozen soil in tension.
Sayles, F.H., MP 3266, Canada-France Seminar—Gas Pipelines, Oil Pipelines and Civil Engineering in Arctic Climates, Caen and Paris, France, Oct. 2-4, 1991. Proceedings. Edited by P.J. Williams, Ottawa, Carleton University, Geotechnical Science Laboratories, 1993, p.61-72, 4 refs.
Underground pipelines, Frost heave, Stress strain diagrams, Tensile properties, Sands, Frozen ground mechanics.

47-4274
Microstructural genesis of a frost susceptible soil adjacent to a buried chilled pipeline.
White, T.L., et al, Canada-France Seminar —Gas Pipelines, Oil Pipelines and Civil Engineering in Arctic Climates, Caen and Paris, France, Oct. 2-4, 1991. Proceedings. Edited by P.J. Williams, Ottawa, Carleton University, Geotechnical Science Laboratories, 1993, p.73-91, 22 refs.
Ottawa. Carleton University. Geotechnical Science Laboratories.
Underground pipelines, Soil water, Frost heave, Freeze thaw cycles, Soil structure, Microstructure.

47-4275
Northern regulatory approvals.
Beaubier, H., Canada-France Seminar—Gas Pipelines, Oil Pipelines and Civil Engineering in Arctic Climates, Caen and Paris, France, Oct. 2-4, 1991. Proceedings. Edited by P.J. Williams, Ottawa, Carleton University, Geotechnical Science Laboratories, 1993, p.92-100.
Natural resources, Economic development.

47-4276
Recent developments of the Mackenzie Delta Pipeline Project.
Kaustinen, O.M., Canada-France Seminar—Gas Pipelines, Oil Pipelines and Civil Engineering in Arctic Climates, Caen and Paris, France, Oct. 2-4, 1991. Proceedings. Edited by P.J. Williams, Ottawa, Carleton University, Geotechnical Science Laboratories, 1993, p.101-115.
Natural gas, Gas pipelines, Gas production, Canada—Northwest Territories—Mackenzie River Delta.

47-4277
Experimental study and numerical solution of frost heaving in specific materials. [Étude expérimentale et simulation numérique du gonflement engendré par le gel dans certain matériaux].
Padilla, F., Canada-France Seminar—Gas Pipelines, Oil Pipelines and Civil Engineering in Arctic Climates, Caen and Paris, France, Oct. 2-4, 1991. Proceedings. Edited by P.J. Williams, Ottawa, Carleton University, Geotechnical Science Laboratories, 1993, p.116-136. In French with English summary. 13 refs.
Soil freezing, Frost heave, Frozen ground mechanics, Simulation, Mathematical models.

47-4278
Highway construction and management in cold regions.
MacLeod, D.R., Canada-France Seminar—Gas Pipelines, Oil Pipelines and Civil Engineering in Arctic Climates, Caen and Paris, France, Oct. 2-4, 1991. Proceedings. Edited by P.J. Williams, Ottawa, Carleton University, Geotechnical Science Laboratories, 1993, p.137-161, 3 refs.
Roads, Construction, Cold weather construction, Cold weather operation, Road maintenance, Cost analysis, Cold weather performance, Pavements.

47-4279
Current work, 1992. The Canada-France Pipeline-Frostheave Frozen Transition Experiment.
Riseborough, E.W., Canada-France Seminar—Gas Pipelines, Oil Pipelines and Civil Engineering in Arctic Climates, Caen and Paris, France, Oct. 2-4, 1991. Proceedings. Edited by P.J. Williams, Ottawa, Carleton University, Geotechnical Science Laboratories, 1993, p.162-170, 3 refs.
Underground pipelines, Frost heave.

47-4280
Ice forces on light piers in the St. Lawrence Seaway.
Frederking, R.M.W., et al, *International journal of offshore and polar engineering*, Mar. 1992, 2(1), p.67-72, 15 refs. For another version see 46-240.
Sayed, M., Penney, G.
Offshore structures, Piers, Floating ice, Ice loads, Ice pressure, Measurement, Ice solid interface, Statistical analysis, Design criteria.

47-4281
Modelling of snowdrift around prismatic buildings for antarctic environment.
Kim, D.H., et al, *International journal of offshore and polar engineering*, Mar. 1992, 2(1), p.73-79, 32 refs. For other versions see 46-231 or 19F-44686.
Kwok, K.C.S., Smedley, D.J., Rohde, H.F.
Buildings, Design criteria, Blowing snow, Topographic effects, Snowdrifts, Snow accumulation, Wind tunnels, Simulation, Turbulent boundary layer.
Modelling of snowdrift was conducted in a purpose-built turbulent boundary layer wind tunnel. A number of similarity criteria, in particular time scaling, for the physical modelling of snowdrift in a wind tunnel were examined. Iversen's (1980) proposed dimensionless time, which includes scaling of particle and fluid densities, Froude number, particle threshold speed, mean wind speed, time and length, was found to produce a reasonable correlation of snowdrift accumulation rate between model and prototype. Tests were also carried out to investigate the relationships between different dimensions of prismatic building and snowdrift. The results were used to formulate design guidelines for buildings in Antarctica. (Auth.)

47-4282
Dynamical problems of ice cover fracture.
Pushkin, A.V., et al, *International journal of offshore and polar engineering*, Sep. 1991, 1(3), p.212-219, 5 refs. For another version see 46-238.
Slepian, L.I., Zlatin, A.N.
Ice sheets, Floating ice, Ice deformation, Cracking (fracturing), Crack propagation, Elastic waves, Ice mechanics, Ice water interface, Analysis (mathematics).

47-4283
Cold region logistics planning and management.
Hulsey, J.L., et al, *Journal of cold regions engineering*, Mar. 1993, 6(1), p.1-11, 19 refs.
Koushki, P.A., Bennett, F.L., Kelley, J.
Cold weather operation, Exploration, Logistics, Cost analysis.

47-4284
Model study of cable-moored conical platform.
Nixon, W.A., et al, *Journal of cold regions engineering*, Mar. 1993, 6(1), p.12-31, 22 refs.
Ettema, R., Matsuishi, M., Johnson, R.C.
Offshore structures, Moorings, Stability, Floating ice, Ice solid interface, Ice loads, Ice breaking, Simulation, Resonance.

47-4285
Creep response of laterally loaded piles in ice and permafrost.
Puswewala, U.G.A., et al, *Géotechnique*, June 1993, 43(2), p.223-240, With French summary. 18 refs.
Rajapakse, R.K.N.D., Domaschuk, L., Shields, D.H.
Piles, Stability, Deformation, Ice creep, Frozen ground mechanics, Ice solid interface, Mathematical models, Computerized simulation.

47-4286
Computer-based simulation of the ice fracture near a vertical pile.
Matskevitch, D.G., et al, *International journal of offshore and polar engineering*, June 1992, 2(2), p.123-128, 20 refs.
Shkhinek, K.N.
Floating ice, Ice cover strength, Offshore structures, Pile structures, Ice mechanics, Ice solid interface, Ice deformation, Cracking (fracturing), Computerized simulation.

47-4287
Contact force and damage evolution in a moving uniaxial ice bar.
Shin, J.G., et al, *International journal of offshore and polar engineering*, June 1992, 2(2), p.129-134, 18 refs.
Karr, D.G.
Ice loads, Ice solid interface, Stress concentration, Ice mechanics, Ice breaking, Damage, Crack propagation, Mathematical models, Offshore structures.

47-4288
Temperature dependence of dielectric relaxation in H2O and D2O ice. A dissipative quantum tunneling approach.
Bruni, F., et al, *Journal of chemical physics*, July 1, 1993, 99(1), p.538-547, 30 refs.
Consolini, G., Careri, G.
Ice physics, Ice relaxation, Dielectric properties, Defects, Impurities, Cooling rate, Temperature effects, Molecular energy levels.

47-4289
On the engulfment of spherical particles by a moving ice-liquid interface.
Lipp, G., et al, *Journal of crystal growth*, June 1993, 130(3-4), p.475-489, 43 refs.
Körber, C.
Ice water interface, Solutions, Solidification, Particles, Velocity measurement, Fluid dynamics, Viscosity, Temperature effects, Liquid phases.

47-4290
On the reproduction of ice from a common seed.
Barrette, P., et al, *Journal of crystal growth*, July 1993, 131(1-2), p.153-156, 23 refs.
Michel, B., Stander, E.
Ice physics, Ice crystal growth, Ice crystal structure, Grain size, Orientation, Artificial nucleation.

47-4291
Variations in snow on sea ice: a mechanism for producing climate variations.
Ledley, T.S., *Journal of geophysical research*, June 20, 1993, 98(D6), p.10,401-10,410, 23 refs.
Sea ice, Ice cover thickness, Snow cover effect, Ice cover effect, Climatic factors, Climatic changes, Air ice water interaction, Ice heat flux, Albedo, Cooling, Ice openings.

47-4292
Interaction of katabatic flow with local thermal effects in a coastal region of Adélie Land, East Antarctica.
Pettré, P., et al, *Journal of geophysical research*, June 20, 1993, 98(D6), p.10,429-10,440, 39 refs.
Payan, C., Parish, T.R.
Wind (meteorology), Wind direction, Air ice water interaction, Ice cover effect, Atmospheric disturbances, Insolation, Diurnal variations, Turbulent boundary layer, Temperature effects, Simulation, Antarctica—Adélie Coast.
Results of a detailed climatological data analysis of Dumont d'Urville support the idea that katabatic flow can be locally enhanced by the diurnal cycle of solar insolation and the temperature contrast between the continent and the ocean. To estimate the effect of the temperature contrast between the ocean and the continent on the katabatic flow, two numerical experiments have been conducted. The simulations consider an ocean free of sea ice representative of the summer months, and another winter case with the ocean covered by thick sea ice. These simulations show that with the ocean free of sea ice, the katabatic flows extend only a limited distance over the open ocean during the day due to the local thermal effects. With the ocean covered by sea ice, the katabatic winds are not constrained and extend a considerable distance offshore. (Auth. mod.)

47-4293
Snow cover model for global climate simulations.
Loth, B., et al, *Journal of geophysical research*, June 20, 1993, 98(D6), p.10,451-10,464, 37 refs.
Graf, H.F., Oberhuber, J.M.
Climatology, Snow cover effect, Mathematical models, Snow physics, Snow heat flux, Snow air interface, Long term forecasting, Computerized simulation.

47-4294
Fourier transform infrared studies of the interactions of HCl with model polar stratospheric cloud films.
Koehler, B.G., et al, *Journal of geophysical research*, June 20, 1993, 98(D6), p.10,563-10,571, 31 refs.
McNeill, L.S., Middlebrook, A.M., Tolbert, M.A.
Cloud physics, Polar stratospheric clouds, Ice vapor interface, Ice spectroscopy, Aerosols, Ozone, Heterogeneous nucleation, Simulation, Water films, Chemical properties.
Heterogeneous reactions involving hydrochloric acid adsorbed on the surfaces of polar stratospheric clouds (PSCs) are postulated to contribute to polar ozone loss. Using Fourier transform infrared (FTIR) spectroscopy to probe the condensed phase, the authors examined the interaction of HCl with ice and nitric acid trihydrate (NAT) films representative of types II and I PSCs, respectively. For HCl pressures in the range of .0000001 to .00001 Torr, FTIR studies show that a small amount of crystalline HCl-6H2O formed on or in ice at 155 K. However, for higher HCl pressures the entire film of ice rapidly converted into an amorphous 4:1 H2O:HCl mixture. For higher temperatures more closely approximating those found in the stratosphere, bulk HCl uptake by ice was not detected. Experiments also detected no bulk uptake of HCl by *alpha*-NAT or *beta*-NAT under various temperature and pressure conditions. Indirect evidence suggests that HCl adsorption onto the surface of model PSC films inhibited the evaporation of both ice and NAT by 3-5 K. (Auth. mod.)

47-4295
Uses of antarctic ice. [Utilización de hielos antárticos].
Beltramino, J.C.M., Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.241-247. In Spanish. 7 refs.
Iceberg towing, Ice physics, Economic development, Legislation.
The principal characteristics of antarctic land and marine ice are described. The legal aspects of possible exploitation of antarctic ice are examined, and the lack of regulations in that regard, not only in the Antarctic Treaty but also in various conventions on antarctic resources, is pointed out. Technical and economic aspects are considered, and an Argentine proposal for the regulation of activities related to ice use is discussed.

47-4296
Shading reduces both visible and invisible frost damage to Norway spruce seedlings in the field.
Örlander, G., *Forestry*, 1993, 66(1), p.27-36, 25 refs.
Trees (plants), Forestry, Cold weather tests, Plant tissues, Frost action, Damage, Sunlight, Light effects.

47-4297
Iceberg scouring in Scoresby Sund and on the East Greenland continental shelf.
Dowdeswell, J.A., et al, *Marine geology*, Apr. 1993, 111(1-2), p.37-53, 24 refs.
Villinger, H., Whittington, R.J., Marienfeld, P.
Marine geology, Ice sheets, Icebergs, Drift, Calving, Ice scoring, Ocean bottom, Oceanographic surveys.

47-4298
Combined creep and yield model of ice under multiaxial stress.
Fish, A.M., *International journal of offshore and polar engineering*, June 1993, 3(2), MP 3267, p.130-138, 37 refs. For another version see 47-1869.
Ice strength, Ice creep, Ice deformation, Ice models, Shear strain, Strain tests, Mathematical models.

47-4299
Stresses and forces under ice compacting.
Nikitin, V.A., et al, *International journal of offshore and polar engineering*, June 1993, 3(2), p.139-142, 21 refs.
Kolesov, S.A.
Sea ice, Ice cover strength, Compaction, Ice breaking, Cracking (fracturing), Pressure ridges, Stress concentration, Loads (forces), Mathematical models.

47-4300
Dynamics of ice cover interacting with ocean and atmosphere.
Kheisin, D.E., *International journal of offshore and polar engineering*, Mar. 1993, 3(1), p.51-55, 13 refs
Sea ice, Air ice water interaction, Ice conditions, Ice deformation, Ice cover strength, Drift, Mathematical models.

47-4301
France-Canada joint study of deformation of an experimental pipe line by differential frost heave.
Williams, P.J., et al, *International journal of offshore and polar engineering*, Mar. 1993, 3(1), p.56-60, 8 refs. For another version see 47-1834.
Riseborough, D.W., Smith, M.W.
Gas pipelines, Subsurface structures, Deformation, Frost heave, Freeze thaw cycles, Soil pressure, Frozen ground mechanics, Mechanical tests.

47-4302
Snowdrift around antarctic buildings—effects of corner geometry and wind incidence.
Kwok, K.C.S., et al, *International journal of offshore and polar engineering*, Mar. 1993, 3(1), p.61-65, 12 refs. For other versions see 47-1845 or G-47697.
Smedley, D.J., Kim, D.H.
Buildings, Cold weather performance, Snowdrifts, Snow accumulation, Simulation, Wind tunnels, Snow air interface, Topographic effects, Design criteria.
Modelling of antarctic snowdrifting was conducted in a turbulent boundary layer wind tunnel. A series of 7 models was designed, based on the extended dimensions of a shipping container. Tests were carried out to investigate the effects of varying the model corner geometry and the angle of wind incidence on snowdrift formation. The results were used to formulate design guidelines for buildings in Antarctica.

47-4303
Effect of voltage polarity on icicles grown on line insulators.
Farzaneh, M., et al, *International journal of offshore and polar engineering*, Dec. 1992, 2(4), p.297-302, 13 refs. For another version see 47-1850.
Laforte, J.L.
Power line icing, Dendritic ice, Ice growth, Ice microstructure, Porosity, Ice solid interface, Electric charge, Polarization (charge separation).

47-4304
Ice forces in dynamic ice structure interaction.
Eranti, E., *International journal of offshore and polar engineering*, Sep. 1992, 2(3), p.204-211, 15 refs.
Offshore structures, Static stability, Floating ice, Ice solid interface, Ice breaking, Ice mechanics, Dynamic loads, Vibration, Design criteria.

47-4305
Effect of confining stress on brittle indentation failure of columnar ice.
Grape, J.A., et al, *International journal of offshore and polar engineering*, Sep. 1992, 2(3), p.212-221, 25 refs. For another version see 47-1867.
Schulson, E.M.
Ice sheets, Ice solid interface, Strain tests, Stress concentration, Ice breaking, Cracking (fracturing), Brittleness.

47-4306
Ice action onto multilegged structures due to change of water level.
Matskevitch, D.G., et al, *International journal of offshore and polar engineering*, Sep. 1992, 2(3), p.222-227, 14 refs. For another version see 47-1863.
Shkhinek, K.N.
Offshore structures, Ice sheets, Pile structures, Deformation, Ice solid interface, Ice loads, Water level, Analysis (mathematics), Design criteria.

47-4307
Ice accretion on energized line insulators.
Farzaneh, M., et al, *International journal of offshore and polar engineering*, Sep. 1992, 2(3), p.228-233, 15 refs. For another version see 47-1849.
Kiernicki, J., Drapeau, J.F.
Power line icing, Simulation, Ice accretion, Ice air interface, Meteorological factors, Insulation, Electrical resistivity, Ice cover effect.

47-4308
Landforms in Skane, south Sweden: preglacial and glacial landforms analyzed from two relief maps.
Lidmar-Bergström, K., et al, *Geografiska annaler*, 1991, 73A(2), p.61-91, 76 refs.
Elvhage, C., Ringberg, B.
Glacial geology, Landforms, Geomorphology, Geological maps, Geological surveys, Classifications, Glaciation, Topographic features, Sweden.

47-4309
Slow soil movement in Tarfala Valley, Kebnekaise Mountains, Swedish Lapland.
Jahn, A., *Geografiska annaler*, 1991, 73A(2), p.93-107, 22 refs.
Mountain soils, Slope processes, Soil creep, Frozen ground mechanics, Periglacial processes, Cryoturbation, Frost action, Microclimatology, Sweden—Lapland.

47-4310
Subglacial meltwater channel systems and ice sheet overriding, Asgard Range, Antarctica.
Sugden, D.E., et al, *Geografiska annaler*, 1991, 73A(1), p.109-121, 24 refs.
Denton, G.H., Marchant, D.R.
Ice sheets, Glaciation, Glacier melting, Bedrock, Water erosion, Subglacial drainage, Geomorphology, Antarctica—Asgard Range.
Various morphological features in the mountain ranges of the Dry Valleys region have been interpreted as reflecting late Tertiary overriding by an expanded East Antarctic Ice Sheet. Such features include large-scale stoss and lee topography, and anastomosing systems of channels and potholes. Alternative explanations for the features have been suggested and throw some doubt on the overriding hypothesis. This paper investigates channels and potholes in part of the Asgard Range in some detail and concludes that they do indeed reflect overriding ice. The channels are subglacial meltwater systems reflecting ice flow across the mountains from southwest to northeast. The channels were probably cut by sudden outbursts of meltwater beneath a local warm-based zone within a predominantly cold-based ice sheet.

47-4311
Spring in the forest terrain at Svartberget, northern Sweden.
Odin, H., et al, *Geografiska annaler. Series A: Physical geography*, 1990, 72A(2), p.167-178, 8 refs.
Degermark, C.
Snow air interface, Snow cover effect, Soil temperature, Frost penetration, Frozen ground temperature, Sweden—Svartberget.

47-4312
Ground temperature variations in a subarctic mountain valley, Abisko, northern Sweden.
Josefsson, M., *Geografiska annaler. Series A: Physical geography*, 1990, 72A(2), p.179-190, 23 refs.
Snow cover effect, Soil temperature, Frozen ground temperature, Seasonal freeze thaw, Valleys, Sweden—Abisko Mountains.

47-4313
Depth of snow and frost on a palsa mire, Finnish Lapland.
Seppälä, M., *Geografiska annaler. Series A: Physical geography*, 1990, 72A(2), p.191-201, 11 refs.
Snow depth, Snow cover effect, Frost penetration, Frozen ground temperature, Soil temperature, Finland—Utsjoki.

47-4314
Geomorphic features as indicators of climatic fluctuations in a periglacial environment, northern Sweden.
Nyberg, R., et al, *Geografiska annaler. Series A: Physical geography*, 1990, 72A(2), p.203-210, 22 refs.
Lindh, L.
Periglacial processes, Geomorphology, Climatic factors, Climatic changes, Mountain glaciers, Mountains, Sweden—Abisko Mountains.

47-4315
Small scale glacial erosion forms and their possible relation to post-glacial weathering.
Franzén, L.G., et al, *Geografiska annaler. Series A: Physical geography*, 1991, 73A(1), p.1-7, 29 refs.
Olvmo, M.
Glacial erosion, Weathering, Glacial geology, Sweden.

47-4316
Cirques at low altitudes need not necessarily have been cut by small glaciers.
Holmlund, P., *Geografiska annaler. Series A: Physical geography*, 1991, 73A(1), p.9-16, 43 refs.
Cirques, Glaciation, Glacier mass balance, Glacial erosion, Sweden.

47-4317
Glacial ice-flows on the islands of Bornholm and Christiansö, Denmark.
Lindström, E., *Geografiska annaler. Series A: Physical geography*, 1991, 73A(1), p.17-35, Refs. p.33-35.
Glacier ice, Quaternary deposits, Striations, Glaciation, Bedrock, Denmark—Bornholm Island, Denmark—Christiansö Island.

47-4318
Thresholds for channel change on two contrasting pro-glacial river fans, West Greenland.
De Jong, C., *Geografiska annaler. Series A: Physical geography*, 1992, 74A(1), p.1-12, 32 refs.
Glacial rivers, Channels (waterways), Models, Glacial deposits, Geomorphology, Greenland.

47-4319
Stagnant glacier ice, St. Elias Mountains, Yukon.
Johnson, P.G., *Geografiska annaler. Series A: Physical geography*, 1992, 74A(1), p.13-19, 24 refs.
Glacier ice, Moraines, Ice melting, Glacial deposits, Alpine landscapes, Degradation, Canada—Yukon Territory—St. Elias Mountains.

47-4320
Boulder ring structures produced during jökulhlaup flows.
Maizels, J., *Geografiska annaler. Series A: Physical geography*, 1992, 74A(1), p.21-33, 31 refs.
Glacial hydrology, Subglacial drainage, Floods, Sediments, Glacial geology, Iceland—Myrdalssandur.

47-4321
Debris flows and snow avalanche landforms in the Lairig Ghru, Cairngorm Mountains, Scotland.
Luckman, B.H., *Geografiska annaler. Series A: Physical geography*, 1992, 74A(2-3), p.109-121, 33 refs.
Avalanche deposits, Avalanche mechanics, Geomorphology, Avalanche tracks, Landforms, United Kingdom—Scotland.

47-4322
High-energy geomorphic events in the Polish Tatra Mountains.
Kotarba, A., *Geografiska annaler. Series A: Physical geography*, 1992, 74A(2-3), p.123-131, 14 refs.
Geomorphology, Glacial deposits, Lacustrine deposits, Poland—Tatra Mountains.

47-4323
Sediment transfer on the floor of the Martinelli Snowpatch, Colorado Front Range, U.S.A.
Caine, N., *Geografiska annaler. Series A: Physical geography*, 1992, 74A(2-3), p.133-144, 20 refs.
Sediment transport, Nivation, Alpine landscapes, Snow accumulation, United States—Colorado—Front Range.

47-4324
Pediments and cold-climate conditions, Barn Mountains, unglaciated northern Yukon, Canada.
French, H.M., et al, *Geografiska annaler. Series A: Physical geography*, 1992, 74A(2-3), p.145-157, Refs. p.155-157.
Harry, D.G.
Geomorphology, Alpine landscapes, Active layer, Sediments, Pleistocene, Paleoclimatology, Frost penetration, Wedges, Periglacial processes, Canada—Yukon Territory—Barn Mountains.

47-4325
Some characteristics of alpine permafrost, Mt. Daisetsu, central Hokkaido, northern Japan.
Fukuda, M., et al, *Geografiska annaler. Series A: Physical geography*, 1992, 74A(2-3), p.159-167, 22 refs.
Sone, T.
Permafrost distribution, Soil temperature, Surface temperature, Electrical resistivity, Frost shattering, Cracking (fracturing), Japan—Hokkaido.

47-4326
Hydrographic characteristics of the Strokdammane Plain, west Spitsbergen, Svalbard.
Akerman, H.J., *Geografiska annaler. Series A: Physical geography*, 1992, 74A(2-3), p.169-182, 16 refs.
Hydrography, Periglacial processes, Shores, Geomorphology, Thermokarst, Lakes, Ponds, Norway—Spitsbergen.

47-4327
Altitudinal zonation of selected geomorphological phenomena in an alpine periglacial area (Abisko, northern Sweden).
Niessen, A., et al, *Geografiska annaler. Series A: Physical geography*, 1992, 74A(2-3), p.183-196, 47 refs.
Van Horssen, P., Koster, E.A.
Geomorphology, Periglacial processes, Frost heave, Sweden—Abisko.

47-4328
Observations on rock moisture variability in gneiss and basalt under natural, arctic conditions.
Humlum, O., *Geografiska annaler. Series A: Physical geography*, 1992, 74A(2-3), p.197-205, 46 refs.
Rock mechanics, Moisture transfer, Frozen rocks, Humidity, Snow cover effect, Weathering, Greenland.

47-4329
Frost-fissure patterns in the Nordic countries.
Svensson, H., *Geografiska annaler. Series A: Physical geography*, 1992, 74A(2-3), p.207-218, 50 refs.
Frost shattering, Ice wedges, Geomorphology, Ice sheets.

47-4330
Large sorted stone polygons, and ventifact distribution, in the Syrkadal area, Scania, S. Sweden.
Schlyter, P., *Geografiska annaler. Series A: Physical geography*, 1992, 74A(2-3), p.219-226, 29 refs.
Rocks, Valleys, Periglacial processes, Snow cover effect, Sweden—Scania.

47-4331
Stabilization of snow temperature in Dronning Maud Land, Antarctica, January 1989.
Seppälä, M., *Geografiska annaler. Series A: Physical geography*, 1992, 74A(2-3), p.227-230, 9 refs.
Snow temperature, Boreholes, Accuracy, Antarctica—Queen Maud Land.
Snow temperatures were observed on Riiser- Larsenisen Shelf Ice and close to Basen, Vestfjella mountains in Jan. 1989, at depths from 0 to 10 m over time intervals of 1-21 hours in two boreholes and a snow pit. The maximum difference noticed over 15h was -3.0 C at 10 m. The coldest layer was found at -5 m. This may be caused by air circulation in the borehole. This may also influence the temperatures at the bottom of the borehole if the measurements are made long after drilling. As a result of drill heat and friction at least 15h stabilization time is recommended before the temperature measurements are made. (Auth.)

47-4332
Multiple glaciation in Scandinavia—seen in gross morphology or not?.
Rudberg, S., *Geografiska annaler. Series A: Physical geography*, 1992, 74A(2-3), p.231-243, 19 refs.
Glaciation, Valleys, Glacial geology, Glacial erosion, Cirque glaciers, Cirques, Geomorphology.

47-4333
Moraines and late glacial activity in southern Värmland, southwestern Sweden.
Lundqvist, J., *Geografiska annaler. Series A: Physical geography*, 1992, 74A(2-3), p.245-252, 43 refs.
Moraines, Glacial deposits, Glaciation, Paleoclimatology, Sweden—Värmland.

47-4334
Evolution of large roches moutonnées.
Sugden, D.E., et al, *Geografiska annaler. Series A: Physical geography*, 1992, 74A(2-3), p.253-264, 25 refs.
Glasser, N., Clapperton, C.M.
Glacial erosion, Glacial geology, Meltwater, Channels (waterways), Geomorphology, United Kingdom—Scotland.

47-4335
Mass wasting on valley-side ice-cored moraines, Boundary Glacier, Alberta Canada.
Mattson, L.E., et al, *Geografiska annaler. Series A: Physical geography*, 1991, 73A(3-4), p.123-128, 14 refs.
Gardner, J.S.
Moraines, Glacier ablation, Canada—Alberta—Boundary Glacier.

47-4336
Rockslides on the terminus of "Jökulsárgilsjökull," southern Iceland.
Sigurdsson, O., et al, *Geografiska annaler. Series A: Physical geography*, 1991, 73A(3-4), p.129-140, 38 refs.
Williams, R.S., Jr.
Rocks, Glacier ablation, Landslides, Glaciology, Iceland—Jökulsárgil.

47-4337
Lichenometrical studies and dating of debris flow deposits in the High Tatra Mountains, Poland.
Jonasson, C., et al, *Geografiska annaler. Series A: Physical geography*, 1991, 73A(3-4), p.141-146, 12 refs.
Kot, M., Kotarba, A.
Glacial deposits, Lichens, Age determination, Valleys, Poland—Tatra Mountains.

47-4338
Ice detection during cloudy conditions over the Arctic region using NOAA AVHRR satellite imagery.
Alm, G., *Geografiska annaler. Series A: Physical geography*, 1991, 73A(3-4), p.155-166, 13 refs.
Ice detection, Cloud cover, Infrared photography, Radiometry, Reflectivity, Sea ice, Spaceborne photography.

47-4339
Ground frost restriction of subarctic Picea abies forest in northern Sweden. A dendroecological analysis.
Kullman, L., *Geografiska annaler. Series A: Physical geography*, 1991, 73A(3-4), p.167-178, 77 refs.
Frost, Frozen ground, Age determination, Trees (plants), Sweden.

47-4340
Deglaciation and shoreline displacement on Alexandra Land, Franz Josef Land.
Glazovskiĭ, A.F., et al, *Geografiska annaler. Series A: Physical geography*, 1992, 74A(4), p.283-293, 47 refs.
Näslund, J.O., Zale, R.
Shoreline modification, Icebound lakes, Paleoclimatology, Radioactive age determination, USSR—Franz Josef Land, USSR—Alexandra Land.

47-4341
Glacial landforms and the age of deglaciation in the Tiksi area, East Siberia.
Grosval'd, M.G., et al, *Geografiska annaler. Series A: Physical geography*, 1992, 74A(4), p.295-304, 18 refs.
Karlén, W., Shishorina, Z., Bodin, A.
Landforms, Paleoclimatology, Radioactive age determination, Glacial geology, Geomorphology, Pollen, USSR—Siberia, USSR—Ladannoye, Lake, USSR—East Sevastian, Lake.

47-4342
Palimpsest glacial landscape in northwestern Sweden.
Kleman, J., *Geografiska annaler. Series A: Physical geography*, 1992, 74A(4), p.305-325, 46 refs.
Landforms, Alpine landscapes, Moraines, Meltwater, Icebound lakes, Paleoclimatology, Ice cover, Sweden.

47-4343
Reconstructing Holocene glacier variations from glacial lake sediments: studies from Nordvestlandet and Jostedalsbreen- Jotunheimen, southern Norway.
Karlén, W., et al, *Geografiska annaler. Series A: Physical geography*, 1992, 74A(4), p.327-348, 48 refs.
Matthews, J.A.
Lakes, Glacial lakes, Glacier oscillation, Lacustrine deposits, Glacial deposits, Radioactive age determination, Norway—Nordvestlandet, Norway—Jostedalsbreen.

47-4344
Palsa formation in floating peat and related vegetation cover as illustrated by a fen bog in the MacMillan Pass, Yukon Territory, Canada.
Harris, S.A., et al, *Geografiska annaler. Series A: Physical geography*, 1992, 74A(4), p.349-362, 37 refs.
Nyrose, D.
Ground ice, Permafrost, Swamps, Peat, Canada—Yukon Territory—MacMillan Pass.

47-4345
Expected changes in ice and thermal regimes in the rivers during the construction of Kansk-Achinsk fuel-power system.
Filippov, A.M., *Soviet meteorology and hydrology*, 1992, No.5, p.61-64, Translated from Meteorologiia i gidrologiia. 5 refs.
Rivers, River ice, Ice formation, Thermal regime, Water temperature, Heating, Temperature effects, Environmental impact.

47-4346
Active and passive radar technique used to study microstructure of hail clouds during weather modification.
Fedchenko, L.M., et al, *Soviet meteorology and hydrology*, 1992, No.5, p.87-92, Translated from Meteorologiia i gidrologiia. 7 refs.
Karmov, Kh.N., Tlimakhov, Kh.M.
Hail clouds, Reflectivity, Microstructure, Cloud seeding, Weather modification, Radar echoes, Remote sensing.

47-4347
Dynamical criterion for freezing of colloidal liquids.
Löwen, H., et al, *Physical review letters*, Mar. 8, 1993, 70(10), p.1557-1560, 25 refs.
Palberg, T., Simon, R.
Colloids, Freezing, Self diffusion, Phase transformations, Fluid dynamics, Computerized simulation.

47-4348
Scattering of light by polyhedral ice crystals.
Macke, A., *Applied optics*, May 20, 1993, 32(15), p.2780-2788, 16 refs.
Ice crystal optics, Ice crystal structure, Classifications, Light scattering, Cloud physics, Remote sensing, Radiation balance.

47-4349
Below-cloud scavenging of aerosol particles: particle-bound radionuclides—experimental.
Sparmacher, H., et al, *Atmospheric environment*, Mar. 1993, 27A(4), p.605-618, 46 refs.
Fülber, K., Bonka, H.
Precipitation (meteorology), Fallout, Snowfall, Snowflakes, Aerosols, Scavenging, Models, Snow air interface, Simulation.

47-4350
Mean circulations of boundary-layer rolls in lake-effect snow storms.
Kristovich, D.A.R., *Boundary-layer meteorology*, Mar. 1993, 63(3), p.293-315, 47 refs.
Atmospheric physics, Snowstorms, Lake effects, Radar echoes, Turbulent boundary layer, Wind direction, Convection, Shear flow.

47-4351
Influence of silica fume replacement of cement on physical properties and resistance to sulfate attack, freezing and thawing, and alkali-silica reactivity.
Hooton, R.D., *ACI materials journal*, Mar.-Apr. 1993, 90(2), p.143-151, 14 refs.
Concrete durability, Concrete admixtures, Mechanical tests, Porosity, Permeability, Freeze thaw tests, Frost resistance.

47-4352
Mean spacing of air voids in hardened concrete.
Attiogbe, E.K., *ACI materials journal*, Mar.-Apr. 1993, 90(2), p.174-181, 20 refs.
Concrete durability, Physical properties, Air entrainment, Porosity, Frost resistance, Analysis (mathematics).

47-4353
Guide to durable concrete.
American Concrete Institute, Detroit, Apr. 1992, 39p., ACI 201.2R-92, Refs. p.33-39.
Concrete durability, Concrete freezing, Concrete aggregates, Concrete admixtures, Corrosion, Freeze thaw cycles, Manuals.

47-4354
Boolean delay equation model of an interdecadal arctic climate cycle.
Darby, M.S., et al, *Climate dynamics*, May 1993, 8(5), p.241-246, 12 refs.
Mysak, L.A.
Climatology, Marine meteorology, Climatic changes, Forecasting, Meteorological factors, Periodic variations, Sea ice distribution, Ice cover effect, Air ice water interaction, Mathematical models.

47-4355
Form of cyclonic precipitation and its thermal impact.
Gedzelman, S.D., et al, *Monthly weather review*, July 1993, 121(7), p.1957-1978, 52 refs.
Arnold, R.
Precipitation (meteorology), Classifications, Cloud physics, Phase transformations, Snowstorms, Snow melting, Snow air interface, Temperature effects, Weather forecasting, Mathematical models.

47-4356
Fertilizer placement for conventional and no-tillage barley in the subarctic.
Cochran, V.L., et al. *Soil Science Society of America. Journal*, Nov.-Dec. 1992, 56(6), p.1973-1978, 25 refs.
Schlentner, S.F.
Agriculture, Soil composition, Plant physiology, Nutrient cycle, Growth, Subarctic landscapes, Soil temperature, Temperature effects.

47-4357
Annual variation of oxygen isotopic contents of drifting snow and the isotopic contents of deposited snow layers at Mizuho Station, Antarctica.
Ageta, Y., *Antarctic record*, Mar. 1993, 37(1), p.24-31, In Japanese. 5 refs.
Snow composition, Oxygen isotopes, Variations, Antarctica—Mizuho Station.
Oxygen isotopic contents of fresh snow drifts in the katabatic wind zone of Mizuho Station were measured, and the oxygen isotope profiles of deposited snow layers were obtained. The *delta*O-18 contents of the snowdrifts had high values in summer (-30 to about -40 per mill); in winter, values were generally low (above -50 per mill). Deviation of relations between air temperature at sampling time and *delta*O-18 content of the snowdrifts under different weather conditions are discussed. Vertical profiles of *delta*O-18 content of deposited snow usually show a wide annual range and complicated annual variation when such snowdrifts accumulate continuously. Those of deposited snow in the surface layers show a narrow range (-35 to about -45 per mill) and a simplified pattern. Positions of maxima and minima in *delta*O-18 profiles of deposited snow have good correlations with layering of ice crusts which were formed during hiatus periods of snow deposition. (Auth. mod.)

47-4358
Construction of the new central building of Syowa Station, Antarctica. I. Preliminary design of the building.
Hannuki, T., et al. *Antarctic record*, Mar. 1993, 37(1), p.61-102, In Japanese. 8 refs.
Cold weather construction, Construction materials, Construction equipment, Design, Antarctica—Showa Station.
The history of building construction at Showa Station by the Japanese Antarctic Research Expedition is surveyed and the present conditions of these buildings are discussed. It is found that the living quarters consisting of the oldest buildings should be replaced as soon as possible. Designs dealing with transportation, climate and construction in polar regions are presented. The development and improvement of the building prefabrication system at Showa Station are reviewed. Fire-preventive plans, and a new wooden structural system with large-scale laminated timber are shown in the design. The future of polar buildings is discussed. (Auth. mod.)

47-4359
Winter storm mapping: a Geographic Information Systems Transportation application.
Swift, L.B., et al. International Conference on Microcomputers in Transportation, 4th, Baltimore, MD, July 22-24, 1992. Proceedings. Edited by J. Chow et al, New York, American Society of Civil Engineers, 1992, p.60-71.
Wheeler, D.
DLC TA1230.I57
Snowstorms, Road maintenance, Transportation, Snow accumulation, Snow removal, Monitors, Computer applications, Mapping.

47-4360
Glacial landform distribution in the area east of Mount Meylixueshan in Yunnan Province, China and its implication to the mountain uplift during the Late Pleistocene and Holocene.
Aniya, M., *Institute of Geoscience, University of Tsukuba. Science reports A*, Jan. 25, 1992, Vol.13, p.1-12, 14 refs.
Pleistocene, Glaciation, Mountain glaciers, Glacier tongues, Landforms, Moraines, Particle size distribution, Glacier oscillation, Age determination.

47-4361
Solidification of a binary mixture in a rectangular cavity.
Zampino, M.A., et al. International Symposium on Transport Phenomena in Heat and Mass Transfer, 4th, Sydney, Australia, July 14-19, 1991. Proceedings, Vol.1. Edited by J.A. Reizes, Amsterdam, Elsevier Science Publishers, 1992, p.629-639, 13 refs.
Waters, R.A., Chellaiah, S.
DLC QC319.8.I59
Solutions, Salt water, Liquid solid interfaces, Solidification, Convection, Phase transformations, Buoyancy, Mass transfer, Freezing rate.

47-4362
Numerical study of three-dimensional natural convection and freezing in water.
Yeoh, G.H., et al. International Symposium on Transport Phenomena in Heat and Mass Transfer, 4th, Sydney, Australia, July 14-19, 1991. Proceedings, Vol.1. Edited by J.A. Reizes, Amsterdam, Elsevier Science Publishers, 1992, p.640-650, 14 refs.
Leonardi, E., de Vahl Davis, G.
DLC QC319.8.I59
Convection, Ice water interface, Phase transformations, Solidification, Heat transfer, Mathematical models.

47-4363
Study of snow melting mechanism by solar radiative absorption material.
Inaba, H., et al. International Symposium on Transport Phenomena in Heat and Mass Transfer, 4th, Sydney, Australia, July 14-19, 1991. Proceedings, Vol.1. Edited by J.A. Reizes, Amsterdam, Elsevier Science Publishers, 1992, p.715-726, 5 refs.
Otake, H., Nozu, S.
DLC QC319.8.I59
Snow melting, Solar radiation, Heat transfer, Snow temperature, Snow air interface, Materials, Simulation, Analysis (mathematics), Artificial melting.

47-4364
Characteristics of a water sprinkler system with variable flow rates to melt snow on railway tracks.
Sawase, K., et al. International Symposium on Transport Phenomena in Heat and Mass Transfer, 4th, Sydney, Australia, July 14-19, 1991. Proceedings, Vol.1. Edited by J.A. Reizes, Amsterdam, Elsevier Science Publishers, 1992, p.727-738, 2 refs.
Kurosaki, Y., Satoh, M.
DLC QC319.8.I59
Railroad tracks, Snow removal, Snow melting, Railroad equipment, Performance, Ice water interface, Water transport, Flow rate.

47-4365
Submarine cements and fabrics in Carboniferous to Lower Permian, reefal, shelf margin and slope carbonates, northwestern Ellesmere Island, Canadian Arctic Archipelago.
Davies, G.R., et al. *Geological Survey of Canada. Bulletin*, 1990, No.399, 77p., Refs. p.71-76.
Nassichuk, W.W.
Arctic landscapes, Marine geology, Lithology, Marine geology, Diagenesis, Rock properties, Thin sections, Isotope analysis, Stratigraphy.

47-4366
Three-dimensional geologic block model of a polar fan-delta complex, Canning River, North Slope, Canada.
Lindsay, J.F., Computer modeling of geologic surface and volumes. Edited by D.E. Hamilton et al, Tulsa, OK, American Association of Petroleum Geologists, 1992, p.183-201, 30 refs.
Rivers, Marine geology, Deltas, Arctic landscapes, Sedimentation, Sediment transport, Permafrost hydrology, Stratigraphy, Ice scoring, Computerized simulation, Alaska—North Slope—Canning River.

47-4367
Freezing.
Haymet, A.D.J., Fundamentals of inhomogeneous fluids. Edited by D. Henderson, New York, Marcel Dekker, Inc., 1992, p.363-405, 105 refs.
DLC QD541.F86
Liquid cooling, Freezing, Crystals, Density (mass/volume), Theories, Phase transformations, Fluid dynamics, Thermodynamics, Analysis (mathematics).

47-4368
Nucleation.
Oxtoby, D.W., Fundamentals of inhomogeneous fluids. Edited by D. Henderson, New York, Marcel Dekker, Inc., 1992, p.407-442, 52 refs.
DLC QD541.F86
Fluid dynamics, Phase transformations, Homogeneous nucleation, Theories, Thermodynamics, Liquid solid interfaces, Surface energy, Analysis (mathematics).

47-4369
Unusual early-winter flood and its varying geomorphic impact along a subalpine river in the Rocky Mountains of Montana, U.S.A.
Butler, D.R., et al. *Zeitschrift für Geomorphologie*, June 1993, 37(2), p.145-155, With German and French summaries. 15 refs.
Malanson, G.P.
Snowmelt, Winter, Flooding, River flow, Water erosion, Shore erosion, Geomorphology.

47-4370
Time- and temperature-dependent solute loading of isolated thylakoids during freezing.
Bakaltcheva, I., et al. *Cryobiology*, Oct. 1992, 29(5), p.607-615, 26 refs.
Schmitt, J.M., Hincha, D.K.
Cryobiology, Plant physiology, Plant tissues, Frost protection, Freeze thaw cycles, Damage, Temperature effects, Chemical analysis.

47-4371
Variability in the Greenland Sea as revealed by a repeated high spatial resolution conductivity-temperature-depth survey.
Budéus, G., et al. *Journal of geophysical research*, June 15, 1993, 98(C6), p.9985-10,000, 26 refs.
Maul, A.A., Krause, G.
Oceanographic surveys, Hydrography, Ice cover effect, Ocean currents, Water temperature, Periodic variations, Convection.

47-4372
Thermal energy conservation in icebergs and tracking by temperature.
Löset, S., *Journal of geophysical research*, June 15, 1993, 98(C6), p.10,001-10,012, 29 refs.
Icebergs, Drift, Calving, Air ice water interaction, Ice temperature, Temperature distribution, Thermal regime, Mathematical models, Ice forecasting.

47-4373
Hydrography and vertical fluxes of heat and salt northeast of Svalbard in autumn.
Steele, M., et al, *Journal of geophysical research*, June 15, 1993, 98(C6), p.10,013-10,024, 31 refs.
Morison, J.H.
Oceanographic surveys, Hydrography, Sea ice, Air ice water interaction, Ice cover effect, Ice heat flux, Ice melting, Drift stations, Water temperature, Turbulent diffusion, Salinity.

47-4374
Wave effects on ocean-ice interaction in the marginal ice zone.
Liu, A.K., et al, *Journal of geophysical research*, June 15, 1993, 98(C6), p.10,025-10,036, 37 refs.
Häkkinen, S., Peng, C.Y.
Oceanography, Sea ice distribution, Ice edge, Upwelling, Ice water interface, Ocean waves, Wave propagation Wind factors, Mathematical models.

47-4375
Arctic sea ice signatures for passive microwave algorithms.
Thomas, D.R., *Journal of geophysical research*, June 15, 1993, 98(C6), p.10,037-10,052, 48 refs.
Sea ice distribution, Periodic variations, Remote sensing, Radiometry, Classifications, Accuracy, Brightness, Mathematical models.

47-4376
Arctic Ocean ice balance: a Kalman smoother estimate.
Thomas, D.R., et al, *Journal of geophysical research*, June 15, 1993, 98(C6), p.10,053-10,067, 19 refs.
Rothrock, D.A.
Sea ice distribution, Ice conditions, Ice surveys, Drift, Periodic variations, Radiometry, Ice models, Mathematical models.

47-4377
Numerical study of haline convection beneath leads in sea ice.
Smith, D.C., IV, et al, *Journal of geophysical research*, June 15, 1993, 98(C6), p.10,069-10,083, 26 refs.
Morison, J.H.
Sea ice, Ice openings, Air ice water interaction, Ocean currents, Salinity, Buoyancy, Convection, Mathematical models, Turbulent diffusion.

47-4378
Intermediate one-dimensional thermodynamic sea ice model for investigating ice-atmosphere interactions.
Ebert, E.E., et al, *Journal of geophysical research*, June 15, 1993, 98(C6), p.10,085-10,109, 106 refs.
Curry, J.A.
Sea ice, Ice cover thickness, Seasonal variations, Air ice water interaction, Ice models, Mathematical models, Thermodynamics, Albedo, Ice openings, Climatic factors.

47-4379
Measurements of high number densities of ice crystals in the tops of tropical cumulonimbus.
Knollenberg, R.G., et al, *Journal of geophysical research*, May 20, 1993, 98(D5), p.8639-8664, 29 refs.
Kelly, K., Wilson, J.C.
Atmospheric physics, Cloud physics, Aerial surveys, Aerosols, Ice crystals, Water content, Particle size distribution, Homogeneous nucleation, Dehumidification.

47-4380
Climatology of the East Antarctic ice sheet (100E to 140E) derived from automatic weather stations.
Allison, I., et al, *Journal of geophysical research*, May 20, 1993, 98(D5), p.8815-8823, 33 refs.
Wendler, G., Radok, U.
Ice sheets, Ice air interface, Climatology, Ice cover effect, Weather stations, Meteorological data, Turbulent boundary layer, Synoptic meteorology, Antarctica—Dome C.
The Australian National Antarctic Research Expeditions and the United States Antarctic Research Program of the National Science Foundation have built up two automatic weather stations (AWS) data nets in East Antarctica. There are a total of 16 stations in the area 55-145E and 65-75S, stretching from sea level to above 3000 m altitude. The records of 10 of these stations are sufficiently long to be adequate for a climatological study of the basic parameters of surface temperature, pressure, and wind and have been used in the study presented here. The station data were reduced to a common format and interpreted jointly to describe the broad-scale climatic features of the ice sheet. Climatological results include (1) an absolute lowest minimum temperature of -84.6 C at Dome C; (2) no minimum below -40 C at D10 near the coast; (3) a "coreless" winter temperature regime, without seasonal temperature trends for 6 months, at all stations; (4) mean surface wind speeds increasing to maxima near, rather than at, the coast; (5) high directional constancy in all seasons, with directions closer to the fall line in winter and during night hours than in summer and during day hours; (7) a distinct semiannual pressure variation with a main minimum in spring (Sep.) and a secondary minimum in autumn (Mar.); and (8) interrelationships among surface temperature, pressure, and wind related to the ice sheet topography. (Auth. mod.)

47-4381
Occurrence of ozone laminae near the boundary of the stratospheric polar vortex.
Reid, S.J., et al, *Journal of geophysical research*, May 20, 1993, 98(D5), p.8883-8890, 16 refs.
Vaughn, G., Kyro, E.
Polar atmospheres, Stratosphere, Sounding, Atmospheric circulation, Turbulent exchange.

47-4382
Heterogeneous chemistry on antarctic polar stratospheric clouds: a microphysical estimate of the extent of chemical processing.
Drdla, K., et al, *Journal of geophysical research*, May 20, 1993, 98(D5), p.8965-8981, 44 refs.
Turco, R.P., Elliott, S.
Cloud physics, Polar atmospheres, Aerosols, Atmospheric composition, Polar stratospheric clouds, Heterogeneous nucleation, Chemical properties, Ozone, Ice vapor interface.
This paper describes a detailed model of polar stratospheric clouds (PSCs) which includes nucleation, condensational growth, and sedimentation processes, and has been applied to the study of heterogeneous chemical reactions. For the first time, the extent of chemical processing during a polar winter has been estimated for an idealized air parcel in the antarctic vortex by calculating in detail the rates of heterogeneous reactions on PSC particles. The resulting active chlorine and NOx concentrations at first sunrise are analyzed with respect to their influence upon the antarctic ozone hole, using a photochemical model. It is found that the species present at sunrise are primarily influenced by the relative values of the heterogeneous reaction rate constants (and thus the "sticking coefficients") and the initial gas concentrations. However, the extent of chlorine activation is also influenced by whether N2O5 is removed by reaction with HCl or H2O. The reaction of N2O5 with HCl, which occurs rapidly on type 1 PSCs, activates the chlorine contained in the reservoir species HCl. Hence the presence and surface area of type 1 PSCs early in the winter are crucial in determining ozone depletion. (Auth. mod.)

47-4383
Atmospheric NO3. 4. Vertical profiles at middle and polar latitudes at sunrise.
Smith, J.P., et al, *Journal of geophysical research*, May 20, 1993, 98(D5), p.8983-8989, 14 refs.
Polar atmospheres, Stratosphere, Ozone, Photochemical reactions, Atmospheric composition, Profiles, Chemical properties, Antarctica—McMurdo Station.
Ground-based measurements of NO3 absorption in the band near 662 nm were carried out on 4 occasions using the moon as a light source during sunrise at both middle and polar latitudes. As the sun rose, the observed slant column abundance of atmospheric NO3 decreased systematically. The observed time-dependent decrease is due to the progression of the solar terminator down through the atmosphere, and provides a basis for inferring the vertical profile of NO3 at sunrise. The inferred profiles are sensitive to the adopted NO3 absorption cross sections and photolysis rates, and these sensitivities are investigated. Two sets of measurements made in Colorado during the summer display a large contribution to the total column from the troposphere, while two data sets obtained at McMurdo Station during the antarctic spring demonstrate that the column at that coordinate is almost entirely located in the stratosphere. The NO3 abundances obtained in Antarctica are substantially smaller than those measured over Colorado, and show that NO3 evolves only at altitudes where the temperature is high enough to allow its formation via the reaction of NO2 and O3. (Auth. mod.)

47-4384
Dynamics of the thickness of permafrost rocks carrying a filtering horizon. Mathematical simulation based on the conditions of the Bestyakhskaia terrace on the Lena River.
Kozlov, A.N., et al, *Moscow University. Geology bulletin*, 1992, 47(4), p.63-67, Translated from Vestnik Moskovskogo Universiteta. Geologiia. 6 refs.
Pustovoit, G.P.
Floodplains, Permafrost thickness, Permafrost heat transfer, Taliks beneath rivers, Permafrost hydrology, Subpermafrost ground water, Computerized simulation, Frozen rocks, Analysis (mathematics).

47-4385
Atactic polypropylene as a viscosity index improver for low-temperature oils.
Alekseev, A.P., et al, *Chemistry and technology of fuels and oils*, May 1993, 28(9), p.509-512, Translated from Khimiia i tekhnologiia topliv i masel. 3 refs.
Leonenko, V.V., Safonov, G.A.
Motor vehicles, Cold weather performance, Lubricants, Viscosity, Chemical composition, Admixtures, Temperature effects.

47-4386
Influence of aqueous solution of anti-icing additives on corrosion of materials of construction.
Likhterova, N.M., et al, *Chemistry and technology of fuels and oils*, May 1993, 28(10), p.563-566, Translated from Khimiia i tekhnologiia topliv i masel. 4 refs.
Starodubtseva, O.A., Balak, G.M., Lifanova, T.A.
Aircraft icing, Fuel additives, Tanks (containers), Metals, Antifreezes, Solutions, Corrosion, Chemical analysis.

47-4387
Passive microwave signatures of fractures and ridges in sea ice at 33.6 GHz (vertical polarization) as observed in aircraft images.
Farmer, L.D., et al, *Journal of geophysical research*, Mar. 15, 1993, 98(C3), p.4645-4665, 36 refs.
Eppler, D.T., Lohanick, A.W.
Sea ice, Surface structure, Ice deformation, Pressure ridges, Detection, Spaceborne photography, Brightness, Radiometry, Microwaves.

47-4388
Microwave brightness temperatures of laboratory-grown undeformed first-year ice with an evolving snow cover.
Lohanick, A.W., *Journal of geophysical research*, Mar. 15, 1993, 98(C3), p.4667-4674, 24 refs.
Sea ice, Snow cover effect, Ice formation, Metamorphism (snow), Remote sensing, Snow ice interface, Microwaves, Radiometry, Brightness, Snow optics, Simulation.

47-4389
Determination of dielectric constant of young sea ice using microwave spectral radiometry.
St. Germain, K.M., et al, *Journal of geophysical research*, Mar. 15, 1993, 98(C3), p.4675-4679, 6 refs.
Swift, C.T., Grenfell, T.C.
Sea ice, Young ice, Ice growth, Ice cover thickness, Ice optics, Remote sensing, Radiometry, Microwaves, Brightness, Spectra, Simulation, Dielectric properties.

47-4390
Nitrogen uptake and new production in the Greenland Sea: the spring *Phaeocystis* bloom.
Smith, W.O., Jr., *Journal of geophysical research*, Mar. 15, 1993, 98(C3), p.4681-4688, 46 refs.
Marine biology, Oceanography, Biomass, Nutrient cycle, Plankton, Sedimentation, Ice edge, Ice cover effect, Seasonal variations, Chemical analysis.

47-4391
Correlations of atmospheric dynamics with solar activity evidence for a connection via the solar wind, atmospheric electricity, and cloud microphysics.
Tinsley, B.A., et al, *Journal of geophysical research*, June 20, 1993, 98(D6), p.10,375-10,384, 56 refs.
Heelis, R.A.
Atmospheric physics, Atmospheric electricity, Cloud physics, Stratosphere, Solar radiation, Solar activity, Climatic factors, Ice formation, Homogeneous nucleation, Polar stratospheric clouds.

47-4392
Climate evolution in the Pliocene and Pleistocene from marine-sediment records and simulations: internal variability versus orbital forcing.
Birchfield, G.E., et al, *Journal of geophysical research*, June 20, 1993, 98(D6), p.10,385-10,399, 56 refs.
Ghil, M.
Paleoclimatology, Pleistocene, Marine deposits, Isotope analysis, Ice sheets, Glacier oscillation, Ice cover effect, Bedrock, Climatic factors, Mathematical models.

47-4393
Visualization of temperature and flow fields using liquid crystals in the fluid regime during various solidification processes.
Nishimura, T., et al, International Symposium on Flow Visualization, 6th, Yokohama, Japan. Oct. 5-9, 1992. Proceedings. Edited by Y. Tanida et al, Berlin, Springer-Verlag, 1992, p.456-460, 5 refs.
Fujiwara, M., Miyashita, H.
DLC TA357.I582 1992
Solutions, Liquid cooling, Solidification, Temperature gradients, Imaging, Heat flux, Fluid dynamics.

47-4394
Bacteria in the sea-ice zone between Elephant Island and the South Orkneys during the Polish sea-ice zone expedition (Dec. 1988 to Jan. 1989).
Zdanowski, M.K., et al, *Polar biology*, May 1993, 13(4), p.245-254, Refs. p.253-254.
Donachie, S.P.
Sea ice, Bacteria, Sea water, Antarctica—Scotia Sea.
During austral summer 1988/89, total bacterial Acridine Orange Direct Counts (AODC) in seawater, mean 6,000,000/l, were three to ten times lower than generally reported for the Bransfield Strait to north Weddell Sea area. In contrast, numbers of viable bacteria (Colony Forming Units, CFU), mean 10,600/l, were two to three times higher than reported. Bacterial abundance here shows large seasonal and spatial changes. On the basis of bacterial, diatom, detritus, and amino acid data from this study, two main regions were defined: 'Cold winter water' in the west with high salinity and low CFU, AODC, and other parameters. In the east, lower salinity and higher values for all parameters were found in warmer meltwater at the surface. CFU and AODC values in ice were respectively six and 85 times higher than in surrounding seawater. Taxonomic studies indicate considerable diversity in genera and nutritional requirements of isolated bacteria. Sea-ice and water column bacterial communities differed. Many isolated strains, however, were found in both habitats. Sea-ice seems to be important in regulating surrounding bacterioplankton. (Auth.)

47-4395
Physical hydrology of the dry valley lakes.
Chinn, T.J., *American Geophysical Union. Antarctic research series*, 1993, Vol.59, Physical and biogeochemical processes in antarctic lakes, p.1-51, Refs. p.49-51.
Limnology, Lake ice, Ice cover thickness, Lake water, Glacier ice, Seasonal variations, Water level, Antarctica—McMurdo Dry Valleys, Antarctica—McMurdo Sound.
This paper presents the results of 20 years of studies of the water levels and permanent ice covers of the dry valley lakes. The different hydrological types of lakes and their relationships with climate are discussed. Since systematic level records commenced during the 1968-1969 summer season, the levels of all of the enclosed lakes have risen by varying amounts. All of the lakes have permanent ice covers which undergo a vertical turnover on approximately 10-yr cycles as ablation loss from the surface is replaced by winter freezing onto the underside. The 2- to 5-m thickness of the permanent ice cover varies from lake to lake and is controlled by the annual ablation rate. The higher the ablation rate is, the thinner the ice cover is. Seasonal cycles of ice thickness reach a maximum at the end of winter in mid-Nov., and summer losses thin ice sheets by 12 to 30% by the end of Jan. Surface ablation losses average 0.3 m/a; loss rates of 5.0 mm/d in summer drop to 0.6 mm/d in winter. Bottom melt accounts for some 45 to 55% of the total summer thinning of the ice cover. Level measurements made over winter at the hypersaline Don Juan Pond indicate that this lake receives groundwater inflow. The behavior of sediments carried by the ice covers is discussed, together with the behavior of lakes in contact with glaciers. (Auth. mod.)

47-4396
Perennial ice covers and their influence on antarctic lake ecosystems.
Wharton, R.A., Jr., et al, *American Geophysical Union. Antarctic research series*, 1993, Vol.59, Physical and biogeochemical processes in antarctic lakes, p.53-70, Refs. p.69-70.
McKay, C.P., Clow, G.D., Andersen, D.T.
Limnology, Lake ice, Ice physics, Ice cover thickness, Seasonal variations, Antarctica - McMurdo Dry Valleys, Antarctica- Hoare, Lake.
Environmental properties of the lakes in the McMurdo Dry Valleys are largely controlled by the presence of perennial ice covers (2.8-6 m thick). Ice cover properties are, in turn, regulated by the extreme seasonality of Antarctica and local climate. An ice cover eliminates wind-generated currents, restricts the exchange of gases between the water column and the atmosphere, reduces light penetration, and limits sediment deposition. The ice sheet on Lake Hoare in Taylor Valley thinned from 5.5 to 3.5 m between 1978 and 1983. Two hypotheses are presented to explain this ice thinning: a "regional" hypothesis which posits that the thinning is due to a change in some regional climatic parameter (e.g., mean annual air temperature) which has altered the ice cover energy balance, and a "transitional" hypothesis that the thinning is a result of a change in the mechanisms of mass loss from the surface of the ice cover. As an ice cover thins, it becomes structurally weaker and develops cracks that enhance the movement of its sediment burden into the lake. A thinner ice cover that has less sediment will result

in increased light penetration into the water column. A lake's productivity should then increase, resulting in greater deposition of organic matter to the benthic microbial mats. The decomposition of this organic matter will consume O2 and, if the abiological sources of O2 are reduced (due to loss of O2 to the atmosphere through a more permeable ice cover), the deep oxygenation of sediments currently observed in Lake Hoare may cease to occur. (Auth. mod.)

47-4397
Terrigenous clastic sedimentation in antarctic dry valley lakes.
Andersen, D.W., et al, *American Geophysical Union. Antarctic research series*, 1993, Vol.59, Physical and biogeochemical processes in antarctic lakes, p.71-81, 24 refs.
Wharton, R.A., Jr., Squyres, S.W.
Limnology, Sedimentation, Lake ice, Lacustrine deposits, Climatic changes, Antarctica—McMurdo Dry Valleys.
Terrigenous clastic sediment is abundant in many of the lakes of the antarctic dry valleys. Sedimentation patterns are strongly influenced by the ice covers of these lakes, resulting in dispersal of coarse sediment across the lake surfaces, even far from shore. The resulting deposits are thus very different from the deposits of most lakes in temperate latitudes. In addition, sediment deposition in many lakes is highly localized and is probably controlled by fractures or porous conduits through the ice. The resulting ridges and mounds of pebbly sand may be unique to the ice-covered lake environment. With changes in the conditions of the lakes through time, clastic sediment becomes interstratified with biogenic sediment and evaporites. Changes in the rates of clastic sediment deposition probably result from ice-sediment interactions and from external controls, such as climatic changes; thus the sedimentary deposits in these lakes may provide sensitive local climatic records. (Auth.)

47-4398
Lithology and paleoclimatic implications of lacustrine deposits around Lake Vanda and Don Juan Pond, Antarctica.
Smith, G.I., et al, *American Geophysical Union. Antarctic research series*, 1993, Vol.59, Physical and biogeochemical processes in antarctic lakes, p.83-94, 28 refs.
Friedman, I.
Lacustrine deposits, Paleoclimatology, Lake ice, Glacial geology, Glacier ice, Antarctica—Vanda, Lake, Antarctica—Don Juan Pond.
Lake sediments exposed on the sides of Wright Valley, around Lake Vanda and Don Juan Pond, indicate that the lakes underwent a period of expansion relative to their former and present sizes. Carbon 14 ages show that Lake Vanda's expansion occurred 2000 to 3000 years ago. Most of the coarse lacustrine deposits are sands and gravels that are poorly sorted, but have properties that are otherwise characteristic of deposition in lakes. Expansion of these water bodies is inferred to have been a product of a geologically brief episode of warming that produced more inflow by temporarily increasing the volume of meltwater, and raised the snow line and caused the tributary glaciers to retreat to higher elevations. When summer temperatures reverted to their former (cooler) levels, runoff produced by melting of the high-elevation ice and snow was markedly reduced for a period, and Lake Vanda and possibly Don Juan Pond nearly desiccated. Eventually, the glaciers readvanced to their former levels in the zone of summer melting, returning Lake Vanda and Don Juan Pond to their former and present climatic equilibrium level. The readvancing glaciers covered whatever morainal record was deposited during the postulated warming event. (Auth.)

47-4399
Geochemical features of the McMurdo Dry Valleys lakes, Antarctica.
Matsumoto, G.I., *American Geophysical Union. Antarctic research series*, 1993, Vol.59, Physical and biogeochemical processes in antarctic lakes, p.95-118, Refs. p.114-118.
Limnology, Geochemistry, Lake water, Sediments.
General characteristics, major ionic components, and minor elements, nutrients, and organic components in lakes and ponds of the McMurdo Dry Valleys are discussed. The lakes and ponds contain various amounts of salts in a variety of compositions. Salinities range from snow meltwater to 13 times seawater. These salts can be explained by the mixing of a common source of atmospheric fallout with various local sources, such as rock weathering, groundwater (including hydrothermal activity), and trapped seawater. The composition of organic components changes in the lakes and ponds, reflecting differences in microbial communities and their activities. As expected, phenolic acids, related to the lignin of vascular plants, are not detected in the lakes. The predominant sterol is frequently 24-ethylcholesterol. Also, significant amounts of long-chain *n*-alkanes and *n*-alkanoic acids are detected in some lake sediments, suggesting that microorganisms are important sources of long-chain *n*-alkanes and *n*-alkanoic acids in natural environments. Vertical distributions of physicochemical properties reveal the zonation of microbial communities in the lakes. Deposited organic matter is degraded quickly by microbial activity in the anoxic lake bottom. (Auth. mod.)

47-4400
Environmental regulators of microbial activity in continental antarctic lakes.
Simmons, G.M., Jr., et al, *American Geophysical Union. Antarctic research series*, 1993, Vol.59, Physical and biogeochemical processes in antarctic lakes, p.165-195, Refs. p.191-195.
Vestal, J.R., Wharton, R.A., Jr.
Limnology, Lake ice, Ecology, Microbiology.
Most antarctic lakes exhibit sharp chemoclines and unusual thermal profiles, and most are covered to some degree with perennial ice. The biological communities which exist in these lakes must be able to adapt to a suite of harsh environmental factors. Some of these include supersaturated levels of dissolved oxygen, extremely low light conditions on an annual basis, and thick ice covers which reduce or eliminate wind-induced internal water circulation. Perhaps one of the most unusual biological features of these lakes is the extensiveness of benthic microbial mats. These mat communities are representative of living stromatolites. The sediments which the stromatolites trap and bind provide an unusual geological record about episodic climatic events related to the wax and wane of the ice surface. Because of the intimate associations among the lakes and their surrounding terrestrial environments in terms of heat budgets, antarctic lakes may also prove to be excellent laboratories in which to study the progress of predicted global warming. (Auth. mod.)

47-4401
Revised snowstorm maximization method for Canadian boreal regions.
Chow, K.C.A., et al, ASCE International Symposium on Engineering Hydrology, San Francisco, CA, July 25-30, 1993. Proceedings. Edited by C.Y. Kuo, New York, American Society of Civil Engineers, 1993, p.449-454, 2 refs.
Jones, S.B.
Precipitation (meteorology), Snowstorms, Snow depth, Snow hydrology, Atmospheric composition, Water vapor, Flood forecasting.

47-4402
Snow estimation—a GIS application for water resources forecasting.
McManamon, A., et al, ASCE International Symposium on Engineering Hydrology, San Francisco, CA, July 25-30, 1993. Proceedings. Edited by C.Y. Kuo, New York, American Society of Civil Engineers, 1993, p.856-861, 5 refs.
Day, G.N., Carroll, T.R.
Water supply, Snow depth, Snowmelt, Snow water equivalent, Snow hydrology, Runoff forecasting, Computerized simulation.

47-4403
Reflectance characteristics of arctic tundra vegetation from airborne radiometry.
Stow, D.A., et al, *International journal of remote sensing*, Apr. 1993, 14(6), p.1239-1244, 9 refs.
Hope, A.S., George, T.H.
Arctic landscapes, Tundra, Remote sensing, Aerial surveys, Airborne equipment, Radiometry, Vegetation patterns, Classifications, Radiance, Dust.

47-4404
Study into electromagnetic effects of a dielectric layer overlying a microstrip patch antenna and the design of an instrument for measuring ice depth on low temperature fuel tanks. Final report.
Stolar Research, Houston, TX, National Aeronautics and Space Administration, 1991, 36p., 1 ref.
Spacecraft, Tanks (containers), Ice accretion, Ice detection, Ice cover thickness, Electrical measurement, Sensors, Electronic equipment, Antennas, Resonance, Design.

47-4405
Destructive hailstorms in Essex on 26 May 1985.
Elsom, D.M., et al, *Weather*, June 1993, 48(6), p.166-173, 14 refs.
Webb, J.D.C.
Precipitation (meteorology), Thunderstorms, Hail, Ice storms, Damage, Weather observations, Meteorological data, Synoptic meteorology.

47-4406
Last glacial maximum on Spitsbergen, Svalbard.
Mangerud, J., et al, *Quaternary research*, July 1992, 38(1), p.1-31, Refs. p.29-31.
Arctic landscapes, Pleistocene, Glacier oscillation, Marine geology, Glaciation, Marine deposits, Quaternary deposits, Radioactive age determination, Stratigraphy.

47-4407
Recent dynamics of subarctic dunes as determined by tree-ring analysis of white spruce, Hudson Bay, Quebec.
Marin, P., et al, *Quaternary research*, Nov. 1992, 38(3), p.316-330, 50 refs.
Filion, L.
Subarctic landscapes, Sands, Forest lands, Landforms, Soil erosion, Age determination, Landscape development, Vegetation patterns, Eolian soils.

47-4408
Paleoecology of late-glacial peats from the Bering land bridge, Chukchi Sea shelf region, northwestern Alaska.
Elias, S.A., et al, *Quaternary research*, Nov. 1992, 38(3), p.371-378, 27 refs.
Short, S.K., Phillips, R.L.
Peat, Pleistocene, Paleoecology, Paleoclimatology, Sea level, Quaternary deposits, Stratigraphy, Drill core analysis, Tundra, Radioactive age determination.

47-4409
Model for the hydrologic and climatic behavior of water on Mars.
Clifford, S.M., *Journal of geophysical research*, June 25, 1993, 98(E6), p.10,973-11,016, Refs. p.11,011-11,016.
Mars (planet), Regolith, Hydrologic cycle, Climatic changes, Soil air interface, Permafrost transformation, Subpermafrost ground water, Ground ice, Soil water migration, Frozen ground thermodynamics, Mathematical models.

47-4410
Coastal geomorphology of the Martian northern plains.
Parker, T.J., et al, *Journal of geophysical research*, June 25, 1993, 98(E6), p.11,061-11,078, 88 refs.
Mars (planet), Regolith, Paleoclimatology, Water erosion, Geomorphology, Periglacial processes, Geologic processes, Topographic features.

47-4411
Ice in the northern lowlands and southern highlands of Mars and its enrichment beneath the Elysium lavas.
Cave, J.A., *Journal of geophysical research*, June 25, 1993, 98(E6), p.11,079-11,097, 69 refs.
Mars (planet), Regolith, Ground ice, Ground water, Distribution, Geomorphology, Hydrologic cycle, Water retention.

47-4412
Calorimetric studies of the ammonia-water system with application to the outer solar system.
Yarger, J., et al, *Journal of geophysical research*, July 25, 1993, 98(E7), p.13,109-13,117, 21 refs.
Lunine, J.I., Burke, M.
Extraterrestrial ice, Satellites (natural), Ice physics, Simulation, Hydrates, Frozen liquids, Heating, Phase transformations, Enthalpy, Temperature measurement.

47-4413
Influence of the freezing process on vapour transport during sublimation in vacuum-freeze-drying of macroscopic samples.
Kochs, M., et al, *International journal of heat and mass transfer*, May 1993, 36(7), p.1727-1738, 42 refs.
Körber, C., Heschel, I., Nunner, B.
Solutions, Freeze drying, Vacuum freezing, Ice vapor interface, Vapor diffusion, Sublimation, Mass transfer, Cooling rate, Mathematical models.

47-4414
Two-dimensional freezing of water filled between vertical concentric tubes involving density anomaly and volume expansion.
Kim, C.J., et al, *International journal of heat and mass transfer*, July 1993, 36(10), p.2647-2656, 26 refs.
Ro, S.T., Lee, J.S., Kim, M.G.
Water, Density (mass/volume), Freezing, Ice water interface, Phase transformations, Convection, Temperature effects, Mathematical models.

47-4415
Proceedings.
ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992, Paris, European Space Agency, 1993, 2 vol., ESA SP-359, Refs. passim. For individual papers see 47-4416 through 47-4449.
Kaldeich, B., ed.
Remote sensing, Geophysical surveys, Spaceborne photography, Synthetic aperture radar, Radiometry, Climatology, Oceanography, Ice surveys, Sea ice distribution, Classifications, Ice cover effect, Resolution, Accuracy, Meetings.

47-4416
Sea ice—a climate component.
Gudmandsen, P., ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.9-13, ESA SP-359, 7 refs.
Sea ice distribution, Air ice water interaction, Climatology, Ice cover effect, Polar atmospheres, Remote sensing, Synthetic aperture radar.

47-4417
Signatures of antarctic firn by means of ERS-1 AMI and by field measurements.
Rott, H., et al, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.227-233, ESA SP-359, 8 refs.
Sturm, K., Miller, H.
Remote sensing, Spacecraft, Radiometry, Firn, Snow cover structure, Snow morphology, Snow optics, Backscattering.
Backscattering coefficients, measured by ERS-1 AMI in scatterometer mode, show significant regional variations over Antarctica. The angular dependence and magnitude of these coefficients are related to the morphology of the snow, enabling the discrimination of different snow regimes. Field measurements on backscattering signatures and on snow properties in Antarctica provide the basis for the interpretation of the ERS-1 scatterometer data. Examples of field data and satellite measurements are presented for refrozen firn on the ice shelves, homogeneous snow in high accumulation zones, and strongly stratified snow in the high plateaus. (Auth. mod.)

47-4418
Analysis of ERS-1 altimeter data over polar ice sheets.
Rapley, C.G., et al, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.235-240, ESA SP-359, 6 refs.
Ice sheets, Remote sensing, Radiometry, Topographic surveys, Height finding, Accuracy, Mapping, Antarctica—Ronne Ice Shelf, Antarctica—Filchner Ice Shelf.
In this paper, ERS-1 altimeter Fast Delivery data are used to derive height maps of Greenland and Antarctica. Without the off-line waveform data it is not possible to correct these for tracker bias. However, over large areas of the ice sheets, this introduces an error which is small compared with the height resolution of the displays. Errors in the orbits and preliminary atmospheric corrections used have been reduced by averaging data over multiple repeat cycles. For Greenland, a slope-induced error correction has been applied. The maps are the most accurate yet of the regions beyond +/- 72 deg. Preliminary results include the delineation of drainage basins on the Greenland ice sheet, and the observation of glaciologically interesting surface features in Antarctica. (Auth. mod.)

47-4419
Some results of the derivation of ice sheet elevations in Antarctica from ERS-1 altimeter data.
Ihde, J., et al, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.241-245, ESA SP-359, 8 refs.
Schirmer, U., Reinhold, A., Eck, J.
Ice sheets, Remote sensing, Height finding, Accuracy, Topographic maps, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
Presented here are the derivations of orthometric heights (sea heights) along a mean 3-day repeat cycle, and the estimation of the reproducible accuracy of the ERS-1 fast delivery altimeter heights for the antarctic ice sheet. For more than 55% of these cycles, the accuracy of derived ellipsoidal ice sheet elevations is within 1 m. Comparisons of the altimeter heights with GPS and trigonometric heights indicate an agreement of better than 0.5 m on flat ice sheets. (Auth. mod.)

47-4420
Utilisation of ERS-1 data for mapping of Antarctica.
Sievers, J., et al, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.247-251, ESA SP-359, 6 refs.
Spaceborne photography, Ice sheets, Topographic maps, Height finding, Synthetic aperture radar.
During an antarctic field campaign in Jan./Feb. 1992, a 40 km x 40 km test site located at 78S and 53W on Ronne Ice Shelf was surveyed in order to calibrate the ERS-1 sensors over snow and ice. The following ground truth measurements were accomplished within the test field: GPS positioning to achieve a digital elevation model; continuous meteorological observations at a central station; measurements of physical characteristics of the snow surface; measurement of reflection and scatter properties of snow and ice within the microwave range; and three-dimensional surveying of SAR reference points. (Auth. mod.)

47-4421
Monitoring of the Greenland ice sheet using ERS-1 synthetic aperture imagery.
Bindschadler, R.A., et al, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.253-257, ESA SP-359, 10 refs.
Fahnestock, M.A.
Ice sheets, Glacier surveys, Spaceborne photography, Synthetic aperture radar, Glacier mass balance, Height finding, Topographic features, Seasonal variations, Climatic changes.

47-4422
Preliminary evaluation of ERS-1 altimetry over Filchner-Ronne Ice Shelf, Antarctica.
Doake, C., et al, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.259-261, ESA SP-359, 6 refs.
Ice sheets, Topographic features, Remote sensing, Height finding, Radiometry, Accuracy, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
Accurate surface elevation data over the antarctic ice sheet are needed to understand how the ice sheet is changing at present and to help determine how it might respond to future global climate change. Range measurements from the ERS-1 URA fast delivery data product have been used to construct a preliminary map of surface elevation for Filchner-Ronne Ice Shelf. The map shows several important features related to processes controlling the movement of the ice shelf and its interaction with the underlying ocean. Elevation data over Berkner I. have been compared to a Digital Elevation Model constructed from airborne data, and show slope-induced errors of up to 50 m. Analysis of waveforms derived from raw data suggest that there is little tracker bias.

47-4423
Investigations of arctic ice-sheets and glaciers using ERS-1 SAR.
Rees, W.G., et al, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.263-268, ESA SP-359, 15 refs.
Dowdeswell, J.A., Diament, A.D.
Spaceborne photography, Synthetic aperture radar, Backscattering, Ice sheets, Glacier surveys, Glacier surfaces, Topographic features, Image processing.

47-4424
Spatial patterns in backscatter strength across the Greenland ice sheet.
Jezek, K.C., ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.269-272, ESA SP-359, 7 refs.
Ice sheets, Firn stratification, Remote sensing, Synthetic aperture radar, Backscattering, Glacial hydrology, Snow cover effect.

47-4425
Ice studies in the Barents Sea by ERS-1 SAR during SIZEX 92.
Johannessen, O.M., et al, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.277-282, ESA SP-359, 9 refs.
Sandven, S., Campbell, W.J., Shuchmann, R.
Sea ice, Ice edge, Ice surveys, Classifications, Spaceborne photography, Synthetic aperture radar, Correlation, Air ice water interaction.

47-4426
Use of ERS-1 SAR to measure ice flux in the East Greenland current.
Wadhams, P., et al, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.283-287, ESA SP-359, 12 refs.
Aldworth, E., Parmiggiani, F.
Sea ice distribution, Spaceborne photography, Synthetic aperture radar, Ocean currents, Drift, Velocity measurement, Ice forecasting

47-4427
Validation of ERS-1 SAR measurements of sea ice during ARCTIC-91.
Askne, J., et al, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.289-294, ESA SP-359, 15 refs.
Sea ice distribution, Ice surveys, Ice conditions, Drift, Classifications, Spaceborne photography, Synthetic aperture radar, Radiometry.

47-4428
Arctic coastal polynya observations with ERS-1 SAR and DMSP SSM/I.
Cavalieri, D.J., et al, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.295-299, ESA SP-359, 5 refs.
Onstott, R.G.
Sea ice distribution, Classifications, Spaceborne photography, Synthetic aperture radar, Radiometry, Polynyas, Ice openings, Young ice, Image processing.

47-4429
Sea ice deformation observed with ERS-1 SAR.
Rothrock, D.A., et al, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.301-306, ESA SP-359, 3 refs.
Stern, H.L.
Sea ice distribution, Drift, Radar tracking, Ice deformation, Ice mechanics, Spaceborne photography, Synthetic aperture radar, Performance.

47-4430
Finnish ERS-1 Baltic Sea ice experiment in winter 1992.
Leppäranta, M., et al, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.307-312, ESA SP-359, 15 refs.
Sea ice distribution, Spaceborne photography, Ice reporting, Ice conditions, Sensor mapping, Synthetic aperture radar, Performance.

47-4431
Experiences from the Swedish sea ice programme during BEERS-92.
Thompson, T., et al, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.313-318, ESA SP-359, 10 refs.
Häkansson, B., Ulander, L.M.H., Carlström, A.
Sea ice distribution, Remote sensing, Spaceborne photography, Radiometry, Ice surveys, Ice conditions, Ice reporting, Icebreakers, Synthetic aperture radar, Correlation.

47-4432
Greenland Sea observations.
Gudmandsen, P., et al, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.319-323, ESA SP-359, 13 refs.
Sea ice distribution, Ice surveys, Ice conditions, Spaceborne photography, Synthetic aperture radar, Image processing, Resolution.

47-4433
Air-sea-ice interactions in the Weddell Sea.
Viehoff, T., et al, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.325-327, ESA SP-359.
Lemke, P., Dierking, W., Schmidt-Gröttrup, M.
Air ice water interaction, Sea ice, Ice conditions, Oceanographic surveys, Ice surveys, Remote sensing, Synthetic aperture radar, Radiometry, Antarctica—Weddell Sea.
As part of the Programme for International Polar Oceans Research, ground measurements were carried out during two cruises of RV *Polarstern* to the Weddell Sea. These ground based data together with several remote sensing techniques (SAR, AVHRR, SSM/I) and coupled ocean-ice-atmosphere models will be used for the geophysical interpretation of sea ice dynamics in the Weddell Sea.

47-4434
Arctic sea ice microwave signature and geophysical processes study.
Onstott, R.G., et al, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.329-332. ESA SP-359.
Shuchman, R.A.
Sea ice, Ice conditions, Ice surveys, Classifications, Spaceborne photography, Synthetic aperture radar, Backscattering, Performance.

47-4435
C-band SAR backscatter from ice on shallow tundra lakes: observations and modelling.
Wakabayashi, H., et al, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.333-337, ESA SP-359, 8 refs.
Jeffries, M.O., Weeks, W.F.
Spaceborne photography, Synthetic aperture radar, Lake ice, Tundra, Backscattering, Ice water interface, Bubbles, Ice optics.

47-4436
Sea ice radar signatures from ERS-1 SAR during late summer and fall in the Beaufort and Chukchi Seas.
Holt, B., et al, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.339-342, ESA SP-359, 6 refs.
Cunningham, G., Kwok, R.
Spaceborne photography, Synthetic aperture radar, Sea ice, Ice surveys, Classifications, Seasonal variations, Backscattering.

47-4437
Waves and mesoscale features in the marginal ice zone.
Liu, A.K., et al, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.343-348, ESA SP-359, 6 refs.
Peng, C.Y.
Sea ice, Ice edge, Upwelling, Ice water interface, Ocean waves, Spaceborne photography, Synthetic aperture radar, Wave propagation.

47-4438
Ocean circulation revealed by ice floe tracking.
Ikeda, M., et al, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.351-353, ESA SP-359, 5 refs.
Prinsenberg, S.J.
Sea ice, Drift, Ocean currents, Ice cover effect, Spaceborne photography, Synthetic aperture radar, Radar tracking.

47-4439
Preliminary evaluation of ERS-1 SAR data for operational use in the Canadian sea ice monitoring program.
Shokr, M.E., et al, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.355-360, ESA SP-359, 4 refs.
Ramsay, B.R., Falkingham, J.C.
Sea ice, Ice surveys, Classifications, Spaceborne photography, Synthetic aperture radar, Accuracy, Image processing.

47-4440
Sea ice feature and type identification in merged ERS-1 SAR and Landsat Thematic Mapper imagery.
Steffen, K., et al, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.361-365, ESA SP-359, 7 refs.
Heinrichs, J., Maslanik, J.A., Key, J.R.
Spaceborne photography, LANDSAT, Sea ice, Classifications, Synthetic aperture radar, Radiometry, Correlation, Backscattering, Resolution.

47-4441
Summer arctic ice concentrations and characteristics from SAR and SSM/I data.
Comiso, J.C., et al, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.367-372, ESA SP-359, 13 refs.
Kwok, R.
Sea ice distribution, Ice conditions, Spaceborne photography, Synthetic aperture radar, Radiometry, Backscattering, Correlation.

47-4442
Evaluating ERS-1 ice motion and classification products.
Fetterer, F.M., et al, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.373-375, ESA SP-359, 4 refs.
Gineris, D.
Sea ice, Spaceborne photography, Synthetic aperture radar, Drift, Image processing, Classifications, Accuracy, Performance.

47-4443
Analysis of the gravity field in the Norwegian Sea and mapping of the ice cap of Greenland using ERS-1 altimeter measurements.
Tscherning, C.C., et al, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.413-418, ESA SP-359, 13 refs.
Knudsen, P., Ekholm, S., Andersen, O.B.
Ice sheets, Ice surveys, Topographic features, Spaceborne photography, Synthetic aperture radar, Height finding.

47-4444
Validating the UK-PAF land ice product surface elevation.
Mantripp, D.R., et al, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.483-488, ESA SP-359, 11 refs.
Ridley, J.K.
Ice sheets, Spacecraft, Remote sensing, Topographic features, Height finding, Radar echoes, Backscattering, Data processing, Antarctica—Filchner Ice Shelf.
The UK-PAF ERS1.ALT.LIR product is designed to provide users with measurements of geophysical parameters over continental ice sheets. The PAF philosophy of providing fully calibrated and validated products extends to these data, and as part of this process a series of field experiments were carried out in Jan./Feb., 1992 on Filchner Ice Shelf by a team from MSSL. The objectives of the fieldwork were to obtain Cal/Val data for ice shelf elevation and radar backscatter. This paper discusses the preliminary work towards establishing a method for external calibration of surface elevation.

47-4445
Snow and glacier investigations by ERS-1 SAR—first results.
Rott, H., et al, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.2. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.577-582, ESA SP-359, 8 refs.
Nagler, T.
Snow cover, Glacier ice, Glacier surveys, Spaceborne photography, Synthetic aperture radar, Backscattering, Snow line, Wet snow, Snow optics.

47-4446
Monitoring of snowcover in high mountain terrain with ERS-1 SAR.
Haefner, H., et al, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.2. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.583-588, ESA SP-359, 13 refs.
Holecz, F., Meier, E., Nüesch, D
Mountains, Snow surveys, Snow cover, Classifications, Spaceborne photography, Synthetic aperture radar, Correlation, Image processing.

47-4447
Application of ERS-1 SAR data to snow mapping.
Hallikainen, M., et al, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.2. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.589-594, ESA SP-359, 2 refs.
Snow cover, Mapping, Snow courses, Spaceborne photography, Synthetic aperture radar, Radiometry, Correlation, Snow melting, Backscattering, Vegetation factors.

47-4448
Impact of ERS-1 wind/wave/ice data on operational ocean forecasting.
Guddal, J., ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.2. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.695-699, ESA SP-359, 3 refs.
Oceanographic surveys, Spaceborne photography, Synthetic aperture radar, Sea ice, Ice conditions, Air ice water interaction, Forecasting.

47-4449
Applications of ERS-1 SAR data for analyzing riverine and coastal processes and geomorphology.
Gatto, L.W., et al, MP 3268, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.2. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.873-878, ESA SP-359, 7 refs.
Calkins, D.J., Chacho, E.F., Jr., Lawson, D.E., Melloh, R.A.
Geomorphology, Spaceborne photography, Synthetic aperture radar, Ice surveys, River ice, Glacier ice, Wetlands, Correlation, Performance, Water supply.
An objective in analyzing European Space Agency ERS-1 SAR images was to determine their utility in monitoring environmental conditions and processes important for managing water resources. This paper summarizes the initial analyses of such SAR images of various geomorphic features around Alaska. Patterns on SAR images are compared to those on Landsat images, and data from ground-penetrating radar and field observations is used to interpret the SAR images. These comparisons show that the ERS-1 SAR can locate unfrozen water beneath river and lake ice on the Sagavanirktok River floodplain; determine the general ice, snow and sediment conditions along the Matanuska Glacier; show general nearshore ice conditions and coastal geomorphology along Alaska's north shore, and delineate coastal wetlands vegetation along Knik Arm. These results suggest that the ERS-1 SAR imagery will be a valuable source of environmental data for addressing water supply in cold regions, for glacial monitoring, for coastal navigation and for assessing wetland conditions.

47-4450
Semi-discrete element approach to the river ice breakup and jamming process.
Guo, Q.Z., et al, National Conference on Hydraulic Engineering, San Francisco, CA, July 25-30, 1993. Proceedings, Vol.1. Edited by H.W. Shen et al, New York, American Society of Civil Engineers, 1993, p.65-69, 13 refs.
Song, C.C.S.
River flow, River ice, Ice jams, Ice breakup, Hydrodynamics, Ice water interface, Mathematical models.

47-4451
Structural and ice effects on salt water marsh hydrology.
Ballestero, T.P., et al, National Conference on Hydraulic Engineering, San Francisco, CA, July 25-30, 1993. Proceedings, Vol.1. Edited by H.W. Shen et al, New York, American Society of Civil Engineers, 1993, p.150-155, 10 refs.
Marrone, J.P., Trottier, D.M.
Swamps, Plant ecology, Culverts, Environmental impact, Hydraulics, Salt water, Water flow, Ice cover effect, Wetlands.

47-4452
Storm water regulations—aircraft deicer/anti-icers operations.
Espey, W.H., Jr., et al, National Conference on Hydraulic Engineering, San Francisco, CA, July 25-30, 1993. Proceedings, Vol.2. Edited by H.W. Shen et al, New York, American Society of Civil Engineers, 1993, p.2333-2338.
Legarreta, G.I.
Aircraft, Maintenance, Antifreezes, Runoff, Storms, Environmental impact, Monitors, Standards, Ice removal, Ice prevention.

47-4453
Modeling the *delta*O-18-derived record of Quaternary climatic change with low dynamical systems.
Saltzman, B., NATO Advanced Study Institute on Irreversible Phenomena and Dynamical Systems Analysis in Geosciences, Crete, Greece, July 14-24, 1985. Proceedings. Edited by C. Nicolis et al, NATO Advanced Science Institutes, Series C. Mathematical and Physical Sciences. Vol.192, Dordrecht, D. Reidel Publishing Co., 1987, p.355-380, 57 refs.
DLC QE33.2.M3 N37
Paleoclimatology, Climatic changes, Pleistocene, Ice sheets, Glacier oscillation, Air ice water interaction, Quaternary deposits, Isotope analysis, Mathematical models.

47-4454
Ice sheet dynamics and the Pleistocene ice ages.
Birchfield, G.E., NATO Advanced Study Institute on Irreversible Phenomena and Dynamical Systems Analysis in Geosciences, Crete, Greece, July 14-24, 1985. Proceedings. Edited by C. Nicolis et al, NATO Advanced Science Institutes, Series C. Mathematical and Physical Sciences. Vol.192, Dordrecht, D. Reidel Publishing Co., 1987, p.381-398, 18 refs.
DLC QE33.2.M3 N37
Ice sheets, Ice volume, Glacier oscillation, Bedrock, Paleoclimatology, Pleistocene, Marine deposits, Isotope analysis, Analysis (mathematics).

47-4455
Relaxation oscillator model of the ice age cycle.
Peltier, W.R., NATO Advanced Study Institute on Irreversible Phenomena and Dynamical Systems Analysis in Geosciences, Crete, Greece, July 14-24, 1985. Proceedings. Edited by C. Nicolis et al, NATO Advanced Science Institutes, Series C. Mathematical and Physical Sciences. Vol.192, Dordrecht, D. Reidel Publishing Co., 1987, p.399-416, 21 refs.
DLC QE33.2.M3 N37
Pleistocene, Paleoclimatology, Periodic variations, Marine deposits, Isotope analysis, Ice sheets, Glacier oscillation, Mathematical models.

47-4456
Cloud-ice-vapor feedbacks in a global climate model.
Jentsch, V., NATO Advanced Study Institute on Irreversible Phenomena and Dynamical Systems Analysis in Geosciences, Crete, Greece, July 14-24, 1985. Proceedings. Edited by C. Nicolis et al, NATO Advanced Science Institutes, Series C. Mathematical and Physical Sciences. Vol.192, Dordrecht, D. Reidel Publishing Co., 1987, p.417-437, 21 refs.
DLC QE33.2.M3 N37
Climatology, Climatic changes, Insolation, Air ice water interaction, Air temperature, Heat balance, Water vapor, Cloud cover, Ice cover effect, Mathematical models.

47-4457
Sea ice-ocean interaction.
Lemke, P., NATO Advanced Study Institute on Irreversible Phenomena and Dynamical Systems Analysis in Geosciences, Crete, Greece, July 14-24, 1985. Proceedings. Edited by C. Nicolis et al, NATO Advanced Science Institutes, Series C. Mathematical and Physical Sciences. Vol.192, Dordrecht, D. Reidel Publishing Co., 1987, p.439-451, 13 refs.
DLC QE33.2.M3 N37
Climatology, Sea ice, Ice cover thickness, Air ice water interaction, Heat flux, Seasonal variations, Ice cover effect, Ice models, Thermodynamics, Mathematical models.

47-4458
Alkane, terpene, and polycyclic aromatic hydrocarbon geochemistry of the Mackenzie River and Mackenzie shelf: riverine contributions to Beaufort Sea coastal sediment.
Yunker, M.B., et al, *Geochimica et cosmochimica*, July 1993, 57(13), p.3041-3061, 87 refs.
Estuaries, Deltas, Surface drainage, Marine deposits, Sediment transport, Hydrocarbons, Suspended sediments, Peat, Geochemistry, Chemical analysis.

47-4459
Parameterization of the radiative properties of cirrus clouds.
Fu, Q., et al, *Journal of the atmosphere sciences*, July 1, 1993, 50(13), p.2008-2025, 36 refs.
Liou, K.N.
Cloud physics, Cloud cover, Albedo, Ice crystal optics, Particle size distribution, Solar radiation, Scattering, Radiation balance, Mathematical models, Greenhouse effect.

47-4460
Application of GIS in modelling winter orographic precipitation, Gunnison River basin, Colorado, USA.
Hay, L.E., et al, International Conference on Application of Geographic Information Systems in Hydrology and Water Resources Management, Vienna, Austria, Apr. 19-23, 1993. Proceedings. Edited by K. Kovar et al, United Kingdom, International Association of Hydrological Sciences, 1993, p.491-499, IAHS Pub.211, 7 refs.
Battaglin, W.A., Branson, M.D., Leavesley, G.H.
Precipitation (meteorology), River basins, Hydrology, Climatic changes, Water supply, Snow water equivalent, Forecasting, Topographic effects, Simulation.

47-4461
Effect of climate on the cryosphere—climatic conditions and the polythermal structure of glaciers.
Blatter, H., *Zürcher geographische Schriften*, 1991, Vol.41, 98p., With German summary. 43 refs.
Ice sheets, Ice physics, Glacier mass balance, Ice temperature, Temperature distribution, Thermal regime, Ice air interface, Climatic factors, Mathematical models.

47-4462
Changes of alpine climate and glacier water resources.
Chen, J.Y., *Zürcher geographische Schriften*, 1991, Vol.46, 196p., With German summary. Refs. p.176-184.
Glacial hydrology, Glacier melting, Glacier mass balance, Ice air interface, Temperature effects, Climatic changes, Alpine glaciation, Periodic variations, Runoff.

47-4463
Properties of a statistical model of ice at low temperatures.
Barkema, G.T., et al, *Journal of chemical physics*, Aug. 1, 1993, 99(3), p.2059-2067, 47 refs.
De Boer, J.
Ice physics, Ice models, Molecular structure, Phase transformations, Low temperature research, Molecular energy levels, Proton transport, Statistical analysis, Mathematical models.

47-4464
Rotational spectrum of a quantum rotor adsorbed on a rough and disordered surface: para-H2 and ortho-H2 on amorphous ice.
Buch, V., et al, *Journal of chemical physics*, Aug. 1, 1993, 99(3), p.2265-2268, 10 refs.
Silva, S.C., Devlin, J.P.
Ice physics, Molecular structure, Adsorption, Hydrogen, Ice vapor interface, Amorphous ice, Spectra, Anisotropy, Mathematical models.

47-4465
Proceedings.
Joint CSCE-ASCE National Conference on Environmental Engineering, 2nd, Montreal, July 12-14, 1993, Montreal, Canadian Society for Civil Engineering, 1993, 2078p. (2 vols.), In English and French. Refs. passim. For selected papers see 47-4466 through 47-4479.
Yong, R.N., ed, Hadjinicolaou, J., ed, Mohamed, A.M.O., ed.
Soil pollution, Oil recovery, Tailings, Sewage treatment, Sludges, Environmental protection.

47-4466
Disposal of fine tails produced at the Syncrude oil sands mine.
Lord, E.R.F., et al, Joint CSCE-ASCE National Conference on Environmental Engineering, 2nd, Montreal, July 12-14, 1993. Proceedings. Vol.1. Edited by R.N. Yong, J. Hadjinicolaou, and A.M.O. Mohamed, Montreal, Canadian Society for Civil Engineering, 1993, p.203-212, 27 refs.
MacKinnon, M.D., Fair, A.E., Friesen, B.C.
Oil recovery, Crude oil, Tailings, Waste disposal, Soil pollution, Environmental protection.

47-4467
Integrated approach to environmentally acceptable disposal of Athabasca oilsand fine tailings.
Sheeran, D., et al, Joint CSCE-ASCE National Conference on Environmental Engineering, 2nd, Montreal, July 12-14, 1993. Proceedings. Vol.1. Edited by R.N. Yong, J. Hadjinicolaou, and A.M.O. Mohamed, Montreal, Canadian Society for Civil Engineering, 1993, p.221-228, 4 refs.
Sethi, A., Smith, P.
Oil recovery, Crude oil, Tailings, Waste disposal, Soil pollution, Environmental protection.

47-4468
Chemical interaction and cyclic freeze-thaw effects on the integrity of the soil cover for Waite Amulet tailings.
Mohamed, A.M.O., et al, Joint CSCE-ASCE National Conference on Environmental Engineering, 2nd, Montreal, July 12-14, 1993. Proceedings. Vol.1. Edited by R.N. Yong, J. Hadjinicolaou, and A.M.O. Mohamed, Montreal, Canadian Society for Civil Engineering, 1993, p.259-272, 11 refs.
Yong, R.N., Caporuscio, F., Yanful, E.K., Bienvenu, L.
Tailings, Waste disposal, Soil pollution, Soil freezing, Freeze thaw cycles, Environmental protection.

47-4469
Hydrologic analysis and prediction in a soil cover.
Woyshner, M.R., et al, Joint CSCE-ASCE National Conference on Environmental Engineering, 2nd, Montreal, July 12-14, 1993. Proceedings. Vol.1. Edited by R.N. Yong, J. Hadjinicolaou, and A.M.O. Mohamed, Montreal, Canadian Society for Civil Engineering, 1993, p.289-296, 5 refs.
Yanful, E.K.
Seepage, Soil water migration, Tailings, Waste disposal, Soil pollution, Environmental protection.

47-4470
Low-temperature performance of biological wastewater treatment systems.
Viraraghavan, T., et al, Joint CSCE-ASCE National Conference on Environmental Engineering, 2nd, Montreal, July 12-14, 1993. Proceedings. Vol.1. Edited by R.N. Yong, J. Hadjinicolaou, and A.M.O. Mohamed, Montreal, Canadian Society for Civil Engineering, 1993, p.297-302, 14 refs.
Zhao, H.W., Tanjore, S.
Sewage treatment, Sludges, Microbiology, Cold weather performance.

47-4471
Refreezing of a building foundation on permafrost.
[Regel de la fondation d'un bâtiment sur pergélisol].
Claisse, M., et al, Joint CSCE-ASCE National Conference on Environmental Engineering, 2nd, Montreal, July 12-14, 1993. Proceedings. Vol.1. Edited by R.N. Yong, J. Hadjinicolaou, and A.M.O. Mohamed, Montreal, Canadian Society for Civil Engineering, 1993, p.303-309, In French.
Dussault, R.G.
Foundations, Permafrost beneath roads, Permafrost preservation, Soil freezing, Artificial freezing.

47-4472
Problems of design for operation and transportation in subarctic offshore environments.
Fuglem, M.K., et al, Joint CSCE-ASCE National Conference on Environmental Engineering, 2nd, Montreal, July 12-14, 1993. Proceedings. Vol.1. Edited by R.N. Yong, J. Hadjinicolaou, and A.M.O. Mohamed, Montreal, Canadian Society for Civil Engineering, 1993, p.311-322, 11 refs.
Jordaan, I.J., Williams, S.A.
Ice loads, Ice solid interface, Offshore structures, Ice navigation, Icebergs, Statistical analysis.

47-4473
Environmental impacts of three runway de-icers.
John, R.D., et al, Joint CSCE-ASCE National Conference on Environmental Engineering, 2nd, Montreal, July 12-14, 1993. Proceedings. Vol.1. Edited by R.N. Yong, J. Hadjinicolaou, and A.M.O. Mohamed, Montreal, Canadian Society for Civil Engineering, 1993, p.323-330, 8 refs.
Rose, P.A.
Road icing, Chemical ice prevention, Runways, Environmental impact, Ice removal.

47-4474
Field investigation of bioremediation of tundra with residual hydrocarbons.
Wooters, K., et al, Joint CSCE-ASCE National Conference on Environmental Engineering, 2nd, Montreal, July 12-14, 1993. Proceedings. Vol.1. Edited by R.N. Yong, J. Hadjinicolaou, and A.M.O. Mohamed, Montreal, Canadian Society for Civil Engineering, 1993, p.331-337.
Elder, B., Hoffman, R., Collver, B., Gerken, B.
Tundra, Oil recovery, Soil pollution, Soil microbiology, Land reclamation.

47-4475
Case study of arctic in situ bioremediation.
Ramert, P.C., et al, Joint CSCE-ASCE National Conference on Environmental Engineering, 2nd, Montreal, July 12-14, 1993. Proceedings. Vol.1. Edited by R.N. Yong, J. Hadjinicolaou, and A.M.O. Mohamed, Montreal, Canadian Society for Civil Engineering, 1993, p.339-346, 4 refs.
Smallbeck, D.R.
Tundra, Oil recovery, Soil pollution, Soil microbiology, Land reclamation, Permafrost preservation.

47-4476
Solving sanitation problems in the Alaskan bush.
Olofsson, J.A., et al, Joint CSCE-ASCE National Conference on Environmental Engineering, 2nd, Montreal, July 12-14, 1993. Proceedings. Vol.1. Edited by R.N. Yong, J. Hadjinicolaou, and A.M.O. Mohamed, Montreal, Canadian Society for Civil Engineering, 1993, p.347-355, 8 refs.
Campbell, C.M.
Sanitary engineering, Regional planning.

47-4477
Lagoon sludge dewatering by natural freeze-thaw.
Martel, C.J., et al, MP 3269, Joint CSCE-ASCE National Conference on Environmental Engineering, 2nd, Montreal, July 12-14, 1993. Proceedings. Vol.1. Edited by R.N. Yong, J. Hadjinicolaou, and A.M.O. Mohamed, Montreal, Canadian Society for Civil Engineering, 1993, p.357-364, 7 refs.
Gagnon, B., Diener, C.J., Hardy, D.L.
Sewage disposal, Sludges, Soil freezing, Freeze thaw cycles, Artificial freezing.
This paper presents a new method of handling sludge from lagoons located in cold regions. This method involves an annual sludge removal operation and the use of a freezing bed for dewatering. It was evaluated at Fort Greely, AK, which has two lagoons containing up to 0.90 m of sludge. Drainage tests comparing frozen and unfrozen lagoon sludge indicated that natural freeze-thaw can significantly improve dewaterability. Filtrate quality was approximately equivalent to that of weak domestic wastewater. On the basis of sludge measurements and freezing depth calculations, the land area required for the freezing bed is 60 sq m. A demonstration of this method is planned at Fort Greely.

47-4478
Freezing rate of sludge layers.
Parker, P.J., et al, Joint CSCE-ASCE National Conference on Environmental Engineering, 2nd, Montreal, July 12-14, 1993. Proceedings. Vol.1. Edited by R.N. Yong, J. Hadjinicolaou, and A.M.O. Mohamed, Montreal, Canadian Society for Civil Engineering, 1993, p.405-412, 9 refs.
Collins, A.G., Dempsey, J.P.
Sewage treatment, Sludges, Freeze thaw cycles, Artificial freezing.

47-4479
Remediation of diesel contaminated site in a cold climate.
Whitlock, C., et al, Joint CSCE-ASCE National Conference on Environmental Engineering, 2nd, Montreal, July 12-14, 1993. Proceedings. Vol.1. Edited by R.N. Yong, J. Hadjinicolaou, and A.M.O. Mohamed, Montreal, Canadian Society for Civil Engineering, 1993, p.977-984.
Wingrove, T.
Oil recovery, Soil pollution, Land reclamation, Cold weather operation.

47-4480
Preprints.
Conference on Climate Variations, 5th, Denver, CO, Oct. 14-18, 1991, Boston, American Meteorological Society, 1991, 528p. + joint papers, Refs. passim.
For selected papers see 47-4481 through 47-4496.
Polar atmospheres, Atmospheric circulation, Air ice water interaction, Sea ice distribution, Global change, Climatic changes.

47-4481
Temperature trends and circulation changes on the Northern Hemisphere in winter.
Van Loon, H., Conference on Climate Variations, 5th, Denver, CO, Oct. 14-18, 1991. Preprints, Boston, American Meteorological Society, 1991, p.12-15, 6 refs.
Polar atmospheres, Global change, Atmospheric circulation, Air temperature, Atmospheric pressure.

47-4482
Faint young sun paradox: simulations using a two-dimensional, seasonal radiative-dynamical climate model with thermodynamic sea-ice.
Molnar, G.I., et al, Conference on Climate Variations, 5th, Denver, CO, Oct. 14-18, 1991. Preprints, Boston, American Meteorological Society, 1991, p.135-138, 20 refs.
Gutowski, W.J., Jr.
Paleoclimatology, Ice age theory, Air ice water interaction, Sea ice distribution, Ice heat flux, Solar radiation, Global change.

47-4483
Variability of snowfall over the conterminous United States during the period 1940-1990.
Zapotocny, J.V., Conference on Climate Variations, 5th, Denver, CO, Oct. 14-18, 1991. Preprints, Boston, American Meteorological Society, 1991, p.191-192.
Snowfall, Snow cover distribution, Snow surveys, United States.

47-4484
Effects of infrared cooling and ice microphysics on large-scale cloud simulations.
Lee, J.L., et al, Conference on Climate Variations, 5th, Denver, CO, Oct. 14-18, 1991. Preprints, Boston, American Meteorological Society, 1991, p.295-298, 11 refs.
Liou, K.N., Ou, S.C.
Cloud cover, Cloud physics, Atmospheric circulation, Ice crystal growth.

47-4485
Coupling of the CSU GCM to a simple ocean and sea ice model.
Jensen, T.G., et al, Conference on Climate Variations, 5th, Denver, CO, Oct. 14-18, 1991. Preprints, Boston, American Meteorological Society, 1991, p.321-322, 4 refs.
Randall, D.A., Dazlich, D.A.
Air ice water interaction, Atmospheric circulation.

47-4486
Modeling study of the role of snow on sea ice in producing interannual climate variations.
Ledley, T.S., Conference on Climate Variations, 5th, Denver, CO, Oct. 14-18, 1991. Preprints, Boston, American Meteorological Society, 1991, p.323-326, 10 refs.
Snow ice interface, Air ice water interaction, Snow air interface, Climatic changes.

47-4487
Model simulation of changes in arctic sea ice thickness, 1960-1989.
Walsh, J.E., et al, Conference on Climate Variations, 5th, Denver, CO, Oct. 14-18, 1991. Preprints, Boston, American Meteorological Society, 1991, p.346-349, 11 refs.
Chapman, W.L.
Ice cover thickness, Sea ice distribution, Air ice water interaction, Ice surveys.

47-4488
Atmospheric circulation anomalies in the arctic basin and their relationships to the great salinity anomaly in the northern north Atlantic.
Serreze, M.C., et al, Conference on Climate Variations, 5th, Denver, CO, Oct. 14-18, 1991. Preprints, Boston, American Meteorological Society, 1991, p.350-353, 17 refs.
Maslanik, J.A., Barry, R.G., Demaria, T.L.
Polar atmospheres, Atmospheric circulation, Air ice water interaction, Salinity.

47-4489
Recent climate variability in the Antarctic Peninsula.
King, J.C., Conference on Climate Variations, 5th, Denver, CO, Oct. 14-18, 1991. Preprints, Boston, American Meteorological Society, 1991, p.354-357, 9 refs.
Polar atmospheres, Sea ice distribution, Ice edge, Air temperature, Surface temperature, Statistical analysis, Climatic changes, Antarctica—Antarctic Peninsula.
Surface air temperature records for 1945-1990 from weather stations at Marguerite Bay, Faraday, King George I., South Orkney Is., and Halley, are compared. Records from this region show a greater degree of variability than those from other parts of Antarctica. Recent high temperatures and evidence of ice shelf retreat are indicative of a systematic warming; however, substantial interannual variations are superimposed on this warming trend. The climatic fluctuations observed are apparently regional rather than continental in scale. Figures and tables are included showing annual mean air temperatures, standard deviations, and mean maximum and minimum sea ice extent.

47-4490
Interannual variability of the atmospheric circulation and sea-ice cover in the Hudson Bay-Baffin Bay-Labrador Sea region, 1953-88.
Wang, J., et al, Conference on Climate Variations, 5th, Denver, CO, Oct. 14-18, 1991. Preprints, Boston, American Meteorological Society, 1991, p.358-361, 13 refs.
Mysak, L.A., Ingram, R.G.
Atmospheric circulation, Sea ice distribution, Ice edge, Ice conditions, Canada—Hudson Bay, Baffin Bay, Labrador Sea.

47-4491
Simultaneous winter sea ice and atmospheric circulation anomaly patterns.
Agnew, T., Conference on Climate Variations, 5th, Denver, CO, Oct. 14-18, 1991. Preprints, Boston, American Meteorological Society, 1991, p.362-365, 8 refs.
Polar atmospheres, Atmospheric circulation, Sea ice distribution, Ice edge, Air ice water interaction.

47-4492
TOVS temperature sounding record for the Arctic.
Khalsa, S.J.S., et al, Conference on Climate Variations, 5th, Denver, CO, Oct. 14-18, 1991. Preprints, Boston, American Meteorological Society, 1991, p.366-367, 6 refs.
Polar atmospheres, Air temperature, Spaceborne photography.

47-4493
Atmospheric forcings on large scale patterns of parameterized albedo over arctic sea ice: case studies for June 1975 and 1988.
Serreze, M.C., et al, Conference on Climate Variations, 5th, Denver, CO, Oct. 14-18, 1991. Preprints, Boston, American Meteorological Society, 1991, p.396-399, 14 refs.
Demaria, T.L., Barry, R.G., Robinson, D.A.
Polar atmospheres, Air ice water interaction, Snow ice interface, Sea ice distribution, Albedo.

47-4494
Oceanic boundary layer in the tropics during the last ice age.
Betts, A.K., et al, Conference on Climate Variations, 5th, Denver, CO, Oct. 14-18, 1991. Preprints, Boston, American Meteorological Society, 1991, p.480-483, 9 refs.
Ridgway, W.
Paleoclimatology, Ice age theory, Air water interactions, Sea level, Atmospheric boundary layer, Snow line, Surface temperature.

47-4495
Comparison of global climate model simulations of polar regions.
Crane, R.G., et al, Conference on Climate Variations, 5th, Denver, CO, Oct. 14-18, 1991. Preprints, Boston, American Meteorological Society, 1991, p.488-491, 12 refs.
Walsh, J.E.
Polar atmospheres, Atmospheric circulation, Air ice water interaction, Global change.

47-4496
Study of the astronomical theory of ice ages in a two-dimensional nonlinear climate model.
Lin, R.Q., et al, Conference on Climate Variations, 5th, Denver, CO, Oct. 14-18, 1991. Preprints, Boston, American Meteorological Society, 1991, p.495-496, 2 refs.
Apel, J.R.
Ice age theory, Paleoclimatology, Solar radiation, Global change, Climatic changes.

47-4497
Climate system modeling.
Trenberth, K.E., ed, Cambridge, England, University Press, 1992, 788p., Refs. p.725-772. For selected papers see 47-4498 through 47-4502.
Air ice water interaction, Ocean currents, Atmospheric circulation, Global change.

47-4498
Ocean circulation.
Niiler, P.P., Climate system modeling. Edited by K.E. Trenberth, Cambridge, England, University Press, 1992, p.117-148.
Ocean currents, Air ice water interaction, Sea ice distribution.

47-4499
Sea ice models.
Hibler, W.D., III, et al, Climate system modeling. Edited by K.E. Trenberth, Cambridge, England, University Press, 1992, p.413-436.
Flato, G.M.
Air ice water interaction, Sea ice distribution, Ice cover thickness, Sea water freezing, Ice models, Drift, Ice heat flux, Mathematical models.

47-4500
Land ice and climate.
Van der Veen, C.J., Climate system modeling. Edited by K.E. Trenberth, Cambridge, England, University Press, 1992, p.437-450.
Land ice, Ice sheets, Mountain glaciers, Ice air interface, Glacier oscillation, Glacier thickness, Glacier mass balance, Global warming.
Possible responses of the Greenland and antarctic ice sheets to global warming are compared. The Greenland ice sheet loses most of its ice through surface melting, whereas the antarctic ice sheet loses most of its ice through calving. Since global warming could result in increased precipitation, it is suggested that the antarctic ice sheet might grow while the Greenland ice sheet would shrink.

47-4501
Global coupled models: atmosphere, ocean, sea ice.
Meehl, G.A., Climate system modeling. Edited by K.E. Trenberth, Cambridge, England, University Press, 1992, p.555-581.
Air ice water interaction, Ocean currents, Atmospheric circulation, Surface temperature, Global change.

47-4502
Modeling large climatic changes of the past.
Kutzbach, J.E., Climate system modeling. Edited by K.E. Trenberth, Cambridge, England, University Press, 1992, p.669-688.
Paleoclimatology, Ice age theory, Global change.

47-4503
Greenland Ice Core Project.
Stauffer, B., *Science*, June 18, 1993, 260(5115), p.1766-1767, 7 refs.
Ice cores, Climatic changes, Research projects, Greenland.

47-4504
Roles of monitoring and research in polar environments: a perspective.
Champ, M.A., et al, *Marine pollution bulletin*, 1992, 25(9-12), p.220-226, 34 refs.
Research projects, Environmental impact.
Environmental monitoring coupled with research provides a mutually beneficial synergism which allows scientists to efficiently monitor the environment using sensitive, relevant environmental signals to detect and quantify change; determine when change is ecologically significant; and determine the cause of change. From the perspective of potentially large-scale ecosystem impacts where causality is an objective, it is believed that environmental monitoring (i.e., research-focused monitoring) is essential and serious decoupling of monitoring and research in this context is a weak strategy and a questionable environmental policy. The perspective of this paper is that it is necessary to be very realistic in informing policy and decision makers about the ability to monitor the impact of human activities in polar regions and setting environmental guidelines. (Auth.)

47-4505
Ozone depletion and UV-B radiation in the Antarctic — limitations to ecological assessment.
Karentz, D., *Marine pollution bulletin*, 1992, 25(9-12), p.231-232, 14 refs.
Ozone, Ultraviolet radiation, Environmental impact.
Ozone depletion has been detected in the upper atmosphere over the Antarctic since the late 1970s. This depletion results in increased flux of incident ultraviolet-B radiation in antarctic environments. There is considerable information available about the chemical and physical characteristics of this atmospheric phenomenon, but the ecological impact of this annual pollution cycle has not been determined. Only a few studies on the UV-photobiology of antarctic organisms have been initiated, and neither the extent of ecosystem modification nor the time scale for ecosystem response are known. (Auth.)

47-4506
Long-term ecological research strategy for polar environmental research.
Quetin, L.B., et al, *Marine pollution bulletin*, 1992, 25(9-12), p.233-238, 16 refs.
Ross, R.M.
Environmental impact, Ecology, Sea ice, Stations, Antarctica—Palmer Station.
The Palmer Long-Term Ecological Research site was established in the vicinity of Palmer Station in 1990. It is the eighteenth and most recent addition to the LTER Network funded by the U.S. NSF. The Palmer LTER expands the geographical and habitat coverage of the LTER Network to southern polar regions, and offers unique opportunities for ecological synthesis and the study of long-term ecological phenomena in the antarctic marine ecosystem. The central hypothesis of the Palmer LTER is that many significant biological processes in the antarctic marine environment are strongly affected by physical processes, particularly interannual variability in the annual extent and dynamics of pack ice and variations in ocean currents. The Palmer LTER Studies Group is multidisciplinary and seeks to understand and model interactions between key species from different trophic levels and the physical environment. It is recognized that anthropogenic impacts in Antarctica cannot be adequately evaluated without understanding the underlying natural variability in antarctic ecosystems. (Auth.)

47-4507
Influence of local and global atmospheric pollution on the chemistry of antarctic snow and ice.
Wolff, E., *Marine pollution bulletin*, 1992, 25(9-12), p.274-280, 55 refs.
Atmospheric composition, Snow impurities, Ice sheets, Chemical composition.
The antarctic ice sheet is the main sink for atmospheric pollution reaching the antarctic atmosphere from other continents. The ice preserves a historical record of the atmosphere that can be recovered in ice cores. No increasing trend is observed over recent decades for nitrate and sulphate. There appears to have been an increase of perhaps eight-fold in lead concentrations in antarctic snow, but the details of when the increase occurred have still to be defined. Many other species could be measured, but analytical problems have hampered such work. These studies would be impaired if emissions due to human activity in Antarctica became significant. The effect on snow concentrations of emissions from fuel and waste burning at antarctic stations and from vehicles is still mainly confined to small areas around the stations.

47-4508
Evolution of a porous H2O-CO2-ice sample in response to irradiation.
Steiner, G., et al, *Journal of geophysical research*, May 25, 1993, 98(E5), p.9065-9073, 29 refs.
Kömle, N.I.
Ice physics, Extraterrestrial ice, Simulation, Ice composition, Radiation absorption, Thermal conductivity, Vapor diffusion, Ice vapor interface, Analysis (mathematics), Insolation.

47-4509
Submillimeter-wave scattering indicatrices for oversized water drops and ice particles in a cloud.
Ajvazyan, H.M., *International journal of infrared and millimeter waves*, May 1993, 14(5), p.1137-1154, 4 refs.
Precipitation (meteorology), Cloud droplets, Ice crystal optics, Ice detection, Hail clouds, Radar echoes, Scattering, Backscattering.

47-4510
Hail embryons detection in clouds using passive and active radars in millimeter and submillimeter wave bands.
Ajvazyan, H.M., et al, *International journal of infrared and millimeter waves*, May 1993, 14(5), p.1155-1174, 17 refs.
Ajvazyan, H.H.
Precipitation (meteorology), Cloud physics, Radar echoes, Radiometry, Antennas, Hail clouds, Ice detection, Ice crystal optics, Phase transformations, Ice water interface.

47-4511
Numerical investigation of wind speed effects on lake-effect storms.
Sousounis, P.J., *Boundary-layer meteorology*, Apr. 1993, 64(3), p.261-290, 37 refs.
Precipitation (meteorology), Wind (meteorology), Snowstorms, Snow accumulation, Lake effects, Wind factors, Wind direction, Turbulent boundary layer, Mathematical models, Weather forecasting.

47-4512
Effect of freeze-thaw on the hydraulic conductivity and morphology of compacted clay.
Othman, M.A., et al, *Canadian geotechnical journal*, Apr. 1993, 30(2), p.236-246, With French summary. 28 refs.
Benson, C.H.
Clays, Compaction, Soil tests, Freeze thaw tests, Soil water migration, Ice lenses, Frozen ground mechanics, Soil structure, Cracks, Thin sections.

47-4513
Compression characteristics and index properties of tills and intertill clays in southern Saskatchewan, Canada.
Sauer, E.K., et al, *Canadian geotechnical journal*, Apr. 1993, 30(2), p.257-275, With French summary. 44 refs.
Egeland, A.K., Christiansen, E.A.
Glaciation, Glacial geology, Glacial deposits, Stratigraphy, Lithology, Ice loads, Soil pressure, Soil structure, Soil compaction, Drill core analysis.

47-4514
Strength and deformation behaviour of model adfreeze and grouted piles in saline frozen soils.
Biggar, K.W., et al, *Canadian geotechnical journal*, Apr. 1993, 30(2), p.319-337, With French summary. 51 refs.
Sego, D.C.
Pile load tests, Bearing strength, Static stability, Permafrost bases, Soil stabilization, Frozen ground temperature, Saline soils, Grouting, Ice solid interface, Design criteria.

47-4515
Creep behavior of fine-grained frozen soils: discussion and reply.
Juárez-Badillo, E., et al, *Canadian geotechnical journal*, Apr. 1993, 30(2), p.385-389, 8 refs. For article under discussion see 46-1011.
Wijeweera, H., Joshi, R.C.
Frozen ground mechanics, Frozen ground strength, Soil creep, Strain tests, Analysis (mathematics).

47-4516
Macrolichens and their zonal distribution in Wells Gray Provincial Park and its vicinity, British Columbia, Canada.
Goward, T., et al, *Acta Botanica Fennica*, 1992, No.147, 60p., Refs. p.57-60.
Ahti, T.
Lichens, Plants (botany), Biogeography, Plant ecology, Snow cover effect, Vegetation patterns, Classifications, Site surveys.

47-4517
Mixotrophic algae in three ice-covered lakes of the Pocono Mountains, U.S.A.
Berninger, U.G., et al, *Freshwater biology*, Oct. 1992, 28(2), p.263-272, 35 refs.
Caron, D.A., Sanders, R.W.
Limnology, Ecosystems, Nutrient cycle, Biomass, Algae, Bacteria, Ice cover effect, Microbiology.

47-4518
Interactions between n-alkanes and cloud point-cold filter plugging point depressants in a diesel fuel. A thermodynamic study.
Claudy, P., et al, *Fuel*, June 1993, 72(6), p.821-827, 12 refs.
Fuel additives, Frost protection, Liquid cooling, Thermodynamics, Temperature measurement, Crystal growth, Temperature effects, Chemical analysis, Antifreezes, Viscosity.

47-4519
East antarctic sea ice: albedo, thickness distribution, and snow cover.
Allison, I., et al, *Journal of geophysical research*, July 15, 1993, 98(C7), p.12,417-12,429, 41 refs.
Brandt, R.E., Warren, S.G.
Sea ice distribution, Ice cover thickness, Pack ice, Ice optics, Albedo, Snow depth, Snow cover effect, Ice water interface.
This paper evaluates characteristics of springtime sea ice off East Antarctica as investigated during a cruise of the Australian National Antarctic Research Expedition in Oct. through Dec. 1988. The fractional coverage of the ocean surface, the ice thickness, and the snow cover thickness for each of several ice types were estimated hourly for the region near the ship. Ice thickness averaged over the ice-covered region only is relatively thin, ranging from 0.35 m near the ice edge to 0.65 m in the interior. The average snow cover thickness on the ice increased from 0.05 m near the ice edge to 0.15 m in the interior. Average ice concentration increased from less than 6/10 near the ice edge to 8/10 in the interior. The ship-observed concentrations were in good agreement with concentrations derived from passive microwave satellite imagery, except in some regions of high concentration. Area-averaged albedos for the East Antarctica sea ice zone in spring were derived from representative allwave albedos together with the hourly observations of ice types. These area-averaged surface albedos increased from about 0.35 at the ice edge to about 0.5 at 350 km from the edge, remaining at 0.5 to the coast of Antarctica. The low average albedo is in part due to the large fraction of open water within the pack, but extensive fractions of almost snow-free thin ice also play an important role. (Auth. mod.)

47-4520
Drag coefficients for winter antarctic pack ice.
Wamser, C., et al, *Journal of geophysical research*, July 15, 1993, 98(C7), p.12,431-12,437, 18 refs.
Martinson, D.G.
Sea ice, Pack ice, Drift, Air ice water interaction, Friction, Turbulent boundary layer, Wind factors, Surface roughness, Snow cover effect.
This paper presents air-ice and ice-water drag coefficients referenced to 10-m-height winds for winter antarctic pack ice, based on measurements made from R/V *Polarstern* during the Winter Weddell Sea Project, 1986 (WWSP-86), and from R/V *Akademik Fedorov* during the Winter Weddell Gyre Study, 1989 (WWGS-89). A single (average) ice-water drag coefficient for both WWSP-86 and WWGS-89, estimated from periods of ice drift thought to represent free-drift conditions (air-ice stress balanced by ice-water drag and Coriolis force), is .00113, and the ice-water turning Beta = 18 +/- 18 deg. This drag value is significantly lower than arctic values for thick multiyear ice, but is similar to the values obtained by Langleben (1982) for first-year arctic ice. Consistent with previous findings for WWSP-86, the free-drift form of the momentum balance can be used to describe the observed WWGS-89 ice drift observations by using an "effective" drag coefficient and turning angle that subsume the influence of ice-ice interaction. For a typical antarctic winter pack ice cover, it appears that the ice cover reduces the momentum flux from the atmosphere to the ocean by approx. 33%. (Auth. mod.)

47-4521
Roughness of Weddell Sea ice and estimates of the air-ice drag coefficient.
Andreas, E.L., et al, *Journal of geophysical research*, July 15, 1993, 98(C7), MP 3270, p.12,439-12,452, 44 refs.
Lange, M.A., Ackley, S.F., Wadhams, P.
Sea ice, Ice floes, Classifications, Surface roughness, Snow surface, Profiles, Spectra, Ice air interface, Ice bottom surface, Snow cover effect, Remote sensing.

The authors report snow surface, ice surface, and ice underside roughness, computed from 47 surface elevation profiles collected during a transect of the Weddell Sea. The roughness for each surface, parameterized as the standard deviation of the surface elevation, segregates according to whether or not a floe has been deformed: deformed ice has greater roughness than undeformed ice. Roughness spectra for all three surfaces and for both deformed and undeformed ice roll off roughly as $1/k$ when the wavenumber k is between 0.1 and 3 rad/m. The snow surface and underside spectra roll off somewhat faster than $1/k$, and the ice surface spectra roll off somewhat slower than $1/k$. It is likely that the excess spectral intensity at high wavenumbers in the antarctic ice surface spectra results from the small-scale roughness that the ice sheet had on consolidation. A remote measurement of roughness will facilitate the decision regarding degree of ice floe deformation. This spectral analysis hints that remote sensing may also be able to differentiate between first-year and second-year ice. From the snow surface spectra, a roughness scale parameter which combines the air-ice momentum coupling permits estimates of the neutral stability drag coefficient referenced to a height of 10 m. (Auth. mod.)

47-4522
Passive microwave remote sensing of thin sea ice using principal component analysis.
Wensnahan, M.R., et al, *Journal of geophysical research*, July 15, 1993, 98(C7), p.12,453-12,468, 36 refs.
Maykut, G.A., Grenfell, T.C., Winebrenner, D.P.
Sea ice, Ice detection, Spaceborne photography, Radiometry, Ice cover thickness, Classifications, Ice optics, Brightness, Data processing.

47-4523
Detectability of arctic leads using thermal imagery under varying atmospheric conditions.
Stone, R.S., et al, *Journal of geophysical research*, July 15, 1993, 98(C7), p.12,469-12,482, 50 refs.
Key, J.R.
Sea ice distribution, Ice openings, Detection, Spaceborne photography, Radiometry, Brightness, Atmospheric attenuation, Cloud cover, Ice temperature, Surface temperature.

47-4524
Finite-floe wave reflection and transmission coefficients from a semi-infinite model.
Meylan, M., et al, *Journal of geophysical research*, July 15, 1993, 98(C7), p.12,537-12,542, 21 refs.
Squire, V.A.
Sea ice, Ice floes, Ocean waves, Sea states, Ice water interface, Wave propagation, Ice cover effect, Mathematical models.

47-4525
Forest development in cold climates.
Alden, J., ed, NATO Advanced Science Institutes. ASI Series A, Life Sciences, Vol.244, New York, Plenum Press, 1993, 566p., Refs. passim. Proceedings of a NATO Advanced Research Workshop, Laugarvatn, Iceland, June 18-23, 1993. For individual papers see 47-4526 through 47-4560.
Mastrantonio, J.L., ed, Ödum, S., ed.
Revegetation, Forestry, Introduced plants, Trees (plants), Plant ecology, Forest lines, Acclimatization, Cold tolerance, Biogeography.

47-4526
Socioeconomic importance of forests in Iceland.
Blöndal, S., Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.1-13, 22 refs.
Revegetation, Forestry, Introduced plants, Trees (plants), Plant ecology, Iceland.

47-4527
Molecular bases for adaptation of coniferous trees to cold climates.
Durzan, D.J., Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.15-42, Refs. p.15-42.
Acclimatization, Trees (plants), Cold tolerance, Frost resistance, Plant ecology, Plant physiology, Plant tissues.

47-4528
Growth and development of northern forest trees as affected by temperature and light.
Junttila, O., et al, Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.43-57, Refs. p.54-57.
Nilsen, J.
Acclimatization, Trees (plants), Cold tolerance, Plant ecology, Plant physiology, Light effects, Growth.

47-4529
Testing winter desiccation resistance for species and provenance selection at timberlines.
Larsen, J.B., Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.59-64, 20 refs.
Acclimatization, Trees (plants), Cold tolerance, Plant ecology, Plant physiology, Desiccation, Forest lines.

47-4530
Growth of mountain birch (*Betula pubescens* Ehrh.) in response to changing temperature.
Skre, O., Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.65-78, Refs. p.76-78.
Acclimatization, Trees (plants), Cold tolerance, Plant ecology, Plant physiology, Growth.

47-4531
Performance of mountain birch in different environments in Sweden and Iceland: implications for afforestation.
Sveinbjörnsson, B., et al, Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.79-88, 34 refs.
Sonesson, M., Nordell, O.K., Karlsson, S.P.
Acclimatization, Trees (plants), Cold tolerance, Plant ecology, Revegetation, Forestry, Forest lines.

47-4532
Causes of alpine timberline: a review of the hypotheses.
Wardle, P., Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.89-103, 29 refs.
Forest lines, Acclimatization, Trees (plants), Cold tolerance, Plant ecology.

47-4533
Physiology of trees at treeline.
Grace, J., et al, Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.105-114, Refs. p.112-114.
James, J.
Forest lines, Acclimatization, Trees (plants), Cold tolerance, Plant ecology, Plant physiology.

47-4534
Treeline in relation to climate, with special reference to oceanic areas.
Tuhkanen, S., Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.115-134, Refs. p.129-134.
Forest lines, Trees (plants), Plant ecology, Biogeography, Introduced plants.

47-4535
Pliocene fossil *Nothofagus* (southern beech) from Antarctica: phytogeography, dispersal strategies, and survival in high latitude glacial-deglacial environments.
Webb, P.N., et al, Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.135-165, Refs. p.158-165.
Harwood, D.M.
Trees (plants), Plant ecology, Paleobotany, Paleoecology, Fossils, Biogeography, Introduced plants, Forest lines, Antarctica—Transantarctic Mountains.
A recently discovered vegetational biome in the Pliocene Sirius Group of the Dominion Range, Transantarctic Mountains is discussed. The flora is dominated by the southern beech tree genus *Nothofagus*. The geological occurrence, phytogeographic implications, dispersal, survival, climatic significance, and eventual demise of this flora are discussed, as are recent experiments in which species of *Nothofagus* have been transplanted from South American and Australasian forests to a variety of Northern Hemisphere alpine and arctic post-glacial environments. The ability of *Nothofagus* to survive hostile glacial-deglacial conditions at very high southern latitudes for almost the entire Cenozoic Era (66 million years) is documented. (Auth.)

47-4536
Predicting afforestation success during climatic warming at the northern limit of forests.
Solomon, A.M., et al, Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.167-188, Refs. p.183-188.
West, D.C.
Forest lines, Trees (plants), Plant ecology, Revegetation, Forestry, Introduced plants, Global warming.

47-4537
Climate change as seen by trees and by climate modelers.
Bowling, S.A., Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.189-202, 35 refs.
Trees (plants), Plant ecology, Revegetation, Forestry, Acclimatization, Global warming.

47-4538
Effects of wind on boreal forests.
Robertson, A., Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.203-225, Refs. p.219-225.
Trees (plants), Plant ecology, Revegetation, Forestry, Taiga, Wind factors.

47-4539
Long-term biometeorological monitoring at two forest sites in Iceland and Newfoundland: initial results.
Thorgeirsson, H., et al, Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.227-239, 20 refs.
McCaughey, J.H., Robertson, A., French, C.T.
Plant ecology, Revegetation, Forestry, Solar radiation.

47-4540
Genetic diversity of tree populations at their arctic limits.
Tigerstedt, P.M.A., Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.241-250, 25 refs.
Revegetation, Forestry, Introduced plants, Trees (plants), Plant ecology, Forest lines, Acclimatization, Cold tolerance, Biogeography.

47-4541
Potential species and provenances for forest development in cold climates.
Hagman, M., Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.251-263, Refs. p.261-263.
Revegetation, Forestry, Introduced plants, Trees (plants), Plant ecology, Forest lines, Acclimatization, Cold tolerance, Biogeography.

47-4542
Species and provenance choice at northern tree limits in maritime climates.
Lines, R., Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.265-276, Refs. p.273-276.
Revegetation, Forestry, Introduced plants, Trees (plants), Plant ecology, Forest lines, Acclimatization, Biogeography.

47-4543
Seed collections from North American trees for marginal sites in the Nordic countries.
Skaret, G., et al, Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.277-291.
Rosvall, O.
Revegetation, Forestry, Introduced plants, Trees (plants), Plant ecology, Acclimatization, Biogeography.

47-4544
Uses of lignoses in horticulture in Iceland.
Pálsson, J., Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.293-297, 3 refs.
Introduced plants, Trees (plants), Acclimatization, Iceland.

47-4545
Accelerating adaptation of trees at tree limits by selective breeding.
Lindgren, D., Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.299-320, Refs. p.317-320.
Revegetation, Forestry, Introduced plants, Trees (plants), Plant ecology, Acclimatization, Cold tolerance, Forest lines.

47-4546
Selection and breeding of Scots pine for northern Sweden.
Nilsson, J.E., Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.321-332, 31 refs.
Revegetation, Forestry, Introduced plants, Trees (plants), Plant ecology, Acclimatization, Cold tolerance, Forest lines, Sweden.

47-4547
Provenance and individual variation in climatic hardiness of Scots pine in northern Finland.
Mikola, J., Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.333-342, 12 refs.
Revegetation, Forestry, Introduced plants, Trees (plants), Plant ecology, Acclimatization, Cold tolerance, Biogeography, Finland.

47-4548
Hybridization among provenances of lodgepole pine.
Fries, A., Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.343-356, 25 refs.
Revegetation, Forestry, Introduced plants, Trees (plants), Plant ecology, Acclimatization, Biogeography, Sweden.

47-4549
Genetics, cytogenetics, and molecular genetics of Icelandic birch: implications for breeding and reforestation.
Anamthawat-Jónsson, K., et al, Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.357-368, 30 refs.
Heslop-Harrison, J.S., Tómasson, T.
Revegetation, Forestry, Trees (plants), Plant ecology, Acclimatization, Plant tissues, Iceland.

47-4550
Chloroplast DNA diversity, phylogenetics, and hybridization in *Picea*.
Sigurgeirsson, A., et al, Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.369-382, Refs. p.379-382.
Szmidt, A.E.
Revegetation, Forestry, Trees (plants), Plant ecology, Acclimatization, Biogeography, Plant tissues.

47-4551
Genetic variation in early frost tolerance of spruce from northwestern North America.
Dietrichson, J., Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.383-391, 11 refs.
Revegetation, Forestry, Introduced plants, Trees (plants), Plant ecology, Acclimatization, Cold tolerance, Frost resistance.

47-4552
History of tree planting on the Aleutian Islands.
Bruce, D., Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.393-426, Refs. p.423-426.
Revegetation, Forestry, Introduced plants, Trees (plants), Plant ecology, Acclimatization, United States—Alaska—Aleutian Islands.

47-4553
Afforestation of Lutz spruce, Sitka spruce, and Norway spruce in the Vesteraalen Islands, Norway.
Kaasen, N.O., et al, Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.427-436, 6 refs.
Skaret, G., Kaasen, T.
Revegetation, Forestry, Introduced plants, Trees (plants), Plant ecology, Acclimatization, Norway.

47-4554
Development of an environmental forest and arboretum on the outer coast of Finnmark County, Norway.
Slettjord, S., Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.437-451, 14 refs.
Revegetation, Forestry, Introduced plants, Trees (plants), Plant ecology, Acclimatization, Norway.

47-4555
Forest development in Iceland.
Loftsson, J., Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.453-461, 22 refs.
Revegetation, Forestry, Introduced plants, Trees (plants), Plant ecology, Acclimatization, Iceland.

47-4556
Potential tree line in the Faroe Islands.
Leivsson, T.G., Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.463-474, 18 refs.
Revegetation, Forestry, Introduced plants, Trees (plants), Plant ecology, Forest lines.

47-4557
Forest trials at high elevations in Britain.
Nixon, C.J., et al, Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.475-489, 26 refs.
Tyler, A.L.
Revegetation, Forestry, Introduced plants, Trees (plants), Plant ecology, Forest lines.

47-4558
Wind and wave forests: a case study and implications for silviculture.
Robertson, A., Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.491-510, 28 refs.
Revegetation, Forestry, Forest lines, Vegetation patterns, Plant ecology.

47-4559
Alpine timberline of Tibet.
Li, B.S., Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.511-527, 8 refs.
Forest lines, Revegetation, Forestry, Introduced plants, Trees (plants), Plant ecology, Biogeography, China—Qinghai-Xizang Plateau.

47-4560
Forestry in New Zealand's southern high country.
Ledgard, N.J., Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.529-548, Refs. p.544-548.
Revegetation, Forestry, Introduced plants, Trees (plants), Plant ecology, Forest lines, Acclimatization, New Zealand.

47-4561
Status of polar ice under international law.
Machowski, J., *Polish polar research*, 1992, 13(2), p.149-175, 84 refs.
Ice, Legislation.
Ice constitutes physically, but not legally, a separate element of polar regions, along with land, water and air. Lack of clear legal regulations in this respect compels the practitioners to apply often inadequate analogies. The specific status of polar permanent and floating ice calls for urgent and comprehensive legal regulation under general international law, the law of the sea and the law of polar regions, on the basis of the principle of arctic sectors in the Northern Hemisphere and the Antarctic Treaty System in the Southern Hemisphere, with reference to the relatively rich legal doctrine as discussed in detail in this article. (Auth.)

47-4562
Radar absorption due to impurities in antarctic ice.
Corr, H., et al, *Geophysical research letters*, June 7, 1993, 20(11), p.1071-1074, 19 refs.
Moore, J.C., Nicholls, K.W.
Ice shelves, Impurities, Ice composition, Ice temperature, Ice models, Radar echoes, Antarctica—Ronne Ice Shelf, Antarctica—George VI Ice Shelf.
Measurements of radar echo strength have been carried out on Ronne and George VI Ice Shelves. The differences in ice-column absorption between the two sites cannot be resolved by considering ice temperatures alone. An absorption model is presented that resolves the discrepancy by considering both the ice temperature and the ice impurity concentrations. In antarctic coastal sites the concentrations of acid and sea salt impurities, both of which affect absorption, have a marked spatial variability and can dominate the absorption budget. With the absorption model, impurity levels in the ice column at the George VI site are deduced from the radar strength measurements and found to be typical of levels measured in antarctic ice at similar elevations and distances from the sea. In particular the measurements suggest that the concentrations of biogenically-derived acids are much lower than the unusually high levels found on the east coast of the Antarctic Peninsula. (Auth.)

47-4563
Internal ice generation as a result of differential exchange of heat and salt through the interface between turbulent layers.
Zatsepin, A.G., et al, *Oceanology*, Aug. 1992, 32(1), p.38-42, Translated from Okeanologiia. 23 refs.
Krylov, A.D.
Sea ice, Sea water, Ice formation, Turbulent exchange, Ice water interface, Salinity, Heat transfer, Simulation.

47-4564
Low-frequency water volume transport through the midsection of Green Bay, Lake Michigan, calculated from current and temperature observations.
Miller, G.S., et al, *Journal of great lakes research*, 1993, 19(2), p.361-367, 13 refs.
Saylor, J.H.
Lakes, Water transport, Periodic variations, Water temperature, Stratification, Velocity measurement, Hydrography, Lake ice, Ice cover effect.

47-4565
Great Lakes air temperature trends for land stations, 1901-1987.
Bolsenga, S.J., et al, *Journal of great lakes research*, 1993, 19(2), p.379-388, 11 refs.
Norton, D.C.
Lakes, Lake ice, Ice cover effect, Air temperature, Temperature variations, Periodic variations, Climatic changes.

47-4566
Bathymetry and sedimentary environments in proglacial lakes at the eastern Bering Piedmont Glacier of Alaska.
Fleisher, P.J., et al, *Journal of geological education*, May 1993, 41(3), p.267-274, 12 refs.
Franz, J.M., Gardner, J.A.
Glacial lakes, Water temperature, Sounding, Turbidity, Glacial hydrology, Subglacial drainage, Sedimentation, Lacustrine deposits, Bottom sediment, United States—Alaska—Bering Piedmont Glacier.

47-4567
Model comet made from mineral dust and H2O-CO2 ice: sample preparation development.
Roessler, K., et al, Lunar and Planetary Science Conference, 20th. Proceedings. Edited by V.L. Sharpton et al, Houston, TX, Lunar and Planetary Institute, 1990, p.379-388, 14 refs.
DLC QB592.A64a
Extraterrestrial ice, Simulation, Laboratory techniques, Performance, Ice physics, Ice composition, Ice sublimation, Ice vapor interface, Insolation.

47-4568
Crustal evolution and dust emission of artificial cometary nuclei.
Thiel, K., et al, Lunar and Planetary Science Conference, 20th. Proceedings. Edited by V.L. Sharpton et al, Houston, TX, Lunar and Planetary Institute, 1990, p.389-399, 16 refs.
DLC QB592.A64a
Extraterrestrial ice, Simulation, Ice composition, Ice solid interface, Ice sublimation, Insolation, Dust, Mass transfer, Soil physics.

47-4569
Particle emission from artificial cometary surfaces: material science aspects.
Kochan, H., et al, Lunar and Planetary Science Conference, 20th. Proceedings. Edited by V.L. Sharpton et al, Houston, TX, Lunar and Planetary Institute, 1990, p.401-411, 15 refs.
Ratke, L., Thiel, K., Grün, E.
DLC QB592.A64a
Extraterrestrial ice, Simulation, Ice sublimation, Insolation, Vapor transfer, Dust, Ice solid interface, Ice vapor interface.

47-4570
Climate instability during the last interglacial period recorded in the GRIP ice core.
Greenland Ice-core Project (GRIP) Members, *Nature*, July 15, 1993, 364(6434), p.203-207, 41 refs.
Ice cores, Ice sheets, Climatic changes, Chemical analysis, Greenland.

47-4571
Century-scale effects of increased atmospheric CO2 on the ocean-atmosphere system.
Manabe, S., et al, *Nature*, July 15, 1993, 364(6434), p.215-218, 16 refs.
Stouffer, R.J.
Atmospheric circulation, Carbon dioxide, Air temperature, Climatic changes, Models.
A coupled ocean-atmosphere climate model is used to study the evolution of the world's climate over the next few centuries, driven by doubling and quadrupling of the concentration of atmospheric CO2. It projects global mean surface air temperature increases of about 3.5 and 7 C, respectively, over 500 years, and a sea-level rise owing to thermal expansion alone of about 1 and 2 m respectively (ice- sheet melting could make these values much larger). The thermal and dynamical structure of the oceans changes markedly in the quadrupled-CO2 climate. In particular, the ocean settles into a new stable state in which the thermohaline circulation has ceased entirely and the thermocline deepens substantially. These changes prevent the ventilation of the deep ocean and could have a profound impact on the carbon cycle and biogeochemistry of the coupled system. In this study the model for climatic changes extends into both polar regions, with figures depicting the stream function of zonal mean meridional circulation and the geographical distributions of the increase of surface air temperature from the CO2-quadrupling experiment. (Auth. mod.)

47-4572
Evidence for general instability of past climate from a 250-kyr ice-core record.
Dansgaard, W., et al, *Nature*, July 15, 1993, 364(6434), p.218-220, 26 refs.
Ice cores, Ice cover thickness, Climatic changes, Isotope analysis, Greenland.

47-4573
Extending the Vostok ice-core record of palaeoclimate to the penultimate glacial period.
Jouzel, J., et al, *Nature*, July 29, 1993, 364(6436), p.407-411, 26 refs.
Ice cores, Climatic changes, Paleoclimatology, Age determination, Antarctica—Vostok Station.
The ice-core record of local temperature, dust accumulation and air composition at Vostok Station now extends back to the penultimate glacial period (140-200 kyr ago) and the end of the preceding interglacial. This yields a new glaciological timescale for the whole record, which is consistent with ocean records. Temperatures at Vostok appear to have been more uniformly cold in the penultimate glacial period than in the most recent one. Concentrations of CO2 and CH4 correlate well with temperature throughout the record. (Auth.)

47-4574
Silica cycle in the antarctic ocean: is the Weddell Sea atypical.
Leynaert, A., et al, *Marine ecology progress series*, June 3, 1993, 96(1), p.1-15, 61 refs.
Nelson, D.M., Quéguiner, B., Tréguer, P.
Sea ice, Water chemistry, Plankton.
The lowest biogenic silica production rates in the southern ocean (average of 2.59 mmol Si/sq m/d) have been recorded in an area of heavy ice cover along a transect through the Weddell Sea from Joinville I. to Cap Norvegia (Nov.-Dec. 1990). The associated biomass was also very low (concentrations 0.6 mmol/l for biogenic silica and 0.8 microg/l for chlorophyll *a*). Based upon these direct measurements of biogenic silica production rates and other data available from the marginal ice zone and open ocean areas, the estimated annual production of biogenic silica in the northern Weddell Sea is 810 to 870 mmol/sq m/yr. This leads to a revised estimate of the total annual biogenic silica production in the southern ocean of between 11 and 32 Tmol Si/yr. Comparing this annual production estimate to previous estimates of vertical flux of opal in the Weddell Sea, the authors conclude that no more than 1% of the silica produced annually by phytoplankton in the upper water column reaches a depth of 800 m. This is consistent with the general distribution of high accumulation rates of opal in southern ocean sediments which evidence an unexplained gap in the Weddell Sea. Thus, regarding the cycling of biogenic silica in the southern ocean, the Weddell Sea appears to be atypical. (Auth. mod.)

47-4575
Winter ecology of the sea ice biota in Weddell Sea pack ice.
Garrison, D.L., et al, *Marine ecology progress series*, June 3, 1993, 96(1), p.17-31, 62 refs.
Close, A.R.
Sea ice, Ecology, Ice composition, Ice structure, Antarctica—Weddell Sea.
During winter 1988, the ice community in the ice edge region of the Weddell and Scotia Seas was examined. Temperature at the ice surface generally followed air temperature, but with a short lag period; *in situ* salinity in the upper layer of ice floes reached >100 per mill; ice floes had variable amounts of snow cover; floes were primarily comprised of congelation ice (56%) and frazil ice (41%). Total integrated chlorophyll as well as chlorophyll concentrations and integrated POC, PON and ATP generally increased with increasing ice age or thickness. High C:chl *a*, C:N and C:ATP ratios characterized all ice types and suggested substantial detritus in the ice. The ice biota was comprised of bacteria, algae, protozoans and some metazoa. Microscopically estimated biomass in floes ranged from <50 to >1000 mg C/sq m, with the highest values from older ice floes. The winter ice assemblage did not differ markedly from the assemblages found during other seasons, and overall the seasonal biomass variation within the pack ice community appears to be low. Resting stages such as archaeomonads and dinoflagellate cysts were common in the ice, and cyst formation for the dinoflagellates appears to take place during the winter as well as in the late summer. Although earlier studies have emphasized the importance of harvesting and concentration of organisms from the water during episodes of frazil ice formation, evidence for this did not appear in the present analysis of biomass associated with different structural types of ice. (Auth. mod.)

47-4576
Core drilling by electromechanical drill.
Vasil'ev, N.I., et al, *Polar record*, July 1993, 29(170), p.235-237, 10 refs.
Kudriashov, B.B., Talalai, P.G., Chistiakov, V.K.
Ice cores, Ice coring drills, Antarctica—Vostok Station.
Core drilling is considered to be the most effective method of studying glaciers and sub-glacial rock. Thermal drills suspended on cables are very simple in construction and enable the drilling of deep bore-holes in firn and ice. However, mechanical drilling is characterized by lower energy consumption and a higher rate of penetration. Moreover, drilling of sub-glacial rock and ice containing mineral inclusions becomes possible only by using electromechanical drills suspended on cables. These types of drills, used at Vostok Station beginning in Mar. 1989, and their effectiveness are described.

47-4577
Evidence for Early Holocene deglaciation of the Vestfold Hills, East Antarctica.
Fitzsimons, S.J., et al, *Polar record*, July 1993, 29(170), p.237-240, 10 refs.
Domack, E.W.
Glacial geology, Ice sheets, Glacier ice, Variations, Antarctica—Vestfold Hills.
The Vestfold Hills area is the third largest ice- free area in Antarctica, after the Dry Valleys area of south Victoria Land and the Bunger Hills of Wilkes Land, and is therefore an important location for finding terrestrial evidence of deglaciation. This report provides new evidence on the timing of deglaciation from the Vestfold Hills, and compares the new evidence with the present model of deglaciation of the area; with the preliminary results from Offshore Drilling Project (ODP) Hole 740A in Prydz Bay; and with evidence of deglaciation from the Ross Embayment and the Antarctic Peninsula.

47-4578
Multipurpose underground structures in the extreme north.
Samokhin, A.V., et al, *Journal of mining science*, July 1993, 28(5), p.461-465, Translated from Fizikotekhnicheskie problemy razrabotki poleznykh iskopaemykh. 5 refs.
Izakson, V.IU.
Underground facilities, Thermal insulation, Cold weather construction, Permafrost, Frozen ground temperature, Ground thawing, Temperature control, Engineering geology.

47-4579
Abrasiveness of frozen and thawed coarse-clastic rocks and its effect on wear and tear of tools.
Polovinko, V.A., et al, *Journal of mining science*, Sep. 1993, 28(6), p.546-550, Translated from Fizikotekhnicheskie problemy razrabotki poleznykh iskopaemykh. 1 ref.
Fedulov, A.I.
Mining, Equipment, Damage, Frozen rocks, Grain size, Abrasion, Mechanical tests, Ice solid interface.

47-4580
Timing of the last deglaciation in Cordillera Oriental, northern Peru, based on glacial geology and lake sedimentology.
Rodbell, D.T., *Geological Society of America. Bulletin*, July 1993, 105(7), p.923-934, 68 refs.
Pleistocene, Quaternary deposits, Moraines, Glacial geology, Radioactive age determination, Lacustrine deposits, Glacier oscillation, Climatic changes, Peru.

47-4581
Numerical modeling of long-range transport of acidic species in association with meso-(beta)-convective-clouds across the Japan Sea resulting in acid snow over coastal Japan. 1. Model description and qualitative verifications.
Kitada, T., et al, *Atmospheric environment*, May 1993, 27A(7), p.1061-1076, 39 refs.
Lee, P.C.S., Ueda, H.
Precipitation (meteorology), Cloud physics, Atmospheric circulation, Snowfall, Snow impurities, Air pollution, Chemical properties, Scavenging, Heterogeneous nucleation, Mathematical models.

47-4582
Numerical modeling of long-range transport of acidic species in association with meso-(beta)-convective-clouds across the Japan Sea resulting in acid snow over coastal Japan. 2. Results and discussion.
Kitada, T., et al, *Atmospheric environment*, May 1993, 27A(7), p.1077-1090, 11 refs.
Lee, P.C.S.
Precipitation (meteorology), Cloud physics, Atmospheric composition, Snowfall, Snow impurities, Air pollution, Chemical properties, Scavenging, Heterogeneous nucleation, Mass transfer.

47-4583
Seed bank composition in a subarctic pine-birch forest in Finnish Lapland: natural variation and the effect of simulated acid rain.
Vieno, M., et al, *Canadian journal of botany*, Mar. 1993, 71(3), p.379-384, With French summary. 36 refs.
Komulainen, M., Neuvonen, S.
Subarctic landscapes, Forest ecosystems, Trees (plants), Growth, Viability, Precipitation (meteorology), Air pollution, Environmental impact, Chemical properties, Simulation.

47-4584
Seed and vegetation dynamics in an alpine herb field: effects of disturbance type.
Chambers, J.C., *Canadian journal of botany*, Mar. 1993, 71(3), p.471-485, With French summary. 40 refs.
Alpine tundra, Plant ecology, Damage, Revegetation, Vegetation patterns, Classifications, Environmental impact, Site surveys.

47-4585
Influence of opening size on snow evaporation in the forests of the Alberta Foothills.
Bernier, P.Y., et al, *Canadian journal of forest research*, Feb. 1993, 23(2), p.239-244, With French summary. 26 refs.
Swanson, R.H.
Forestry, Snow evaporation, Forest canopy, Snow cover effect, Topographic effects, Water supply, Snow air interface, Microclimatology.

47-4586
Late Quaternary continental paleohydrology as related to future environmental change.
Starkel, L., *Global and planetary change*, May 1993, 7(1-3), p.95-108, 71 refs.
Climatic changes, Global change, Paleoclimatology, Hydrologic cycle, Periodic variations, Water balance, Ice sheets, Ice (water storage), Human factors, Greenhouse effect.

47-4587
Glacials-interglacials in Vostok: climate and greenhouse gases.
Lorius, C.J., et al, *Global and planetary change*, May 1993, 7(1-3), p.131-143 50 refs.
Jouzel, J., Raynaud, D.
Pleistocene, Paleoclimatology, Ice sheets, Glacial oscillation, Ice cores, Drill core analysis, Atmospheric composition, Climatic changes, Global change, Greenhouse effect, Antarctica—Vostok Station.
This paper interprets long term ice core records from Vostok Station, which may reveal close associations between changes in the atmospheric composition and glacial/interglacial changes. When compared with the preanthropogenic levels, the Vostok paleorecords show lower CO2 and CH4 concentrations and significant variations in aerosols of both terrestrial and oceanic origins. These changes, in particular those associated with greenhouse gases, may account for about half of the temperature change over the last climatic cycle. Although the interplay between the physical atmospheric and oceanic systems and the biosphere has still to be clarified, this finding may provide a clue to help in the prediction of future greenhouse gases-induced warming. In view of available paleodata, a warming of 3-4 C, at equilibrium, may be a realistic figure for a doubling of CO2 concentrations or its equivalent. (Auth. mod.)

47-4588
"Recent warming": ice core evidence from tropical ice cores with emphasis on Central Asia.
Thompson, L.G., et al, *Global and planetary change*, May 1993, 71(1-3), p.145-156, 24 refs.
Global warming, Pleistocene, Paleoclimatology, Climatic changes, Air temperature, Periodic variations, Ice sheets, Ice cores, Drill core analysis, China—Dunde Ice Cap.
Ice cores from the tropics and subtropics, in conjunction with those from the polar regions, provide a multifaceted record of environmental changes which can be viewed both spatially and temporally. This paper emphasizes the oxygen isotopic record preserved in cores from the poles to the tropics and assesses the evidence for global warming in the last 50-100 years. These records include: Camp Century, Greenland; Dunde and Guliya Ice Caps, China; Gregoriev Ice Cap, Kirghizia (formerly part of USSR); Quelccaya Ice, Peru; and Siple Station and South Pole, Antarctica. The central Asian records along with that from Quelccaya provide strong evidence of recent and rapid warming in the tropics and subtropics. For the Dunde Ice Cap, where a long paleoclimatic record is available, the warming in this century appears to be unprecedented in the Holocene. These tropical and subtropical records contrast sharply with those from polar cores which show little evidence of a recent warming. These data suggest that either the recent warming is a middle and lower latitude phenomenon or that these high altitude tropical and subtropical glaciers may be more sensitive to climate changes than the massive polar ice sheets. Regardless, the current rapid disintegration of many tropical and subtropical glaciers may result in the permanent loss of numerous unique archives. (Auth. mod.)

47-4589
Climate change inferred from borehole temperatures.
Pollack, H.N., *Global and planetary change*, May 1993, 71(1-3), p.173-179, 25 refs.
Climatic changes, Global warming, Air temperature, Surface temperature, Boreholes, Geothermy, Geophysical surveys, Correlation.

47-4590
Review of GEOSAT data over Canadian east coast waters.
Topliss, B.J., et al. *Canadian journal of remote sensing*, Apr.-May 1993, 19(2), p.117-130. With French summary. 62 refs.
Challenor, P., Tokmakian, R., Snaith, H.
Oceanographic surveys, Sea states, Remote sensing, Spacecraft, Height finding, Radar echoes, Data processing, Performance, Sea ice distribution, Ice edge.

47-4591
Evaluation of limits to the performance of the surface roughness meter.
Johnson, F., et al. *Canadian journal of remote sensing*, Apr.-May 1993, 19(2), p.140-145. With French summary. 10 refs.
Brisco, B., Brown, R.J.
Remote sensing, Surface roughness, Measuring instruments, Oblique photography, Portable equipment, Image processing, Performance, Accuracy, Synthetic aperture radar, Ice surface.

47-4592
PIXE analysis as a tool for dating of ice cores from the Greenland ice sheet.
Hansson, H.C., et al. *Nuclear instruments & methods in physics research*, Apr. 1993, B75(1-4), International Conference on PIXE and Its Analytical Applications, 6th, Tokyo, Japan, July 20-24, 1992. Proceedings, p.428-434, 18 refs.
Swietlicki, E., Larsson, N.P.O., Johnsen, S.J.
Ice sheets, Ice cores, Ice dating, Ice accretion, Stratigraphy, Seasonal variations, Drill core analysis, X ray analysis, Ice sublimation, Climatic changes.

47-4593
Diapirism on Triton: a record of crustal layering and instability.
Schenk, P.M., et al. *Geology*, Apr. 1993, 21(4), p.299-302, 24 refs.
Jackson, M.P.A.
Satellites (natural), Extraterrestrial ice, Regolith, Layers, Surface structure, Stability, Ground ice, Geologic processes, Geocryology.

47-4594
Late Wisconsin subglacial megaflood paths in Alberta.
Rains, B., et al. *Geology*, Apr. 1993, 21(4), p.323-326, 40 refs.
Pleistocene, Glacial geology, Glacial erosion, Meltwater, Water erosion, Subglacial drainage, Floods, Bedrock, Sediment transport.

47-4595
Microorganisms in antarctic sea ice.
Palmisano, A.C., et al. Antarctic microbiology, edited by E.I. Friedmann, New York, Wiley-Liss, Inc., 1993, p.167-218, Refs. p.210-218.
Garrison, D.L.
Sea ice, Microbiology, Algae, Ecology.
This review of the microbiology of sea-ice habitats emphasizes studies carried out in recent years. Included is background information on the ecology of sea-ice microorganisms, with older hypotheses about the relationships between ice-associated organisms and their environments, and on factors controlling biological activity and population distributions, which are still being refined. Although it is not the purpose of the authors to compare arctic and antarctic ecosystems, similar studies are being conducted in the two regions, and comparisons have been included where appropriate. In the final section, directions for future research in the field of sea-ice microbiology are discussed. These range from the wider use of remote sensing by satellites to application of state-of-the-art microprobes to the study of microhabitats of the ice community. Many of the technological advances now in wide use in lower-latitude research are slowly being incorporated into studies of polar regions.

47-4596
Microorganisms in the antarctic ice.
Abyzov, S.S., Antarctic microbiology, edited by E.I. Friedmann, New York, Wiley-Liss, Inc., 1993, p.265-295, Refs. p.290-295.
Microbiology, Ice cores, Ice sheets, Cryobiology, Instruments, Antarctica—Vostok Station.
The method and instruments used in microbiological studies in ice cores from the Vostok Station between 1974 and 1989 are described. The discussion covers the frequency of viable microorganisms at various depths of the ice sheet and the types of viable microflora found. It is suggested that fungal spores, and especially bacterial spores, are able to survive for many thousands of years; the latter have been found in the very oldest layers studied.

47-4597
Microbiology of antarctic soils.
Vishniac, H.S., Antarctic microbiology, edited by E.I. Friedmann, New York, Wiley-Liss, Inc., 1993, p.297-341, Refs. p.329-338.
Soil microbiology, Desert soils, Cryogenic soils, Polar regions, Antarctica—McMurdo Dry Valleys.
The heterotrophic soil microbiota of the antarctic region falls into two major categories distinguished by the presence or absence of vegetation. Much of this review, which excludes the microbiota of soils heated by volcanism, consists of a recital of microbial taxa. This recital is necessary for assessing the uniqueness of antarctic microbiota and in discussing the question of the indigenity and activity of microbial life in the most stressed antarctic habitat, the soils of the Ross Desert (McMurdo Dry Valleys). The combination of osmotic stress and low substrate availability may energetically prevent microbial colonization of the arid Ross Desert soils, but conditions in the less salt-burdened soils are not too harsh for microbial life to exist and evolve.

47-4598
Environmental regulators of microbial activity in continental antarctic lakes.
Simmons, G.M., Jr., et al. Antarctic microbiology, edited by E.I. Friedmann, New York, Wiley-Liss, Inc., 1993, p.491-541, Refs. p.534-541. For another version see 47-4400 or B-48644.
Vestal, J.R., Wharton, R.A., Jr.
Limnology, Microbiology, Climatic factors, Lake ice.
A considerable body of review literature exists for antarctic aquatic environments, and although the purpose of this review is not to update those exhaustive treatments, some of the more recent research conducted in continental lacustrine environments of Antarctica, particularly as these studies relate to the factors that regulate the microbial ecology of lakes, is summarized here. The focus is primarily on those lakes south of the Antarctic Circle and located on the continent.

47-4599
Relevance of antarctic microbial ecosystems to exobiology.
McKay, C.P., Antarctic microbiology, edited by E.I. Friedmann, New York, Wiley-Liss, Inc., 1993, p.593-601, Refs. p.600-601.
Limnology, Lake ice, Ice cover effect, Microbiology.
Antarctica, particularly the cold, dry Ross Desert regions, provides the best terrestrial analog to Martian conditions, so antarctic microbial ecosystems provide a fruitful testing ground for theories of exobiology, particularly for the question of life on Mars. Because access to extraterrestrial habitats is so difficult, terrestrial analogs present the best opportunity for both formulation and preliminary testing of hypotheses about life there. Antarctica, as one of few suitable environments for this on earth, will almost certainly be a major locus of progress in exobiology in the next decade.

47-4600
Distribution of *delta*D in 25-cm surface snow along trans-antarctic route II: The "1990 International Trans- Antarctic Expedition" glaciological research.
Qin, D.H., et al. *Science in China*, Mar. 1993, 36(3), p.375-384, 19 refs.
Snow composition, Isotope analysis, Traverses, Water vapor, Air temperature.
On the route of the 1990 International Trans-Antarctic Expedition 104 snow samples were collected in 25 cm surface snow along a 5,986 km route on the antarctic ice sheet from west to east. The geographical distribution of *delta*D across Antarctica by the longest route is obtained from stable isotope analysis for the first time. After discussing regional differences of physical geographic conditions, maritime- continental influence, altitudes and latitudes at sampling sites, the distribution of *delta*D is considered to have a close relation to latitude, but the topographic effect is prominent in some particular regions. The mean annual temperature at sampling sites and its relationship to *delta*D in surface snow covering Antarctica from west to east are discussed also. The *delta*D-temperature gradient from the south end of the Antarctic Peninsula to Vostok is very close to that in Terre Adélie obtained by predecessors. Snowdrift may make an important contribution to the relatively high *delta*D-temperature gradient from Vostok to Mirnyy. (Auth. mod.)

47-4601
Aircraft ice detectors and related technologies for onground and inflight applications. Final report.
Hoover, G.A., *U.S. Department of Transportation. Federal Aviation Administration. Technical Center. Report*, Apr. 1993, DOT/FAA/CT-92/27, 43p.
Aircraft icing, Ice detection.

47-4602
Biosphere reserves—a challenge and an opportunity.
UNESCO, Man and the Biosphere Programme, *MAB Northern Sciences Network. Newsletter*, Apr. 1993, No.13, 31p., Refs. passim.
Environmental protection, Ecosystems, Tundra, Research projects, Regional planning, Meetings.

47-4603
Report of the International Ice Patrol in the North Atlantic, 1992 season.
U.S. Coast Guard, *U.S. Coast Guard. Bulletin*, 1992, No.78, 45p., CG-188-47, 10 refs.
Ice reporting, Sea ice distribution, Icebergs, Ice conditions, Ice detection, Drift.

47-4604
Isotopic analysis of carbon dioxide from air trapped in polar ice.
Lang, S.J., Melbourne, University, 1991, 148p., M.S. thesis. Refs. p.135-143.
Ice cores, Ice composition, Impurities, Paleoclimatology, Global warming, Atmospheric composition, Carbon dioxide, Isotope analysis.
CO2 concentrations in parts per million by volume (ppmv) from isotopic analysis of air trapped in Greenland and antarctic ice cores are compared. The records indicate that the CO2 concentration in the atmosphere was 180-200 ppmv during the last glacial maximum about 18,000 years B.P., about 270 ppmv by 1740, about 315 ppmv in 1958 when the rate of increase was 0.6 ppmv per year, and presently 353 ppmv, with a rate of increase of 1.8 ppmv per year.

47-4605
Coast Guard and the Greenland Patrol.
Tilley, J.A., Washington, D.C., U.S. Coast Guard, 1992, 17p., 11 refs.
Ice navigation, Military operation, History, Greenland.

47-4606
Suite of type temperature-depth profiles in permafrost for areas of Holocene shoreline regression and marine transgression, arctic Canada.
Adams, J., *Canada. Geological Survey. Open file*, 1993, No.2656, 66p., 17 refs.
Subsea permafrost, Permafrost thermal properties, Permafrost thickness, Marine geology, Shore erosion, Shoreline modification, Paleoclimatology.

47-4607
Winter storms test new anti-ice tactics.
McKenna, J.T., *Aviation week and space technology*, Jan. 11, 1993, 138(2), p.38-40.
Aircraft icing, Ice removal, Safety.

47-4608
Icing problems at Corps projects.
Haynes, F.D., et al, *U.S. Army Corps of Engineers. Waterways Experiment Station. Repair, Evaluation, Maintenance, and Rehabilitation Research Program. Technical report*, Apr. 1993, REMR-HY-10, MP 3271, 18p. + figs., 6 refs.
Haehnel, R., Zabilansky, L.J.
River ice, Ice conditions, Ice control, Ice prevention, Ice loads, Icing, Locks (waterways), Dams, Hydraulic structures.

47-4609
European Helicopters' ICE detection system enters final trials stage.
European Helicopters Limited, Uxbridge, England, *Aircraft engineering*, May 1988, 60(5), p.23.
Aircraft icing, Ice detection, Helicopters.

47-4610
Flying on thin ice.
Elliott, S., et al, *Flight international*, Apr. 29-May 5, 1992, p.38-40.
Warwick, G.
Aircraft icing, Ice detection, Ice removal, Accidents.

47-4611
Frozen ground. *International Permafrost Association. News bulletin*, June, 1993, 24p., Refs. passim.
Research projects, Organizations, Meetings, Permafrost.

47-4612
Cold Weather Transit Technology Program. Volume 1: Executive summary. Final report.
Kleinman, R.L., et al, *U.S. Federal Transit Administration. Report*, Sep. 1992, FTA-IN-06-0018-92-1, 34p., 32 refs.
Kahle, K.H., Berry, W.B.
Ice removal, Ice forecasting, Railroad tracks, Road icing, Road maintenance.

47-4613
Arctic Centre news.
Lange, M.A., ed, *University of Lapland, Rovaniemi, Finland. Newsletter*, 1993, No.1, 12p., 6 refs.
Katermaa, T., ed, Pretes, M., ed.
Research projects, Organizations, Regional planning, Meetings.

47-4614
Avalanche characteristics and structure response, East Riverside avalanche shed, Highway 550, Ouray County, Colorado.
Mears, A., *Colorado Department of Transportation. Report*, Mar. 1992, CDOT-DTD-R-92-4, 113p. PB93-183838.
Avalanche engineering, Snowsheds, Road maintenance.

47-4615
Evaluation of concrete and aggregate durability test.
Missouri Highway and Transportation Department, *Missouri Cooperative Highway Research Program. Report*, Jan. 1993, MCHRP-86-1, 64p., PB93-183812, 5 refs.
Road icing, Road maintenance, Concrete pavements, Concrete aggregates, Concrete durability, Concrete freezing, Frost resistance, Freeze thaw tests.

47-4616
Detection of frost-prone highway beds from response-type surface roughness measurements.
Scully, J., *U.S. Federal Highway Administration. Report*, Feb. 1992, FHWA/CT/RD-1344-F-92-2, 15p. + appends. PB93-180180.
Road icing, Road maintenance, Roadbeds, Subgrade maintenance, Frost heave.

47-4617
Characterization of PM-10 emissions from antiskid materials applied to ice- and snow-covered roadways.
Kinsey, J.S., *U.S. Environmental Protection Agency. Report*, Jan. 1993, EPA/600/R-93/019, Var. p., PB93-150209, 10 refs.
Road icing, Road maintenance, Chemical ice prevention, Air pollution, Environmental impact.

47-4618
Sulfur mass loading of the atmosphere from volcanic eruptions: calibration of the ice core record on the basis of sulfate aerosol deposition in polar regions from the 1982 El Chichon eruption.
Sigurdsson, H., et al, *U.S. National Aeronautics and Space Administration. Contractor report*, 1990, NASA-CR-192409, 7p. + appends. N93-20302.
Laj, P.
Polar atmospheres, Atmospheric composition, Air pollution, Volcanic ash, Ice cores

47-4619
Transparent insulations. Cold-region application.
Kouhia, I., et al, *Finland. Technical Research Centre (Valtion Teknillinen Tutkimuskeskus). Building Materials Laboratory. Report*, 1992, VTT-ETRR-16, 32p., DE93-769931, 6 refs.
Nieminen, J., Rautiainen, L., Ojanen, T., Salonvaara, M.
Thermal insulation, Buildings, Walls, Cold weather performance.

47-4620
Monthly mean sea ice data from the Polar Ice Prediction System (PIPS), the Regional Polar Ice Prediction System-Barents Sea (RPIPS-B), the Regional Polar Ice Prediction System-Greenland Sea (RPIPS-G), and the Polar Ice Prediction System 2.0 (PIPS2.0).
Posey, P.G., et al, *U.S. Naval Research Laboratory. Memorandum report*, Feb. 1993, NRL/MR/7322-93-7020, 6p. + appends., ADA-262 794, 15 refs.
Preller, R.H.
Ice surveys, Sea ice distribution, Ice cover thickness, Drift, Ice forecasting, Ice models, Computerized simulation.

47-4621
Radar backscatter measurements from arctic sea ice during the fall freeze-up.
Beaven, S.G., et al, *Kansas. University. Radar Systems and Remote Sensing Laboratory. Technical report*, Feb. 1993, RSL-TR-8241-1/8243-1, MP 3272, 66p., ADA-261 843, 7 refs.
Gogineni, S.P., Shanableh, M., Gow, A.J., Tucker, W.B., Jezek, K.C.
Ice surveys, Sea ice distribution, Ice detection, Drift, Ice electrical properties, Freezeup, Radar tracking, Backscattering.

47-4622
Climatology of polar low occurrences in the Nordic Seas and an examination of katabatic winds as a triggering mechanism.
Wos, K.A., Monterey, CA, U.S. Naval Postgraduate School, 1992, 139p., ADA-261 719, M.S. thesis. 47 refs.
Polar atmospheres, Storms, Weather forecasting, Atmospheric disturbances, Atmospheric circulation, Atmospheric pressure, Marine meteorology, Wind (meteorology).

47-4623
Anticorrosive deicer used on bridges. *Public works*, Apr. 1993, 124(4), p.36.
Bridges, Winter maintenance, Corrosion, Antifreezes, Snow removal, Salting, Countermeasures.

47-4624
Lessons learned from an ice storm emergency.
Low, T.A., *Public works*, Apr. 1993, 124(4), p.38-49.
Precipitation (meteorology), Ice storms, Electric power, Damage, Ice cover effect, Countermeasures, Urban planning.

47-4625
Snow-belt county's approach to snow and ice control.
Bakken, R.C., *Public works*, Apr. 1993, 124(4), p.40-42.
Snow removal, Salting, Winter maintenance, Road maintenance, Machinery, Education.

47-4626
Effects of lime-sludge discharge on an arctic river.
Tumeo, M.A., *Water resources bulletin*, Dec. 1992, 28(6), p.1083-1094, 10 refs.
Water treatment, Waste disposal, Sludges, Rivers, Environmental impact, Sampling, Water chemistry, Sedimentation, Seasonal variations, Snowmelt.

47-4627
Effects of freezing and moisture on impact properties of glass fiber reinforced RTM parts.
Karbhari, V.M., et al, Annual ASM/ESD Advanced Composites Conference, 8th, Chicago, IL, Nov. 2-5, 1992. Proceedings. Advanced composites: design, materials and processing technologies, Materials Park, OH, ASM International, 1992, p.135-142, 9 refs.
Pope, G.
DLC TA418.9.C6 A268
Composite materials, Synthetic materials, Construction materials, Freezing, Cold weather construction, Cold weather tests, Impact tests, Flexural strength.

47-4628
Are arctic marine invertebrates relatively insensitive to metals.
Chapman, P.M., *Environmental toxicology and chemistry*, Apr. 1993, 12(4), p.611-613, 12 refs.
Marine biology, Water pollution, Ecosystems, Metals, Environmental protection, Environmental tests.

47-4629
Selective accumulation of polychlorocamphenes in aquatic biota from the Canadian Arctic.
Bidleman, T.F., et al, *Environmental toxicology and chemistry*, Apr. 1993, 12(4), p.701-709, 28 refs.
Walla, M.D., Muir, D.C.G., Stern, G.A.
Marine biology, Hydrocarbons, Water pollution, Environmental impact, Environmental tests, Chemical analysis, Ecosystems.

47-4630
Possible effects of anthropogenically-increased CO2 on the dynamics of climate: implications for ice age cycles.
Saltzman, B., et al, *Geophysical research letters*, June 7, 1993, 20(11), p.1051-1054, 13 refs.
Maasch, K.A., Verbitskiĭ, M.IA.
Pleistocene, Ice sheets, Ice volume, Glacier oscillation, Atmospheric composition, Carbon dioxide, Greenhouse effect, Climatic changes, Mathematical models.

47-4631
Comparison of VLBI data with the ICE-3G glacial rebound model.
James, T.S., et al, *Geophysical research letters*, May 5, 1993, 20(9), p.871-874, 8 refs.
Lambert, A.
Sea level, Glacier oscillation, Isostasy, Measurement, Ice models, Correlation, Geological surveys, Statistical analysis.

47-4632
Airborne measurement of absolute sea-surface heights.
Brozena, J.M., et al, *Geophysical research letters*, May 5, 1993, 20(9), p.875-878, 11 refs.
Peters, M.F., Forsberg, R.
Aerial surveys, Topographic surveys, Geophysical surveys, Radar echoes, Sea level, Height finding, Ice cover effect, Accuracy, Correlation.

47-4633
Ocean-acoustic propagation in an arctic profile.
Buckingham, M.J., IMACS Symposium on computational acoustics, 3rd, Cambridge, MA, June 26-28, 1991. Proceedings, Vol.1, Computational acoustics: scattering, supercomputing and propagation. Edited by R.L. Lau et al, Amsterdam, Elsevier Science Publishers, 1993, p.93-104, 9 refs.
Oceanography, Underwater acoustics, Sound transmission, Wave propagation, Scattering, Velocity measurement, Sea ice, Ice cover effect, Mathematical models.

47-4634
New results of the dust investigation in the comet simulation project KOSI.
Thiel, K., et al, Lunar and Planetary Science. Proceedings. Edited by G. Ryder et al. Vol.21, Houston, TX, Lunar and Planetary Institute, 1991, p.579-589, 29 refs.
DLC QB592.A64a
Extraterrestrial ice, Simulation, Soil physics, Ice sublimation, Dust, Vapor transfer, Radiation absorption, Ice solid interface, Insolation.

47-4635
Ammonia-water mixtures at high pressures: melting curves of ammonia dihydrate and ammonia monohydrate and a revised high-pressure phase diagram for the water-rich region.
Boone, S., et al, Lunar and Planetary Science. Proceedings. Edited by G. Ryder et al. Vol.21, Houston, TX, Lunar and Planetary Institute, 1991, p.603-610, 24 refs.
Nicol, M.F.
DLC QB592.A64a
Extraterrestrial ice, Simulation, Solutions, Hydrates, Ice melting, High pressure tests, Phase transformations, Thermodynamic properties, Low temperature research.

47-4636
Weathering of basaltic rocks under cold arid conditions: Antarctica and Mars.
Allen, C.C., et al, Lunar and Planetary Science. Proceedings. Edited by G. Ryder et al. Vol.21, Houston, TX, Lunar and Planetary Institute, 1991, p.711-717, 30 refs.
Conca, J.L.
DLC QB592.A64a
Mars (planet), Geocryology, Soil formation, Weathering, Correlation, Simulation, Antarctica--Victoria Land.
Ubiquitous etch pits occur in cobbles of nonvesicular dolerite (basalt) from many ice-free areas of Victoria Land. The pits appear to be formed by dissolution of the rock by rare snow meltwater during the austral summer. Wind erosion removes weathered material from the pits. A model for rock pitting on Mars analogous to that described above for antarctic dolerites is proposed. Water frost or snow deposited on rock surfaces during the winter, as observed at the Viking 2 lander site, occasionally melts, wetting the rocks for short periods of time. During these brief wetting episodes chemical weathering takes place in an extremely thin near-surface zone. Pit formation is initiated at sites of greatest weathering activity. Subsequent wind erosion scours the pits, removing the salts and clays more efficiently than the illite-rich coatings. The results are Fe-rich aeolian fines with lower Al and K contents than their source rocks. (Auth. mod.)

47-4637
Snow and floating ice.
Gray, D.M., et al, Handbook of hydrology. Edited by D.R. Maidment, New York, McGraw-Hill, 1993, p.7/1-7/58, 171 refs.
Prowse, T.D.
Snow hydrology, Snowmelt, Snow cover effect, Runoff, River ice, Ice breakup, Ice cover effect.

47-4638
Hydrologic forecasting.
Lettenmaier, D.P., et al, Handbook of hydrology. Edited by D.R. Maidment, New York, McGraw-Hill, 1993, p.26/1-26/30, 48 refs.
Wood, E.F.
Snow hydrology, Snowmelt, Runoff forecasting.

47-4639
Constraints imposed by the ice core data on the budgets of nitrous oxide and methane.
Khalil, M.A.K., et al, Liège International Astropnysical Colloquium, 28th, June 26-30, 1989. Proceedings. Edited by P.J. Crutzen, J.C. Gerard, and R. Zander. Our changing atmosphere, Liège, Université, Institut d'Astrophysique, 1989, p.403-410, 25 refs.
Rasmussen, R.A.
Ice cores, Atmospheric composition, Paleoclimatology, Air pollution, Human factors, Global change.

47-4640
Climate model sensitivity to sea ice albedo parameterization.
Morassutti, M.P., *Theoretical and applied climatology*, 1991, Vol.44, p.25-36, 47 refs
Air ice water interaction, Ice cover effect, Ice optics, Ice heat flux, Polar atmospheres, Atmospheric circulation, Albedo, Global change, Mathematical models.

47-4641
Deep ice penetrator/instrumented test results.
Rychnovsky, R.E., *Sandia National Laboratories. Report*, Apr. 1988, SAND87-8245, 25p., 19 refs.
Ice cover strength, Ice breaking, Projectile penetration, Penetration tests, Military engineering, Military equipment, Military operation.

47-4642
Ice penetration tests of a water/ice penetrator.
Rychnovsky, R.E., *Sandia National Laboratories. Report*, Mar. 1987, SAND86-8245, 50p., 11 refs.
Ice cover strength, Ice breaking, Projectile penetration, Penetration tests, Military engineering, Military equipment, Military operation.

47-4643
International and American efforts to coordinate glaciological programs.
Field, W.O., Boulder, CO, World Data Center A for Glaciology, Jan. 1991, 17p.
Glacier surveys, Research projects, Organizations, International cooperation, History.

47-4644
Model for the anisotropic reflectance of pure snow.
Li, S.S., *California. University, Santa Barbara. Department of Geography. Discussion paper*, Mar. 1982, No.4, 60p., 36 refs.
Snow optics, Snow density, Snow surface, Snow surveys, Albedo, Grain size, Radiometry, Remote sensing, Mathematical models.

47-4645
Snow-line plunge changed the face of the old world. Scientists discover new clues to the Ice Age.
Kuhle, M., *Deutsche Forschungsgemeinschaft. DFG reports. German research*, 1988, No.3, p.15-18.
Ice age theory, Snow line, Paleoclimatology.

47-4646
Ecological environmental features of antarctic sea ice and its role in the marine ecosystems.
Wang, Z.P., et al, *Antarctic research (Chinese edition)*, 1993, 5(1), p.1-15, In Chinese with English summary. Refs. p.13-15.
Dieckmann, G.S.
Sea ice, Ice crystal structure, Ice physics, Algae, Marine biology, Cryobiology.
The development and physical properties of antarctic sea ice (including fast ice and pack ice), and the mechanism for algal assemblage in sea ice, are described. The ecological characteristics of microbiota in sea ice and its role in maintaining marine primary productivity and improving the transportation of biotic energy are discussed. (Auth. mod.)

47-4647
Characteristics of radiation over Mizuho Station in Antarctica.
Liu, S.H., et al, *Antarctic research (Chinese edition)*, 1993, 5(1), p.39-45, In Chinese with English summary. 10 refs.
Xiong, K.
Snow air interface, Solar radiation, Albedo, Meteorological data, Antarctica—Mizuho Station.
Measurements of radiation components and micrometeorological observations were carried out in the atmospheric boundary layer at Mizuho Station in 1979 and 1980. The annual variations of radiation components, the effective emissivity of snow surface and atmosphere, the effective transmittance of the atmosphere, and the snow surface albedo have been calculated and analyzed. Relationships between the snow surface albedo and the spectral diffuse fluxes, and the solar elevation angle under clear sky, have also been analyzed. Preliminary results are discussed and presented in graphs. (Auth. mod.)

47-4648
Late Proterozoic anthracite coals from the Hornsund area, south Spitsbergen.
Birkenmajer, K., et al, *Polish polar research*, 1992, 13(2), p.71-90, With Polish summary. 25 refs.
Frankiewicz, J.K., Wagner, M.
Arctic landscapes, Geological surveys, Stratigraphy, Sediments, Coal, Diagenesis, Chemical analysis, Geologic processes.

47-4649
Quaternary landforms, sediments and morphogenetic evolution of Hansbreen-Sofiekammen region, Wedel Jarlsberg Land, Spitsbergen.
Lindner, L., et al, *Polish polar research*, 1992, 13(2), p.91-101, With Polish summary. 43 refs.
Marks, L., Szczesny, R.
Arctic landscapes, Marine geology, Quaternary deposits, Geological surveys, Geological maps, Geologic processes, Landforms, Photointerpretation.

47-4650
Statistical characteristics of soil temperature at the depth of 5 cm in thermal seasons, Hornsund, Spitsbergen.
Mietus, M., *Polish polar research*, 1992, 13(2), p.103-112, With Polish summary. 13 refs.
Arctic landscapes, Tundra, Soil surveys, Soil temperature, Soil air interface, Snow cover effect, Temperature distribution, Seasonal variations, Statistical analysis.

47-4651
Spatial differentiation of air temperature and humidity on western coast of Spitsbergen in 1979-1983.
Przybylak, R., *Polish polar research*, 1992, 13(2), p.113-129, With Polish summary. 9 refs.
Climatology, Subpolar regions, Air temperature, Humidity, Temperature measurement, Periodic variations, Atmospheric circulation.

47-4652
Occurrence of algae on tundra soils in Oscar II Land, Spitsbergen.
Oleksowicz, A.S., et al, *Polish polar research*, 1992, 13(2), p.131-147, With Polish summary. 11 refs.
Luscińska, M.
Arctic landscapes, Soil microbiology, Biogeography, Site surveys, Algae, Tundra, Active layer, Plant ecology, Classifications.

47-4653
Geoecology of the North (an introduction to geocryoecology). [Geoekologiia Severa (vvedenie v geokriioekologiiu)].
Solomatin, V.I., ed, Moscow, Izd. MGU, 1992, 270p., In Russian. Refs. p.253-266.
Geocryology, Ecosystems, Ecology, Revegetation.

47-4654
Grass plants in Yakutia. [Gazonnye rasteniia v IAkutii].
Petrova, A.N., Yakutsk, IAkutskiĭ nauchnyĭ tsentr SO AN SSSR, 1990, 125p., In Russian. Refs. p.112-124.
Grasses, Meadow soils, Agriculture, Plants (botany), Introduced plants, USSR—Yakutia.

47-4655
Conditions and effectiveness of feed production in tundra. [Usloviia i effektivnost' kormoproizvodstva v tundre].
Archegova, I.B., et al, Syktyvkar, Komi nauchnyĭ tsentr UrO AN SSSR, 1988, 102p., In Russian. Refs. p.96-102.
Antonov, N.A., Sharkov, A.F.
Tundra, Agriculture, Grasses, Frozen ground.

47-4656
Oxygen isotope composition of ground ice (application to paleogeocryological reconstruction). [Izotopno-kislorodnyĭ sostav podzemnykh l'dov (opyt paleogeograficheskikh rekonstruktsiĭ)].
Vasil'chuk, IU.K., Moscow, Izd. Soveta po kriologii Zemli RAN, 1992, 2 vols. (684p.) + 2 foldouts, In Russian with English summary, table of contents, and inscriptions for all figures. 998 refs.
Ground ice, Oxygen isotopes, Geocryology, Paleoclimatology, Ice composition, Pleistocene, Permafrost thickness.

47-4657
Meteorological conditions for icing on a dirigible. [Meteorologicheskie usloviia obledeneniia dirizhablei].
Minervin, V.E., *Moscow. Tsentral'naia aerologicheskaia observatoriia. Trudy*, 1992, Vol.180, p.42-60, In Russian with English summary. 15 refs.
Aircraft icing, Icing rate, Cloud droplets.

47-4658
Numerical modeling of the coagulation and aggregation of ice crystals and snowflakes. [Chislennoe modelirovanie koaguliatsii i sovokupnosti ledianykh kristallov i snezhinok].
Sergeev, B.N., et al, *Moscow. Tsentral'naia aerologicheskaia observatoriia. Trudy*, 1992, Vol.180, p.71-79, In Russian with English summary. 5 refs.
Mikhailova, E.IU.
Mathematical models, Ice crystals, Snowflakes.

47-4659
Automated dual polarization complex for studying the characteristics of cumulonimbus. [Avtomatizirovannyĭ dvukhpoliarizatsionnyĭ kompleks dlia issledovaniia kharakteristik kuchevo-dozhdevykh oblakov].
Dinevich, L.A., et al, *Moscow. Tsentral'naia aerologicheskaia observatoriia. Trudy*, 1992, Vol.180, p.79-95, In Russian with English summary. 10 refs.
Kapital'chuk, I.P., Shupiatskiĭ, A.B., Shtivel'man, D.K.
Hail clouds, Supercooled clouds, Cloud droplets, Reflectivity, Polarization (waves), Hail prevention, Hailstone growth, Cloud seeding, Radar.

47-4660
Ecological situation and protection of flora and fauna of the Barents Sea. [Ekologicheskaia situatsiia i okhrana flory i fauny Barentseva moria].
Matishov, G.G., ed, Apatity, Kol'skiĭ nauchnyĭ tsentr AN SSSR, 1991, 211p., In Russian with English summary and table of contents. Refs. p.180-206.
Ecology, Ecosystems, Marine biology, Animals, Water pollution, Radioactive wastes, Plankton, Plants (botany), Oil spills, Barents Sea.

47-4661
Micromorphological features of the USSR zonal soils. [Mikromorfologiia pochv prirodnykh zon SSSR].
Gerasimova, M.I., et al, Pushchino, Pushchinskiĭ nauchnyĭ tsentr RAN, 1992, 214p. (Pertinent p.66-107), In Russian. Refs. p.191-200.
Gubin, S.V., Shoba, S.A.
Soil classification, Chernozem, Soil profiles, Microstructure, Cryogenic soils, Tundra, Soil physics, USSR.

47-4662
Flow regulation for controlled river-ice formation.
Jain, S.C., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, May 1993, CR 93-03, 50p., ADA-266 409, 38 refs.
Ettema, R., Park, I.
Frazil ice, River flow, River ice, Water temperature, Simulation, Flow control, Ice jams, Channels (waterways), United States—Ohio River.
Results are presented of a study to determine appropriate methods of flow modification for mitigating ice jam formation in navigable rivers. Based on a review of alternative methods for flow modification, it is concluded that for many rivers, especially large ones, the most appropriate method involves controlled ice-cover formation through the regulation of river flow. Flow discharge and stages would be regulated by controlling the flow releases from reservoirs and flow stages at river dams, such that optimal flow conditions prevail for rapid formation, and subsequent maintenance, of an accumulation ice cover over river reaches in which potentially large amounts of frazil ice may grow. Accumulation covers would be formed of frazil ice pans and floes and, if appropriate, broken ice conveyed from upstream. Existing dams, augmented where needed by navigable ice booms, could serve as retention structures for the development of accumulation covers. A preliminary indication of the feasibility of this method for controlling ice-cover formation on stage-regulated pools of the Ohio River is assessed through the use of a numerical model that simulates ice-cover formation from frazil ice. This approach holds promise for mitigating jam occurrence, although its implementation necessarily entails management of flow through major portions of the Ohio River. The results of the study are, to a limited extent, generalized to other rivers.

47-4663
Feasibility study of preparing performance evaluation soils for analyzing volatile organic compounds.
Hewitt, A.D., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, May 1993, SR 93-05, 9p., ADA-266 410, 19 refs.
Laboratory techniques, Soil pollution, Vapor diffusion.
Vapor fortification, an alternative method for spiking soils with volatile organic compounds for quality assurance/quality control, was improved by minimizing the effects of numerous variables. The procedure developed resulted in average analyte concentrations for triplicate test samples that were not significantly different among three separate fortification treatments, and had relative standard deviations within each treatment of less than 9% for three of the four analytes tested. The advantages of using vapor fortification instead of the conventional liquid injection methods are discussed.

47-4664
Site characterization measurements of background and targets in support of smart weapons testing.
Hayward, M., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Mar. 1993, SR 93-03, 96p., ADB-174 199, 1 ref.
Long, K., Berger, R.
Data processing, Measurement, Military operation, Military research, Infrared mapping.
In the spring of 1989 the U.S. Advanced Research Projects Agency sponsored a data collection exercise to obtain target and background signatures at infrared and millimeter wavelengths. To support the airborne data collection effort, exten-

sive ground-based measurements were made to characterize the targets, the background and meteorological conditions during the airborne measurements. These ground-based measurements were designed to record characteristics of the background scenes that have the greatest influence on the infrared and millimeter wave sensors. Other scene characteristics were also measured so that the scenes may be compared and put into the context of the local climatic conditions. The measurements and measurement techniques are described and representative data from each measurement are presented.

47-4665
Polar operations manual.
Jenkins, W.T., *U.S. Naval Sea Systems Command. Manual*, Sep. 1988, SO300-A5-MAN-010, Var. p., 34 refs.
Cold weather operation, Cold weather survival, Military operation, Logistics, Manuals.

47-4666
Greenland Ice Sheet Project Two. GISP2 core data report 1991.
GISP2 Science Management Office, Durham, NH, University of New Hampshire, 1991, Var. p.
Ice sheets, Ice cores, Coring, Greenland.

47-4667
On the 1990-1991 operation of the Lake Erie-Niagara River ice boom.
International Niagara Working Committee, Sep. 1991, 32p. + figs.
Ice booms, Ice control, River ice, Lake ice.

47-4668
Comparison of conventional and passive microwave sea ice data sets for Hudson Bay.
Etkin, D.A., North York, Ontario, York University, 1991, 132p., MS thesis. 46 refs.
Ice surveys, Sea ice distribution, Ice cover thickness, Ice detection, Ice conditions, Ice electrical properties, Radiometry, Spaceborne photography, Data processing.

47-4669
Greenland Ice Sheet Project Two. GISP2 internal data report 1991.
GISP2 Science Management Office, Durham, NH, University of New Hampshire, 1991, Var. p., Refs. passim.
Ice sheets, Ice cores, Ice composition, Atmospheric composition, Paleoclimatology, Greenland.

47-4670
Arctic Ocean Buoy Program data report for 1 January 1987-31 December 1987.
Colony, R.L., et al, *University of Washington, Seattle. Applied Physics Laboratory. Technical memorandum*, May 1990, APL-UW TM7-91, 152p.
Rigor, I.
Drift, Drift stations, Ocean currents, Atmospheric pressure, Air temperature, Surface temperature.

47-4671
Arctic Ocean Buoy Program data report for 1 January 1988-31 December 1988.
Colony, R.L., et al, *University of Washington, Seattle. Applied Physics Laboratory. Technical memorandum*, May 1991, APL-UW TM8-91, 181p.
Rigor, I.
Drift, Drift stations, Ocean currents, Atmospheric pressure, Air temperature, Surface temperature.

47-4672
Arctic Ocean Buoy Program data report for 1 January 1989-31 December 1989.
Colony, R.L., et al, *University of Washington, Seattle. Applied Physics Laboratory. Technical memorandum*, May 1991, APL-UW TM9-91, 158p.
Rigor, I.
Drift, Drift stations, Ocean currents, Atmospheric pressure, Air temperature, Surface temperature.

47-4673
Arctic Ocean Buoy Program data report for 1 January 1990-31 December 1990.
Colony, R.L., et al, *University of Washington, Seattle. Applied Physics Laboratory. Technical memorandum*, May 1991, APL-UW TM10-91, 142p.
Rigor, I.
Drift, Drift stations, Ocean currents, Atmospheric pressure, Air temperature, Surface temperature.

47-4674
Feature maps of ice streams C, D, and E, West Antarctica.
Scambos, T.A., et al, *Antarctic journal of the United States*, 1991, 26(5), p.312-314, 5 refs.
Bindschadler, R.A.
Topographic maps, Ice sheets, Image processing, Spaceborne photography, Radiometry, Antarctica—Siple Coast.
Satellite image data reveal a wealth of features that assist in interpreting ice-flow dynamics and the flow history of the west antarctic Siple Coast region. A map of features observed in ice streams C, D, and E of the Siple Coast/Rockefeller Plateau area has been created, based on 10 overlapping Landsat thematic mapper (TM) images and one advanced very-high-resolution radiometer (AVHRR) image. This map reveals several geographic features not previously identified and emphasizes the importance of satellite image mapping in the polar regions.

47-4675
Advances in antarctic surveying and mapping.
Mullins, J.L., *Antarctic journal of the United States*, 1991, 26(5), p.314-315.
Topographic maps, Ice sheets, Mapping, Low temperature research.
The U.S. Geological Survey's (USGS) Antarctic Surveying and Mapping Program focused its activities during the 1990-1991 season on the acquisition of global positioning system (GPS) geodetic mapping control, Doppler satellite surveying, an international GPS campaign, seismology, and Doppler satellite tracking. In addition, the USGS participated in the second phase of the Antarctic GPS Observing Campaign, the forerunner of a major international cooperative GPS observation campaign proposed for the 1991-1992 austral summer season in the Southern Hemisphere. The objectives of the international GPS campaigns are to undertake investigations to determine the relative motion between the antarctic tectonic plates and the adjoining plates, and to establish a baseline between existing and proposed antarctic Very Long Baseline Interferometry sites. Plans for the 1991-1992 GPS campaign are outlined.

47-4676
Monitoring the dynamics of the antarctic coastline with Landsat images.
Lucchitta, B.K., et al, *Antarctic journal of the United States*, 1991, 26(5), p.316-317, 4 refs.
Bertolini, L.M., Ferrigno, J.G., Williams, R.S., Jr.
Coastal topographic features, Mapping, LANDSAT, Glacier flow, Ice shelves.
An extensive set of Landsat images covering Antarctica was acquired in the early to middle 1970s. Recently, an international consortium of the Scientific Committee on Antarctic Research began a program to obtain new Landsat images over the antarctic coastal region. Pairing these later views with scenes imaged earlier will permit changes in the coastline to be monitored. The pilot study showed that the images, after scanning, digitizing, and registration, can be manipulated by image-processing techniques. These techniques enable one to compare the extent of shelf ice, glaciers, and open-water or seasonal ice and to map and quantify the changes.

47-4677
Analysis of the large deformation and flow characteristics of developable surface snowplow moldboards.
Crane, R.L., Laramie, University of Wyoming, 1992, 293p., M.S. thesis. Refs. p.70-75.
Snow removal, Metal snow friction, Snow loads, Snow mechanics, Road maintenance, Computerized simulation, Computer programs, Mathematical models.

47-4678
Published research papers. [Yuki to doro no kenkyu happyokai chosa kenkyu happyo shiryo],
Snow and Road Research Meeting, 2nd, Feb. 29, 1990, Tokyo, Kensetsusho (Ministry of Construction), 1990, 37p. + panel discussion, In Japanese. Refs. passim.
For selected papers see 47-4679 through 47-4687.
Road icing, Snow removal, Blowing snow, Road maintenance, Avalanche engineering, Avalanche forecasting.

47-4679
Study on predicting snow avalanches. [Yuki nadare hassei yochi yosoku ni kansuru kenkyu],
Oka, K., Yuki to doro no kenkyu happyokai chosa kenkyu happyo shiryo (Snow and Road Research Meeting, 2nd, Feb. 29, 1990. Published research papers), Tokyo, Kensetsusho (Ministry of Construction), 1990, p.1-4, In Japanese. 1 ref.
Avalanches, Avalanche forecasting, Snow cover stability, Japan.

47-4680
Basic experiments on snow avalanche abatement. [Yuki nadare genseiko ni kansuru kisoteki jikken],
Shimomura, C., et al, Yuki to doro no kenkyu happyokai chosa kenkyu happyo shiryo (Snow and Road Research Meeting, 2nd, Feb. 29, 1990. Published research papers), Tokyo, Kensetsusho (Ministry of Construction), 1990, p.5-8, In Japanese. 4 refs.
Terada, H., Sakai, Y.
Avalanche engineering, Avalanche modeling, Snow loads, Road maintenance.

47-4681
Development of snow removal information systems. [Josetsu joho shisutemu no kaihatsu],
Kato, T., et al, Yuki to doro no kenkyu happyokai chosa kenkyu happyo shiryo (Snow and Road Research Meeting, 2nd, Feb. 29, 1990. Published research papers), Tokyo, Kensetsusho (Ministry of Construction), 1990, p.9-11, In Japanese.
Kamino, S.
Snow removal, Road maintenance, Data transmission.

47-4682
Simulation for planning road snow melting. [Doro yusetsu sekkei no tame no shimyureshon],
Miyamoto, S., Yuki to doro no kenkyu happyokai chosa kenkyu happyo shiryo (Snow and Road Research Meeting, 2nd, Feb. 29, 1990. Published research papers), Tokyo, Kensetsusho (Ministry of Construction), 1990, p.13-16, In Japanese. 3 refs.
Snow removal, Road maintenance, Snow melting, Artificial melting, Computerized simulation.

47-4683
Development of methods to evaluate mechanical snow removal. [Kikai josetsu hyoka shuho no kaihatsu],
Endo, T., et al, Yuki to doro no kenkyu happyokai chosa kenkyu happyo shiryo (Snow and Road Research Meeting, 2nd, Feb. 29, 1990. Published research papers), Tokyo, Kensetsusho (Ministry of Construction), 1990, p.17-19, In Japanese.
Sasaki, S.
Snow removal, Road maintenance.

47-4684
Automation of snow removal graders. [Josetsu gureda no jidoka ni tsuite],
Kamimura, H., Yuki to doro no kenkyu happyokai chosa kenkyu happyo shiryo (Snow and Road Research Meeting, 2nd, Feb. 29, 1990. Published research papers), Tokyo, Kensetsusho (Ministry of Construction), 1990, p.20-23, In Japanese.
Snow removal, Road maintenance.

47-4685
Basic plan for a snowdrift information system. [Jifubuki joho shisutemu no kihonteki keikaku ni tsuite],
Sakata Construction Office, Yuki to doro no kenkyu happyokai chosa kenkyu happyo shiryo (Snow and Road Research Meeting, 2nd, Feb. 29, 1990. Published research papers), Tokyo, Kensetsusho (Ministry of Construction), 1990, p.26-29, In Japanese.
Snowdrifts, Weather observations, Road maintenance.

47-4686
Using blowing snow observa[illegible]s in traffic management. [Fubuki kansoku no k[illegible]kanri e no riyo],
Fukuzawa, Y., et al, Yuki to [illegible]oro no kenkyu happyokai chosa kenkyu happyo shiryo (Snow and Road Research Meeting, 2nd, Feb. 29, 1990. Published research papers), Tokyo, Kensetsusho (Ministry of Construction), 1990, p.30-33, In Japanese. 5 refs.
Takeuchi, M., Ishimoto, K., Isobe, K.
Blowing snow, Weather observations, Road maintenance.

47-4687
Study on the characteristics of icy road surfaces. [Seppyo romen ni okeru romen seijo chosa],
Suzuki, S., et al, Yuki to doro no kenkyu happyokai chosa kenkyu happyo shiryo (Snow and Road Research Meeting, 2nd, Feb. 29, 1990. Published research papers), Tokyo, Kensetsusho (Ministry of Construction), 1990, p.34-37, In Japanese.
Kowase, M., Azeta, M.
Road icing, Skid resistance, Road maintenance.

47-4688
Research summaries. [Yuki to doro no kenkyu happyokai chosa kenkyu gaiyosho],
Snow and Road Research Meeting, 2nd, Feb. 29, 1990, Tokyo, Kensetsusho (Ministry of Construction), 1990, 78p., In Japanese. Refs. passim. Each paper is a one page summary of research for 1988 and 1989.
Road icing, Road maintenance, Snow removal, Blowing snow, Avalanche engineering, Research projects.

47-4689
Outline of the Civil Engineering Research Institute, 1992. [Hokkaido kaihatsukyoku kaihatsu doboku kenkyujo gaiyo 1992],
Hokkaido Development Bureau, Sapporo, 1992, 37p., In Japanese and English.
Research projects, Organizations, Regional planning, Cold weather operation, Cold weather performance, Japan—Hokkaido.

47-4690
Roads in Hokkaido.
Hokkaido Development Bureau, Sapporo, 1992, 27p.
Road maintenance, Highway planning, Regional planning, Snow removal, Japan—Hokkaido.

47-4691
Modelling of local climate with applications to winter road conditions.
Gustavsson, T., *Göteborg, Sweden. Universitet. Naturgeografiska Institutionen. GUNI rapport*, 1990, No.30, 13p. + reprints, 23 refs. For individual papers see 44-980, and 47- 4692 through 47-4696.
Road icing, Frost forecasting, Ice detection, Weather forecasting, Road maintenance.

47-4692
Infrared thermography in applied road climatological studies.
Gustavsson, T., et al. *Göteborg, Sweden. Universitet. Naturgeografiska Institutionen. GUNI rapport.* 1990, No.30, Modelling of local climate with applications to winter road conditions, 22p., 42 refs. Paper No.2 in this report. To be published in the International journal of remote sensing, 1990.
Bogren, J.
Road icing, Frost forecasting, Ice detection, Weather forecasting, Road maintenance, Infrared photography, Temperature measurement.

47-4693
Analyses of local climatological factors controlling risk of road slipperiness during warm-air advections.
Gustavsson, T., *Göteborg, Sweden. Universitet. Naturgeografiska Institutionen. GUNI rapport.* 1990, No.30, Modelling of local climate with applications to winter road conditions, 23p., 26 refs. Paper No.3 in this report. To be published in the International journal of climatology, 1991, Vol.11, Part 4.
Road icing, Frost forecasting, Ice detection, Weather forecasting, Road maintenance, Skid resistance.

47-4694
Variation in road surface temperature due to topography and wind.
Gustavsson, T., *Göteborg, Sweden. Universitet. Naturgeografiska Institutionen. GUNI rapport.* 1990, No.30, Modelling of local climate with applications to winter road conditions, p.227-236, 22 refs. Paper No.4 in this report. Reprinted from Theoretical and applied climatology, 1990, Vol.41.
Road icing, Frost forecasting, Ice detection, Weather forecasting, Road maintenance.

47-4695
Nocturnal air and road surface temperature variations in complex terrain.
Bogren, J., et al. *Göteborg, Sweden. Universitet. Naturgeografiska Institutionen. GUNI rapport.* 1990, No.30, Modelling of local climate with applications to winter road conditions, 17p., 39 refs. Paper No.5 in this report. To be published in the International journal of climatology, 1991, Vol.11, Part 4.
Gustavsson, T.
Road icing, Frost forecasting, Ice detection, Weather forecasting, Road maintenance.

47-4696
Use of a local climatological model for the prediction of air and road surface temperatures along road stretches.
Gustavsson, T., et al. *Göteborg, Sweden. Universitet. Naturgeografiska Institutionen. GUNI rapport.* 1990, No.30, Modelling of local climate with applications to winter road conditions, 45p., 30 refs. Paper No.6 in this report. Reprint of GUNI report, 1990, No.29.
Bogren, J.
Road icing, Frost forecasting, Ice detection, Weather forecasting, Road maintenance.

47-4697
Application of a local climatological model for prediction of air and road surface temperatures.
Bogren, J., *Göteborg, Sweden. Universitet. Naturgeografiska Institutionen. GUNI rapport.* 1990, No.31, 12p. + reprints, 24 refs. For selected papers see 47-4698 and 47- 4699.
Road icing, Frost forecasting, Ice detection, Weather forecasting, Road maintenance.

47-4698
Screening effects on road surface temperature and road slipperiness.
Bogren, J., *Göteborg, Sweden. Universitet. Naturgeografiska Institutionen. GUNI rapport.* 1990, No.31, 17p., 19 refs. Paper No.3 in this report. To be published in Theoretical and applied climatology, 1990.
Road icing, Frost forecasting, Ice detection, Weather forecasting, Road maintenance, Skid resistance.

47-4699
Variations in air and road surface temperature affecting risk of slipperiness in a small region.
Bogren, J., *Göteborg, Sweden. Universitet. Naturgeografiska Institutionen. GUNI rapport.* 1990, No.31, 17p., 20 refs. Paper No.4 in this report.
Road icing, Frost forecasting, Ice detection, Weather forecasting, Road maintenance, Skid resistance.

47-4700
Local protection from snowdrifts defence structures. [Le opere da vento].
Sivardière, F., et al. *Neve e valanghe.* Mar. 1993, No.18, p.6-17. In Italian with English summary. 7 refs.
Castelle, T.
Snow fences, Snowdrifts, Snow retention, Avalanche engineering.

47-4701
Snow load on avalanche barriers. In-situ measurements and experiments. [Le sollecitazioni della neve sulle opere paravalanghe. Misurazioni ed esperimenti in sito].
Bavoux, E., *Neve e valanghe.* Mar. 1993, No.18, p.18-25. In Italian with English summary.
Avalanche engineering, Snow fences, Snow loads.

47-4702
Snow surveys for ski-lift managers—a proposal for a method of work, with application examples in some ski areas in Lombardy. [Le perizie nivologiche per le societa' impianti—una proposta di metodologie di lavoro, con esempi di applicazione in aree sciistiche lombarde].
Bariffi, A., *Neve e valanghe.* Mar. 1993, No.18, p.26-37. In Italian with English summary. 12 refs.
Avalanche forecasting, Snow surveys, Safety, Italy—Lombardy.

47-4703
New wind-chill nomogram.
Rees, W.G., *Polar record.* July 1993, 29(170), p.229-234, 10 refs.
Wind chill, Nomographs, Physiological effects, Frostbite, Heat loss, Clothing, Cold weather survival, Accuracy.

47-4704
Frost formation and heat transfer on circular cylinders in cross flow.
Raju, S.P., et al. Fundamentals of Heat Transfer in Porous Media. Edited by M. Kaviany, New York, American Society of Mechanical Engineers, 1992, p.109-122, HTD-Vol.193, 30 refs.
Sherif, S.A.
DLC TA418.9.P6 F85
Frost forecasting, Ice formation, Surface temperature, Ice accretion, Ice air interface, Heat transfer, Ice thermal properties, Mathematical models.

47-4705
Prediction of spatial and temporal distributions of frost growth on a flat plate under forced convection.
Tao, Y.X., et al. Fundamentals of Heat Transfer in Porous Media. Edited by M. Kaviany, New York, American Society of Mechanical Engineers, 1992, p.131-139, HTD-Vol.193, 13 refs. For another version see 47-2551.
Besant, R.W.
DLC TA418.9.P6 F85
Frost forecasting, Ice growth, Ice accretion, Ice air interface, Ice solid interface, Heat transfer, Turbulent flow, Mathematical models.

47-4706
Polarimetric measurements in a severe hailstorm.
Zrnić, D.S., et al. *Monthly weather review.* Aug. 1993, 121(8), p.2223-2238, 40 refs.
Precipitation (meteorology), Storms, Hail clouds, Particle size distribution, Ice crystal optics, Classifications, Remote sensing, Radar echoes, Backscattering, Polarization (waves).

47-4707
Heat transfer from a heated cylinder buried in a frozen porous medium in an enclosure.
Oosthuizen, P.H., et al. Heat and mass transfer in porous media. Edited by M. Quintard et al, Amsterdam, Elsevier Science Publishers, 1992, p.315-326, 13 refs.
Paul, J.T.
DLC TA418.9.P6 H43
Porous materials, Frozen ground thermodynamics, Heat pipes, Subsurface investigations, Soil freezing, Ice solid interface, Convection, Heat transfer, Mathematical models.

47-4708
Onset and evolution of penetrative convection during the melting process in a porous medium.
Nguyen, T.H., et al. Heat and mass transfer in porous media. Edited by M. Quintard et al, Amsterdam, Elsevier Science Publishers, 1992, p.381-392, 23 refs.
Zhang, X.
DLC TA418.9.P6 H43
Ice melting, Phase transformations, Porous materials, Ice water interface, Convection, Heat transfer, Isotherms, Temperature effects, Analysis (mathematics).

47-4709
Effects of surfaces on the melting/freezing behavior of fluids in derivatized- and nude-porous silica.
Malhotra, V.M., et al. Symposium on Dynamics in Small Confining Systems, 2nd, Boston, MA, Nov. 30-Dec. 4, 1992. Proceedings, Materials Research Society Symposium Proceedings, Vol.290, Pittsburgh, Materials Research Society, 1993, p.121-126, 15 refs.
Mu, R., Natarajan, A.
DLC QD461.D945
Low temperature research, Porous materials, Hydrocarbons, Thermodynamic properties, Surface structure, Liquid solid interfaces, Freezing points, Phase transformations, Temperature measurement.

47-4710
Climate change and natural resource dynamics of the Atacama Altiplano during the last 18,000 years: a preliminary synthesis.
Messerli, B., et al. *Mountain research and development.* May 1993, 13(2), International Workshop on Mountain Geoecology of the Andes, Santiago, Chile Oct. 21-Nov. 4, 1991. Proceedings, p.117-127, With French and German summaries. 27 refs.
Mountains, Glaciation, Paleoclimatology, Paleobotany, Climatic changes, Periglacial processes.

47-4711
Late-Quaternary glaciation as a proxy for climate change in the central Andes.
Seltzer, G.O., *Mountain research and development.* May 1993, 13(2), International Workshop on Mountain Geoecology of the Andes, Santiago, Chile, Oct. 21-Nov. 4, 1991. Proceedings, p.129-138, With French and German summaries. 56 refs.
Mountain glaciers, Pleistocene, Paleoclimatology, Climatic changes, Quaternary deposits, Radioactive age determination, Glacier mass balance, Glacier oscillation, Snow line.

47-4712
Spatial heterogeneity of high mountain vegetation in the Andean desert zone of Chile.
Squeo, F.A., et al. *Mountain research and development.* May 1993, 13(2), International Workshop on Mountain Geoecology of the Andes, Santiago, Chile, Oct. 21-Nov. 4, 1991. Proceedings, p.203-209, With French and German summaries. 22 refs.
Alpine landscapes, Plant ecology, Vegetation patterns, Deserts, Snow cover effect, Biogeography, Site surveys.

47-4713
Remote sensing of cirrus cloud parameters using advanced very-high-resolution radiometer 3.7- and 10.9-micron channels.
Ou, S.C., et al. *Applied optics.* Apr. 20, 1993, 32(12), p.2171-2180, 24 refs.
Liou, K.N., Gooch, W.M., Takano, Y.
Cloud cover, Physical properties, Spaceborne photography, Radiometry, Ice crystal optics, Particle size distribution, Radiance, Data processing.

47-4714
Experimental and theoretical analysis of spatial coherence on a horizontal array under the arctic ice.
LePage, K., et al, European Conference on Underwater Acoustics, Luxembourg, Sep. 14-18, 1992. Proceedings. Edited by M. Weydert, London, Elsevier Science Publishers, 1992, p.3-16, 11 refs.
Schmidt, H., Kuperman, W.A.
DLC QC242.E87
Sea ice, Ice acoustics, Ice cover effect, Surface roughness, Underwater acoustics, Sound waves, Low frequencies, Wave propagation, Scattering, Mathematical models.

47-4715
Doppler acoustic studies of fine scale variability in the Arctic Ocean.
Pinkel, R., et al, European Conference on Underwater Acoustics, Luxembourg, Sep. 14-18, 1992. Proceedings. Edited by M. Weydert, London, Elsevier Science Publishers, 1992, p.17-23, 8 refs.
Merrifield, M., Deane, G., Smith, J.
DLC QC242.E87
Oceanography, Ocean currents, Acoustic measurement, Underwater acoustics, Sea ice, Ice cover effect.

47-4716
Matched field tomography results in the Arctic.
Diachok, O.I., et al, European Conference on Underwater Acoustics, Luxembourg, Sep. 14-18, 1992. Proceedings. Edited by M. Weydert, London, Elsevier Science Publishers, 1992, p.24-27, 10 refs.
Livingston, E., Wolf, J.
DLC QC242.E87
Sea ice, Ice acoustics, Ice cover thickness, Ice surveys, Acoustic measurement, Underwater acoustics, Ice cover effect, Wave propagation, Scattering, Correlation.

47-4717
Ambient noise generation by ice-ocean jets, eddies and tidal current in the marginal ice zone.
Johannessen, O.M., et al, European Conference on Underwater Acoustics, Luxembourg, Sep. 14-18, 1992. Proceedings. Edited by M. Weydert, London, Elsevier Science Publishers, 1992, p.28-38, 14 refs.
DLC QC242.E87
Sea ice, Underwater acoustics, Sound transmission, Acoustic measurement, Ice edge, Ice water interface, Ocean currents, Tidal currents, Wind factors, Ice cover effect.

47-4718
Analytical technique for solving an arctic acoustic model.
Sheard, J.D., et al, European Conference on Underwater Acoustics, Luxembourg, Sep. 14-18, 1992. Proceedings. Edited by M. Weydert, London, Elsevier Science Publishers, 1992, p.39-42, 4 refs.
Uscinski, B.J.
DLC QC242.E87
Underwater acoustics, Sound waves, Wave propagation, Sea ice, Ice cover effect, Ice water interface, Mathematical models.

47-4719
Ice edge noise observations from the 1988-89 Greenland Sea tomography experiment.
Lynch, J.F., et al, European Conference on Underwater Acoustics, Luxembourg, Sep. 14-18, 1992. Proceedings. Edited by M. Weydert, London, Elsevier Science Publishers, 1992, p.611-619, 3 refs.
Wu, H.X., Wadhams, P., Worcester, P.
DLC QC242.E87
Sea ice, Ice edge, Ice acoustics, Underwater acoustics, Acoustic measurement, Ice water interface, Wind factors, Air ice water interface.

47-4720
Antarctic ozone lidar system.
Stefanutti, L., et al, *Applied physics B*, July 1992, 55(1), p.3-12, 14 refs.
Ozone, Aerosols, Meteorological instruments, Antarctica—Dumont d'Urville Station.
A new complex lidar, designed to measure tropospheric and stratospheric ozone, stratospheric aerosols and polar stratospheric clouds, and tropospheric clouds has been designed by IROE-CNR and SA-CNRS and implemented at the French antarctic base of Dumont d'Urville. A description of the system and some preliminary measurements carried out during the antarctic winter of 1991 are reported.

47-4721
Four-wavelength depolarization backscattering lidar for polar stratospheric cloud monitoring.
Stefanutti, L., et al, *Applied physics B*, July 1992, 55(2), p.13-17, 7 refs.
Meteorological instruments, Clouds (meteorology), Stratosphere, Polar stratospheric clouds.

47-4722
Phytoplankton in the Weddell Sea, Antarctica: composition, abundance and distribution in water-column assemblages of the marginal ice-edge zone during austral autumn.
Kang, S.H., et al, *Marine biology*, 1993, 116(2), p.335-348, 60 refs.
Fryxell, G.A.
Sea ice, Plankton, Ice edge, Antarctica—Weddell Sea.
At the compacted north-south line of the ice edge, phytoplankton were sampled during early austral autumn of 1986 in the northwestern Weddell Sea. Cells from discrete water bottle samples from 12 stations on two east-west transects were counted to gain quantitative information on the composition, abundance, distribution, and condition of the phytoplankton in water-column assemblages. Over 70 species were found. The highest numbers of total cells (integrated through the top 150 m) were found in open water, well-separated from and to the east of the ice edge on the southern transect, with about 60 billion cells/sq m. With one exception, the relative abundance of diatoms was low at ice- covered stations and high at open-water stations. Overall, the diatom cell density was similar to that found previously during a northward transect from ice-covered to ice-free water at the Weddell-Scotia Sea ice edge (spring 1983). The phytoplankton spatial patterns in the two autumn transects differed, with the more southerly transect exhibiting a higher abundance of diatoms and dinoflagellates. The ratio of full to empty diatoms was higher on the southern transect, indicating a healthy population, while lower ratios of full/empty frustules on the northern transect suggested a generally declining population. (Auth. mod.)

47-4723
New South African research programme in the southern ocean.
Lucas, M.I., et al, *South African journal of science*, Feb. 1993, 89(2), p.61-67, 59 refs.
Lutjeharms, J.R.E., Field, J.G., McQuaid, C.D.
Research projects, Climatic changes, Hydrology, Sea ice.
South Africa, as an original signatory to the Antarctic Treaty in 1960, has had an active research program on the antarctic continent and in the surrounding southern ocean for the past 30 years. Recently a new program has been developed which will guide South Africa's research effort in this region for the next five years. Reported here is the oceanic component of this program that is specifically designed to address global climate change and its interaction with the antarctic marine ecosystem. The new program not only fulfils national goals but makes a contribution to the Scientific Committee for Antarctic Research (SCAR) and other international programs concerned with climate change. (Auth.)

47-4724
New snow protection engineering handbook. [Shinpen bosetsu kogaku handobukku],
Japan Association for Mechanization of Construction (Nihon kensetsu kikaika kyokai), Tokyo, Morikita Publishing Company, 1988, 527p., In Japanese. Refs. passim. Revised edition. For earlier editions see 36-2640 and 42-1110.
Road icing, Road maintenance, Snow removal, Blowing snow, Avalanche engineering.

47-4725
Changes in the sea-ice brine community during the spring-summer transition, McMurdo Sound, Antarctica. II. Phagotrophic protists.
Stoecker, D.K., et al, *Marine ecology progress series*, May 19, 1993, 95(1-2), p.103-113, Refs. p.112-113.
Buck, K.R., Putt, M.
Sea ice, Brines, Biomass, Microbiology, Antarctica—McMurdo Sound.
The land-fast sea-ice brine contains a diverse phagotrophic protist assemblage consisting of <5 microns heterotrophic flagellates, *Cryothecomonas* spp., heterotrophic dinoflagellates, and heterotrophic and mixotrophic ciliates. Fine-scale horizontal spatial variability is a feature of this assemblage; samples taken within 1 m of each other can be dominated by different heterotrophic protists. Many of the larger heterotrophic protists found in the brine are also found in the water column. The photosynthetic ciliate *Mesodinium rubrum* is also common. In mid to late austral spring, the heterotrophic assemblage accounts for about 10% of the total protist biomass in the brine and is dominated by *Cryothecomonas* spp. This flagellate can reach densities of over 1,000,000 cells/l of brine. In the early austral summer, ciliates (primarily *Strombidium* spp., *Mesodinium rubrum* and *Didinium* spp.) and heterotrophic dinoflagellates (primarily a small *Gymnodinium* sp. and *Polykrikos* sp.) increase in abundance in the brine. By the end of Jan. (just prior to ice decay and break-out), heterotrophic flagellates and ciliates can account for 50% of the protist biomass. (Auth. mod.)

47-4726
On the relation between ozone and potential vorticity.
Allaart, M.A.F., et al, *Geophysical research letters*, May 5, 1993, 20(9), p.811-814, 9 refs.
Kelder, H., Heijboer, L.C.
Ozone, Atmospheric circulation.

47-4727
Arctic: arena for international environmental security?.
Kolodkin, A., et al, Ocean yearbook 10. Edited by E.M. Borgese et al, Chicago, IL, University of Chicago Press, 1993, p.277-289, 18 refs.
Mirovitskaia, N., Roginko, A.
DLC GC1000.O27
Ocean environments, Ecosystems, Natural resources, Economic development, Environmental impact, Environmental protection, International cooperation, Legislation.

47-4728
Greenland: a temptation and a challenge.
Dansgaard, W., et al, *Endeavour*, Mar. 1993, 17(1), p.12-16, 3 refs.
Gundestrup, N.S.
Ice sheets, Climatic changes, Pleistocene, Atmospheric composition, Research projects, Ice cores, Drill core analysis, Forecasting, Greenland—Summit.

47-4729
Greenhouse effect and global warming: a Canadian perspective.
Kemp, D., *Geography*, Apr. 1991, 76-Pt.2(331), p.121-130, 34 refs.
Global warming, Greenhouse effect, Climatic changes, Environmental impact, Countermeasures, Research projects, Economic development.

47-4730
Determination of analytical temperatures of saline clayey soils taking into account the phase conversions of soil moisture in the below-freezing temperature spectrum.
Gokhman, M.R., *Soil mechanics and foundation engineering*, July 1993, 30(1), p.23-26, Translated from Osnovaniia, fundamenty i mekhanika gruntov. 3 refs.
Saline soils, Permafrost bases, Permafrost thermal properties, Soil temperature, Temperature variations, Thermal regime, Soil water, Phase transformations, Analysis (mathematics).

47-4731
On the ductile-to-brittle transition in ice under compression.
Batto, R.A., et al, *Acta metallurgica et materialia*, July 1993, 41(7), p.2219-2225, 17 refs.
Schulson, E.M.
Ice mechanics, Ice plasticity, Ice creep, Grain size, Dynamic loads, Crack propagation, Phase transformations, Brittleness, Compressive properties.

47-4732
Low-energy electron diffraction study of oxygen, water and ice adsorption on Pt(111).
Starke, U., et al, *Surface science*, May 10, 1993, Vol.287/288(Pt.A), International Conference on Solid Surfaces, 8th, The Hague, Netherlands, Oct. 12-16, 1992. Proceedings. Edited by O.L.J. Gijzeman et al, p.432-437, 21 refs.
Metals, Surface properties, Ice solid interface, Adsorption, Ice crystal structure, Molecular structure, Ice spectroscopy, Spectra.

47-4733
Aminostratigraphic correlations and paleotemperature implications, Pliocene-Pleistocene high-sea-level deposits, northwestern Alaska.
Kaufman, D.S., et al, *Quaternary science reviews*, Jan. 1993, 12(1), p.21-33, 67 refs.
Brigham-Grette, J.
Pleistocene, Quaternary deposits, Marine deposits, Arctic landscapes, Shores, Sea level, Stratigraphy, Paleoclimatology, Correlation, Climatic changes, United States—Alaska.

47-4734
Large-scale production and purification of an *Erwinia ananas* ice nucleation protein and evaluation of its ice nucleation activity.
Watabe, S., et al, *Bioscience, biotechnology, and biochemistry*, Apr. 1993, 57(4), p.603-606, 20 refs.
Microbiology, Cryobiology, Bacteria, Ice nuclei, Ice formation, Heterogeneous nucleation, Chemical composition, Manufacturing.

47-4735
***Craspedopleura* (Bacillariophyta), a new diatom genus of arctic sea ice assemblages.**
Poulin, M., *Phycologia*, May 1993, 32(3), p.223-233, 32 refs.
Sea ice, Ice composition, Oceanographic surveys, Marine biology, Microbiology, Plankton, Algae, Microstructure, Classifications.

47-4736
Mid- and far-infrared spectroscopy of ices: optical constants and integrated absorbances.
Hudgins, D.M., et al, *Astrophysical journal. Supplement series*, June 1993, 86(2), p.713-870, 38 refs.
Sandford, S.A., Allamandola, L.J., Tielens, A.G.G.M.
Extraterrestrial ice, Simulation, Ice optics, Optical properties, Standards, Radiation absorption, Refractivity, Ice spectroscopy, Infrared spectroscopy, Spectra.

47-4737
Transfer of polarized infrared radiation in optically anisotropic media: application to horizontally oriented ice crystals.
Takano, Y., et al, *Optical Society of America. Journal A*, June 1993, 10(6), p.1243-1256, 19 refs.
Liou, K.N.
Cloud physics, Radiance, Ice crystal optics, Anisotropy, Infrared radiation, Scattering, Polarization (waves), Theories, Analysis (mathematics).

47-4738
Thermodynamic properties of ice and of tetrahydrofuran hydrate in confined geometries.
Zakrzewski, M., et al, *Journal of chemical thermodynamics*, May 1993, 25(5), p.631-637, 17 refs.
Handa, Y.P.
Clathrates, Hydrates, Porous materials, Ice structure, Ice solid interface, Melting points, Temperature effects, Thermodynamic properties, Low temperature research, X ray diffraction.

47-4739
Magnetic investigations of the Ekström Ice Shelf, Antarctica.
Reiprich, S., et al. *Polarforschung*, 1991 (Pub. 1992), 61(2/3), p.113-129, 12 refs.
Brodscholl, A.L.
Ice shelves, Geomagnetism, Antarctica—Ekström Ice Shelf
Analysis of geomagnetic measurements carried out on the Ekstrom Ice Shelf during the overwintering campaign of 1987 reveals a high reliability of the differential total intensity field determination, as the error is only 5 nT. The measured values were separated from external variations and the normal field with data from the Georg von Neumayer observatory sited north of the Ekström Ice Shelf, and IGRF 85 model data, respectively. The reduced geomagnetic differential total intensity field values are called *deltaT* red-anomalies. The results are: a prominent *deltaT* red-anomaly in the center part and a positive coast parallel anomaly in the north of the Ekström Ice Shelf. Upward field continuation reveals a good agreement with a map derived from Soviet aeromagnetic measurements. Power spectra analysis and forward modelling calculations suggest a Curie-depth of about 12 to 18 km. True locations of the geomagnetic anomalies are calculated by the method of reduction to the magnetic pole. (Auth. mod.)

47-4740
Ice sheets: growing or shrinking.
Van der Veen, C.J., *Earth in space*, Jan. 1993, 5(5), p.5-9.
Ice sheets, Glacier mass balance, Glacier oscillation, Remote sensing, Spacecraft, Sea level, Ice forecasting, Measurement, Accuracy.
Satellite studies are helping to monitor the thickening and thinning of Greenland and antarctic ice sheets. Used with other study techniques, satellites prove valuable in getting an accurate picture of glacial activity. This paper examines the problems and prospects for such glaciological studies, and discusses glacier mass balances in both regions.

47-4741
Sediment export by ice rafting from a coastal polynya, arctic Alaska, U.S.A.
Reimnitz, E., et al, *Arctic and alpine research*, May 1993, 25(2), p.83-98, 48 refs.
McCormick, M., McDougall, K., Brouwers, E.
Sea ice, Ice surveys, Polynyas, Ice rafting, Drift, Sediment transport, Ice composition, Turbidity, Marine deposits, Shoreline modification, Beaufort Sea.

47-4742
Location of mechanical controls on Columbia Glacier, Alaska, U.S.A., prior to its rapid retreat.
Van der Veen, C.J., et al, *Arctic and alpine research*, May 1993, 25(2), p.99-105, 20 refs.
Whillans, I.M.
Glacier flow, Glacier oscillation, Glacier surveys, Glacier friction, Stress concentration, Strains, Ice mechanics, Ice solid interface, United States—Alaska—Columbia Glacier.

47-4743
Modern and Little Ice Age equilibrium-line altitudes on outlet valley glaciers from Jostedalsbreen, western Norway: an evaluation of different approaches to their calculation.
Torsnes, I., et al, *Arctic and alpine research*, May 1993, 25(2), p.106-116, 34 refs.
Rye, N., Nesje, A.
Glacier surveys, Glacier oscillation, Glacier mass balance, Measurement, Accuracy, Altitude, Periodic variations, Topographic effects, Moraines, Norway.

47-4744
Inverse relation between frost survival and atmospheric pressure.
Halloy, S., et al, *Arctic and alpine research*, May 1993, 25(2), p.117-123, 26 refs.
González, J.A.
Plant physiology, Acclimatization, Cold weather tests, Cold weather survival, Frost resistance, Temperature effects, Altitude, Atmospheric pressure.

47-4745
Plant competition over winter in alpine shrubland and grassland, Snowy Mountains, Australia.
Egerton, J.J.G., et al, *Arctic and alpine research*, May 1993, 25(2), p.124-129, 49 refs.
Wilson, S.D.
Alpine landscapes, Plant ecology, Winter, Growth, Vegetation patterns, Snow cover effect, Cold weather tests, Australia—Snowy Mountains.

47-4746
Response of an Alaska, U.S.A., shrub-tussock community to selected all-terrain vehicle use.
Ahlstrand, G.M., et al, *Arctic and alpine research*, May 1993, 25(2), MP 3273, p.142-149, 18 refs.
Racine, C.H.
Tundra, Subarctic landscapes, Vegetation patterns, Plant ecology, Organic soils, Damage, All terrain vehicles, Environmental impact, Environmental tests, United States—Alaska—Wrangell Mountains.
This paper examines the results of tests conducted at Wrangell-St. Elias National Park which quantified the effects of all-terrain vehicle (ATV) use on a shrub-tussock community. Vehicle track depth increased significantly with increasing passes. Vehicles running on rubber tires created deeper tracks than similar vehicles mounted on continuous rubber tracks. Heavier ATVs usually produced deeper tracks than lighter vehicles. Deeper tracks resulted when vehicle use was spread over a 10-wk period during the summer than when the passes were concentrated into shorter time periods near the beginning or end of the snow-free period. Two years after completing the treatments, most of the heavier-used lanes had subsided 2 to 4 cm due to thawing of ice-rich permafrost. Although injury occurred to shrubs continuously throughout the treatments, shrub injury rates were greatest during the first few passes by an ATV. The degree of sedge tussock compression and amount of organic soil exposed along the ATV tracks increased in relation to vehicle weight.

47-4747
Taxonomic revision of the genus *Antennaria* (Asteraceae: Inulear: Gnaphaliinae) of Alaska and Yukon Territory, northwestern North America.
Bayer, R.J., *Arctic and alpine research*, May 1993, 25(2), p.150-159, 32 refs.
Arctic landscapes, Subarctic landscapes, Plants (botany), Biogeography, Vegetation patterns, Classifications, Accuracy, Canada—Yukon Territory.

47-4748
Water II is a "strong" liquid.
Angell, C.A., *Journal of physical chemistry*, June 17, 1993, 97(24), p.6339-6341, 34 refs.
Amorphous ice, Water structure, Molecular structure, Viscosity, Polymers, Phase transformations, Low temperature research, Temperature effects.

47-4749
Rhine-Linth glacier in the upper Wurm: a model of the last alpine glaciation.
Keller, O., et al, *Quaternary international*, June 1993, Vol.18, p.15-17, 39 refs.
Krayss, E.
Pleistocene, Mountain glaciers, Alpine glaciation, Glacial geology, Quaternary deposits, Glacier oscillation, Snow line, Models, Switzerland—Alps.

47-4750
Neoglacial fluctuations and sedimentation of an iceberg-calving glacier resolved with tree rings (Kenai Fjords National Park, Alaska.
Wiles, G.C., et al, *Quaternary international*, June 1993, Vol.18, p.35-42, 27 refs.
Calkin, P.E.
Glacier oscillation, Glacial deposits, Glacier tongues, Calving, Outwash, Sedimentation, Marine deposits, Age determination, United States—Alaska.

47-4751
Deposition of the Late Wisconsin Johnston moraine, southcentral Wisconsin.
Lundqvist, J., et al, *Quaternary international*, June 1993, Vol.18, p.53-59, 3 refs.
Clayton, L., Mickelson, D.M.
Glacial deposits, Quaternary deposits, Glacial geology, Moraines, Geomorphology, Geological surveys, Stratigraphy, Lithology, United States—Wisconsin.

47-4752
Stratigraphy and origin of an area of hummocky glacial topography, northern Wisconsin, U.S.A.
Attig, J.W., et al, *Quaternary international*, June 1993, Vol.18, p.61-67, 24 refs.
Clayton, L.
Pleistocene, Glaciation, Quaternary deposits, Hummocks, Geomorphology, Glacier melting, Soil structure, Stratigraphy, Topographic features, United States—Wisconsin.

47-4753
Till stratigraphy and glacial history of the Vestfold Hills area, East Antarctica.
Hirvas, H., et al, *Quaternary international*, June 1993, Vol.18, p.81-95, 22 refs.
Nenonen, K., Quilty, P.
Pleistocene, Geological surveys, Glacial geology, Glacial deposits, Moraines, Bedrock, Stratigraphy, Radioactive age determination, Lithology, Antarctica—Vestfold Hills.
This paper presents results of a study of the formation, properties and stratigraphy of glacigenic deposits at the marginal zone of the East Antarctic ice sheet acquired during the 1988 1989 Australian National Antarctic Research Expedition. Samples (132) were collected for granulometric, geochemical, heavy mineral and various dating analysis. Fabric analyses (27) were performed from glacial till and debris-rich basal ice. Three test pits were excavated through frozen sediments to solid bedrock at a depth of 4.2 m. The whole ice free area of 410 sq km was studied by stereo interpretation of aerial photographs and reconnaissance field survey. Tills deposited by earlier phases of the Sörsdal glacier cover an interglacial deposit of shelly gravel near the Australian Davis Station. Shelly gravel represents clearly an ice free period when the climate was warmer and sea level higher than at present, and this stage is named the Davis interglacial. According to the thermoluminescence datings and amino acid analyses of the shelly gravel deposits, it seems that the age of the Davis interglacial could fall between 300,000 to 1,000,000 years BP. The glacial stratigraphy of the Vestfold Hills shows at least two similar Pleistocene outlet glacier 'floodings' during which the Sörsdal glacier drained the vast ice masses of the continental ice sheet beyond the Vestfold Hills antarctic oasis. (Auth. mod.)

47-4754
Field investigation of major and minor ions along Summit (central Greenland) ice cores by ion chromatography.
Legrand, M.R., et al, *Journal of chromatography*, June 25, 1993, 640(1-2), International Ion Chromatography Symposium, 3rd, Linz, Austria, Sep. 21-24, 1992. Proceedings. Edited by G.K. Linz, p.251-258, 13 refs.
De Angelis, M., Maupetit, F.
Ice sheets, Ice cores, Ice sampling, Accuracy, Chemical properties, Chemical analysis, Impurities, Solubility, Ion density (concentration), Greenland.

47-4755
Liquid and solid phases of water: an extensive molecular dynamics simulation with an *ab initio* polarizable potential.
Clementi, E., et al, *Journal of molecular structure*, Aug. 2, 1993, 296(3), Conference of the Liquids Section of the European Physical Society on Neutron Scattering from Liquids, 7th, Taormina, Sicily, Sep. 15-18, 1992. Proceedings. Edited by J. Teixeira et al, p.205-213, 23 refs.
Corongiu, G., Sciortino, F.
Ice physics, Water structure, Molecular structure, Phase transformations, Solid phases, Polarization (charge separation), Neutron scattering, Temperature effects, Computerized simulation.

47-4756
Thermal effects on the shape of a solidifying interface near a foreign particle.
Casses, P., et al, *Journal of crystal growth*, May 1993, 130(1-2), p.13-20, 10 refs.
Azouni, M.A.
Liquid solid interfaces, Solidification, Ice water interface, Freezing front, Particles, Surface structure, Thermal conductivity, Mathematical models, Thermal analysis.

47-4757
Microbubble mediated surface probe and the ice-antifreeze glycoprotein solution system.
Vesenka, J.P., et al, *Journal of crystal growth*, May 1993, 130(1-2), p.67-74, 29 refs.
Feeney, R.E., Yeh, Y.
Solutions, Antifreezes, Ice crystal growth, Ice water interface, Nucleation, Bubbles, Vapor diffusion, Light scattering, Probes.

47-4758
Identifying sources of snowmelt acidification with a watershed mixing model.
Schaefer, D.A., et al, *Water, air, and soil pollution*, Apr. 1993, 67(3-4), p.345-365, 65 refs.
Driscoll, C.T.
Watersheds, Snow hydrology, Surface waters, Water pollution, Chemical properties, Snowmelt, Snow impurities, Hydrogeochemistry, United States—New York—Adirondack Mountains.

47-4759
Use of chemistry and stable sulfur isotopes to determine sources of trends in sulfate of Colorado lakes.
Turk, J.T., et al, *Water, air, and soil pollution*, Apr. 1993, 67(3-4), p.415-431, 14 refs.
Campbell, D.H., Spahr, N.E.
Limnology, Alpine landscapes, Water chemistry, Water pollution, Origin, Isotope analysis, Snowmelt, Snow impurities, Chemical properties, United States—Colorado.

47-4760
Raman and infrared spectra of hexagonal ice between 0 and 400/cm—a molecular dynamics simulation.
Sciortino, F., et al, *Molecular physics*, June 20, 1993, 79(3), p.547-558, 19 refs.
Corongiu, G.
Ice physics, Water structure, Molecular structure, Molecular energy levels, Ice spectroscopy, Infrared spectroscopy, Spectra, Simulation.

47-4761
Exceptional rain-snow event of February 1990 in the Northern Alps. [L'episode pluvio-neigeux exceptionnel de fevrier 1990 dans les Alpes du Nord].
Blanchet, G., *La météorologie*, June 1993, 8(2), p.68-77, In French with English summary. 2 refs.
Precipitation (meteorology), Mountains, Snow accumulation, Meteorological data, Wind factors, Topographic effects, France—Alps.

47-4762
Ground-water-quality data collected during 1991, west Nikiski, Alaska.
Maurer, M.A., *Alaska. Department of Natural Resources. Division of Geological and Geophysical Surveys. Public-data file*, Apr. 1993, No.93-48, 64p., 18 refs.
Ground water, Water supply, Water chemistry, Hydrogeochemistry, Water pollution, Wells, Radioactivity, United States—Alaska—Kenai Peninsula.

47-4763
Hydrologic and water quality investigations related to placer mining in interior Alaska: summer 1992.
Ray, S.R., *Alaska. Department of Natural Resources. Division of Geological and Geophysical Surveys. Public-data file*, Mar. 1993, No.93-46, 83p., 10 refs.
Placer mining, Water reserves, Stream flow, Suspended sediments, Turbidity, United States—Alaska.

47-4764
Summary of water-use data in Alaska, 1991.
Petrik, W.A., et al, *Alaska. Department of Natural Resources. Division of Geological and Geophysical Surveys. Public-data file*, Dec. 1992, No.92-25, 5p. + appends., 7 refs.
Noll, R.S.
Water reserves, Water supply, Regional planning, United States—Alaska.

47-4765
Tensile, fracture and thermal properties of polyarylates at room and cryogenic temperatures.
Humer, K., et al, *Cryogenics*, July 1993, 93(7), p.686-691, 16 refs.
Tschegg, E.K., Weber, H.W.
Cryogenics, Plastics, Low temperature tests, Mechanical tests, Tensile properties, Mechanical properties, Cracking (fracturing), Temperature effects.

47-4766
Streamflow, sediment load, and water quality study of Hoseanna Creek basin near Healy, Alaska: 1991 progress report.
Ray, S.R., et al, *Alaska. Department of Natural Resources. Division of Geological and Geophysical Surveys. Public-data file*, Sep. 1992, No.92-19, 51p., 23 refs.
Vohden, J.
Water chemistry, Hydrogeochemistry, Water reserves, Stream flow, Suspended sediments, United States—Alaska—Healy.

47-4767
Miscellaneous water quality and stream flow data from the Gold Creek drainage basin, Juneau, Alaska.
Noll, R.S., *Alaska. Department of Natural Resources. Division of Geological and Geophysical Surveys. Public-data file*, Apr. 1992, No.92-11, 32p., 3 refs.
Water chemistry, Hydrogeochemistry, Water reserves, Stream flow, United States—Alaska—Juneau.

47-4768
Analysis of potable water-supply options for Gambell, Alaska.
Munter, J.A., et al, *Alaska. Department of Natural Resources. Division of Geological and Geophysical Surveys. Public-data file*, Dec. 1992, 92-10, 39p., 11 refs.
Williams, J.
Ground water, Water supply, Water chemistry, Hydrogeochemistry, United States—Alaska—Gambell.

47-4769
Evaluation of two springs at Anchor Point, Alaska, for water-supply potential.
Munter, J.A., et al, *Alaska. Department of Natural Resources. Division of Geological and Geophysical Surveys. Public-data file*, Apr. 1992, No.92-8, 27p., 9 refs.
Maurer, M.A.
Springs (water), Water supply, Water chemistry, Water pollution, Hydrogeochemistry, United States—Alaska—Anchor Point.

47-4770
Hydrologic and water quality investigations related to placer mining in interior Alaska; summer 1991.
Ray, S.R., *Alaska. Department of Natural Resources. Division of Geological and Geophysical Surveys. Public-data file*, Feb. 1992, No.92-4, 73p., 8 refs.
Placer mining, Water reserves, Stream flow, Suspended sediments, Turbidity, United States—Alaska.

47-4771
Preliminary results of heavy minerals concentrate analysis from selected interior and western Alaska placer mines.
Wood, J.E., *Alaska. Department of Natural Resources. Division of Geological and Geophysical Surveys. Public-data file*, Jan. 1992, No.92-2, 7p.
Exploration, Minerals, Geochemistry, Placer mining, United States—Alaska.

47-4772
Preliminary water-quality sampling for the Fairbanks International Airport Bioremediation Project: November 1990 through October 1991.
Ray, S.R., et al, *Alaska. Department of Natural Resources. Division of Geological and Geophysical Surveys. Public-data file*, Jan. 1992, No.92-1, 15p., 2 refs.
Vohden, J.
Water chemistry, Water treatment, Water supply, Water pollution, Hydrogeochemistry, Airports, Wells, United States—Alaska—Fairbanks.

47-4773
Short notes on Alaskan geology 1993.
Solie, D.N., ed, *Alaska. Department of Natural Resources. Division of Geological and Geophysical Surveys. Professional report*, 1993, No.113, 99p., Refs. passim. For selected papers see 47-4774 through 47-4778.
Tannian, F., ed.
Exploration, Geological surveys, Geochronology, Stratigraphy, Glacial deposits, United States—Alaska.

47-4774
Penultimate great earthquake in southcentral Alaska: evidence from a buried forest near Girdwood.
Combellick, R.A., *Alaska. Department of Natural Resources. Division of Geological and Geophysical Surveys. Professional report*, 1993, No.113, Short notes on Alaskan geology 1993. Edited by D.N. Solie and F. Tannian, p.7-15, 30 refs.
Earthquakes, Tectonics, Geochronology, Stratigraphy, Peat, Fossils, Paleobotany, United States—Alaska.

47-4775
Geology, alteration, and mineralization of the Vinasale Mountain gold deposit, west-central Alaska.
DiMarchi, J.J., *Alaska. Department of Natural Resources. Division of Geological and Geophysical Surveys. Professional report*, 1993, No.113, Short notes on Alaskan geology 1993. Edited by D.N. Solie and F. Tannian, p.17-29, 11 refs.
Exploration, Gold, Minerals, Geochemistry, Geological surveys, United States—Alaska.

47-4776
Fumarolic gas chemistry (1982) and thermal spring water chemistry, Crater Peak (1985), Mount Spurr, Alaska.
Motyka, R.J., et al, *Alaska. Department of Natural Resources. Division of Geological and Geophysical Surveys. Professional report*, 1993, No.113, Short notes on Alaskan geology 1993. Edited by D.N. Solie and F. Tannian, p.31-40, 25 refs.
Nye, C.J.
Geothermal prospecting, Geothermy, Volcanoes, Hot springs, Hydrogeochemistry, United States—Alaska.

47-4777
Organic-rich shale and bentonite in the Arctic Creek unit, Arctic National Wildlife Refuge: implications for stratigraphic and structural interpretations.
Mull, C.G., et al, *Alaska. Department of Natural Resources. Division of Geological and Geophysical Surveys. Professional report*, 1993, No.113, Short notes on Alaskan geology 1993. Edited by D.N. Solie and F. Tannian, p.41-49, 12 refs.
Decker, J.
Exploration, Hydrocarbons, Lithology, Stratigraphy, Geologic structures, United States—Alaska—Arctic National Wildlife Refuge.

47-4778
Dating Holocene moraines of Black Rapids Glacier, Delta River valley, central Alaska Range.
Reger, R.D., et al, *Alaska. Department of Natural Resources. Division of Geological and Geophysical Surveys. Professional report*, 1993, No.113, Short notes on Alaskan geology 1993. Edited by D.N. Solie and F. Tannian, p.51-59, 30 refs.
Sturmann, A.G., Begét, J.E.
Glacier oscillation, Glacier surges, Glacial deposits, Moraines, Quaternary deposits, Geochronology, Soil dating, United States—Alaska—Delta River.

47-4779
Snow clearing removal technique of Sapporo.
Hirata, M., Sapporo, Japan, Construction Bureau, Apr. 1991, 7p.
Road maintenance, Snow removal, Snowfall, Weather forecasting.

47-4780
Harmony between road management and environment in winter.
Northern Intercity Conference Committee. Winter Urban Environmental Research Subcommittee, Sapporo, Japan, Construction Bureau, Road Maintenance Department, Jan. 1992, 44p.
Road icing, Road maintenance, Snow removal, Urban planning, Cost analysis.

47-4781
Road heating in Sapporo. Sapporo, Japan, Construction Bureau, Road Maintenance Department, Feb. 1990, 18p.
Road icing, Road maintenance, Snow removal, Artificial melting, Snow melting, Heating.

47-4782
Published research papers. [Yuki to doro no kenkyu happyokai chosa kenkyu happyo shiryo],
Snow and Road Research Meeting, 5th, Jan. 29, 1993, Tokyo, Kensetsusho (Ministry of Construction), 1993, 54p., In Japanese. Refs. passim. For individual papers see 47-4783 through 47-4793.
Road maintenance, Snow removal, Road icing, Weather forecasting.

47-4783
Study on blowing snow and snowdrift countermeasures. [Fubuki fukidamari taisaku ni kansuru kenkyu],
Tsunaki, R., et al, Yuki to doro no kenkyu happyokai chosa kenkyu happyo shiryo (Snow and Road Research Meeting, 5th, Jan. 29, 1993. Published research papers), Tokyo, Kensetsusho (Ministry of Construction), 1993, p.1-4, In Japanese. 2 refs.
Ishidaira, S.
Blowing snow, Snowdrifts, Road maintenance, Weather forecasting.

47-4784
Study on regional activities and roads in winter. [Toki ni okeru chiiki katsudo to doro ni kansuru chosa],
Tohoku Regional Construction Bureau, Yuki to doro no kenkyu happyokai chosa kenkyu happyo shiryo (Snow and Road Research Meeting, 5th, Jan. 29, 1993. Published research papers), Tokyo, Kensetsusho (Ministry of Construction), 1993, p.5-8, In Japanese.
Snow removal, Road maintenance, Regional planning.

47-4785
Winter road traffic sensors. [Toki doro kotsu sensasu ni tsuite],
Nagata, N., et al, Yuki to doro no kenkyu happyokai chosa kenkyu happyo shiryo (Snow and Road Research Meeting, 5th, Jan. 29, 1993. Published research papers), Tokyo, Kensetsusho (Ministry of Construction), 1993, p.9-12, In Japanese.
Matsudaira, N.
Road icing, Road maintenance, Highway planning.

47-4786
Comfortable towns with enhanced safety in snow. [Yuki ni tsuyoku anzen de kaiteki na machi zukuri],
Sakamoto, Y., Yuki to doro no kenkyu happyokai chosa kenkyu happyo shiryo (Snow and Road Research Meeting, 5th, Jan. 29, 1993. Published research papers), Tokyo, Kensetsusho (Ministry of Construction), 1993, p.13-21, In Japanese.
Road maintenance, Snow removal, Urban planning, Safety.

47-4787
Tests on snow removal equipment. [Josetsu kikai ni kansuru josa shiken],
Sawaguchi, S., Yuki to doro no kenkyu happyokai chosa kenkyu happyo shiryo (Snow and Road Research Meeting, 5th, Jan. 29, 1993. Published research papers), Tokyo, Kensetsusho (Ministry of Construction), 1993, p.22-25, In Japanese.
Road maintenance, Snow removal.

47-4788
Development of simple-operation sidewalk snow removal equipment. [Kani sosakei hodo josetsu kikai no kaihatsu],
Fukuta, N., et al, Yuki to doro no kenkyu happyokai chosa kenkyu happyo shiryo (Snow and Road Research Meeting, 5th, Jan. 29, 1993. Published research papers), Tokyo, Kensetsusho (Ministry of Construction), 1993, p.26-29, In Japanese.
Kamimura, H., Maeda, T., Ikegami, N.
Snow removal, Road maintenance, Sidewalks.

47-4789
Development of shock absorbers for snow removal graders. [Josetsu gureda no shindo yokusei kiko no kaihatsu].
Kumamoto, Y., et al. Yuki to doro no kenkyu happyokai chosa kenkyu happyo shiryo (Snow and Road Research Meeting, 5th, Jan. 29, 1993. Published research papers). Tokyo, Kensetsusho (Ministry of Construction), 1993, p.30-33, In Japanese.
Ikeda, H., Sasaki, S., Suda, M.
Snow removal, Road maintenance, Motor vehicles.

47-4790
Study on winter road maintenance with a snow melting system. [Shoyusetsu shisutemu ni yoru toki romen kanri ni kansuru ikkosatsu].
Miyamoto, S., et al. Yuki to doro no kenkyu happyokai chosa kenkyu happyo shiryo (Snow and Road Research Meeting, 5th, Jan. 29, 1993. Published research papers). Tokyo, Kensetsusho (Ministry of Construction), 1993, p.34-37, In Japanese. 13 refs.
Konagai, N., Asano, M.
Snow removal, Road maintenance, Snow melting, Artificial melting.

47-4791
Study on methods for predicting road surface freezing. [Rumen toketsu yosoku shuho ni kansuru kenkyu].
Suzuki, T., et al. Yuki to doro no kenkyu happyokai chosa kenkyu happyo shiryo (Snow and Road Research Meeting, 5th, Jan. 29, 1993. Published research papers). Tokyo, Kensetsusho (Ministry of Construction), 1993, p.38-42, In Japanese.
Amano, W., Hirama, T.
Road icing, Road maintenance, Frost forecasting, Weather forecasting.

47-4792
Road heating control using snowfall forecast data. [Kosetsu yosoku joho ni yoru rodo hitingu seigyo ni tsuite].
Takahashi, T., et al. Yuki to doro no kenkyu happyokai chosa kenkyu happyo shiryo (Snow and Road Research Meeting, 5th, Jan. 29, 1993. Published research papers). Tokyo, Kensetsusho (Ministry of Construction), 1993, p.43-50, In Japanese.
Hasegawa, Y.
Road maintenance, Snowfall, Snow removal, Snow melting, Artificial melting, Weather forecasting.

47-4793
Development of a system for forecasting road surface freezing. [Doro no romen toketsu yosoku shisutemu no kaihatsu].
Ishizaka, T., Yuki to doro no kenkyu happyokai chosa kenkyu happyo shiryo (Snow and Road Research Meeting, 5th, Jan. 29, 1993. Published research papers). Tokyo, Kensetsusho (Ministry of Construction), 1993, p.51-54, In Japanese. 8 refs.
Road icing, Road maintenance, Frost forecasting, Weather forecasting.

47-4794
Research summaries. [Yuki to doro no kenkyu happyokai chosa kenkyu gaiyosho].
Snow and Road Research Meeting, 5th, Jan. 29, 1993, Tokyo, Kensetsusho (Ministry of Construction), 1993, 107p., In Japanese. Refs. passim. Each paper is a one page summary of research for 1991 and 1992.
Road icing, Road maintenance, Snow removal, Blowing snow, Avalanche engineering, Avalanche forecasting, Research projects, Japan.

47-4795
Current status and future trends for road snow and ice countermeasures in North America. Special lecture. [Hokkaido ni okeru doro seppyo taisaku no genjo to shorai no hoko. Tokubetsu koen].
Minsk, L.D., Jan. 29, 1993, 4p.
Road icing, Road maintenance, Snow removal, Regional planning, Highway planning.

47-4796
Data on Hokkaido roads and snow. [Hokkaido no doro to yuki ni kansuru shiryo].
Hokkaido Development Bureau, Jan. 29, 1993, 26p., In Japanese.
Road maintenance, Snow removal.

47-4797
New Kotoni snow removal channel. [Shin Kotoni ryusetsuko]. Sapporo, Japan, Construction Bureau, [1992]. n.p. (brochure), In Japanese.
Road maintenance, Snow removal, Drains.

47-4798
Current status of road snow melting in Jozankei, Sapporo City. [Sapporoshi Jozankei ni okeru doro yusetsu no kinkyo ni tsuite].
Sato, M., et al. *Chinetsu (Geothermy)*, Dec. 1986, 23(4), p.330-339, In Japanese. 5 refs.
Mikami, T.
Snow removal, Road maintenance, Snow melting, Artificial melting.

47-4799
Winter road maintenance by the Hokkaido Development Bureau.
Hokkaido Development Bureau, 1992, 39p.
Road icing, Road maintenance, Snow removal, Regional planning, Highway planning.

47-4800
Snow-Sapporo-21 Project. Sapporo, Japan, Construction Bureau, Road Maintenance Department, June 1991, 50p.
Road maintenance, Snow removal, Urban planning.

47-4801
Cryology of soils; collected scientific papers. [Kriologiia pochv; sbornik nauchnykh trudov].
Gilichinskiĭ, D.A., ed, Pushchino, Pushchinskiĭ nauchnyĭ tsentr AN SSSR, 1991, 131p., In Russian. Refs. passim. For individual papers see 47-4802 through 47-4821.
Soil classification, Frozen ground, Soil formation, Tundra, Plants (botany), Frozen ground chemistry, Cryogenic soils.

47-4802
Cryology of soils. [Kriologiia pochv].
Makeev, O.V., Kriologiia pochv; sbornik nauchnykh trudov (Cryology of soils; collected scientific papers). Edited by D.A. Gilichinskiĭ, Pushchino, Pushchinskiĭ nauchnyĭ tsentr AN SSSR, 1991, p.3-10, In Russian. 16 refs.
Frozen ground, Soil classification, History.

47-4803
Automorphic soil formation in the tundra zone of northern Yakutia. [Avtomorfnoe pochvoobrazovanie v tundrovoĭ zone severa Akutii].
Gubin, S.V., Kriologiia pochv; sbornik nauchnykh trudov (Cryology of soils; collected scientific papers). Edited by D.A. Gilichinskiĭ, Pushchino, Pushchinskiĭ nauchnyĭ tsentr AN SSSR, 1991, p.11-20, In Russian. 9 refs.
Soil formation, Tundra, Frozen ground physics, USSR—Yakutia.

47-4804
Early and recent cryogenic phenomena in subaerial deposits and soils in southern Central Siberia. [Drevnie i sovremennye kriogennye iavleniia v subaeral'nykh otlozheniiakh i pochvakh iuga Srednei Sibiri].
Vorob'eva, G.A., Kriologiia pochv; sbornik nauchnykh trudov (Cryology of soils; collected scientific papers). Edited by D.A. Gilichinskiĭ, Pushchino, Pushchinskiĭ nauchnyĭ tsentr AN SSSR, 1991, p.20-26, In Russian. 12 refs.
Frozen ground, Solifluction, Pleistocene, USSR—Siberia.

47-4805
Paleosoils of the southern Yenisey region of Siberia: chronology, paleogeography, and cryogenesis. [Paleopochvy iuga Prieniseĭskoĭ Sibiri: khronologiia, paleogeografiia, kriogenez].
Amskikh, A.F., Kriologiia pochv; sbornik nauchnykh trudov (Cryology of soils; collected scientific papers). Edited by D.A. Gilichinskiĭ, Pushchino, Pushchinskiĭ nauchnyĭ tsentr AN SSSR, 1991, p.27-34, In Russian. 2 refs.
Geochronology, Geocryology, Soil formation, Paleoclimatology, USSR—Yenisey River, USSR—Siberia.

47-4806
Cryogenesis in the system of factors causing variegation in the soil-plant cover in the floodplains of Mongolia (in the example of the Orhon River floodplain of the lower course). [Kriogenez v sisteme faktorov, obuslovlivaiushchikh pestrotu pochvenno-rastitel'nogo pokrova v poĭmakh Mongolii (na primere poĭmy r. Orkhon v nizhnem techenii)].
Maksimovich, S.V., et al, Kriologiia pochv; sbornik nauchnykh trudov (Cryology of soils; collected scientific papers). Edited by D.A. Gilichinskiĭ, Pushchino, Pushchinskiĭ nauchnyĭ tsentr AN SSSR, 1991, p.34-37, In Russian. 5 refs.
Baatar, R.
Plant ecology, Plants (botany), Meadow soils, Frozen ground, Floodplains, Mongolia—Orhon River.

47-4807
Characteristics of the microstructure of deposits from the ice complexes in northern Yakutia (in the example of the Bykovskiy Peninsula). [Osobennosti mikrostroeniia otlozheniĭ ledovykh kompleksov severnoĭ Akutii (na primere Bykovskogo poluostrova)].
Slagoda, E.A., Kriologiia pochv; sbornik nauchnykh trudov (Cryology of soils; collected scientific papers). Edited by D.A. Gilichinskiĭ, Pushchino, Pushchinskiĭ nauchnyĭ tsentr AN SSSR, 1991, p.38-47, In Russian. 2 refs.
Ice microstructure, Glacial deposits, USSR—Yakutia, USSR—Bykovskiy Peninsula.

47-4808
Dynamics of seasonal heat, moisture, and salt transfer in frozen ground. [Dinamika sezonnogo teplo-, vlago-, soleperenosa v merzlotnom pochvogrunte].
Permiakov, P.P., et al, Kriologiia pochv; sbornik nauchnykh trudov (Cryology of soils; collected scientific papers). Edited by D.A. Gilichinskiĭ, Pushchino, Pushchinskiĭ nauchnyĭ tsentr AN SSSR, 1991, p.47-51, In Russian. 7 refs.
Romanov, P.G., Munkhalova, L.A.
Heat transfer, Moisture transfer, Saline soils, Salinity, Active layer, Frozen ground mechanics, Frozen ground thermodynamics, Mathematical models.

47-4809
On the characteristics of mass transfer during the freezing of peat. [K voprosu o kharakteristikakh massoperenosa pri promerzanii torfa].
Brovka, G.P., et al, Kriologiia pochv; sbornik nauchnykh trudov (Cryology of soils; collected scientific papers). Edited by D.A. Gilichinskiĭ, Pushchino, Pushchinskiĭ nauchnyĭ tsentr AN SSSR, 1991, p.51-56, In Russian. 5 refs.
Dediulia, I.V., Lishtvan, I.I., Churaev, N.V.
Mass transfer, Peat, Freezing.

47-4810
Effect of freeze-thaw processes on calcium ion mobility in the example of brown forest soil. [Vliianie protsessov promerzaniia-ottaivaniia na podvizhnost' ionov kal'tsiia na primere buroĭ lesnoĭ pochvy].
Gurikov, IU.V., et al, Kriologiia pochv; sbornik nauchnykh trudov (Cryology of soils; collected scientific papers). Edited by D.A. Gilichinskiĭ, Pushchino, Pushchinskiĭ nauchnyĭ tsentr AN SSSR, 1991, p.57-60, In Russian. 10 refs.
Savel'eva, E.M., Skobeleva, O.V.
Freeze thaw cycles, Forest soils, Ions, USSR—Sakhalin Island.

47-4811
Geochemical processes at the soil-snow boundary. [Geokhimicheskie protsessy na granitse pochva-sneg].
Fedoseeva, V.I., et al, Kriologiia pochv; sbornik nauchnykh trudov (Cryology of soils; collected scientific papers). Edited by D.A. Gilichinskiĭ, Pushchino, Pushchinskiĭ nauchnyĭ tsentr AN SSSR, 1991, p.60-67, In Russian. 4 refs.
Fedoseev, N.F., Makarov, V.N.
Geochemical cycles, Geochemistry, Snow cover, Soil mechanics, Vapor transfer.

47-4812
Redistribution of moisture and cryogenic structural formation in freezing sapropel. [Pererasprede-lenie vlagi i kriogennoe strukturoobrazovanie v promerzaiushchem sapropele].
Brovka, G.P., et al, Kriologiia pochv; sbornik nauchnykh trudov (Cryology of soils; collected scientific papers). Edited by D.A. Gilichinskiĭ, Pushchino, Pushchinskiĭ nauchnyĭ tsentr AN SSSR, 1991, p.67-74, In Russian. 3 refs.
Murashko, A.A.
Mass transfer, Heat transfer, Moisture transfer, Freezing, Sapropel.

47-4813
Salinization mechanism of the deposits of an ice complex in Yakutia. [Mekhanizm zasoleniia otlozheniĭ ledovogo kompleksa Akutii].
Konishchev, V.N., et al, Kriologiia pochv; sbornik nauchnykh trudov (Cryology of soils; collected scientific papers). Edited by D.A. Gilichinskiĭ, Pushchino, Pushchinskiĭ nauchnyĭ tsentr AN SSSR, 1991, p.74-80, In Russian. 9 refs.
Plakht, I.R.
Glacial deposits, Salinity, Alluvium, USSR—Yakutia.

47-4814
Gas-bio-geochemical characteristics of the seasonally thawing layer in the Anadyr' and Khatyrka lowlands. [Gazobiogeokhimicheskie osobennosti sezonnotalogo sloia v Anadyrskoĭ i Khatyrskoĭ nizmennostiakh].
Glotov, V.E., Kriologiia pochv; sbornik nauchnykh trudov (Cryology of soils; collected scientific papers). Edited by D.A. Gilichinskiĭ, Pushchino, Pushchinskiĭ nauchnyĭ tsentr AN SSSR, 1991, p.80-86, In Russian. 7 refs.
Active layer, Geochemistry, Soil chemistry, Soil composition, Frozen ground chemistry, Gases, USSR—Anadyr' River, USSR—Khatyrka River.

47-4815
Microflora of soils in the Arctic and its activity. [Mikroflora pochv Arktiki i ee aktivnost'].
Parinkina, O.M., Kriologiia pochv; sbornik nauchnykh trudov (Cryology of soils; collected scientific papers). Edited by D.A. Gilichinskiĭ, Pushchino, Pushchinskiĭ nauchnyĭ tsentr AN SSSR, 1991, p.87-91, In Russian. 8 refs.
Plants (botany), Cryogenic soils, Soil microbiology, Tundra, Ecosystems.

47-4816
Nitrifying bacteria from frozen deposits in the Kolyma lowlands. [Nitrifitsiruiushchie bakterii iz merzlykh otlozheniĭ Kolymskoĭ nizmennosti].
Soina, V.S., et al, Kriologiia pochv; sbornik nauchnykh trudov (Cryology of soils; collected scientific papers). Edited by D.A. Gilichinskiĭ, Pushchino, Pushchinskiĭ nauchnyĭ tsentr AN SSSR, 1991, p.92-97, In Russian. 7 refs.
Lebedeva, E.V., Golyshina, O.V., Fedorov-Davydov, D.G.
Bacteria, Microbiology, Permafrost, Tundra, USSR—Kolyma River.

47-4817
Effect of the complexity of soil cover on the agricultural development of meadow-swamp soils. [Vliianie kompleksnosti pochvennogo pokrova na sel'skokhoziaĭstvennoe osvoenie lugovo-bolotnykh pochv].
Butsenko, A.N., Kriologiia pochv; sbornik nauchnykh trudov (Cryology of soils; collected scientific papers). Edited by D.A. Gilichinskiĭ, Pushchino, Pushchinskiĭ nauchnyĭ tsentr AN SSSR, 1991, p.97-103, In Russian.
Swamps, Meadow soils, Agriculture, Soil composition, Cryogenic soils, Soil chemistry, Frozen ground chemistry.

47-4818
Soil degradation in the vicinity of industrial centers in the North. [Degradatsiia pochv v okrestnostiakh promyshlennykh uzlov Severa].
Kriuchkov, V.V., Kriologiia pochv; sbornik nauchnykh trudov (Cryology of soils; collected scientific papers). Edited by D.A. Gilichinskiĭ, Pushchino, Pushchinskiĭ nauchnyĭ tsentr AN SSSR, 1991, p.103-108, In Russian.
Environmental impact, Soil pollution, Taiga, Ecosystems, Tundra, Snow impurities, USSR.

47-4819
Regularities in the vertical-zonal distribution of seasonally frozen taiga soils in the Lake Baykal basin. [Zakonomernosti vertikal'no-poiasnogo raspredeleniia taezhnykh sezonno-merzlykh pochv basseĭna ozera Baĭkal].
Tsybzhitov, Ts.Kh., et al, Kriologiia pochv; sbornik nauchnykh trudov (Cryology of soils; collected scientific papers). Edited by D.A. Gilichinskiĭ, Pushchino, Pushchinskiĭ nauchnyĭ tsentr AN SSSR, 1991, p.109-115, In Russian. 5 refs.
Tsybikdorzhiev, Ts.Ts.
Taiga, Frozen ground, Seasonal freeze thaw, USSR—Baykal, Lake.

47-4820
Optimizing the mineral feeding of plants—a method of increasing bioproductivity and protecting frozen soils in the BAM zone. [Optimizatsiia mineral'nogo pitaniia rasteniĭ—put' povysheniia bioproduktivnosti i okhrany merzlotnykh pochv zony BAMa].
Gershevich, E.G., et al, Kriologiia pochv; sbornik nauchnykh trudov (Cryology of soils; collected scientific papers). Edited by D.A. Gilichinskiĭ, Pushchino, Pushchinskiĭ nauchnyĭ tsentr AN SSSR, 1991, p.115-120, In Russian. 4 refs.
Kozhevnikov, A.I.
Plants (botany), Agriculture, Frozen ground, Environmental protection, USSR—Transbaikal.

47-4821
Results of the Fifth All-Union Conference on the Theoretical Principles of Soil Cryogenesis. [Reshenie V Vsesoiuznoĭ konferentsii—Teoreticheskie osnovy pochvennogo kriogeneza], Kriologiia pochv; sbornik nauchnykh trudov (Cryology of soils; collected scientific papers). Edited by D.A. Gilichinskiĭ, Pushchino, Pushchinskiĭ nauchnyĭ tsentr AN SSSR, 1991, p.121-128, In Russian.
Meetings, Frozen ground, Soil formation, Cryogenic soils.

47-4822
Circumantarctic benthic foraminifers.
Ishman, S.E., *Florida State University. Sedimentology Research Laboratory. Contribution*, Mar. 1993, No.57, Workshop on antarctic glacial marine and biogenic sedimentation: notes fo: a shortcourse. Part 2. Biogenic sedimentation. Edited by J.R. Bryan, p.105-133, Refs. p.131-133.
Glacial deposits, Marine deposits, Paleoecology, Sedimentation, Core samplers, Biogeography, Cryobiology.
A key component to paleoenvironmental studies of antarctic marine deposits is the use of benthic foraminifer species and assemblage data. Although not as useful biostratigraphically as planktic foraminifers, southern ocean benthic foraminifers can also provide valuable biostratigraphic information, particularly in the Cretaceous and Paleogene. This chapter emphasizes circumantarctic smaller (63 to 200 micron) benthic foraminifers and their use as paleoenvironmental indicators. It covers general and specific biogeographic distributions, factors controlling the distribution and preservation of modern and fossil benthic foraminifers, and processing techniques for glaciomarine sediments.

47-4823
Geologic use of polar marine diatoms.
Leventer, A., et al, *Florida State University. Sedimentology Research Laboratory. Contribution*, Mar. 1993, No.57, Workshop on antarctic glacial marine and biogenic sedimentation: notes for a shortcourse. Part 2. Biogenic sedimentation. Edited by J.R. Bryan, p.134-253, Refs. p.168-178.
Harwood, D.M.
Sea ice, Algae, Paleoclimatology, Paleoecology, Paleobotany, Sedimentation, Cryobiology.
Most of the information on polar marine diatoms presented here has been summarized from the many references listed in the final section of this chapter. A few laboratory techniques for cleaning and mounting diatom samples are described. These include a technique for working with diatoms in water samples, a technique to clean sediment samples, a general technique for making permanent slides, and one for making quantitative diatom slides from sediment samples. The bulk of the chapter discusses taxonomy and identification of polar marine diatoms, their use in paleoclimatic reconstruction, their distribution, taphonomy and biostratigraphic use. Four appendices, including classification with illustrative line drawings and taxonomic keys for various diatom genera, conclude this chapter.

47-4824
Antarctic glacial-marine sedimentation.
Anderson, J.B., *Florida State University. Sedimentology Research Laboratory. Contribution*, Mar. 1993, No.57, Workshop on antarctic glacial marine and biogenic sedimentation: notes for a shortcourse. Part 1. Glacial-marine sedimentation. Edited by J.R. Bryan, p.1-88, Refs. p.83-88.
Glacial deposits, Marine deposits, Sedimentation, Sea ice, Glacier ice, Ice shelves, Oceanography.
The United States' research effort to sample the antarctic sea floor, centered around expeditions of the USNS *Eltanin*, R/V *Vema*, R/V *Conrad*, the USCGC *Glacier*, and the R/V *Polar Duke*, has successfully acquired thousands of piston cores and bottom grab samples and thousands of kilometers of bottom-profiler and seismic-reflection data. The cores reside at the Antarctic Marine Geology Research Facility at Florida State University. The first chapter of the core workshop reported here used the collection of geological samples at the Research Facility to examine sedimentation on the antarctic sea floor, focusing on the subglacial environment.

47-4825
Stratigraphy and paleoclimatic analysis of deep water antarctic glacial marine sediments.
Domack, E.W., *Florida State University. Sedimentology Research Laboratory. Contribution*, Mar. 1993, No.57, Workshop on antarctic glacial marine and biogenic sedimentation: notes for a shortcourse. Part 1. Glacial-marine sedimentation. Edited by J.R. Bryan, p.89-104, 14 refs.
Paleoclimatology, Glacial deposits, Marine deposits, Stratigraphy.
Because of iceberg scouring and storm current activity, most of the depositional record of fine-grained sediment in antarctic waters is found within deep shelf basins or fjords on the continental shelf. These basins are generally between 500 and 1500 m deep and contain a detailed depositional history of the past 10,000 years or more. Results of a stratigraphic and geophysical study of such basins along the western Antarctic Peninsula, begun in 1990, are presented in this chapter. The major tools used to investigate the stratigraphic and paleoclimatic record included visual descriptions of freshly cut (<12 hours) cores, magnetic susceptibility, total organic carbon, biogenic silica, core x-ray radiography, AMS radiocarbon dating, and very high resolution seismic (HUNTEC) reflection profiling.

47-4826
Descriptions of sediments recovered by the USCGC *Glacier*, USARP Operation Deep Freeze 1987: western Ross Sea.
Bryan, J.R., ed, *Florida State University. Sedimentology Research Laboratory. Contribution*, Mar. 1993, No.56, 75p., Refs. p.68-73.
Bottom sediment, Lithology, Marine deposits, Drill core analysis, Antarctica—Ross Sea.
This volume contains descriptions of cored sediments obtained during the 1986-1987 austral summer cruise of the U.S. Coast Guard icebreaker *Glacier*, which surveyed the western Ross Sea. This is the eighth and final volume to be published of sediment descriptions of material collected by the *Glacier* in antarctic waters since 1968. These are designed to serve the general geologic community by providing descriptive information of shallow sediments surrounding the continent of Antarctica, and to assist geoscientists wishing to pursue more detailed studies by serving as a guide for sediment sampling. Included are: a summary of the scientific objectives of the 1986-1987 cruise of the *Glacier*, a discussion of core and grab sample recovery and processing, a table and maps of station locations, an explanation of laboratory descriptive procedures, and lithologic descriptions of piston and trigger cores.

47-4827
Satellite remote sensing of forest type and landcover in the subalpine forest region, Kananaskis Valley, Alberta.
Franklin, S.E., *Geocarto international*, Dec. 1992, 7(4), p.25-35, 35 refs.
LANDSAT, Spaceborne photography, Photogrammetry, Radiometry, Forest land, Terrain identification, Vegetation patterns, Ecology, Classifications, Accuracy, Canada—Alberta—Kananaskis Valley.

47-4828
Theoretical and experimental studies of snow covers' microwave emissivity.
Boyarskiĭ, D.A., et al, *Journal of electromagnetic waves and applications*, July 1993, 7(7), p.959-970, 19 refs.
Snow cover structure, Snow cover effect, Stratification, Remote sensing, Radiometry, Brightness, Seasonal variations, Snow optics, Microwaves, Mathematical models.

47-4829
Optical characteristics of heat-affected bitumens from the Nanisivik mine, N.W. Baffin Island, arctic Canada.
Goodarzi, F., et al, *Energy sources*, Apr.-June 1993, 15(2), p.359-376, 39 refs.
Gentzis, T., Jackson, G., MacQueen, R.W.
Bitumens, Mineralogy, Geologic structures, Geologic processes, Classifications, Optical properties, Physical properties, Mining, Canada—Northwest Territories—Baffin Island.

47-4830
Steel selection for arctic ships: effects of elevated loading rate on toughness.
Tyson, W.R., et al, *Canadian metallurgical quarterly*, July-Sep. 1993, 32(3), p.261-265, 15 refs.
Ships, Steels, Plates, Mechanical properties, Ice solid interface, Impact strength, Strain tests, Temperature effects, Structural analysis, Design criteria, Standards.

47-4831
Lake effect of the Great Salt Lake: overview and forecast problems.
Carpenter, D.M., *Weather and forecasting*, June 1993, 8(2), p.181-193, 17 refs.
Snowstorms, Lake effects, Snow air interface, Weather forecasting, Accuracy, Turbulent boundary layer, Meteorological factors, United States--Utah—Great Salt Lake.

47-4832
Measurements of the heat and mass transfer parameters characterizing conical graupel growth.
Cober, S.G., et al, *Journal of the atmospheric sciences*, June 1, 1993, 50(11), p.1591-1609, 38 refs.
List, R.
Cloud physics, Snow pellets, Surface temperature, Snow crystal growth, Hailstone growth, Mass transfer, Heat transfer, Simulation, Wind tunnels, Ice air interface.

47-4833
Changes in cadmium concentrations in antarctic ice and snow during the past 155,000 years.
Boutron, C.F., et al, *Earth and planetary science letters*, June 1993, 117(3/4), p.431-441, 35 refs.
Ice composition, Ice cores, Snow composition, Paleoclimatology, Atmospheric composition, Impurities, Antarctica—Dome C, Antarctica—Vostok Station.

Changes in Cd concentrations in antarctic ice and snow during the last full climatic cycle (the past 155,000 yrs) have been investigated by analyzing various sections of the Dome C and Vostok deep ice cores and several blocks of recent snow. Each sample was mechanically decontaminated using ultraclean procedures and then analyzed for Cd by the new ultrasensitive laser-excited atomic fluorescence technique. Cd concentrations are found to have been highly variable in ancient antarctic ice, and therefore in the past pristine south polar atmosphere during the last climatic cycle, the highest values being observed during the cold terminal stages of the last and next to last ice ages. Concentrations measured in recent antarctic snows are comparable with those in antarctic Holocene ice several thousand years old, which suggests that the anthropogenic influence is probably still negligible for this heavy metal in the south polar atmosphere. For some of the samples, measured Cd concentrations can be simply accounted for by rock and soil dust and volcanic emissions, while for others there is a significant excess over the contributions from these two sources. (Auth.)

47-4834
Learning behavior of sea ice.
Denner, W.W., Conference on Natural Physical Sources of Underwater Sound, 2nd, Cambridge, England, July 3-6, 1990. Sea surface sound (2). Edited by B.R. Kerman, Dordrecht, Kluwer Academic Publishers, 1993, p.527-536, 17 refs.
DLC QC242.W38
Sea ice, Pack ice, Underwater acoustics, Acoustic measurement, Ice breaking, Mechanical properties, Sound transmission, Ice water interface, Ice models.

47-4835
Source mechanisms for arctic ocean ambient noise.
Dyer, I., Conference on Natural Physical Sources of Underwater Sound, 2nd, Cambridge, England, July 3-6, 1990. Sea surface sound (2). Edited by B.R. Kerman, Dordrecht, Kluwer Academic Publishers, 1993, p.537-551, 24 refs.
DLC QC242.W38
Underwater acoustics, Sea ice, Ice edge, Ice acoustics, Acoustic measurement, Ice breaking, Cracking (fracturing), Ice water interface, Ice mechanics, Analysis (mathematics).

47-4836
Vertical directivity measurements of ice cracking.
Greening, M.V., et al, Conference on Natural Physical Sources of Underwater Sound, 2nd, Cambridge, England, July 3-6, 1990. Sea surface sound (2). Edited by B.R. Kerman, Dordrecht, Kluwer Academic Publishers, 1993, p.553-562, 10 refs.
Zakarauskas, P., Verrall, R.I.
DLC QC242.W38
Sea ice, Underwater acoustics, Acoustic measurement, Ice breaking, Sound transmission, Cracking (fracturing), Wave propagation, Orientation.

47-4837
Spatial variation in ambient sound level within ice edge eddies.
Johannessen, O.M., et al, Conference on Natural Physical Sources of Underwater Sound, 2nd, Cambridge, England, July 3-6, 1990. Sea surface sound (2). Edited by B.R. Kerman, Dordrecht, Kluwer Academic Publishers, 1993, p.563-571, 11 refs.
DLC QC242.W38
Underwater acoustics, Acoustic measurement, Sound transmission, Sea ice, Ice edge, Ice water interface, Ice cover effect, Ocean currents.

47-4838
Aspects of the mechanics and modeling of thermally-induced stresses in arctic pack ice as related to under-ice ambient noise.
Lewis, J.K., et al, Conference on Natural Physical Sources of Underwater Sound, 2nd, Cambridge, England, July 3-6, 1990. Sea surface sound (2). Edited by B.R. Kerman, Dordrecht, Kluwer Academic Publishers, 1993, p.573-590, 17 refs.
Stein, P.J., Denner, W.W.
DLC QC242.W38
Sea ice, Underwater acoustics, Ice acoustics, Thermal stresses, Ice deformation, Ice heat flux, Ice mechanics, Cracking (fracturing), Mathematical models, Rheology.

47-4839
Sea ice constitutive behavior and under-ice noise.
Pritchard, R.S., Conference on Natural Physical Sources of Underwater Sound, 2nd, Cambridge, England, July 3-6, 1990. Sea surface sound (2). Edited by B.R. Kerman, Dordrecht, Kluwer Academic Publishers, 1993, p.591-610, 31 refs.
DLC QC242.W38
Sea ice, Ice mechanics, Ice models, Ice acoustics, Ice conditions, Ice cover thickness, Elastic properties, Underwater acoustics, Sound transmission, Mathematical models.

47-4840
Wave induced noise generation in the marginal ice zone.
Rottier, P., Conference on Natural Physical Sources of Underwater Sound, 2nd, Cambridge, England, July 3-6, 1990. Sea surface sound (2). Edited by B.R. Kerman, Dordrecht, Kluwer Academic Publishers, 1993, p.611-624, 14 refs.
DLC QC242.W38
Sea ice distribution, Ice edge, Ice acoustics, Ice models, Underwater acoustics, Ice water interface, Ice cover effect, Sound waves, Water waves.

47-4841
Predictions and measurements of the directivity of a monopole source in a floating ice plate.
Stein, P.J., Conference on Natural Physical Sources of Underwater Sound, 2nd, Cambridge, England, July 3-6, 1990. Sea surface sound (2). Edited by B.R. Kerman, Dordrecht, Kluwer Academic Publishers, 1993, p.625-639, 7 refs.
DLC QC242.W38
Sea ice, Floating ice, Ice acoustics, Acoustic measurement, Ice water interface, Underwater acoustics, Sound transmission, Thermal stresses, Ice breaking, Cracking (fracturing).

47-4842
Acoustic radiation beneath the arctic ice cover.
Xie, Y.B., et al, Conference on Natural Physical Sources of Underwater Sound, 2nd, Cambridge, England, July 3-6, 1990. Sea surface sound (2). Edited by B.R. Kerman, Dordrecht, Kluwer Academic Publishers, 1993, p.641-647, 7 refs.
Farmer, D.M.
DLC QC242.W38
Sea ice, Ice acoustics, Underwater acoustics, Ice water interface, Ice breaking, Cracking (fracturing), Sound transmission, Wave propagation.

47-4843
High latitude ocean convection.
Rudels, B., NATO Advanced Study Institute on Dynamic Modeling and Flow in the Earth and Planets, Fairbanks, AK, June 17-28, 1991. Flow and creep in the solar system: observations, modeling and theory. Edited by D.B. Stone et al, NATO Advanced Science Institute, Series E. Applied Sciences. Vol.391, Dordrecht, Kluwer Academic Publishers, 1993, p.323-356, 57 refs.
DLC QB500.5.F56
Oceanography, Ocean currents, Stratification, Water temperature, Heat loss, Convection, Sea water freezing, Air ice water interaction, Ice cover effect, Climatic factors, Antarctica—Weddell Sea.
The main part of the world ocean deep waters is formed by heat loss at high latitudes. In contrast to the thermal winter convection occurring over most of the oceans, the thermohaline forcing in the polar areas is dominated by freezing and melting. The density changes are due to variations in salinity rather than in temperature. The characteristics of the created waters depend upon topographic conditions, the nature of the ice cover and the ambient water masses. In this paper, four areas of deep and bottom water formation are identified: the shelves of the Arctic Ocean; the shelf areas around the antarctic continent; the Weddell Sea; and the Greenland Sea. These areas represent two types: boundary and open ocean convection. The different areas are presented in order of increasing complexity of the possible active processes. (Auth. mod.)

47-4844
Dynamics of subcritical double-diffusive convection in the southern ocean: an application to polynyas.
Schmalzl, J., et al, NATO Advanced Study Institute on Dynamic Modeling and Flow in the Earth and Planets, Fairbanks, AK, June 17-28, 1991. Flow and creep in the solar system: observations, modeling and theory. Edited by D.B. Stone et al, NATO Advanced Science Institute, Series E. Applied Sciences. Vol.391, Dordrecht, Kluwer Academic Publishers, 1993, p.371-383, 23 refs.
Hansen, U.
DLC QB500.5.F56
Oceanography, Ocean currents, Stratification, Heat loss, Polynyas, Air ice water interaction, Ice cover effect, Convection, Thermal diffusion, Analysis (mathematics), Antarctica—Weddell Sea.
This paper investigates the nature of subcritical double diffusive convection in the southern ocean with a time dependent two-dimensional finite-element method based on stream-function, compositional and temperature fields. The initial and boundary conditions are chosen with special respect to open-water polynyas, which play an important role in the heat budget and in the gas exchange of the antarctic ocean with the polar atmosphere. Results indicate that the initially layered period is important for the transport of heat and salt from the lower to the upper cold and fresh layer. Even under conditions which are stable in the static sense, overturning convection with a high heat transport rate was observed. (Auth. mod.)

47-4845
Strategies for modelling climate changes.
Lliboutry, L.A., NATO Advanced Study Institute on Dynamic Modeling and Flow in the Earth and Planets, Fairbanks, AK, June 17-28, 1991. Flow and creep in the solar system: observations, modeling and theory. Edited by D.B. Stone et al, NATO Advanced Science Institute, Series E. Applied Sciences. Vol.391, Dordrecht, Kluwer Academic Publishers, 1993, p.385-398, 48 refs.
DLC QB500.5.F56
Pleistocene, Paleoclimatology, Climatic changes, Simulation, Ice sheets, Glacier oscillation, Ice models, Mathematical models.

47-4846
Ice sheet dynamics.
Lliboutry, L.A., NATO Advanced Study Institute on Dynamic Modeling and Flow in the Earth and Planets, Fairbanks, AK, June 17-28, 1991. Flow and creep in the solar system: observations, modeling and theory. Edited by D.B. Stone et al, NATO Advanced Science Institute, Series E. Applied Sciences. Vol.391, Dordrecht, Kluwer Academic Publishers, 1993, p.399-416, 32 refs.
DLC QB500.5.F56
Glaciology, Ice sheets, Ice models, Glacier oscillation, Glacier thickness, Basal sliding, Ice temperature, Rheology, Ice solid interface, Mathematical models.
Polar ice sheets are often very anisotropic, and there is a lack of quantitative models for predicting their fabrics and behavior. In this paper the full rheological law of anisotropic ice with rotational symmetry, to be used in 3-D modelling, is given. Considered successively are the kinematics, the driving forces, and the temperature distribution, with the case of a base at the melting point of ice sheets. Lastly, the exact rheology of polar ice, which depends on a slowly evolving fabric, is examined. (Auth. mod.)

47-4847
Glacier flow modeling.
Kamb, B., NATO Advanced Study Institute on Dynamic Modeling and Flow in the Earth and Planets, Fairbanks, AK, June 17-28, 1991. Flow and creep in the solar system: observations, modeling and theory. Edited by D.B. Stone et al, NATO Advanced Science Institute, Series E. Applied Sciences. Vol.391, Dordrecht, Kluwer Academic Publishers, 1993, p.417-506, Refs. p.497-506.
DLC QB500.5.F56
Glaciology, Glacier flow, Ice mechanics, Mathematical models, Ice solid interface.
This article reviews salient principles and physical foundations of glacier flow modeling with some comparison of modeling results and observations. The treatment employed is essentially mathematical, and particular reference is made to both arctic and antarctic glacial contexts.

47-4848
Notch sensitivity of first-year sea ice.
Parsons, B.L., et al, *Journal of engineering mechanics*, July 1993, 119(7), p.1303-1313, 18 refs.
Williams, F.M., Everard, J., Slade, T.
Sea ice, Ice mechanics, Mechanical tests, Accuracy, Stress concentration, Ice strength, Ice cracks, Cracking (fracturing), Ice microstructure, Anisotropy.

47-4849
Influence of polysaccharides on the glass transition in frozen sucrose solutions and ice cream.
Goff, H.D., et al, *Journal of dairy science*, May 1993, 76(5), p.1268-1277, 27 refs
Caldwell, K.B., Stanley, D.W., Maurice, T.J.
Solutions, Cryogenics, Colloids, Cold storage, Stability, Ice crystal growth, Phase transformations, Ice crystal size, Ice microstructure.

47-4850
Influence of snow upon rates of granodiorite weathering, Colorado Front Range, USA.
Benedict, J.B., *Boreas*, June 1993, 22(2), p.87-92, 34 refs.
Bedrock, Landforms, Weathering, Snow cover effect, Age determination, Lichens, Alpine landscapes, Geological surveys, United States—Colorado—Front Range.

47-4851
Moraine-ridge formation along a stationary ice front in Iceland.
Krüger, J., *Boreas*, June 1993, 22(2), p.101-109, 30 refs.
Moraines, Glacier tongues, Ice edge, Glacier oscillation, Ice solid interface, Landscape development, Stratigraphy, Periglacial processes, Geomorphology, Iceland—Myrdalsjökull.

47-4852
Water-eroded crescentic scours and furrows associated with subglacial flutes at Breidamerkurjökull, Iceland.
Dreimanis, A., *Boreas*, June 1993, 22(2), p.110-112, 5 refs.
Bedrock, Surface structure, Glacial hydrology, Sediment transport, Meltwater, Water erosion, Subglacial drainage, Periglacial processes, Iceland—Breidamerkurjökull.

47-4853
Pre-Holocene marine limit on Hopen, Svalbard.
Zale, R., et al, *Boreas*, June 1993, 22(2), p.159-164, 40 refs.
Brydsten, L.
Pleistocene, Marine deposits, Radioactive age determination, Glaciation, Shoreline modification, Arctic landscapes, Sea level, Norway—Svalbard.

47-4854
Ship of opportunity section to the North Pole: upper ocean temperature observations.
Quadfasel, D., et al, *Deep-sea research*, Apr. 1993, 40(4), p.777-789, 25 refs.
Sy, A., Rudels, B.
Oceanographic surveys, Ocean currents, Stratification, Sampling, Water temperature, Temperature measurement, Temperature distribution, Hydrography, Ice cover effect, North Pole.

47-4855
Diffusion of atomic hydrogen in ice-Ih.
Bartels, D.M., et al, *Chemical physics letters*, July 23, 1993, 210(1-2-3), p.129-134, 17 refs.
Ping, H., Percival, P.W.
Ice physics, Ice structure, Molecular structure, Molecular energy levels, Ice relaxation, Hydrogen, Self diffusion, Electron paramagnetic resonance.

47-4856
Proton transfer in ice.
Lee, C., et al, *Chemical physics letters*, July 23, 1993, 210(1-2-3), p.279-284, 17 refs.
Vanderbilt, D.
Ice physics, Molecular structure, Defects, Ion diffusion, Molecular energy levels, Proton transport, Hydrogen bonds, Ice relaxation, Computerized simulation.

47-4857
Simulation of ice-shedding on electrical transmission lines using ADINA.
Jamaleddine, A., et al, *Computers & structures*, June 3, 1993, 47(4-5), ADINA Conference, 9th, Cambridge, MA, June 23-25, 1993. Proceedings. Nonlinear finite element analysis and ADINA. Edited by K.J. Bathe, p.523-536, 19 refs.
McClure, G., Rousselet, J., Beauchemin, R.
Power line icing, Transmission lines, Static stability, Oscillations, Ice removal, Ice cover effect, Dynamic loads, Mechanical tests, Computerized simulation.

47-4858
Low-temperature physics: an introduction for scientists and engineers.
McClintock, P.V.E., et al, Glasgow, Scotland, Blackie and Son Ltd., 1992, 296p., Refs. passim.
Meredith, D.J., Wigmore, J.K.
Cryogenics, Low temperature research, Phase transformations, Superconductivity, Liquefied gases, Mathematical models.

47-4859
Arctic and the rest.
Jörgensen-Dahl, A., Challenges of a changing world. Festschrift to Willy Östreng on his 50th birthday May 4th 1991, Lysaker, Norway, Fridtjof Nansen Institute, 1991, p.55-61.
International cooperation, Regional planning.

47-4860
Petroleum policy in the north.
Moe, A., Challenges of a changing world. Festschrift to Willy Östreng on his 50th birthday May 4th 1991, Lysaker, Norway, Fridtjof Nansen Institute, 1991, p.211-231, 13 refs.
Exploration, Petroleum industry, Economic development, Regional planning, Norway.

47-4861
Diode laser humidity sensor for cold environments. Phase I. Final technical report.
Stanton, A.C., et al, MP 3274, U.S. Army Cold Regions Research and Engineering Laboratory, Santa Fe, NM, Southwest Sciences, Inc., Mar. 1988, 35p., Contract No. DACA33-87-C-0028, 23 refs.
Silver, J.A.
Humidity, Hygrometers, Lasers, Meteorological instruments, Cold weather performance, Atmospheric attenuation, Optical absorption, Infrared spectroscopy.

47-4862
Measurement of heat losses from a conduit-type heat distribution system.
Lunardini, V.J., MP 3275, Army Science Conference Proceedings, 12-15 June 1990, Volume II, Washington, D.C., Department of the Army, 1990, p.435-449, 5 refs.
Heat loss, Heat transfer, Radiant heating, Heat pipes, Military facilities, Cost analysis, Mathematical models.
It has been estimated that the Department of the Army has approximately 3,000 miles of energy-carrying conduits and the Department of Defense has approximately double this. A conservative estimate for the cost to the Army of energy losses from these conduits is $90 million each year. Heat losses from buried conduit energy-distribution systems are not known with confidence, especially in regions of seasonal frost. Values used for design are based on calculation procedures that rely on unverified assumptions. The object of this study was to measure the heat losses from a full-scale buried conduit under controlled laboratory conditions. The data and calculated quantities could then be compared to the predicted heat losses using standard calculation methods.

47-4863
Investigation of air containing propeller stream. Part I: physical modelling. Part II: mathematical modelling.
Wang, S.L., et al, *National Research Council Canada. Institute for Marine Dynamics. Laboratory memorandum*, July 1993, LM-1993-20, 4p., 7 refs. Presented at the 14th Canadian Congress of Applied Mechanics, Kingston, Ontario, May 30-June 4, 1993.
Shih, L.Y., Hsiung, C.C.
Ice solid interface, Ice navigation, Ice control, Bubbling, Propellers, Ships, Mathematical models.

47-4864
Experimental and theoretical evaluation of hydrodynamic pressure during non-contact propeller/ice interaction.
Newbury, S., et al, *National Research Council Canada. Institute for Marine Dynamics. Institute report*, July 1993, IR-1993-15, 10p., 4 refs. Presented at the 2nd Marine Dynamics Conference, Vancouver, British Columbia, Aug. 9-11, 1993.
Ice solid interface, Ice loads, Ice navigation, Propellers, Ships, Hydrodynamics.

47-4865
Application of 3-D BEM to time-dependent potential flow over a propeller with ice blockage at proximity condition.
Shih, L.Y., et al, *National Research Council Canada. Institute for Marine Dynamics. Institute report*, July 1993, IR-1993-05, 12p., 6 refs. Presented at the Inaugural Conference of the CFD (Computational Fluid Dynamics) Society of Canada, Montreal, June 14-15, 1993.
Zheng, Y.
Ice solid interface, Ice loads, Ice navigation, Propellers, Ships, Mathematical models.

47-4866
Special challenge: cathodic protection on trans-Alaska pipeline.
Peabody, A.W., *Pipeline and gas journal*, Dec. 1976, p.40,42,43.
Underground pipelines, Hot oil lines, Electrical grounding, Electrical insulation, Corrosion, Countermeasures.

47-4867
Future of Soviet oil supplies to the West.
Moe, A., *Soviet geography*, 1991, 32(3), p.137-167, Refs. p.165-167.
Petroleum industry, Crude oil, USSR—Siberia.

47-4868
Effect of concentration on sorption of dissolved organics by well casings.
Parker, L.V., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, May 1993, SR 93-08, 17p., ADA-266 858, 17 refs.
Ranney, T.A.
Ground water, Well casings, Soil pollution, Water pollution, Environmental tests, Environmental impact.
This report examines sorption of low ppb levels of organic solutions by polytetrafluorethylene (PTFE), rigid polyvinyl chloride (PVS) and stainless steel 304 and 316 well casings. Nineteen organics that were either on the EPA priority pollutant list or of concern to the U.S. Army were selected, including several munitions and chlorinated solvents. These compounds were selected to give a range in physical properties such as solubility in water, octanol-water partition coefficient and molecular structure. When these results were compared with the results from a similar study conducted at ppm levels, the rate and extent of sorption by PTFE and PVC was the same for almost all analytes. There were no losses of any compounds associated with stainless steel. At these low levels (ppm and ppb) the rate of diffusion within the polymer (PVC and PTFE) is independent of concentration. Only with PTFE are the rates rapid enough to be of concern when monitoring for some compounds in groundwater. Tetrachloroethylene was the compound sorbed by PTFE the most rapidly. The study showed that PVC well casings are suitable for monitoring low levels (ppm and ppb) of organics.

47-4869
Bibliography on snow and ice friction.
Colbeck, S.C., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, May 1993, SR 93-06, 17p., ADA-266 868, Refs. p.1-17.
Bibliographies, Ice friction, Snow mechanics, Snow ice interface, Rubber snow friction, Wood snow friction, Skis.
This is a bibliography compiled for use by anyone interested in friction on snow or ice surfaces. The items are separated into snow and ice categories because the physical processes and the problems on these two surfaces are somewhat different. There is some repetition between the lists because some references are appropriate for both subjects. The references were selected because they were of direct interest to the subject of friction and not just because knowledge of friction was important in the study. That is, the references selected provide information about friction and do not just use such information.

47-4870
Mathematical model of frost heave and thaw settlement in pavements.
Guymon, G.L., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, April 1993, CR 93-02, 126p., ADA-267 037, Refs. p.43-45.
Berg, R.L., Hromadka, T.V.
Mathematical models, Frost heave, Ground thawing, Soil freezing, Pavements, Thaw weakening, Frost penetration, Heat transfer, Moisture transfer.
Since 1975 the U.S. Army Corps of Engineers, the Federal Highway Administration and the Federal Aviation Administration have been working cooperatively to develop a mathematical model to estimate frost heave and thaw weakening under various environmental conditions and for various pavement designs. A model has been developed. It is a one-dimensional representation of vertical heat and moisture flux, and is based on a numerical solution technique termed the nodal domain integration method; it estimates frost heave and frost penetration reasonably well for a variety of situations. The model is now ready for additional field evaluation and implementation in appropriate cases. The main objectives of this report are to describe the model, FROST, including modeling uncertainties and errors; to summarize recent comparisons between measured and computed values for frost heave and frost penetration; and to describe parameters necessary for input into the model.

47-4871
Mathematical model for river ice processes.
Lal, A.M.W., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, May 1993, CR 93-04, 80p., ADA-266 847, Refs. p.71-75.
Shen, H.T.
Mathematical models, River ice, Ice cover, United States—Ohio River, Canada—St. Lawrence River.
River ice processes are complex phenomena that are affected by many factors, including meteorological conditions, thermal inputs, hydraulic conditions and channel geometry. In this study a one-dimensional model called RICE is developed for simulating ice processes in rivers. In the river hydraulics component, the flow condition is determined by an implicit finite-difference solution of one-dimensional unsteady flow equations. In the thermal component, distributions of water temperature and ice concentration are determined by a Lagrangian-Eulerian solution scheme for equations of transport of thermal energy and ice. A two-layer formulation is introduced to model the ice transport. In this formulation the total ice discharge is considered to consist of the surface ice discharge and the discharge of suspended ice distributed over the depth of the flow. The effect of surface ice on ice production, as well as the formation of skim ice and border ice, is included. The dynamic formation and stability of the ice cover is formulated according to existing equilibrium ice jam theories with due consideration of the interaction between ice cover and flow. The undercover ice accumulation is formulated according to the critical velocity criterion. The growth and decay of the ice cover is simulated using a finite-difference formulation applicable to composite ice covers consisting of snow, ice and frazil layers. The model has been applied to the St. Lawrence River and the Ohio River system, with simulated results comparing favorably with field observations. Future improvements on the mathematical model as well as theoretical formulations on various ice processes are discussed.

47-4872
Northern Sea Route—now open.
Ivanov, IU., et al, *International challenges*, 1992, 12(1), p.15-20.
Ushakov, A.
Marine transportation, Ice navigation, Northern Sea Route, Northeast Passage.

47-4873
Geopolitics of the Northern Sea Route.
Östreng, W., *International challenges*, 1992, 12(1), p.21-25, 1 ref.
Marine transportation, Ice navigation, Northern Sea Route, Northeast Passage.

47-4874
Future of Russian oil. [Budushchee rossiĭskoĭ nefti],
Moe, A., et al, *Energiia: ekonomika, tekhnika, ekologiia*, 1992, No.8, p.20-24. In Russian.
Kriukov, V.
Petroleum industry, Crude oil, Natural resources, USSR—Siberia.

47-4875
Modeling the temperature regime of an arctic soil.
Rycheva, T.A., et al, *Eurasian soil science*, 1992, 24(8), p.1-11, Translated from Pochvovedenie. 18 refs.
Kapinos, V.A., Gil'manov, T.G.
Mathematical models, Tundra, Frozen ground temperature, Frozen ground thermodynamics, Thermal regime.

47-4876
Cryogenic ambient air vaporizers: frost growth, wind and seismic design for safety.
Bernert, R.E., Jr., et al, *Cryogenics*, Aug. 1993, 33(8), p.789-793, 8 refs.
Everett, W., Bernert, R.E., Sr.
Cryogenics, Liquified gases, Vapor transfer, Structures, Stability, Ice formation, Ice loads, Frost protection, Safety, Wind factors, Design criteria.

47-4877
Effects of global changes on social life in the Arctic and possible response strategies.
Lange, M.A., ed, *Finland. University of Lapland. Arctic Centre. Report*, 1993, No.9, 64p., Includes extended abstracts of seminar given at Rovaniemi, Finland, May 31-June 1, 1992. Various refs.
Flanders, N.E., ed.
Ecosystems, Human factors, Global change, International cooperation, Environmental impact, Environmental protection, Research projects.

47-4878
Expedition to Novaja Zemlja and Franz Josef Land with RV *Dalnie Zelentsy*.
Nürnberg, D., et al, *Berichte zur Polarforschung*, 1993, No.120, p.45-74, 9 refs.
Groth, E.
Expeditions, Sediments, Marine geology, USSR—Novaya Zemlya, USSR—Franz Josef Land.

47-4879
Expedition ANTARKTIS X3 of RV *Polarstern* in 1992. [Die Expedition ANTARKTIS X/3 mit FS *Polarstern* 1992],
Spindler, M., ed, *Berichte zur Polarforschung*, 1993, No.121, p.1-122, With German summary.
Dieckmann, G.S., ed, Thomas, D., ed.
Expeditions, Sea ice, Sea water, Marine biology.
The third leg (ANT X/3) began on Mar. 27, 1992 in Cape Town and ended on May 19, 1992. Interest focussed on seasonal changes in physical, chemical and biological processes in the region of pack ice formation. Investigations concentrated on sea ice biology, plankton in upper water layers, and oceanography. The major goal was to obtain a comprehensive picture of processes prior to, during and after the onset of sea ice formation. To achieve this, Polarstern cruised on several transects from open water into the ice and out again. This cruise track also provided the oceanographers with a detailed station grid to study water mass boundaries in the continental area of the Weddell Sea. Additional research was undertaken on deep-sea benthos, microbiology, and fish physiology. During the cruise several long-term moorings were recovered and redeployed. (Auth.)

47-4880
Electron diffraction and imaging of uncompressed monolayers of amphiphilic molecules on vitreous and hexagonal ice.
Majewski, J., et al, *Science*, Aug. 13, 1993, 261(5123), p.899-902, 30 refs.
Ice composition, Vitreous ice, Ice structure, X ray diffraction.

47-4881
Organochlorine pesticides in the atmosphere of the southern ocean and Antarctica, January-March, 1990.
Bidleman, T.F., et al, *Marine pollution bulletin*, May 1993, 26(5), p.258-262, 39 refs.
Air pollution, Atmospheric composition.
Chlorinated pesticides in air were measured from the Greenpeace ship *Gondwana* between New Zealand and Ross I., Jan.-Mar., 1990. Geometric mean concentrations (pg/cu m) were: *alpha* and *gamma*-hexachlorocyclohexanes = 4.0 and 3.8, hexachlorobenzene = 60, heptachlor epoxide = 0.52, chlordanes + nonachlors = 1.8, p,p'-DDE + p,p'-DDT = 0.81. A trend of decreasing pesticide concentration at higher latitudes was noted. The low levels of DDTs found in this study and also during 1988-90 on Ross I. indicate that atmospheric DDT over the southern ocean has dropped markedly in the past decade. Recent concentrations of DDTs in antarctic air are similar to those in the Arctic. (Auth.)

47-4882
Radiosonde supercooled liquid water detector.
Hill, G.E., MP 3276, U.S. Army Cold Regions Research and Engineering Laboratory, Boulder, CO, Atek Data Corp., Sep. 1990, 97p., Contract No. DA-CA89-84-C-0005, Refs. passim.
Supercooled clouds, Unfrozen water content, Ice detection, Aircraft icing.
A radiosonde icing detector consists of a vibrating wire placed in the humidity duct of a VIZ radiosonde. The wire is forced to vibrate at its natural frequency. As supercooled liquid water accumulates on the wire in the form of ice, the vibration frequency decreases according to the mass collected. This frequency is transmitted to a receiver along with the standard data. From the rate of change of frequency, the balloon rise speed and characteristics of the wire, the concentration of supercooled liquid water in clouds is found.

47-4883
Development of a portable ice-thickness measuring instrument. Final report. Phase I.
Adler, D., et al, MP 3277, U.S. Army Cold Regions Research and Engineering Laboratory. Small Business Innovation Research Program, SBIR A 91- 020, Amityville, NY, General Microwave Corporation, Mar. 1992, 28p. Contract No. DACA33-91-C-0035.
Jacobs, M.
Ice cover thickness, Ice electrical properties, Ice surveys, Ice detection, Microwaves, Radar.
General Microwave Corporation has performed a feasibility study on the application of a novel narrow-band radar technology to the measurement of ice thickness. Such an instrument is needed by the US Army. It also has potential commercial applications as a safety device for frozen lakes, as an analytical instrument to determine pavement conditions on highways, and as an aerospace sensor to measure icing conditions on airplanes. A laboratory prototype was designed, assembled, and tested during the Phase I effort. The targeted 0.5" resolution for ice thickness up to 24" was achieved. The narrow-band method permits the use of small size and simple components for a portable, cost-effective device.

47-4884
Development of a portable ice-measuring instrument.
Doundoulakis, G.J., MP 3278, U.S. Army Cold Regions Research and Engineering Laboratory. Small Business Innovation Research Program, SBIR A91-020, North Bellmore, NY, Neotronics Corporation, Dec. 1991, 31p. + appends., Contract No. DACA33-91-C-0033, 10 refs.
Ice cover thickness, Ice acoustics, Ice surveys, Ice detection, Acoustic measurement, Electronic equipment.
Under Phase I of an SBIR contract, Neotronics Corp. has completed a working breadboard, capable of providing LCD display of ice thickness from 2" to over 24," proving feasibility of the proposed concept. The breadboard uses a two-transducer array (0.4 Mhz), and reports more than one reading, each with its reliability level, between 1 and 3. The breadboard comprises, besides transducers: pulsing circuits for driving transducers; a transceiver chip for coupling transducer and electronic circuits; tuned echo-amplifying circuits; an interface circuit for digitizing and conveying signals to a microcontroller; external RAM for storing the microcontroller program; and LCD controller with 4- digit display for processing and displaying the computed ice thickness and reliability number. Two parts are envisioned in the finished equipment: the head, which is placed on the ice (about 8x8x4 inches) and a hand-held box (2.25x5x1.5 inches) providing control buttons and LCD display, besides cable for plugging into the head. Uses include *measuring ice thickness over water, where children skate, or for* transporting heavy loads, and of ice on airplane wings; measuring thicknesses of material with unknown sound velocity, such as cement or sediments (where it can help identify buried fossils); and measuring fluid density in fluid flow measurements.

47-4885
Iceberg impacts on massive structures. [Impacts d'icebergs sur une structure massive],
Guichard, A., Université de Paris 6 (Pierre et Marie Curie), 1992, Var. p., Ph.D. thesis. In French with English summary. 147 refs.
Icebergs, Ice solid interface, Ice loads, Ice pressure, Ice forecasting, Drift, Impact tests.
Structures threatened by icebergs appear with the development of polar regions. A review of general iceberg features allows one to specify the conditions of a possible collision. The study of the mechanical behavior of ice and impact simulations allows one to assess the effects of a collision on a massive structure and to determine the influence of various parameters. The knowledge of the scale effect, which turns out to be crucial, implies full scale tests. The elaboration and the carrying out of experiments in the Antarctic provide interesting initial data. (Auth.)

47-4886
Forecasters handbook for the Bering Sea, Aleutian Islands, and Gulf of Alaska.
Fett, R.W., et al, *U.S. Naval Research Laboratory. Report*, Mar. 1993, NRL/PU/7541—93-0006, Var. p., 40 refs.
Englebretson, R.E., Perryman, D.C.
Weather forecasting, Marine meteorology, Atmospheric circulation, Storms, Ice forecasting, Sea ice distribution, Bering Sea, United States—Alaska—Gulf of Alaska.

47-4887
Numerical and experimental investigation of river ice cover cracking.
Abdel-Zaher, A.K., Fredericton, University of New Brunswick, 1992, 201p., *Ph.D. thesis*. Refs. p.178-184.
River ice, Ice cover strength, Ice cracks, Ice deformation, Ice water interface, Ice breakup, Fast ice, Mathematical models.

47-4888
Mechanism of freeze-thaw deterioration of rock in the Great Lakes region.
Lienhart, D.A., Rock for erosion control. Edited by C.H. McElroy et al, Philadelphia, American Society for Testing and Materials, 1993, p.77-87, ASTM STP 1177, 14 refs.
DLC TA709.R63
Rock mechanics, Rock properties, Frost action, Frozen rock strength, Freeze thaw cycles, Saturation, Frost shattering, Temperature effects, Thermal expansion.

47-4889
Performances of a tracked over-snow vehicle towing a roller up and down a shallow-sloped terrain.
Muro, T., *Journal of terramechanics*, May 1993, 30(3), p.143-155, 6 refs.
Tracked vehicles, Design, Traction, Mechanical tests, Slope orientation, Ice solid interface, Snow cover effect, Performance, Mathematical models.

47-4890
Ground freezing.
Bell, F.G., Engineering in rock masses. Edited by F.G. Bell, Oxford, England, Butterworth-Heinemann Ltd., 1992, p.321-333, 25 refs.
DLC TA706.E56
Engineering geology, Soil freezing, Design, Artificial freezing, Frozen ground mechanics, Cooling systems, Cryogenics, Hydrogeology.

47-4891
Homogeneous ice nucleation and supercooled liquid water in orographic wave clouds.
Heymsfield, A.J., et al, *Journal of the atmospheric sciences*, Aug. 1, 1993, 50(15), p.2335-2353, 26 refs.
Miloshevich, L.M.
Clouds (meteorology), Cloud physics, Supercooled clouds, Ice water interface, Ice crystal growth, Ice crystal size, Freezing points, Homogeneous nucleation, Nucleation rate, Temperature effects.

47-4892
Regulations for navigation on the seaways of the Northern Sea Route. [Pravila plavaniia po trassam Severnogo morskogo putiĭ, Moscow, Izd. Glav. upr. navigatsii i okeanografii Min-va oborony SSSR, 1991, 23p., In Russian and English. With letter from director of Northern Sea Route Administration on requirements of notification prior to navigating the NSR.
Ice navigation, Marine transportation, Northern Sea Route.

47-4893
Teshekpuk Lake Special Management Area oil and gas resource assessment, National Petroleum Reserve-Alaska.
Bascle, R.J., *U.S. Bureau of Land Management. Alaska State Office. Open file report*, July 1993, No.46, 20p., 20 refs.
Exploration, Crude oil, Natural gas, Geological surveys, Natural resources, Economic development, United States—Alaska—Teshekpuk Lake.

47-4894
Kodiak National Wildlife Refuge oil and gas resource assessment.
Bascle, R.J., et al, *U.S. Bureau of Land Management. Alaska State Office. Open file report*, July 1993, No.45, 21p., 39 refs.
Seidlitz, A., Borkoski, J.
Exploration, Crude oil, Natural gas, Geological surveys, Natural resources, Economic development, United States -Alaska -Kodiak National Wildlife Refuge.

47-4895
Innoko National Wildlife Refuge oil and gas resource assessment.
Bascle, R.J., et al, *U.S. Bureau of Land Management. Alaska State Office. Open file report*, July 1993, No.44, 20p., 29 refs.
Seidlitz, A., Borkoski, J.
Exploration, Crude oil, Natural gas, Geological surveys, Natural resources, Economic development, United States -Alaska—Innoko National Wildlife Refuge.

47-4896
Pneumatically de-iced ice detector.
Franklin, C.H., et al, MP 3279 U.S. Army Cold Regions Research and Engineering Laboratory, Ann Arbor, MI, Franklin Engineering Co., May 1985, 32p., Contract No. DACA89-84-C-0006, 20 refs.
Rogne, C.O., Vinton, C.S.
Ice detection, Power line icing, Ice loads, Ice removal, Anemometers, Computer programs.
The ice detector measures both the weight of ice forming on the collection cylinder and the wind effects on these ice formations in azimuth and torsional wind loads through the vertical axis of the ice detector. These loads will be measured by a force transducer located between the collection probe and the mounting support housing. The pneumatically de-iced ice detector is designed to operate on 110 VAC or to be battery operated, and consumes very little power. The instrument's collection cylinder and mounting support are both pneumatically de-iced using gas-operated rubber boots. The pressure can be supplied by an air compressor or by a compressed dry nitrogen gas cylinder. The collection probe and support housing are de-iced periodically, depending on the weight of ice accumulated on the probe. In the de-iced condition, the instrument will measure wind direction and wind speed. The instrumentation package will time-code and record all functions of the ice detector.

47-4897
Measurement of heat losses from an operating district heating system.
Phetteplace, G., *Fernwärme international*, 1992, 21(3), MP 3280, p.100-111, With German summary. 7 refs.
Heat loss, Heat transfer, Radiant heating, Heat pipes, Water pipes, Military facilities.

47-4898
Fatigue crack propagation in freshwater ice. Final report.
Nixon, W.A., et al, U.S. Army Research Office, Iowa City, University of Iowa, Iowa Institute of Hydraulic Research, July 1993, 42p., Contract No. DAAL03-89-K-0069, Refs. p.8-15.
Weber, L.J.
Ice strength, Ice cracks, Ice deformation Ice loads, Crack propagation, Fatigue (materials).

47-4899
Biennial report, 1991-1992.
Colorado. University. Institute of Arctic and Alpine Research, Boulder, University of Colorado, 1993, 52p., Refs. passim.
Research projects, Organizations.

47-4900
Mechanics of bedrock frost heaving in permafrost regions.
Michaud, Y., Kingston, Ontario, Queen's University, 1991, 128p., Ph.D. thesis. With French summary. Refs. p.118- 125.
Frost heave, Bedrock, Permafrost weathering, Permafrost indicators, Frozen rock strength, Rock mechanics, Frozen ground mechanics, Freezing front.

47-4901
Arctic environmental cooperation after Rovaniemi—what now.
Stokke, O.S., Nordic Arctic Research Forum Symposium 1992. Proceedings. Edited by L. Lyck. Nordic arctic research on contemporary arctic problems, Alborg, Alborg University Press, 1992, p.221-234, 30 refs.
Environmental protection, International cooperation, Regional planning, Pollution.

47-4902
Investigations of active infrared detection of pavement icing.
Rosen, D.L., et al, *Physical Sciences Inc., Andover, MA. Technical report*, May 1989, PSI-2045/TR-837. MP 3281, U.S. Army Cold Regions Research and Engineering Laboratory, 30p., Contract No. DACA33-87-C-0023, 1 ref. For earlier version see 41-3763.
Chen, C.J.
Road icing, Ice detection, Road maintenance, Infrared equipment.

47-4903
Development of advanced instrumentation for drop size and liquid water content measurements in clouds.
Bachalo, W.D., et al, MP 3282, U.S. Army Cold Regions Research and Engineering Laboratory, Sunnyvale, CA, Aerometrics, Inc., July 1988, 66p., Contract No. DACA33-87-C-0027, 23 refs.
Rudoff, R.C., Smith, J.N.
Cloud droplets, Unfrozen water content, Particle size distribution, Ship icing, Ice forecasting.
The objective of this program is the development of a portable and rugged probe for the determination of drop size, velocity distributions and liquid water content (LWC) in clouds. Current methodologies for determining drop size and LWC are time-consuming and/or lack accuracy, reliability, and versatility. In addition, they do not provide the drop velocity information or the high spatial and temporal resolution of the Phase Doppler Particle Analyzer (PDPA). In this preliminary study, the standard PDPA instrument was evaluated to determine its ability to measure LWC, number density, and drop size and drop velocity distributions. Based upon comparisons with other methods, the PDPA results showed good agreement. In addition, a prototype compact fiber optic probe was designed, fabricated and evaluated. The method showed exceptional promise as a field portable probe.

47-4904
Snow wetness project. Final report.
Wilson, M.A., Maranatha Research Ltd., Dec. 1984, 10p. + appends., 37 refs.
Snow water content, Snow electrical properties, Snow melting, Snow surveys, Snow samplers, Magnetic resonance.

47-4905
Observation of flooded ice in arctic regions.
Goroch, A.K., et al, *International journal of remote sensing*, May 10, 1993, 14(7), p.1305-1324, 14 refs.
Fett, R.W.
Sea ice distribution, Pack ice, Ice surface, Brightness, Flooding, Detection, Microwaves, Spaceborne photography, Radiometry, Mathematical models, Arctic Ocean.

47-4906
Stable isotopic biogeochemistry of carbon and nitrogen in a perennially ice-covered antarctic lake.
Wharton, R.A., Jr., et al, *Chemical geology*, July 20, 1993, 107(1-2), p.159-172, 57 refs.
Lyons, W.B., Des Marais, D.J.
Limnology, Geochemistry, Isotope analysis, Lake ice, Ice cover effect, Ice water interface, Bottom sediment, Lacustrine deposits, Nutrient cycle, Microbiology, Antarctica—Hoare, Lake.
This paper reports results of an analysis of the dissolved inorganic carbon (DIC) of Lake Hoare in the McMurdo Dry Valleys area, for *delta*C-13 of the DIC indicates that C-12 is differentially removed in the shallow, oxic portions of the lake via photosynthesis. In the anoxic portions of the lake (27-34 m), a net addition of C-12 to the DIC pool occurs via organic matter decomposition. The dissolution of CaCO3 at depth also contributes to the DIC pool. Except near the Canada Glacier, where a substantial amount of allochthonous organic matter enters the lake, the organic carbon being deposited on the lake bottom at different sites is isotopically similar, suggesting an autochthonous source for the organic carbon. Preliminary inorganic carbon flux calculations suggest that a high percentage of the organic carbon fixed in the water column is remineralized as it falls through the water column. At nearby Lake Fryxell, the substantial (relative to Lake Hoare) glacial meltstream input overprints Fryxell's shallow-water biological *delta*C-13 signal with *delta*C-13-depleted DIC. In contrast, Lake Hoare is not significantly affected by surface-water input and mixing, and therefore the *delta*C-13 patterns observed arise primarily from biological dynamics within the lake. Organic matter in Lake Hoare is depleted in N-15, which is thought to be partially from the addition of relatively light inorganic nitrogen into the lake system from terrestrial sources. (Auth. mod.)

47-4907
Kinematic model of river ice motion during dynamic breakup.
Ferrick, M.G., et al, *Nordic hydrology*, 1993, Vol.24, MP 3283, p.111-134, Presented at Northern Research Basin Symposium, 9th, Whitehorse, Yukon Territories, Canada, Aug. 1992. 19 refs.
Weyrick, P.B., Nelson, D.F.
River ice, River flow, Ice jams, Ice breakup, Dynamic properties, Ice mechanics, Velocity measurement, Ice water interface, Ice models, Mathematical models.
In this paper, the dynamics of ice motion during river breakup is studied by formulating a kinematic model. Ice continuity equations are applied to relate the speeds of a breaking front, a convergence front, a stoppage front, and a release front with the ice discharge and volume per unit surface area (unit volume) on either side of each front. Ice velocity was measured over time during a dynamic breakup at a pair of sites bounding a reach of the Connecticut River. The ice and front motion over time for this reach were simulated using the kinematic model, with the assumptions that accumulation thickness and porosity are uniform, and that changes in the ice conditions and motion occur only at a front. Contrary to the basic assumption of static jam formation, it is found that the accumulation developed while the ice was moving, and that jam formation merely represents the arrest of the motion.

47-4908
Method for extracting tidal and inertial motion from ARGOS ice buoys applied to the Barents Sea during CEAREX.
Turet, P., et al, *U.S. National Oceanic and Atmospheric Administration. Technical memorandum*, Apr. 1993, ERL PMEL-99, 63p., 15 refs.
Pease, C.H., Pritchard, R.S., Overland, J.E.
Oceanographic surveys, Sea ice distribution, Drift stations, Ice water interface, Ocean currents, Velocity measurement, Tidal currents, Periodic variations, Remote sensing, Analysis (mathematics), Barents Sea.

47-4909
Sea ice off the Icelandic coasts—October 1990-September 1991. [Hafís vid Strendur íslands—Október 1990-September 1991], Icelandic Meteorological Office, Reykjavík, 1992, 39p., In Icelandic with English summary.
Sea ice distribution, Ice surveys, Ice conditions, Ice reporting, Iceland.

47-4910
Study of the arctic heat sink.
Ripley, E.A., *Canadian Climate Centre. Report*, Dec. 3, 1990, No.91-5, 95p. + appends., With French summary. 40 refs.
Climatology, Heat sinks, Surface temperature, Snow cover effect, Ice cover effect, Atmospheric boundary layer, Meteorological data, Correlation, Statistical analysis, Synoptic meteorology.

47-4911
Influence of season and phenology on freezing tolerance in *Silene acaulis* L., a subarctic and arctic cushion plant of circumpolar distribution.
Junttila, O., et al, *Annals of botany*, May 1993, 71(5), p.423-426, 18 refs.
Robberecht, R.
Plants (botany), Frost resistance, Cold tolerance, Cold weather survival, Phenology, Plant tissues, Seasonal variations, Snow cover effect.

47-4912
Silurian pinnacle reefs of the Canadian Arctic.
De Freitas, T.A., et al, *Palaios*, Apr. 1993, 8(2), p.172-182, 43 refs.
Dixon, O.A., Mayr, U.
Arctic landscapes, Marine geology, Stratigraphy, Geologic processes, Geologic structures, Marine deposits, Hydrocarbons, Canada—Northwest Territories—Ellesmere Island.

47-4913
Estimation of cloud liquid water in winter storms on the Mongollon Rim—report on task 1.
Medina, J.G., *U.S. Department of Interior. Bureau of Reclamation. Report*, May 1993, 93-07, 19p., 8 refs.
Precipitation (meteorology), Cloud physics, Cloud seeding, Weather modification, Sounding, Radiometry, Water content, Weather forecasting, United States —Arizona.

47-4914
When ice melts in sea water: a review.
Gade, H.G., *Atmosphere-ocean*, 1993, 31(1), p.139-165, With French summary. 37 refs.
Sea ice, Ice melting, Sea water, Meltwater, Melting points, Turbulent diffusion, Thermodynamics, Ice water interface, Water temperature, Analysis (mathematics).

47-4915
Ice detector for protecting boats.
Schuellein, G.J., *U.S. Patent Office. Patent*, June 4, 1991, 4 col., USP-5,021,769, 2 refs.
Ships, Docks, Ice formation indicators, Ice prevention, Ice detection, Floating structures, Electronic equipment, Sensors, Design.

47-4916
Ice conditions offshore West Greenland.
Thomsen, H.H., *Denmark. Grønlands geologiske undersøgelse. Rapport*, 1993, No.159, p.43-47, 9 refs.
Sea ice distribution, Geophysical surveys, Ice surveys, Ice conditions, Classifications, Greenland.

47-4917
Evaluation of hydropower potential for possible future industrial use, Nauk area, West Greenland.
Thomsen, H.H., et al, *Denmark. Grönlands geologiske undersögelse. Rapport*, 1993, No.159, p.59-62, 18 refs.
Braithwaite, R.J., Weidick, A., Olesen, O.B.
Electric power, Glacial hydrology, Glacier melting, Meltwater, Runoff, Forecasting, Greenland.

47-4918
Measurements of firn density in the lower accumulation area of the Greenland ice sheet: EPOCH 1992.
Braithwaite, R.J., et al, *Denmark. Grönlands geologiske undersögelse. Rapport*, 1993, No.159, p.62-65, 5 refs.
Laternser, M.
Ice sheets, Glacier surveys, Firn stratification, Snow density, Snowmelt, Regelation, Runoff forecasting, Greenland.

47-4919
Palaeo-environmental studies on the Greenland ice sheet margin.
Reeh, N., et al, *Denmark. Grönlands geologiske undersögelse. Rapport*, 1993, No.159, p.66-68, 9 refs.
Thomsen, H.H., Böggild, C.E.
Pleistocene, Ice sheets, Paleoclimatology, Climatic changes, Ice cores, Sampling, Radioactive age determination, Isotope analysis, Greenland.

47-4920
Firn temperature and meltwater refreezing in the lower accumulation area of the Greenland ice sheet, Pâkitsoq, West Greenland.
Braithwaite, R.J., *Denmark. Grönlands geologiske undersögelse. Rapport*, 1993, No.159, p.109-114, 23 refs.
Ice sheets, Glacier melting, Meltwater, Firn, Temperature measurement, Ice temperature, Melting points, Regelation, Glacier surveys, Greenland.

47-4921
Neoglacial change of ice cover and the related response of the Earth's crust in West Greenland.
Weidick, A., *Denmark. Grönlands geologiske undersögelse. Rapport*, 1993, No.159, p.121-126, 23 refs.
Ice sheets, Glacier oscillation, Sea level, Isostasy, Climatic changes, Paleoclimatology, Greenland.

47-4922
Large-scale statistical structure of antarctic temperature fields. [Krupnomasshtabnaia statisticheskaia struktura temperaturnykh poleĭ Antarktiki],
Liubarskiĭ, A.N., *Antarktika: doklady komissii*, 1992, No.30, p.18-25, In Russian with English summary. 18 refs.
Sea ice, Seasonal variations, Air temperature, Climatic factors.
Various degrees of temperature field homogeneity for different antarctic regions are determined by means of a modified method of the correlation structure description. The assessment of its connection with non-stationary temperature changes, and the possibility of their forecasting, has been carried out. The relationship between spatial distribution of temperature in the Antarctic and the influence of orographic and cryogenic factors is established. On the basis of this relationship, the gradients of temperature between coastal and continental areas of the Antarctic have been calculated. Based on spatial correlation scale estimation in temperature fields, the precise division of climatic parameters in the Antarctic and Subantarctic is shown. The sectorial structure of the antarctic coastal zone temperature fields has been determined. The scientific validity of the division of Antarctica into three zones, according to the zones of hydrometeorological information services for navigation, has been confirmed. (Auth. mod.)

47-4923
Hydrology and hydrochemistry of natural waters of East Antarctica. [Gidrologo-gidrokhimicheskie issledovaniia prirodnykh vod Vostochnoĭ Antarktidy (vklad v razvitie sovremennoĭ gidrokhimii)],
Shmideberg, N.A., *Antarktika: doklady komissii*, 1992, No.30, p.65-76, In Russian with English summary. Refs. p.75-76.
Paleoclimatology, Snow composition, Ice composition, Limnology, Atmospheric composition, Glacial hydrology, Geochemistry, Antarctica—East Antarctica.
Hydrochemical data are given from a 30-year study of natural waters of East Antarctica (ice sheet, lake waters), showing three major problems of modern hydrochemistry. These are: atmospheric pollution; study of the formation regularities of natural waters chemical composition; and the reconstruction of the continental paleogeographic situation. Results are used to examine the processes of the formation of natural water chemical composition in the present and paleogeographic situations. (Auth.)

47-4924
Observations of large-size river water temperature and accuracy of hydrothermal calculations.
Korenkov, V.A., et al, *Soviet meteorology and hydrology*, 1991, No.6, p.95-98, Translated from Meteorologiia i gidrologiia. 6 refs.
Nazarov, I.I.
River flow, Water temperature, Hydrothermal processes, Accuracy, Electric power, Fast ice, USSR—Krasnoyarsk, USSR—Ust'-Ilimsk.

47-4925
Rate of vapor condensation in a cloud layer at a slow updraft.
Smirnov, V.I., et al, *Soviet meteorology and hydrology*, 1991, No.8, p.78-82, Translated from Meteorologiia i gidrologiia. 5 refs.
Cherkasova, N.I.
Condensation, Cloud physics, Precipitation (meteorology), Analysis (mathematics), Temperature effects.

47-4926
Perturbations in the fields of meteorological parameters caused by artificial crystallization of clouds.
Shmeter, S.M., *Soviet meteorology and hydrology*, 1991, No.10, p.29-33, Translated from Meteorologiia i gidrologiia. 19 refs.
Cloud seeding, Cloud physics, Crystal growth.

47-4927
Thermal effects of marine water mixing with different temperatures and salinities.
Zatsepin, A.G., et al, *Soviet meteorology and hydrology*, 1991, No.10, p.72-76, Translated from Meteorologiia i gidrologiia. 10 refs.
Krylov, A.D., Maksimenko, N.A.
Thermodynamics, Sea water, Salt water, Salinity, Temperature effects, Frazil ice.

47-4928
Frontal zones of the Barents Sea.
Chvilev, S.V., *Soviet meteorology and hydrology*, 1991, No.10, p.89-95, Translated from Meteorologiia i gidrologiia. 8 refs.
Sea water, Ocean currents, Salinity, Water temperature, Barents Sea.

47-4929
Shock absorption for the KBR-80 compact snowplow. [Kogata josetsusha (KBR-80 kata) no shindo taisaku ni tsuite],
Yamada, Y., et al, *Kenki giho (Construction machinery technical report)*, 1980, No.58, p.23-30, In Japanese. 2 refs.
Nohira, K.
Snow removal, Road maintenance, Motor vehicles, Damping.

47-4930
Determining the operational visibility of snowplows (part 2). [Josetsusha unten shikai sokutei (dai 2 ho)],
Yanagisawa, Y., *Kenki giho (Construction machinery technical report)*, 1980, No.58, p.31-36, In Japanese. 1 ref.
Snow removal, Road maintenance, Motor vehicles, Visibility.

47-4931
Trends in snow removal machinery at the Hokkaido Development Bureau. [Hokkaido kaihatsukyoku ni okeru josetsu kikai no hensen],
Katada, Y., *Kenki giho (Construction machinery technical report)*, 1980, No.58, p.37-45, In Japanese.
Snow removal, Road maintenance, Motor vehicles.

47-4932
Experiments on snowdrift prevention in the Okushunbetsu district of Teshikaga. [Teshikaga (Okushunbetsu) no fukidamari boshi jikken],
Anno, Y., *Kenki giho (Construction machinery technical report)*, 1980, No.58, p.46-50, In Japanese. 1 ref.
Snowdrifts, Road maintenance, Snow fences, Snow hedges.

47-4933
Tests on safety of snow removal trucks (part 1). [Josetsu torakku no anzensei ni kansuru chosa shiken (dai ichi ho)],
Matsusaka, H., *Kenki giho (Construction machinery technical report)*, 1980, No.58, p.72-79, In Japanese.
Snow removal, Road maintenance, Motor vehicles, Safety.

47-4934
Tests on improving the efficiency of rotary snowplows. [Rotari josetsusha no koritsuka ni kansuru chosa shiken],
Motoya, H., *Kenki giho (Construction machinery technical report)*, 1980, No.58, p.80-85, In Japanese. 2 refs.
Snow removal, Road maintenance, Motor vehicles.

47-4935
Tests on improving the efficiency of rotary snowplows. [Rotari josetsusha no koritsuka ni kansuru chosa shiken],
Motoya, H., et al, *Kenki giho (Construction machinery technical report)*, 1981, No.59, p.27-34, In Japanese. 2 refs.
Yanagisawa, Y.
Snow removal, Road maintenance, Motor vehicles.

47-4936
Tests on safety of snow removal trucks. [Josetsu torakku no anzensei ni kansuru chosa shiken],
Takeda, Y., et al, *Kenki giho (Construction machinery technical report)*, 1981, No.59, p.35-44, In Japanese.
Matsusaka, H.
Snow removal, Road maintenance, Motor vehicles, Safety.

47-4937
Review of a wind tunnel experimental facility. [Fudo jikken setsubi no gaiyo to jikken],
Kokubun, M., et al, *Kenki giho (Construction machinery technical report)*, 1981, No.59, p.45-62, In Japanese
Ishizuka, Y.
Snow removal, Road maintenance, Blowing snow, Snow fences, Wind tunnels.

47-4938
Tests on developing an ice groove cutting device. [Hyobanko kiri sochi no kaihatsu ni kansuru chosa shiken],
Horibe, K., et al, *Kenki giho (Construction machinery technical report)*, 1982, No.60, p.37-46, In Japanese.
Sakai, M.
Road icing, Road maintenance, Ice cutting, Ice removal.

47-4939
Tests on developing a one-touch (oil pressure-type) mechanism for changing the edge of a snow removal grader. [Josetsu guredayo edji kokan wantatchi kiko (yuatsushiki) no kaihatsu ni kansuru chosa shiken],
Horibe, K., et al, *Kenki giho (Construction machinery technical report)*, 1982, No.60, p.47-50, In Japanese.
Yanagisawa, Y.
Snow removal, Road maintenance, Motor vehicles.

47-4940
Tests on improving a (shear pin) safety mechanism for snow removal graders. [Josetsu guredayo anzen kiko (shapin) no kairyo ni kansuru chosa shiken],
Horibe, K., et al, *Kenki giho (Construction machinery technical report)*, 1982, No.60, p.51-56, In Japanese.
Takino, A.
Snow removal, Road maintenance, Motor vehicles, Safety.

47-4941
Tests on sideways skidding of compact snowplows. [Kogata josetsusha no yoko suberi ni kansuru chosa shiken],
Sakai, M., et al, *Kenki giho (Construction machinery technical report)*, 1982, No.60, p.57-66, In Japanese.
Takino, A.
Snow removal, Road maintenance, Motor vehicles, Skid resistance.

47-4942
Wind tunnel experiments on the snow shelter facility on National Highway 231. [Ippan kokudo 231 go suno sheruta setsubi ni tomonau fudo jikken],
Ishizuka, Y., *Kenki giho (Construction machinery technical report)*, 1982, No.60, p.67-72, In Japanese.
Snowsheds, Blowing snow, Road maintenance, Wind tunnels.

47-4943
Wind tunnel experiments on snowbreak forest planting in the Sarakitomanai district of Wakkanai on National Highway 40. [Ippan kokudo 40 go Wakkanai-shi Sarakitomanai chiku bosetsurin shokusai ni tomonau fudo jikken],
Ishizuka, Y., *Kenki giho (Construction machinery technical report)*, 1983, No.61, p.17-32, In Japanese. 3 refs.
Snow hedges, Blowing snow, Road maintenance, Forest strips, Wind tunnels.

47-4944
Performance tests on the KBR-81 compact snowplow. [Kogata josetsusha (KBR-81 kata) no seino shiken ni tsuite],
Sakai, M., *Kenki giho (Construction machinery technical report)*, 1983, No.61, p.33-48, In Japanese.
Snow removal, Road maintenance, Motor vehicles.

47-4945
Tests on snow removal machinery. [Josetsu kikai ni kansuru chosa shiken],
Yanagisawa, Y., *Kenki giho (Construction machinery technical report)*, 1983, No.61, p.49-66, In Japanese. 4 refs.
Snow removal, Road maintenance, Motor vehicles.

47-4946
Tests on improving the efficiency of road surface maintenance. [Romen seisei sagyo no koritsuka ni kansuru chosa shiken],
Itabashi, N., *Kenki giho (Construction machinery technical report)*, 1983, No.61, p.67-88, In Japanese.
Snow removal, Road maintenance, Motor vehicles.

47-4947
Tests on snow removal machinery. [Josetsu kikai ni kansuru chosa shiken],
Yanagisawa, Y., et al, *Kenki giho (Construction machinery technical report)*, 1984, No.62, p.15-42, In Japanese. 6 refs.
Takino, A., Mino, M.
Snow removal, Road maintenance, Motor vehicles.

47-4948
Tests on improving the efficiency of road surface maintenance. [Romen seisei sagyo no koritsuka ni kansuru chosa shiken],
Shoji, K., et al, *Kenki giho (Construction machinery technical report)*, 1984, No.62, p.43-68, In Japanese.
Matsusaka, H., Ishizuka, Y., Itabashi, N.
Snow removal, Road maintenance, Motor vehicles.

47-4949
Performance tests on a 400 PS-class rotary snowplow with an automatic control device. [Rotari josetsusha (400 PS kyu, jido seigyo sochi tsuki) no seino shiken chosa ni tsuite],
Yanagisawa, Y., et al, *Kenki giho (Construction machinery technical report)*, 1985, No.63, p.21-26, In Japanese. 1 ref.
Takino, A.
Snow removal, Road maintenance, Motor vehicles.

47-4950
Developing a device to record snowplow operation. [Josetsusha shiko kiroku sochi no kaihatsu],
Matsuzaki, K., et al, *Kenki giho (Construction machinery technical report)*, 1985, No.63, p.43-52, In Japanese.
Shoji, K., Matsusaka, H.
Snow removal, Road maintenance, Motor vehicles, Recording instruments.

47-4951
Wind tunnel experiments for building the snow shelter at Nita in Teshikagacho on National Highway 243. [Ippan kokudo 243 go Teshikagacho Nita suno sheruta kensetsu ni tomonau fudo jikken],
Ishizuka, Y., et al, *Kenki giho (Construction machinery technical report)*, 1985, No.63, p.53-62, In Japanese.
Nakano, T.
Snowsheds, Blowing snow, Road maintenance, Wind tunnels.

47-4952
Wind tunnel experiments on snow countermeasures for the Sarakitomanai district in Wakkanai on National Highway 40. [Kokudo 40 go Wakkanaishi Sarakitomanai chiku bosetsu taisaku fudo jikken],
Ishizuka, Y., et al, *Kenki giho (Construction machinery technical report)*, 1986, No.64, p.55-64, In Japanese.
Nakano, T.
Snow hedges, Blowing snow, Road maintenance, Forest strips, Wind tunnels.

47-4953
Tests on the surface layout of snow removal drains. [Ryusetsuko no menteki seibi ni kansuru chosa shiken],
Shimaguchi, Y., et al, *Kenki giho (Construction machinery technical report)*, 1986, No.64, p.65-82, In Japanese. 14 refs.
Sakaguchi, K.
Snow removal, Road maintenance, Drains.

47-4954
Tests on the surface layout of snow removal drains. [Ryusetsuko no menteki seibi ni kansuru chosa shiken],
Shimaguchi, Y., et al, *Kenki giho (Construction machinery technical report)*, 1987, No.65, p.1-16, In Japanese. 7 refs.
Sakaguchi, K.
Snow removal, Road maintenance, Drains.

47-4955
Wind tunnel experiments on snow countermeasures for the stretch of National Highway 5 between the Hanaura section of Yakumocho and the Toyono section of Oshamanbecho. [Ippan kokudo 5 go sen Yakumocho aza Hanaura—Oshamanbecho aza Toyono kan bosetsu taisaku fudo jikken],
Nakano, T., et al, *Kenki giho (Construction machinery technical report)*, 1987, No.65, p.17-28, In Japanese. 1 ref.
Takabe, N.
Snow hedges, Snow fences, Blowing snow, Road maintenance, Wind tunnels.

47-4956
Wind tunnel experiments on the construction of the interchange in Ebetsu on National Highway 337 (Part 1). [Ippan kokudo 337 go sen Ebetsu inta kensetsu ni tomonau fudo jikken (sono 1)],
Takabe, N., et al, *Kenki giho (Construction machinery technical report)*, 1987, No.65, p.29-34, In Japanese.
Nakano, T.
Snow fences, Blowing snow, Road maintenance, Wind tunnels.

47-4957
Tests on snow removal trucks. [Josetsu torakku ni kansuru chosa shiken],
Itabashi, N., et al, *Kenki giho (Construction machinery technical report)*, 1987, No.65, p.35-56, In Japanese. 5 refs.
Nakajima, J.
Snow removal, Road maintenance, Motor vehicles.

47-4958
Tests on developing studless snowplows. [Supaikuresu josetsusha no kaihatsu ni kansuru chosa shiken],
Kawakami, S., et al, *Kenki giho (Construction machinery technical report)*, 1987, No.65, p.57-66, In Japanese.
Chiba, A.
Snow removal, Road maintenance, Motor vehicles, Tires.

47-4959
Tests on the surface layout of snow removal drains. [Ryusetsuko no menteki seibi ni kansuru chosa shiken],
Shimaguchi, Y., et al, *Kenki giho (Construction machinery technical report)*, 1988, No.66, p.1-55, In Japanese. 16 refs.
Sakaguchi, K.
Snow removal, Road maintenance, Drains.

47-4960
Wind tunnel experiments on snow countermeasures in the Kaigen district of Toyotomicho on National Highway 40. [Ippan kokudo 40 go Toyotomicho Kaigen chiku bosetsu taisaku fudo jikken],
Nakano, T., et al, *Kenki giho (Construction machinery technical report)*, 1988, No.66, p.56-71, In Japanese.
Takabe, N.
Snowsheds, Blowing snow, Road maintenance, Wind tunnels.

47-4961
Wind tunnel experiments on snow fences for the Sokotai district on National Highway 241. [Ippan kokudo 241 go Sokotai chiku bosetsusaku ni kansuru fudo jikken],
Takabe, N., et al, *Kenki giho (Construction machinery technical report)*, 1988, No.66, p.72-81, In Japanese.
Nakano, T.
Snow fences, Blowing snow, Road maintenance, Wind tunnels.

47-4962
Tests on rotary snow removal machinery. [Rotari josetu kikai ni kansuru chosa shiken],
Yamagami, M., et al, *Kenki giho (Construction machinery technical report)*, 1988, No.66, p.82-119, In Japanese. 5 refs.
Nakamura, N.
Snow removal, Road maintenance, Motor vehicles.

47-4963
Performance tests on rotary snow plows in single file. [Rotari josetsusha (isshasen tsumikomi kata) no seino ni kansuru chosa shiken],
Sasaki, T., et al, *Kenki giho (Construction machinery technical report)*, 1990, No.68, p.1-9, In Japanese.
Horikawa, R., Sawaguchi, S.
Snow removal, Road maintenance, Motor vehicles.

47-4964
Tests on the surface layout of snow removal drains. [Ryusetsuko no menteki seibi ni kansuru chosa shiken],
Maeda, T., *Kenki giho (Construction machinery technical report)*, 1990, No.68, p.23-30, In Japanese.
Snow removal, Road maintenance, Drains.

47-4965
Wind tunnel experiments on road improvement at Shanai in Hamatonbetcho on National Highway 238. [Ippan kokudo 238 go Hamatonbetcho Shanai doro kairyo ni kansuru fudo jikken],
Takabe, N., *Kenki giho (Construction machinery technical report)*, 1990, No.68, p.31-35, In Japanese.
Blowing snow, Road maintenance, Wind tunnels.

47-4966
Tests on snow removal trucks. [Josetsu torakku ni kansuru chosa shiken],
Nakajima, J., et al, *Kenki giho (Construction machinery technical report)*, 1990, No.68, p.36-67, In Japanese. 8 refs.
Ushiki, S., Kurita, G.
Snow removal, Road maintenance, Motor vehicles.

47-4967
Tests on urban snow removal. [Toshinai josetsu ni kansuru chosa shiken],
Sumita, N., et al, *Kenki giho (Construction machinery technical report)*, 1991, No.69, p.1-24, In Japanese. 6 refs.
Sawaguchi, S., Nagahora, K.
Snow removal, Road maintenance, Municipal engineering.

47-4968
Tests on developing snowplows with a variable curved surface. [Kyokumen kahensei josetsu purau no kaihatsu ni kansuru chosa shiken],
Nagahora, K., et al, *Kenki giho (Construction machinery technical report)*, 1991, No.69, p.25-50, In Japanese. 9 refs.
Matsubara, M.
Snow removal, Road maintenance, Motor vehicles.

47-4969
Tests on developing a device to modify the blade cutting edge of road maintenance equipment. [Romen seisei sochi buredoyo kattinguedji henko sochi no kaihatsu ni kansuru chosa shiken],
Nagahora, K., et al, *Kenki giho (Construction machinery technical report)*, 1991, No.69, p.51-56, In Japanese.
Matsubara, M.
Snow removal, Road maintenance, Motor vehicles.

47-4970
Wind tunnel experiments on road improvement at Mineoka on National Highway 238. [Ippan kokudo 238 go Mineoka doro kairyo koji ni tomonau fudo jikken],
Takabe, N., et al, *Kenki giho (Construction machinery technical report)*, 1991, No.69, p.57-68, In Japanese.
Katano, H.
Blowing snow, Road maintenance, Wind tunnels.

47-4971
Wind tunnel experiments on snow countermeasures for the stretch of National Highway 238 between Numanoue in Monbetsushi and Old Monbetsu. [Ippan kokudo 238 go Monbetsushi Numanoue—Moto Monbetsu kan bosetsu taisaku ni kansuru fudo jikken],
Takabe, N., et al, *Kenki giho (Construction machinery technical report)*, 1991, No.69, p.69-73, In Japanese.
Katano, H.
Snow hedges, Blowing snow, Road maintenance, Forest strips, Wind tunnels.

47-4972
Performance tests on the 10t class B-B-D snow removal truck. [Josetsu torakku 10t kyu (B-B-D) no seino ni kansuru chosa shiken],
Nakajima, J., et al, *Kenki giho (Construction machinery technical report)*, 1991, No.69, p.74-91, In Japanese.
Kurita, G., Harada, N.
Snow removal, Road maintenance, Motor vehicles.

47-4973
Development of a reverse blade type, shear-pinless device for a snow removal grader. [Josetsu guredayo shapinresu sochi (buredo koho hantenshi) no kaihatsu],
Nagahora, K., et al, *Kenki giho (Construction machinery technical report)*, 1992, No.70, p.1-21, In Japanese. 15 refs.
Matsubara, M.
Snow removal, Road maintenance, Motor vehicles.

47-4974
Development of an automatic guidance system for a dump truck in single file with a rotary snowplow. [Rotari josetsusha (isshasen tsumikomi kata) no danpu torakku yudo jidoka shisutemu no kaihatsu],
Kubota, S., et al, *Kenki giho (Construction machinery technical report)*, 1992, No.70, p.55-69, In Japanese.
Sawaguchi, S.
Snow removal, Road maintenance, Motor vehicles.

47-4975
Wind tunnel experiments on innovations at the Toyono bypass on National Highway 40. [Ippan kokudo 40 go Toyono baipasu shinsetsu ni tomonau bosetsu taisaku no fudo jikken].
Takabe, N., et al. *Kenki giho (Construction machinery technical report)*, 1992, No.70, p.70-91, In Japanese.
Sasaki, T.
Snow hedges, Blowing snow, Road maintenance, Forest strips, Wind tunnels.

47-4976
Wind tunnel experiments on snow countermeasures in the Shiomi district of Rumoishi on National Highway 232. [Ippan kokudo 232 go Rumoishi Shiomi chiku bosetsu taisaku no fudo jikken].
Sasaki, T., et al. *Kenki giho (Construction machinery technical report)*, 1992, No.70, p.92-101, In Japanese.
Takabe, N.
Snowdrifts, Road maintenance, Snow fences, Wind tunnels.

47-4977
Frost-susceptible soils as foundations of structures. [Morozoopasnye grunty kak osnovaniia sooruzheniĭ].
Orlov, V.O., et al, Novosibirsk, Nauka, 1992, 166p., In Russian. Refs. p.152-166.
Zhelezniak, I.I., Filippov, V.D., Fursov, V.V.
Frost heave, Foundations, Soil mechanics, Frozen ground mechanics, Seasonal freeze thaw, Frost penetration, Deformation, Pile structures, Frozen ground strength, Soil strength.

47-4978
Global climate change: environmental and climatic links between Antarctica and South Africa.
Lucas, M.I., et al. *South African journal of antarctic research*, 1991, 21(2), p.193-219, Refs. p.215-219.
Lindesay, J.A.
Paleoclimatology, Paleoecology, Climatic changes, Research projects, Sea ice, Air ice water interaction, Ozone, Atmospheric composition, Oceanography.
In this review, the authors outline how the earth's climate evolved and took shape in response to the geological evolution of continental Antarctica and the southern ocean. They then summarize global climate, climate change, the role of the oceans and the antarctic ecosystem. This leads to identified links between present-day global and Southern Hemisphere climate with Antarctica and the southern ocean. Finally, they provide some insight into the possible feedback responses of these high latitudes to future climate change scenarios. Current South African marine research programs which address these issues are also outlined. (Auth.)

47-4979
SANAE total column ozone: 1980 to 1990.
Bodeker, G.E., et al. *South African journal of antarctic research*, 1991, 21(2), p.220-221, 1 ref.
Scourfield, M.W.J.
Ozone, Data processing, Mapping, Antarctica—SANAE Station.
TOMS (Total Ozone Mapping Spectrometer) data have been processed for a period of 11 years, from 1980 to 1990, over an area extending from 10W to 39E and from the equator to the South Pole. This area includes South Africa, much of the South African southern oceans and the South African antarctic research base, SANAE. Daily total column ozone values have been obtained for SANAE Station and monthly and yearly means have been calculated. Decreases in monthly averages are clearly evident, while yearly averages show a decrease of 4.9 DU/year. For comparison purposes, Durban shows a decrease of 1.5 DU/year over the same period.

47-4980
Natural ozone depletion over Antarctica.
Stephenson, J.A.E., et al. *South African journal of antarctic research*, 1991, 21(2), p.222, 3 refs.
Scourfield, M.W.J.
Solar activity, Ozone, Antarctica—SANAE Station.
The loss of stratospheric ozone caused by the reaction of ozone with nitric oxide generated by energetic protons, associated with solar flares, is examined. During large solar flares in Mar. 1989, satellite observations reveal depletion over the southern polar regions, shown in a color plot of Mar. 21. This color plot uses data obtained from the total ozone mapping spectrometer (TOMS) aboard the Nimbus 7 satellite launched in 1978. The experiment measures the daily global distribution of total column ozone.

47-4981
Temporal characteristics of USA snowfall 1945-1946 through to 1984-1985.
Leathers, D.J., et al. *International journal of climatology*, Jan.-Feb. 1993, 13(1), p.65-76, 35 refs.
Precipitation (meteorology), Climatology, Snow accumulation, Periodic variations, Meteorological data, Statistical analysis, United States.

47-4982
Conditions of the Pleistocene glaciation of mountainous regions.
Klimaszewski, M., *Zeitschrift für Geomorphologie*, Mar. 1993, 37(1), p.1-18, With German and French summaries. 66 refs.
Mountain glaciers, Glaciation, Glacier oscillation, Pleistocene, Geomorphology, Climatic factors, Snow line, Topographic effects.

47-4983
Use of meltwater stream material loads in the estimation of glacial erosion rates.
Warburton, J., et al. *Zeitschrift für Geomorphologie*, Mar. 1993, 37(1), p.19-28, With German and French summaries. 31 refs.
Beecroft, I.
Geomorphology, Glacial erosion, Glacier melting, Sediment transport, Meltwater, Streams, Sampling, Moraines, Forecasting, Switzerland—Bas Glacier d'Arolla.

47-4984
Debris flow characteristics in an area of continuous permafrost, St. Elias Range, Yukon Territory.
Harris, S.A., et al. *Zeitschrift für Geomorphologie*, Mar. 1993, 37(1), p.41-56, With German and French summaries. 52 refs.
Gustafson, C.A.
Continuous permafrost, Permafrost mass transfer, Permafrost hydrology, Sediment transport, Mass flow, Flow rate, Subarctic landscapes, Geomorphology, Periglacial processes, Revegetation, Canada—Yukon Territory—St. Elias Range.

47-4985
Determination of salting frequency through examination of salt residue amounts. [Ermittlung des Streuzeitpunktes nach der Restsalzmenge].
Dirnböck, G., *Austria. Bundesministerium für Bauten und Technik. Strassenforschung*, 1990, No.148, 38p., In German with French and English summaries. 12 refs.
Road icing, Winter maintenance, Salting, Ice prevention, Solutions, Electrical measurement, Freezing points, Chemical analysis.

47-4986
Maintenance techniques for road surfacings—investigations, route decisions, planning, implementation. [Methoden zur Erhaltung von Strassendecken—Ermittlung, Wahl der Verfahren, Planung, Durchführung],
Organisation für Wirtschaftlichen Zusammenarbeit und Entwicklung, *Austria. Bundesministerium für Bauten und Technik. Strassenforschung*, Oct. 1978, No.224, 221p., In German. 141 refs.
Road maintenance, Winter maintenance, Covering, Research projects, Cold weather construction.

47-4987
Test methods for the renovation of road coverings. [Prüfmethoden für die Sanierung von Fahrbahndecken].
Wicke, M., et al. *Austria. Bundesministerium für Bauten und Technik. Strassenforschung*, 1985, No.264, 48p., In German with French and English summaries. 11 refs.
Stehno, G.
Road maintenance, Winter maintenance, Damage, Covering, Concrete admixtures, Synthetic materials, Mechanical tests, Concrete durability.

47-4988
Construction and documentation of the test strip "Josefsberg" along B 20 employed to determine the qualitative changes and ice prevention properties of a surface with an admixture of VERGLIMIT. [Errichtung und Dokumentation der Versuchsstreck "Josefsberg" auf der B 20 zum Zwecke der Festellung von Qualitätsänderungen und Eisverhinderung eines Belages, dem VERGLIMIT zugesetzt wurde],
Augustin, H., et al. *Austria. Bundesministerium für Bauten und Technik. Strassenforschung*, 1986, No.288, 60p., In German with French and English summaries. 22 refs.
Kirchknopf, H., Pippich, J.
Road icing, Ice prevention, Covering, Surface properties, Salting, Concrete admixtures, Cold weather tests, Performance.

47-4989
Snow loads on road-side structures during plowing. [Schneelast auf seitliche Einbauten an Strassen durch die Räumung],
Rudelstorfer, K., et al. *Austria. Bundesministerium für Bauten und Technik. Strassenforschung*, 1987, No.305, 88p., In German with French and English summaries. 8 refs.
Tiefenthaler, H., Erlacher, H.
Road maintenance, Snow removal, Snow loads, Markers, Vibrations, Stability, Protection, Design criteria.

47-4990
Using physical methods to predict slippery road conditions. [Vorhersage von Strassenglätte mit physikalischen Methoden],
Hertl, S., et al. *Austria. Bundesministerium für Wirtschaftliche Angelegenheiten. Strassenforschung*, 1988, No.350, 72p., In German with French and English summaries. 19 refs.
Schaffar, G.
Road icing, Ice forecasting, Sensors, Infrared equipment, Temperature measurement, Cold weather performance.

47-4991
Manual for planning and implementing road surface condition studies in wintertime—vol.1 and 2. [Handbok i planlegging og gjennomføring av føreforholdsundersökelser—Del 1 og 2],
Gabestad, K.O., *Norway. Transportökonomisk Institutt. Rapport*, 1988, No.13, 2 vols., In Norwegian with English summary.
Cold weather tests, Road maintenance, Pavements, Surface properties, Winter maintenance, Road icing, Snow removal, Ice conditions, Classifications, Safety.

47-4992
Driver behavior during winter conditions. [Trafikantatferd pa vinterföre],
Gabestad, K.O., et al, *Norway. Transportökonomisk Institutt. Rapport*, 1988, No.10, 54p. + appends., In Norwegian with English summary.
Amundsen, F.H., Skarra, N.
Transportation, Motor vehicles, Winter, Cold weather performance, Human factors, Safety, Forecasting, Snow cover effect.

47-4993
Predicting wilderness snow water equivalent with nonwilderness snow sensors.
McGurk, B.J., et al, *Water resources bulletin*, Feb. 1993, 29(1), p.85-94, 8 refs.
Edens, T.J., Azuma, D.L.
Mountains, Snow cover, Snow water equivalent, Remote sensing, Telemetering equipment, Runoff forecasting, Water supply, Sensors, Accuracy, United States—California—Sierra Nevada.

47-4994
Optics on a fractal surface and the photometry of the regoliths.
Drossart, P., *Planetary and space science*, May 1993, 41(5), p.381-393, 20 refs.
Extraterrestrial ice, Satellites (natural), Remote sensing, Regolith, Surface structure, Photometry, Fractals, Light scattering, Mathematical models.

47-4995
Classification of the maximum annual Baltic Sea ice cover extent—1720-1992. [Itämeren suurimpien vuotuisten jääpeitteen laajuuksien luokittelu 1720-1992],
Seinä, A., et al, *Finland. Merentutkimuslaitos*, 1993, No.20, p.5-20, In Finnish with English summary. 12 refs.
Palosuo, E.
Sea ice distribution, Periodic variations, Classifications, Ice surveys, Winter, Statistical analysis, Baltic Sea.

47-4996
Polaarialueiden tutkimus ja globaalinen ilmaston-ja ympäristönmuutos.
Launiainen, J., *Finland. Merentutkimuslaitos*, 1993, No.20, p.21-31, In Finnish with English summary. 15 refs.
Polar atmospheres, Atmospheric circulation, Global change, Heat balance, Climatic changes, Air ice water interaction, Ice cover effect.

47-4997
Development of planted *Pinus sylvestris* and *P. contorta* after soil preparation in a northern climate.
Fries, C., *Scandinavian journal of forest research*, 1993, 8(1), p.73-80, 19 refs.
Forestry, Soil science, Trees (plants), Growth, Cold weather survival, Snow cover effect, Soil tests, Topographic effects.

47-4998
Effect of photosynthetic photon flux density on development of frost hardiness in top and roots of *Larix leptolepis* seedlings.
Hansen, J.M., et al, *Scandinavian journal of forest research*, 1993, 8(2), p.204-212, 25 refs.
Eriksen, E.N.
Plant physiology, Acclimatization, Frost resistance, Temperature variations, Photosynthesis, Light effects, Cold weather tests.

47-4999
Winter chills.
Collins, R.L., *AOPA pilot*, Feb. 1993, 36(2), p.53-57.
Aircraft icing, Meteorological factors, Ice prevention, Ice forecasting, Weather forecasting, Countermeasures.

47-5000
Effects of thawing salts on biological sewage treatment plants. [Einfluss von Strassenstreusalzen auf biologische Kläranlagen],
Washüttl, J., *Austria. Bundesministerium für Bauten und Technik. Strassenforschung*, 1983, No.219, p.1-19, In German with French and English summaries.
Sewage treatment, Water supply, Road maintenance, Salting, Chemical ice prevention, Runoff, Cold weather performance, Environmental impact, Chemical analysis.

47-5001
Clearing and spreading tests with minimal salt scattering as observed during abrasion of worn sections. [Räum- und Streuversuch bei minimaler Salzstreuung unter Beobachtung des Abriebes der Verschleisschicht],
Augustin, H., et al, *Austria. Bundesministerium für Bauten und Technik. Strassenforschung*, 1983, No.219, p.21-78, In German with French and English summaries. 12 refs.
Somitsch, W., Wieden, P., Zieger, M.
Road maintenance, Chemical ice prevention, Salting, Abrasion, Cold weather tests, Physical properties, Monitors, Safety.

47-5002
Early warnings.
Horne, T.A., *AOPA pilot*, Mar. 1993, 36(3), p.T-11,T-14.
Aircraft icing, Ice accretion, Ice detection, Ice prevention, Probes, Sensors, Safety, Warning systems.

47-5003
Concentrations of metals in soil and snow as a function of distance from pollutant emission sites.
Malakhov, S.G., et al, *Eurasian soil science*, Feb. 1993, 25(2), p.111-115, Translated from Pochvovedenie, 1992, No.9. 12 refs.
Senilov, N.B.
Air pollution, Snow impurities, Soil pollution, Metals, Aerosols, Fallout, Atmospheric circulation, Snow air interface, Mathematical models.

47-5004
Fluid film and heat flows on its boundaries at sliding of solid body on melting surface.
Pushkarev, O.E., et al, *Soviet journal of friction and wear*, 1992, 13(4), p.25-30, Translated from Trenie i iznos. 14 refs.
Kapustianenko, G.G.
Ice solid interface, Ice friction, Thermal analysis, Sliding, Ice melting, Heat transfer, Water films, Mathematical models.

47-5005
Periglacial microjointing and faulting in Weichselian fluvio-aeolian deposits.
Mol, J., et al, *Journal of Quaternary science*, Mar. 1993, 8(1), p.15-30, 25 refs.
Vandenberghe, J., Kasse, K., Stel, H.
Pleistocene, Quaternary deposits, Cryogenic structures, Permafrost indicators, Permafrost transformation, Periglacial processes, Frost action, Stratigraphy, Netherlands.

47-5006
"Little Ice Age" variations of outlet glaciers from the Jostedalsbreen ice-cap, southern Norway: a regional lichenometric-dating study of ice-marginal moraine sequences and their climatic significance.
Bickerton, R.W., et al, *Journal of Quaternary science*, Mar. 1993, 8(1), p.45-66, 58 refs.
Matthews, J.A.
Quaternary deposits, Glacial deposits, Glacier oscillation, Glacier tongues, Geomorphology, Moraines, Age determination, Climatic changes, Norway—Jostedalsbreen.

47-5007
Experimental evaluation of flat plate boundary layer growth over an anti-icing fluid film.
Laforte, J.L., et al, *Canadian aeronautics and space journal*, June 1993, 39(2), p.96-104, With French summary. 9 refs.
Louchez, P.R., Bouchard, G.
Aircraft icing, Ice prevention, Antifreezes, Viscosity, Air flow, Turbulent boundary layer, Fluid dynamics, Performance, Standards, Wind tunnels.

47-5008
Determination of influence of studded tires on roadway surfaces and traffic accidents—winter 1981/82. [Bestimmung des Fahrbahnabriebes durch Spikesreifen sowie des Unfallgeschehens in der Winterperiode 1981/82],
Bereza-Kudrycki, W., *Austria. Bundesministerium für Bauten und Technik. Strassenforschung*, 1985, No.277, 55p., In German with French and English summaries. 26 refs.
Motor vehicles, Roads, Damage, Tires, Cold weather performance, Cold weather tests, Accidents, Safety.

47-5009
Development of a new de-icing agent. [Entwicklung eines neuen Auftaumittels],
Washüttl, J., et al, *Austria. Bundesministerium für Bauten und Technik. Strassenforschung*, 1985, No.262, 34p., In German with French and English summaries. 4 refs.
Kroyer, G., Hafner, H.
Road icing, Ice removal, Ice melting, Salting, Chemical composition, Environmental impact, Environmental tests, Plant ecology.

47-5010
Survey of the influence of studded tires on traffic safety and determination of roadway surface wear from studs. [Feststellung des Einflusses von Spikesreifen auf die Verkehrssicherheit und Bestimmung der Abnützungserscheinungen der Fahrbahnen durch Spikes],
Knoflacher, H., et al, *Austria. Bundesministerium für Bauten und Technik. Strassenforschung*, 1974, No.25, 90p., In German. 31 refs.
Bereza-Kudrycki, W.
Motor vehicles, Cold weather performance, Accidents, Tires, Safety.

47-5011
Reliability of guyed masts with special reference to arctic conditions.
Johansson, B., et al, IASS Working Group for Masts and Towers, Meeting, Stockholm, Sweden, Sep. 1991, Copenhagen, International Association for Shell and Spatial Structures, 1991, 18p., 16 refs.
Fahleson, C.
Towers, Cables (ropes), Icing, Ice cover effect, Structural analysis, Stability, Ice loads, Wind factors, Mechanical tests, Design criteria.

47-5012
Nonsymmetric icing of guyed masts.
Peil, U., et al, IASS Working Group for Masts and Towers, Meeting, Stockholm, Sweden, Sep. 1991, Copenhagen, International Association for Shell and Spatial Structures, 1991, 10p., 16 refs.
Nölle, H.
Towers, Stability, Cables (ropes), Icing, Ice loads, Ice cover effect, Ice cover thickness, Anisotropy, Wind factors.

47-5013
Proceedings.
Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993, Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, 647p., For selected papers see 47-5014 through 47-5058. Refs. passim.
Nuclear power, Environmental protection, Radioactive wastes, Waste disposal, Radioactive isotopes, Environmental impact, Water pollution, Fallout, Barents Sea, Arctic Ocean, USSR—Kara Sea.

47-5014
Report of Inventories/Sources Group.
Smith, J.N., ed, Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.5-7.
Environmental impact, Radioactive wastes, Data processing, USSR.

47-5015
Report of the Working Group on Routes, Rates, Reactions and Fates. Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.9-11.
Environmental impact, Radioactive wastes, Data processing, USSR.

47-5016
Assessment and Remediation [Working Group report]. Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.13-15.
Environmental impact, Radioactive wastes.

47-5017
Summary report of the Working Group on Legal, Economic and Policy Priorities.
Lamb, J.M., Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.17-26.
International cooperation, Environmental impact, Radioactive wastes.

47-5018
Novaya Zemlya test site and the problem of the radioactive pollution of the polar ocean.
Adushkin, V., et al, Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.27-36, 5 refs.
Krasilov, G.
Radioactive wastes, Environmental impact, Water pollution, USSR—Novaya Zemlya.

47-5019
Sediment inventory of Cs-137 in the Eastern Chukchi Sea, Northwest Alaskan Arctic.
Baskaran, M., et al, Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.37-47, 25 refs.
Naidu, A.S.
Sediments, Radioactive wastes, Fallout, Environmental impact, Chukchi Sea, USSR—Chernobyl, United States—Alaska—Kotzebue Sound.

47-5020
Anthropogenic radioactivity in the arctic seas: time trends and present levels.
Dahlgaard, H., Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.49-63, 18 refs.
Radioactive wastes, Fallout, Environmental impact, Water pollution, USSR—Chernobyl.

47-5021
Radioactivity and environmental problems for the seas and oceans.
Israel, IU.A., et al, Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.65-78, 11 refs.
Tsiban, A.V., Vakulovskiĭ, S.M.
Fallout, Water pollution, Radioactive wastes, Environmental impact, USSR—White Sea, USSR—Kara Sea, Barents Sea, Chukchi Sea.

47-5022
Radioecology of the Barents and Kara Sea: level of apprehension and research strategy.
Ivanov, G.I., et al, Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.79-89.
Radioactive wastes, Water pollution, Bottom sediment, Ecology, Environmental impact, USSR—Kara Sea, Barents Sea.

47-5023
Sellafield as a source of radioactivity to the Barents Sea.
Kershaw, P., et al, Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.91-104, 24 refs.
Baxter, A.
Radioactive wastes, Water pollution, Environmental impact, Barents Sea.

47-5024
Estimated inventory of radionuclides in former Soviet Union naval reactors dumped in the Kara Sea and their associated health risk.
Mount, M.E., et al, Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.105-118, 19 refs.
Radioactive wastes, Water pollution, Environmental impact, Health, Sea water, Submarines, Radioactive isotopes, USSR—Kara Sea.

47-5025
Cs-137 contamination of sea water surrounding the "Komsomoletz" nuclear submarine.
Neĭdanov, G., Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.119-133, 3 refs.
Submarines, Water pollution, Radioactive wastes, Radioactive isotopes, Spectra, Sea water, Norwegian Sea.

47-5026
Bomb radiocarbon in arctic Alaskan aquatic and terrestrial biota.
Schell, D.M., Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.135-144, 12 refs.
Environmental impact, Carbon isotopes, Animals, Ecology, Plankton, Marine biology, Tundra, Peat, Bombing, Bering Sea, United States—Alaska—North Slope.

47-5027
I-129 as a tracer of European reprocessing emissions in the North Atlantic and Arctic oceans.
Zhou, Z.Q., et al, Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.145-156, 19 refs.
Raisbeck, G.M., Yiou, F., Kilius, L.R.
Water pollution, Radioactive wastes, Fallout, Radioactive isotopes, Arctic Ocean, North Atlantic Ocean.

47-5028
Radioactive contamination of the Barents and Kara seas.
Vakulovskiĭ, S.M., et al, Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.157-168, 11 refs.
Nikitin, A., Chumichev, V.
Water pollution, Radioactive isotopes, Radioactive wastes, Barents Sea, USSR—Kara Sea.

47-5029
Arctic radioactive contamination: past legacy and future.
IAkimets, V., Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.169-190, 9 refs.
Water pollution, Radioactive wastes, Submarines, Waste disposal, Radioactive isotopes.

47-5030
Artificial radioactivity, and mixing in the Arctic.
Denner, W.W., et al, Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.191-200, 9 refs.
Temple, P.R.
Radioactive wastes, Waste disposal, Ocean currents, Water pollution, Arctic Ocean.

47-5031
Radioactivity in the Barents Sea, past and present status, and its impact on fisheries.
Föyn, L., Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.201-211, 10 refs.
Environmental impact, Radioactive wastes, Animals, Water pollution, Marine biology, Ecology, Barents Sea.

47-5032
Behavior of artificial radionuclides in seawater.
Khodakovskiĭ, I.L., et al, Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.213-223, 25 refs.
Mironenko, M.V., Sergeeva, E.I.
Sea water, Water pollution, Radioactive wastes, Ions, Waste disposal, Radioactive isotopes, Thermodynamics, Computer programs.

47-5033
Temporal evolution of artificial radioactivity in the North and Baltic Sea after the reduction of the Sellafield discharges and the Chernobyl accident.
Nies, H., et al, Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.225-236, 12 refs.
Herrmann, J., Goroncy, I.
Radioactive wastes, Waste disposal, Water pollution, Radioactive isotopes, Fallout, North Sea, Baltic Sea, USSR—Chernobyl.

47-5034
Organization and technical facilities of the radiation monitoring of sunken objects with radioactive components.
Nosov, N.A., Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.237-249.
Radioactive wastes, Water pollution, Monitors.

47-5035
Formation features of the structure and variability of the hydrological processes of the Kara Sea area.
Pavlov, V.K., Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.251-265, 10 refs.
Hydrologic cycle, Sea ice, Ice cover effect, Runoff, Tidal currents, Water pollution, Radioactive wastes, USSR—Kara Sea.

47-5036
Potential transport of radionuclides and other pollutants by arctic sea ice.
Pfirman, S.L., et al, Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.267-284, 56 refs.
Eicken, H., Grabitz, D.
Sea ice, Pack ice, River ice, Brines, Ice scoring, Radioactive isotopes, Ice formation, Drift, Water pollution, Barents Sea, Greenland Sea, Fram Strait.

47-5037
Large-scale circulation of the Arctic Ocean: implications for pollutant transport.
Schlosser, P., et al, Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.285-309, 22 refs.
Swift, J.H., Lewis, D.
Waste disposal, Water pollution, Radioactive isotopes, Oceanography, Ocean currents, Runoff, Drift, Tritium, Arctic Ocean, Barents Sea, USSR—Kara Sea.

47-5038
Mobility of radioisotopes in marine surface sediments.
Buchholtz ten Brink, M.R., et al, Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.311-323, 21 refs.
Santschi, P.H.
Radioactive isotopes, Sediments, Waste disposal, Water pollution, Radioactive wastes, USSR—Kara Sea, USSR—Ob' River.

47-5039
Destruction of the ecological food-chain in the Barents Sea as a result of a combination of overfishing and atmospheric nuclear testing at Novaya Zemlya.
Vorontsov, N.N., Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.325-327.
Fallout, Ecosystems, Environmental impact, Water pollution, Barents Sea, USSR.

47-5040
Non-local radiological consequences of nuclear waste dumping in the Arctic seas: a preliminary assessment.
Baxter, M.S., et al, Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.329-341, 10 refs.
Radioactive wastes, Radioactive isotopes, Waste disposal, Water pollution, Data processing, Barents Sea, USSR—Kara Sea.

47-5041
Application of U.S. interagency coastal and marine monitoring programs for determining levels of radioactivity resulting from disposal of radioactive wastes in Arctic seas.
Curtis, W.R., et al, Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.343-357, 26 refs.
Dyer, R.S.
Monitors, Waste disposal, Radioactive wastes, Water pollution, Ecosystems, Radioactive isotopes, Marine biology.

47-5042
Treatment of data on sea pollutions and dumping sites with radioecological indices method.
Georgievskiĭ, V., et al, Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.359-365, 2 refs.
Eremenko, V.
Data processing, Ecosystems, Waste disposal, Radioactive wastes, Water pollution, Ecology.

47-5043
Application of offshore drilling technology to the entombment of artificial sources of radioactivity on the sea floor.
Francis, T.J.G., Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.367-377, 4 refs.
Countermeasures, Radioactive isotopes, Water pollution, Offshore drilling, Ocean bottom, Construction.

47-5044
Radioactive contamination of the northern seas: approaches to the assessment of the impact on the marine environment and man.
Kuznetsov, IU.V., et al, Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.379-394, 31 refs.
Legin, V.K.
Radioactive isotopes, Fallout, Radioactive wastes, Submarines, Waste disposal, Water pollution, Ecosystems, Environmental impact, North Sea, Baltic Sea, Norwegian Sea, USSR—Pripyat' River, USSR—Dnepr River.

47-5045
Radioecological risk assessment for solid radioactive waste (SRW) dumped into the Kara Sea by the former USSR.
Lystsov, V.N., Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.395-414, 6 refs.
Radioactive wastes, Radioactive isotopes, Waste disposal, Water pollution, Ecosystems, Submarines, Nuclear power, USSR—Kara Sea, USSR—Novaya Zemlya, USSR—Laptev Sea, Barents Sea, Arctic Ocean

47-5046
Problems of evaluation and management of risk of radioactive contamination of oceans.
Protsenko, A.N., et al, Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.425-438, 2 refs.
Kuz'min, I.I.
Radioactive wastes, Waste disposal, Water pollution, International cooperation, Research projects.

47-5047
Expedition to the nuclear submarine *Komsomolets* site.
Samoflov, V., Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.439-442.
Submarines, Water pollution, Radioactive wastes, Norwegian Sea.

47-5048
International Arctic Seas Assessment Project IASAP (1993-1996).
Sjoeblom, K.-L., et al, Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.443-447, 2 refs.
Linsley, G.
Research projects, International cooperation, Radioactive wastes, Waste disposal, Water pollution, Barents Sea, USSR—Kara Sea.

47-5049
Assessment of deep-sea nekton and their role in radionuclide transfer.
Stein, D.L., Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.449-461, 10 refs.
Marine biology, Ecosystems, Ecology, Sampling, Radioactive isotopes, Radioactive wastes.

47-5050
Radiological assessment for the dumping of radioactive wastes in the oceans.
Templeton, W.L., Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.480-496, 18 refs.
Waste disposal, Radioactive wastes, Water pollution, Ecosystems, Ecology, Barents Sea, USSR—Kara Sea.

47-5051
Certain legal issues concerning prevention of radioactive pollution of the arctic marine environment from land-based sources.
Barsegov, IU., Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.523-534.
International cooperation, Legislation, Radioactive wastes, Waste disposal, Water pollution.

47-5052
Framework for a regional environmental regime for the Arctic.
Chircop, A., Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.535-540, 5 refs.
Legislation, International cooperation, Environmental protection.

47-5053
London Convention and radioactive waste dumping at sea: a global treaty regime in transition.
Curtis, C., Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.541-555, 15 refs.
Radioactive wastes, Waste disposal, Legislation, International cooperation, Environmental protection.

47-5054
Radioactive pollution from accidents involving nuclear-powered vessels: problems and solutions.
Handler, J., Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.557-572, 23 refs.
Radioactive wastes, Waste disposal, Submarines, Water pollution.

47-5055
Use of ALARA in decision making on costly international cleanup effort of radioactive contamination.
Kuz'min, I.I., et al, Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.573-584, 10 refs.
Shaposhnikov, D.A.
International cooperation, Cost analysis, Economic analysis, Radioactive wastes.

47-5056
Some aspects of radioactive wastes dumping: international regulation.
Menshikov, V.F., et al, Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.585-594.
Hippius, E.V.
Legislation, International cooperation, Radioactive wastes, Waste disposal, Water pollution.

47-5057
Environmental security and governance issues in the Arctic Ocean.
Perelet, R., Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.595-601, 16 refs.
Environmental protection, International cooperation, Legislation, Research projects, Radioactive wastes, Waste disposal, Arctic Ocean.

47-5058
Legal regulation of environmental improvement of the Russian Federation nuclear complex activities in order to prevent radioactive pollution of arctic seas.
Veksler, M., Radioactivity and Environmental Security in the Oceans: New Research and Policy Priorities in the Arctic and North Atlantic, Woods Hole, MA, June 7-9, 1993. Proceedings., Woods Hole, MA, Woods Hole Oceanographic Institution, June 1993, p.609-614.
Legislation, Environmental protection, Nuclear power, Radioactive wastes, Waste disposal, Water pollution, USSR.

47-5059
Antifreeze glycopeptide adsorption on single crystal ice surfaces using ellipsometry.
Wilson, P.W., et al, *Biophysical journal*, June 1993, 64(6), p.1878-1884, 26 refs.
Beaglehole, D., DeVries, A.L.
Ice crystals, Antifreezes, Adsorption.
Antarctic fishes synthesize antifreeze proteins which can effectively inhibit the growth of ice crystals. The mechanism relies on adsorption of these proteins to the ice surface. Ellipsometry has been used to quantify glycopeptide antifreeze adsorption to the basal and prism faces of single ice crystals. The rate of accumulation was determined as a function of time and at concentrations between 0.0005 and 1.2 mg/ml. Estimates of packing density at saturation coverage have been made for the basal and prism faces. (Auth.)

47-5060
Antarctic sea ice mapping using the AVHRR.
Zibordi, G., et al, *Remote sensing of environment*, Aug. 1993, 45(2), p.155-163, 31 refs.
Van Woert, M.L.
Sea ice distribution, Classifications, Spaceborne photography, Radiometry, Sensor mapping, Infrared mapping, Resolution, Image processing, Antarctica—Weddell Sea.
A sea ice mapping scheme based on Advanced Very High Resolution Radiometer (AVHRR) data from the NOAA polar orbiting satellites has been developed and applied to daylight images taken between Nov. 1989 to Jan. 1990 and Nov. 1990 to Jan. 1991 over the Weddell and Ross Seas. After masking of the continent and ice shelves, sea ice is discriminated from clouds and open sea using thresholds applied to the multidimensional space formed by AVHRR Channel 2, 3, and 4 radiances. Sea ice concentrations in cloud-free regions are then computed, using the tie-point method. Results based on the analysis of more than 70 images show that the proposed scheme is capable of properly discriminating among sea ice, open sea, and clouds under most conditions, thus allowing high resolution sea ice maps to be produced during the austral summer season. (Auth.)

47-5061
Resistance of high strength concrete to cold weather environments—durability and performance of concrete containing fly ash.
Ernzen, J.J., et al, *University of Texas. Center for Transportation Research. Research report.*, July 1993, No.481-7, 304p., FHWA/TX-93+481-7, 81 refs.
Carrasquillo, R.L.
Concrete strength, Concrete durability, Reinforced concretes, Concrete aggregates, Mechanical tests, Cold weather performance, Cold weather tests, Freeze thaw tests, Air entrainment, Frost resistance, Mechanical properties.

47-5062
Science of snow and ice (1). [Yuki to kori no kagaku (1)],
Inoue, M., *Yuki to doro (Snow and roads)*, Oct. 1984, No.1, p.15-18, In Japanese.
Road icing, Snowfall, Snow cover stability.

47-5063
Summary of damages and countermeasures in the snowstorms of 1984. [Showa 59 nen gosetsu no higai to taisaku no gaiyo],
Takahashi, T., *Yuki to doro (Snow and roads)*, Oct. 1984, No.1, p.30-34, In Japanese.
Snowstorms, Snowfall, Snow removal, Accidents, Cost analysis, Japan.

47-5064
Status of road snow removal in the snowstorms of 1984. [59 gosetsu ni okeru doro josetsu jokyo],
Iina, I., *Yuki to doro (Snow and roads)*, Oct. 1984, No.1, p.35-39, In Japanese.
Snowstorms, Snow removal, Road maintenance, Japan.

47-5065
Safeguarding of high speed highways. [Kosoku doro no kakuho],
Hirai, M., *Yuki to doro (Snow and roads)*, Oct. 1984, No.1, p.40-44, In Japanese.
Road icing, Road maintenance, Highway planning, Safety, Japan.

47-5066
Safeguarding traffic on the snowy stretches of National Highway 17 during the 1984 snowstorms. [59 gosetsu ni okeru kokudo 17 go tasetsu kukan no kotsu kakuho ni tsuite].
Aoki, S., *Yuki to doro (Snow and roads)*, Oct. 1984, No.1, p.45-50, In Japanese.
Snowstorms, Snow removal, Road maintenance, Avalanches, Japan.

47-5067
Snowdrifts on National Highway 7. [Kokudo 7 go ni okeru jifubuki ni tsuite].
Kuroki, M., *Yuki to doro (Snow and roads)*, Oct. 1984, No.1, p.51-57, In Japanese.
Snowstorms, Snowdrifts, Snow removal, Road maintenance, Japan.

47-5068
Safeguarding the main roads in Hokkaido. [Hokkaido no kansen doro no kakuho ni tsuite].
Bando, T., *Yuki to doro (Snow and roads)*, Oct. 1984, No.1, p.58-63, In Japanese. 1 ref.
Snow removal, Road maintenance, Highway planning, Japan—Hokkaido.

47-5069
Looking back at the snowstorms of 1984. [59 gosetsu o furikaette].
Iwatani, T., *Yuki to doro (Snow and roads)*, Oct. 1984, No.1, p.64-68, In Japanese.
Snowstorms, Snow removal, Road maintenance, Japan.

47-5070
Current status and countermeasures in isolated communities. [Koritsu shuraku no genkyo to taisaku],
Niigata Prefecture Civil Engineering Department, *Yuki to doro (Snow and roads)*, Oct. 1984, No.1, p.69-74, In Japanese.
Snowstorms, Cold weather operation, Rescue operations, Japan.

47-5071
Looking back at the snowstorms of 1984. [59 gosetsu o furikaette],
Ima, M., *Yuki to doro (Snow and roads)*, Oct. 1984, No.1, p.75-79, In Japanese.
Snowstorms, Snow removal, Road maintenance, Japan.

47-5072
Snow removal in Sapporo City. [Sapporoshi no josetsu ni tsuite],
Segawa, T., *Yuki to doro (Snow and roads)*, Oct. 1984, No.1, p.80-84, In Japanese.
Snow removal, Road maintenance, Municipal engineering, Japan—Sapporo.

47-5073
Developing comprehensive technology to make cities snowproof. [Yuki ni tsuyoi toshi zukuri ni kansuru sogo gijutsu no kaihatsu].
Shibata, M., et al, *Yuki to doro (Snow and roads)*, Oct. 1984, No.1, p.85-89, In Japanese.
Ueda, S.
Snow removal, Road maintenance, Municipal engineering.

47-5074
On-site tests for dealing with roadside snowbanks by water sprinkling. [Sansui ni yoru rosoku settei shori no genchi shiken].
Murakuni, M., *Yuki to doro (Snow and roads)*, Oct. 1984, No.1, p.90-95, In Japanese.
Snow removal, Snowdrifts, Road maintenance, Artificial melting.

47-5075
Study on snow fences. [Bosetsusaku no kenkyu].
Takeuchi, M., et al, *Yuki to doro (Snow and roads)*, Oct. 1984, No.1, p.96-100, In Japanese. 7 refs.
Ishimoto, K., Nohara, T., Fukuzawa, Y.
Snow fences, Blowing snow, Road maintenance.

47-5076
Study on winter traffic volume. [Toki kotsu yoryo chosa ni tsuite].
Seki, N., et al, *Yuki to doro (Snow and roads)*, Oct. 1984, No.1, p.101-106, In Japanese.
Sato, H.
Road maintenance, Road icing, Highway planning, Cold weather operation, Japan.

47-5077
Sapporo Road Office. [Sapporo doro jimusho yori].
Oyama, S., *Yuki to doro (Snow and roads)*, Oct. 1984, No.1, p.107-110, In Japanese.
Snow removal, Road maintenance, Japan—Sapporo.

47-5078
Estimated budget requirements for snow and cold weather operations for 1985. [60 nendo sekkan jigyo yosan gaisan yokyu].
Iina, I., *Yuki to doro (Snow and roads)*, Oct. 1984, No.1, p.111-112, In Japanese.
Snow removal, Road maintenance, Cold weather operation, Cost analysis, Japan.

47-5079
Science of snow and ice (2). [Yuki to kori no kagaku (2)].
Inoue, M., *Yuki to doro (Snow and roads)*, Jan. 1985, No.2, p.9-13, In Japanese.
Snowdrifts, Snow cover, Avalanches.

47-5080
Current status and countermeasures in the problem of studded tires. [Supaikutaiya mondai no genkyo to taisaku],
Fujishiro, Y., *Yuki to doro (Snow and roads)*, Jan. 1985, No.2, p.29-34, In Japanese.
Road icing, Road maintenance, Tires, Environmental protection, Legislation.

47-5081
Skid resistance of studded tires. [Supaikutaiya no suberi masatsu teiko],
Shibata, M., et al, *Yuki to doro (Snow and roads)*, Jan. 1985, No.2, p.35-41, In Japanese. 8 refs.
Onoda, M.
Road icing, Tires, Skid resistance.

47-5082
Actual conditions and countermeasures for pavement abrasion. [Hoso mamo no jittai to taisaku],
Iijima, H., *Yuki to doro (Snow and roads)*, Jan. 1985, No.2, p.42-51, In Japanese. 8 refs.
Road icing, Tires, Road maintenance, Pavements, Abrasion.

47-5083
Summary and improvement trends for studded tires. [Supaikutaiya no gaiyo to kairyo no hoko],
Hayashi, H., *Yuki to doro (Snow and roads)*, Jan. 1985, No.2, p. 52-62, In Japanese.
Road icing, Tires, Road maintenance.

47-5084
Countermeasures to the problem of studded tires in Hokkaido. [Hokkaido ni okeru "supaikutaiya mondai" to sono taisaku ni tsuite],
Ito, K., *Yuki to doro (Snow and roads)*, Jan. 1985, No.2, p.63-68, In Japanese.
Road icing, Tires, Road maintenance.

47-5085
Countermeasures to studded tires in Miyagi Prefecture. [Miyagiken ni okeru supaikutaiya taisaku],
Onodera, O., *Yuki to doro (Snow and roads)*, Jan. 1985, No.2, p.69-72, In Japanese.
Road icing, Tires, Road maintenance.

47-5086
Frost heave damage to roads from abnormally low temperatures. [Ijo teion ni yoru doro no tojo saigai ni tsuite],
Ito, N., *Yuki to doro (Snow and roads)*, Jan. 1985, No.2, p.73-76, In Japanese.
Road icing, Frost heave, Pavements, Cost analysis, Japan.

47-5087
Wrestling with the problem of studded tires. [Supaikutaiya mondai e no torikumi ni tsuite],
Niigata Prefecture Civil Engineering Department, *Yuki to doro (Snow and roads)*, Jan. 1985, No.2, p.77-82, In Japanese.
Road icing, Tires, Road maintenance.

47-5088
Pipe transport system for snow. [Yuki no paipu yuso shisutemu],
Isobe, K., *Yuki to doro (Snow and roads)*, Jan. 1985, No.2, p.83-89, In Japanese. 9 refs.
Snow removal, Road maintenance, Drains, Water pipelines.

47-5089
Study on the performance of various anti-skid devices. [Kakushu suberidome sochi no seino chosa],
Inagaki, M., *Yuki to doro (Snow and roads)*, Jan. 1985, No.2, p.90-95, In Japanese.
Road icing, Tires, Skid resistance.

47-5090
Study and design of countermeasures for blowing snow. [Fubuki taisaku no chosa, sekkei ni tsuite],
Katayama, O., et al, *Yuki to doro (Snow and roads)*, Jan. 1985, No.2, p.96-101, In Japanese. 5 refs.
Nakayama, M.
Snow fences, Snow hedges, Blowing snow, Road maintenance.

47-5091
Winter in Yuzawa. [Yuzawa no fuyu],
Kawakami, A., *Yuki to doro (Snow and roads)*, Jan. 1985, No.2, p.106-111, In Japanese.
Snow removal, Road maintenance, Japan.

47-5092
Improvement and development of snow removal equipment at the Hokuriku Regional Construction Bureau. [Hokuriku chiho kensetsukyoku ni okeru josetsu kikai no kairyo, kaihatsu],
Sugiyama, A., et al, *Yuki to doro (Snow and roads)*, Jan. 1985, No.2, p.112-119, In Japanese.
Muramatsu, T., Haga, K.
Snow removal, Road maintenance, Vehicles.

47-5093
Bulletin on the budget for snow and cold weather operations for 1985. [Showa 60 nendo sekkan jigyo yosan sokuho],
Iina, I., *Yuki to doro (Snow and roads)*, Jan. 1985, No.2, p.123, In Japanese.
Snow removal, Road maintenance, Cold weather operation, Cost analysis, Japan.

47-5094
Science of snow and ice (3). [Yuki to kori no kagaku (3)],
Inoue, M., *Yuki to doro (Snow and roads)*, Apr. 1985, No.3, p.7-10, In Japanese.
Metamorphism (snow), Snow stratigraphy, Ice sublimation, Ice sintering.

47-5095
Snow countermeasure operations at the Hokkaido Development Bureau. [Hokkaido kaihatsukyoku no bosetsu jigyo ni tsuite],
Bando, T., *Yuki to doro (Snow and roads)*, Apr. 1985, No.3, p.21-28, In Japanese. 1 ref.
Snow fences, Snow hedges, Snow removal, Road maintenance, Cost analysis, Japan—Hokkaido.

47-5096
Road snow removal in Nagaoka in the snow belt. [Tasetsu chitai Nagaoka ni okeru doro no josetsu],
Nishikata, M., *Yuki to doro (Snow and roads)*, Apr. 1985, No.3, p.29-32, In Japanese.
Snow removal, Road maintenance, Japan—Nagaoka.

47-5097
Snow removal in Yamagata Prefecture. [Yamagata ken no doro josetsu ni tsuite],
Yamagata Prefecture Civil Engineering Department, *Yuki to doro (Snow and roads)*, Apr. 1985, No.3, p.33-41, In Japanese.
Snow removal, Road maintenance, Japan—Yamagata Prefecture.

47-5098
Road snow removal in Hokuriku regional construction. [Hokuriku chiken no doro josetsu ni tsuite],
Yasui, K., et al, *Yuki to doro (Snow and roads)*, Apr. 1985, No.3, p.42-48, In Japanese.
Higuchi, I.
Snow removal, Road maintenance, Highway planning, Cost analysis, Japan.

47-5099
Traffic flow on local two lane roads in Hokkaido. [Hokkaido ni okeru chihobu 2 shasen doro no kotsuryu],
Ogino, H., et al, *Yuki to doro (Snow and roads)*, Apr. 1985, No.3, p.49-52, In Japanese. 1 ref.
Abe, S.
Road icing, Road maintenance, Cold weather operation, Japan—Hokkaido.

47-5100
Shinjo Branch of the National Research Center for Disaster Prevention Science and Technology. [Kokuritsu bosai kagaku gijutsu senta Shinjo shisho],
Nakamura, T., *Yuki to doro (Snow and roads)*, Apr. 1985, No.3, p.53-60, In Japanese.
Organizations, Research projects, Snowstorms, Snow loads, Road icing, Cold weather operation, Japan.

47-5101
Scavenging effect of snow. [Yuki no seijo koka ni tsuite],
Kumagai, K., et al, *Yuki to doro (Snow and roads)*, Apr. 1985, No.3, p.61-64, In Japanese.
Watanabe, N., Hoyasu, M.
Snowfall, Scavenging, Air pollution, Dust.

47-5102
Roads of Hida in snow. [Yuki no Hida michi],
Sone, I., et al, *Yuki to doro (Snow and roads)*, Apr. 1985, No.3, p.72-76, In Japanese.
Suzuki, H.
Snow removal, Road maintenance, Japan.

47-5103
Improvement and development of sidewalk snow removal equipment at the Tohoku Regional Construction Bureau. [Tohoku chiho kensetsukyoku ni okeru hodo josetsu kikai no kairyo, kaihatsu],
Takahashi, K., et al, *Yuki to doro (Snow and roads)*, Apr. 1985, No.3, p.77-81, In Japanese.
Sai, T.
Snow removal, Road maintenance, Vehicles, Sidewalks.

47-5104
Bulletin on road snow removal in the 1985 snowstorms. [Showa 60 gosetsu ni okeru doro josetsu sokuho],
Iina, I., *Yuki to doro (Snow and roads)*, Apr. 1985, No.3, p.82-83, In Japanese.
Snowstorms, Snow removal, Road maintenance, Cost analysis, Japan.

47-5105
Soil-fabric measurement using phase transition porosimetry.
Gunnink, B.W., et al, *Journal of geotechnical engineering*, June 1993, 119(6), p.1019-1036, 25 refs.
El-Jayyousi, J.
Soil tests, Soil structure, Freeze thaw cycles, Porosity, Phase transformations, Laboratory techniques, Electrical measurement, Capillarity, Ice water interface.

47-5106
Identification of clear and cloudy pixels at high latitudes from AVHRR radiances.
Sakellariou, N.K., et al, *International journal of remote sensing*, July 10, 1993, 14(10), p.2005-2024, 30 refs.
Leighton, H.G., Li, Z.
Polar atmospheres, Cloud cover, Detection, Classifications, Spaceborne photography, Resolution, Image processing, Radiometry, Snow cover effect, Ice cover effect.

47-5107
Toughness indices of steel fiber reinforced concrete at subzero temperatures.
Banthia, N., et al, *Cement and concrete research*, July 1993, 23(4), p.863-873, 13 refs.
Mani, M.
Reinforced concretes, Concrete strength, Flexural strength, Brittleness, Mechanical tests, Thermal stresses, Low temperature tests, Temperature effects.

47-5108
Numerical and experimental study on supercooled laminar flow of water.
Ismail, K.A.R., et al, World Conference on Experimental Heat Transfer, Fluid Mechanics, and Thermodynamics, 2nd Dubrovnik, Yugoslavia, June 23-28, 1991. Proceedings. Edited by J.F. Deffer et al, New York, Elsevier Science Publishing Co., 1991, p.899-903, 10 refs.
Padilha, A.
DLC QC319.8.W67 1991
Laminar flow, Water flow, Supercooling, Solidification, Phase transformations, Liquid solid interfaces, Heat transfer, Analysis (mathematics).

47-5109
Recent advances in research on freezing and melting heat-transfer phenomena.
Fukusako, S., et al, World Conference on Experimental Heat Transfer, Fluid Mechanics, and Thermodynamics, 2nd Dubrovnik, Yugoslavia, June 23-28, 1991. Proceedings. Edited by J.F. Deffer et al, New York, Elsevier Science Publishing Co., 1991, p.1157-1170, 140 refs.
Yamada, M.
DLC QC319.8.W67 1991
Freezing, Ice formation, Ice melting, Ice physics, Ice water interface, Ice air interface, Ice heat flux, Heat transfer.

47-5110
Effect of the water density extremum on the solidification process.
Braga, S.L., et al, World Conference on Experimental Heat Transfer, Fluid Mechanics, and Thermodynamics, 2nd Dubrovnik, Yugoslavia, June 23-28, 1991. Proceedings. Edited by J.F. Deffer et al, New York, Elsevier Science Publishing Co., 1991, p.1185-1192, 21 refs.
Viskanta, R.
DLC QC319.8.W67 1991
Fluid dynamics, Liquid cooling, Liquid solid interfaces, Phase transformations, Ice formation, Temperature effects, Solidification, Convection, Water structure, Density (mass/volume).

47-5111
Proceedings of the Fifth Symposium on Antarctic Logistics and Operations, San Carlos de Bariloche, Argentina, 8 to 10 June 1992.
Melander, O., ed, Buenos Aires, Dirección Nacional del Antártico, 1993, 365p., Refs. passim. For individual papers see A-48923, A-48945 through A-48947, B-48922, B-48924, B-48925, B-48932, B-48935, C-48944, G-48929 through G-48931, G-48933, G-48934, G-48936 through G-48941, G-48943, H-48926 through H-48928, J-48942 or 47-5112 through 47-5118.
Fontana, L.R., ed.
Research projects, Low temperature research, Logistics, Transportation, Environmental protection, Oil spills.
This is a collection of papers presented at the Fifth Symposium on Antarctic Logistics and Operations, held June 8-10, 1992, in San Carlos de Bariloche, Argentina. The Symposium was conducted by the Standing Committee on Antarctic Logistics and Operations (SCALOP) of the Council of Managers of National Antarctic Programs (COMNAP). Among the 26 papers presented, there are some dealing with general issues related to antarctic logistics regarding ships, stations and transportation, but the emphasis of the Fifth Symposium was on environmental impact issues, with one day dealing with oil-spill fighting, a field in which a subgroup of SCALOP is reported to be working.

47-5112
Petroleum pollution prevention, response and remediation in the Antarctic: an equipment and procedural approach.
Kohlmeyer, C.R.C., Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.157-172, 7 refs.
Oil spills, Countermeasures, Environmental protection, Impurities, Equipment, Fuel transport.
This overview presents several key issues for the prevention and remediation of petroleum pollution in the antarctic environment. The use of state of the art equipment, properly maintained, combined with site specific operational procedures, are components of a zero release philosophy. The equipment and procedures must be tailored to the harsh antarctic environment and the specialized petroleum products that are currently in use there. The development of a set of detailed standards and recommended practices allows for a uniform program designed to minimize petroleum releases. The training and implementation of new procedures must be carefully tailored to the unique psychological environment of the antarctic community. Upgrading existing tanks with secondary containment systems, leak detection sensors, and dry-break delivery nozzle technology is presented as a cost effective strategy. If this were coupled with adequate training and formal operational procedure, the zero release goal would be attainable. (Auth. mod.)

47-5113
Use of the C-5 Galaxy in support of the United States Antarctic Program.
Bresnahan, D.M., Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.238-245.
Logistics, Ice runways, Ice growth, Aircraft, Aircraft landing areas, Cold weather operation, Cargo, Antarctica—McMurdo Station.
The National Science Foundation (NSF) has overall funding and management responsibility for U.S. activities in Antarctica. The Unites States Antarctic Program (USAP) relies heavily on airlift support, both intracontinental and intercontinental, to provide logistics support to all elements of the program. The annual ice runway allows conventional wheeled aircraft to fly between McMurdo and Christchurch, New Zealand, from early Oct. through early Dec. each austral summer. The ability to move large amounts of cargo to McMurdo by air earlier in the season gives the USAP the capability to support projects which would normally be dependent on surface vessels for the delivery of needed support material early in the austral summer. Operations of the C-5 aircraft at McMurdo are described.

47-5114
Vehicles and transports during the Swedish Antarctic Research Programme 1991/92.
Berg, A., Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.258-266.
Traverses, Transportation, Snow vehicles, Sleds, Ice navigation, Portable equipment, Antarctica—Aboa Station, Antarctica—Wasa Station, Antarctica—Queen Maud Land.
The transport system for the 1991-92 Swedish expedition, as well as earlier expeditions, was mainly based on the Hägglunds Bv 206 All-Terrain Carrier. The Bv 206 was chosen with respect to the current range of application and 5,000 units in 15-20 different versions being already in operational use in the Swedish Army since the early 80s. The vehicles were of original design, but had been equipped for use in Antarctica. Modification work was kept to a minimum. Dwelling containers, containers for scientific samples, scientific equipment, food and fuel were transported from the unloading site on the sea-ice outside the Riiser-Larsen Ice Shelf to the Swedish and Finnish stations in Vestfjella, Queen Maud Land. One 1700-km and two 800-km traverses were carried out by scientists between Nov. 30, 1991 and Feb. 20, 1992. (Auth.)

47-5115
Transport concept at the antarctic stations and for field operations of the Alfred Wegener Institute.
Kohnen, H., et al, Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.267-273.
Müller, N.
Transportation, Snow vehicles, Sleds, Tractors, Traction, Portable equipment, Cargo, Bearing strength.
The antarctic operations of the Alfred Wegener Institute for Polar and Marine Research are primarily concentrated on the Weddell Sea and the adjacent ice-covered areas. Appropriate logistical technologies had to be developed and introduced to cope with the regional environmental conditions. The onshore transport logistics has to be suitable for travelling as well as for carrying heavy cargo on soft snow surfaces. The range of temperatures encountered through the year is from about 0 to -50 C. The density of the snow surface is low, thus requiring vehicles exerting a low specific ground pressure. A tractor is described which is able to tow heavy loads on over-snow traverses. It can be used as a mobile scientific laboratory or simply as a personnel carrier; it can also be modified to a construction and service machine equipped with cranes, front blades, front shovels, lifting forks or winches. Also described are heavy cargo sledges which can alternatively be used for transporting bulk cargo, standard 20' cargo containers, 20' tank containers or 20' living modules.

47-5116
Aspects to be considered in planning logistic operations in the Weddell and Bellingshausen seas.
Federici, V.M., et al, Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.274-299, 11 refs.
Poy, R.L., Cattáneo, N.
Meteorological data, Meteorological factors, Ice navigation, Sea ice distribution, Marine transportation, Unloading, Antarctica—Bellingshausen Sea, Antarctica—Weddell Sea.
To facilitate naval operations dealing with logistic support to stations in the Weddell Sea and Bellingshausen Sea areas, local meteorological and glaciological data obtained during the last 20 years are discussed. It is concluded that the most favorable conditions to carry out such operations in the vicinity of the Antarctic Peninsula prevail from Dec. through Mar., which could possibly be extended to include Nov. and Apr. for tasks in specific areas.

47-5117
Performance of the *Nathaniel B. Palmer* in ice.
Sutherland, A.L., et al, Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.300-309, 5 refs.
Kennedy, H., Voelker, R., St. John, J.
Ice navigation, Ships, Icebreakers, Sea ice, Equipment, Laboratories, Diesel engines, Antarctica—Weddell Sea.
On the first voyage of the *Nathaniel B. Palmer* into ice, it transited well into the southwestern Weddell Sea to a position of 67.7S, 51.7W. This brought the ship into some of the thickest and oldest ice in the Weddell. Generally, Weddell Sea ice has a maximum age of 1 1/2 years, although floes of 2 yr ice do occur and were likely encountered. Ship performance throughout this journey was excellent. This paper, written aboard ship at the conclusion of the maiden voyage, details the ship's performance during the cruise. Attached is a companion paper which describes the vessel's specifications, procurement, and scientific capabilities. (Auth. mod.)

47-5118
Antarctic drifting sea ice atlas for areas restricted from 0 to 90 west longitude.
Faccini, E.E., et al, Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.310-317.
Alba, G.J.
Sea ice distribution, Ice navigation, Ice edge, Maps.
To facilitate naval operations in the Antarctic, a study was made of spatial distribution of the ice edge, the frequency of ice field occurrence, the ice field edges, the standard deviation of the ice field boundaries mean positions and interior channels, the mean ice concentration, and the selective concentration occurrence frequency. Results are described and shown in 6 maps drawn for the first two weeks of Jan. for the period 1973-1990.

47-5119
Antarctic ice sheet topography mapped with the ERS-1 radar altimeter.
Ridley, J.K., et al, *International journal of remote sensing*, June 1993, 14(9), p.1649-1650, 6 refs.
Laxon, S.W.C., Rapley, C.G., Mantripp, D.R.
Ice sheets, Glacier surveys, Glacier surveys, Topographic features, Height finding, Spaceborne photography, Radiometry.
This note describes an image derived from ERS-1 satellite altimeter fast delivery (FD) data, which corresponds to on-board height values accumulated during periods of the 3-day repeat orbit patterns. The image provides a representation of antarctic topography accurate to within the resolution of the color-height scale used for illustration, and shows excellent agreement with the best available map from existing survey data. This early result illustrates vividly the major improvement in antarctic topographic mapping which will be possible once the 35-day and 176-day orbit repeat cycles of the ERS-1 mission have been completed. (Auth. mod.)

47-5120
Glacier study using wavenumber domain synthetic aperture radar.
Hamran, S.E., et al, *Radio science*, July-Aug. 1993, 28(4), p.559-570, 12 refs.
Aarholt, E.
Glacier surveys, Remote sensing, Glacier mass balance, Radar echoes, Synthetic aperture radar, Subsurface investigations, Wave propagation, Data processing, Analysis (mathematics), Resolution.

47-5121
Subdivision of Late Pleistocene moraines in the Cordillera Blanca, Peru, based on rock-weathering features, soils, and radiocarbon dates.
Rodbell, D.T., *Quaternary research*, Mar. 1993, 39(2), p.133-143, 40 refs.
Pleistocene, Glaciation, Quaternary deposits, Geological surveys, Moraines, Weathering, Radioactive age determination, Mountain glaciers, Peru—Cordillera Blanca.

47-5122
Neoglacial glacier fluctuations in the Canadian Rockies.
Luckman, B.H., et al, *Quaternary research*, Mar. 1993, 39(2), p.144-153, 25 refs.
Holdsworth, G., Osborn, G.D.
Glacier oscillation, Mountain glaciers, Glacial deposits, Quaternary deposits, Moraines, Geological surveys, Radioactive age determination, Sediments, Wood, Canada—Alberta—Peyto Glacier.

47-5123
Relationship of temperature and light ring formation at subarctic treeline and implications for climate reconstruction.
Yamaguchi, D.K., et al, *Quaternary research*, Mar. 1993, 39(2), p.256-262, 27 refs.
Filion, L., Savage, M.
Paleoclimatology, Climatic changes, Volcanic ash, Temperature variations, Correlation, Trees (plants), Forest lines, Age determination, Subarctic landscapes, Canada—Hudson Bay.

47-5124
Laboratory simulation of a cometary nucleus: experimental setup and first results.
Kochan, H., et al, Lunar and Planetary Science Conference, 19th, Houston, TX, Mar. 14-18, 1988. Proceedings. Edited by G. Ryder et al, Houston, Lunar and Planetary Institute, 1989, p.487-492, 6 refs.
DLC QB592.A64a
Extraterrestrial ice, Ice sublimation, Geochemistry, Insolation, Simulation, Laboratory techniques, Performance.

47-5125
How far do results of recent simulation experiments fit current models of cometary nuclei.
Klinger, J., et al, Lunar and Planetary Science Conference, 19th, Houston, TX, Mar. 14-18, 1988. Proceedings. Edited by G. Ryder et al, Houston, Lunar and Planetary Institute, 1989, p.493-497, 21 refs.
DLC QB592.A64a
Extraterrestrial ice, Simulation, Ice sublimation, Porous materials, Geochemistry, Vapor diffusion, Ice air interface, Heat transfer, Analysis (mathematics).

47-5126
Decrease in the growth rates of atmospheric chlorofluorocarbons 11 and 12.
Elkins, J.W., et al, *Nature*, Aug. 26, 1993, 364(6440), p.780-783, 37 refs.
Air pollution, Chemical composition, Polar regions, Antarctica—Amundsen-Scott Station.
Here the focus is on CFC-11 (CCl_3F) and CFC-12 (CCl_2F_2), which are used for refrigeration, air conditioning and the production of aerosols and foams, and which together make up about half of the total abundance of stratospheric organic chlorine. A significant recent decrease in the atmospheric growth rates of these two species is reported, based on measurements spanning the past 15 years and latitudes ranging from 83N to 90S. This is consistent with CFC-producers' own estimates of reduced emissions. If the atmospheric growth rates of these two species continue to slow in line with predicted changes in industrial emissions, global atmospheric mixing ratios will reach a maximum before the turn of the century, and then begin to decline. (Auth.)

47-5127
Evaluating the role of climate cooling in iceberg production and the Heinrich events.
Oerlemans, J., *Nature*, Aug. 26, 1993, 364(6440), p.783-786, 22 refs.
Icebergs, Climatic changes, Ice sheets, Models.

47-5128
Ices on the surface of Triton.
Cruikshank, D.P., et al, *Science*, Aug. 6, 1993, 261(5122), p.742-745, 21 refs.
Extraterrestrial ice, Remote sensing, Chemical composition, Ice spectroscopy, Satellites (natural), Triton.

47-5129
Surface ices and the atmospheric composition of Pluto.
Owen, T.C., et al, *Science*, Aug. 6, 1993, 261(5122), p.745-748, 41 refs.
Extraterrestrial ice, Atmospheric composition, Remote sensing, Planetary environments, Satellites (natural), Pluto.

47-5130
Phase composition of Triton's polar caps.
Duxbury, N.S., et al, *Science*, Aug. 6, 1993, 261(5122), p.748-751, 19 refs.
Brown, R.H.
Ice sheets, Satellites (natural), Ice composition, Temperature variations, Models, Triton.

47-5131
Spectroscopic determination of the phase composition and temperature of nitrogen ice on Triton.
Tryka, K.A., et al, *Science*, Aug. 6, 1993, 261(5122), p.751-754, 17 refs.
Ice structure, Ice composition, Ice temperature, Satellites (natural), Triton.

47-5132
Probing stratospheric ozone.
Rodriguez, J.M., *Science*, Aug. 27, 1993, 261(5125), p.1128-1129, 20 refs.
Ozone, Clouds (meteorology), Aerosols, Atmospheric composition, Stratosphere, Chemical composition.

47-5133
Chlorine chemistry on polar stratospheric cloud particles in the Arctic winter.
Webster, C.R., et al, *Science*, Aug. 27, 1993, 261(5125), p.1130-1134, Numerous refs.
Ozone, Clouds (meteorology), Aerosols, Atmospheric composition, Stratosphere, Chemical composition.

47-5134
Seasonal evolution of reactive chlorine in the Northern Hemisphere stratosphere.
Toohey, D.W., et al, *Science*, Aug. 27, 1993, 261(5125), p.1134-1136, 20 refs.
Ozone, Seasonal variations, Atmospheric composition, Chemical composition.

47-5135
Heterogeneous reaction probabilities, solubilities, and the physical state of cold volcanic aerosols.
Toon, O., et al, *Science*, Aug. 27, 1993, 261(5125), p.1136-1140, 18 refs.
Ozone, Stratosphere, Aerosols, Atmospheric composition, Chemical composition.

47-5136
***In situ* observations of aerosol and chlorine monoxide after the 1991 eruption of Mount Pinatubo: Effects of reactions on sulfate aerosol.**
Wilson, J.C., et al, *Science*, Aug. 27, 1993, 261(5125), p.1140-1143, 27 refs.
Ozone, Atmospheric composition, Chemical composition.

47-5137
Stratospheric meteorological conditions in the Arctic polar vortex, 1991-1992.
Newman, P., et al, *Science*, Aug. 27, 1993, 261(5125), p.1143-1146, 28 refs.
Stratosphere, Atmospheric composition, Air temperature, Chemical composition, Atmospheric circulation.

47-5138
Chemical loss of ozone in the Arctic polar vortex in the winter of 1991-1992.
Salawitch, R.J., et al, *Science*, Aug. 27, 1993, 261(5125), p.1146-1149, 54 refs.
Ozone, Atmospheric circulation, Atmospheric composition, Chemical composition.

47-5139
Ozone loss inside the northern polar vortex during the 1991-1992 winter.
Proffitt, M.H., et al, *Science*, Aug. 27, 1993, 261(5125), p.1150-1154, 42 refs.
Ozone, Atmospheric circulation, Atmospheric composition, Chemical composition.

47-5140
Ozone and aerosol changes during the 1991-1992 Airborne Arctic Stratospheric Expedition.
Browell, E.V., et al, *Science*, Aug. 27, 1993, 261(5125), p.1155-1158, 16 refs.
Ozone, Aerosols, Seasonal variations, Atmospheric composition, Stratosphere, Chemical composition.

47-5141
Characteristics and possible source of a 1479 A.D. volcanic ash layer in a Greenland ice core.
Fiacco, R.J., Jr., et al, *Quaternary research*, May 1993, 39(3), p.267-273, 49 refs.
Ice sheets, Quaternary deposits, Ice cores, Drill core analysis, Ice composition, Aerosols, Volcanic ash, Atmospheric circulation, Greenland.

47-5142
Late Quaternary lacustrine pollen records from southwestern Beringia.
Lozhkin, A.V., et al, *Quaternary research*, May 1993, 39(3), p.314-324, 46 refs.
Paleoecology, Quaternary deposits, Lacustrine deposits, Subarctic landscapes, Landscape development, Tundra, Vegetation patterns, Palynology, USSR—Beringia.

47-5143
Pleistocene vertebrates and other fossils from Epiguruk, northwestern Alaska.
Hamilton, T.D., et al, *Quaternary research*, May 1993, 39(3), p.381-389, 23 refs.
Ashley, G.M., Reed, K.M., Schweger, C.E.
Quaternary deposits, Sampling, Pleistocene, Continuous permafrost, Tundra, Paleoecology, Palynology, Fossils, United States—Alaska—Kobuk River.

47-5144
Partitioning of nitrogen oxides in the lower arctic troposphere during spring 1988.
Bottenheim, J.W., et al, *Journal of atmospheric chemistry*, July 1993, 17(1), p.15-27, 32 refs.
Barrie, L.A., Atlas, E.
Polar atmospheres, Atmospheric boundary layer, Atmospheric composition, Chemical properties, Air pollution, Sampling, Chemical analysis, Ozone, Canada—Northwest Territories—Alert.

47-5145
Aluminium solubility in rainwater and molten snow.
Losno, R., et al, *Journal of atmospheric chemistry*, July 1993, 17(1), p.29-43, 27 refs.
Atmospheric composition, Precipitation (meteorology), Aerosols, Metals, Solubility, Snow impurities, Snow composition, Chemical analysis.

47-5146
Seasonal variability of hydraulic conductivity.
Asare, S.N., et al, *American Society of Agricultural Engineers. Transactions*, Mar.-Apr. 1993, 36(2), p.451-457, 21 refs.
Rudra, R.P., Dickinson, W.T., Well, G.J.
Soil tests, Soil composition, Saturation, Seasonal variations, Hydrology, Soil water migration, Unfrozen water content, Freeze thaw cycles, Soil temperature, Temperature effects, Frozen ground physics.

47-5147
Refractive indices of water and ice in the 0.65- to 2.5-micron spectral range.
Kou, L.H., et al, *Applied optics*, July 1, 1993, 32(19), p.3531-3540, 15 refs.
Labrie, D., Chýlek, P.
Cloud physics, Optical properties, Radiation absorption, Refractivity, Indexes (ratios), Standards, Ice crystal optics, Spectra, Infrared spectroscopy.

47-5148
Science of snow and ice (4). [Yuki to kori no kagaku (4)].
Inoue, M., *Yuki to doro (Snow and roads)*, July 1985, No.4, p.7-11, In Japanese.
Snow cover stability, Snow melting, Snow surface, Albedo.

47-5149
Avalanche countermeasures in Hokkaido. [Hokkaido ni okeru nadare taisaku].
Takeuchi, M., *Yuki to doro (Snow and roads)*, July 1985, No.4, p.22-26, In Japanese. 4 refs.
Avalanche engineering, Road maintenance, Avalanches, Snow fences, Snowsheds, Japan—Hokkaido.

47-5150
Avalanche countermeasures. [Yuki nadare taisaku ni tsuite],
Sato, K., *Yuki to doro (Snow and roads)*, July 1985, No.4, p.27-31, In Japanese. 1 ref.
Avalanche engineering, Avalanches, Avalanche formation, Japan.

47-5151
Avalanche countermeasures in the Tsuchidaru stretch of the Kanetsu Highway. [Kanetsu jidoshado (Tsuchidaru chiku) nadare taisaku],
Tsukada, C., et al, *Yuki to doro (Snow and roads)*, July 1985, No.4, p.32-36, In Japanese.
Hata, T.
Avalanche engineering, Avalanche forecasting, Road maintenance, Japan.

47-5152
Avalanche countermeasures in Fukushima Prefecture. [Fukushima ken no yuki nadare taisaku ni tsuite],
Hamazu, F., *Yuki to doro (Snow and roads)*, July 1985, No.4, p.37-44, In Japanese.
Avalanche engineering, Road maintenance, Avalanches, Snowsheds, Japan—Fukushima Prefecture.

47-5153
Summary of avalanche countermeasure operations in Fukushima Prefecture. [Fukushima ken no yuki nadare taisaku jigyo no kairyo],
Fukushima Prefecture Civil Engineering Department, *Yuki to doro (Snow and roads)*, July 1985, No.4, p.45-52, In Japanese.
Avalanche engineering, Avalanche forecasting, Avalanches, Road maintenance, Japan—Fukushima Prefecture.

47-5154
Avalanche countermeasures (1). [Yuki nadare taisaku (1)],
Kuriyama, H., *Yuki to doro (Snow and roads)*, July 1985, No.4, p.53-57, In Japanese. 8 refs.
Avalanche engineering, Avalanche formation, Snow cover stability.

47-5155
Study on providing pedestrian space in snowy regions. [Sekisetsu chiiki ni okeru hokosha kukan kakuho ni kansuru chosa],
Nishiue, H., *Yuki to doro (Snow and roads)*, July 1985, No.4, p.58-62, In Japanese.
Snowsheds, Sidewalks, Human factors engineering.

47-5156
Snow pressure on avalanche prevention structures built on the periphery of small sections of cut slopes. [Kiri tsuchi shamen no kodan shuhen ni setchi shita yuki nadare yobo shisetsu no setsuatsu tokusei],
Shimomura, C., et al, *Yuki to doro (Snow and roads)*, July 1985, No.4, p.63-68, In Japanese. 1 ref.
Kobayashi, K.
Avalanche engineering, Snow loads, Snow stabilization, Snow fences.

47-5157
Tests on the basic characteristics of road surface freezing deicers. [Romen toketsu boshi yakuzai no kihon tokusei shiken],
Murakuni, M., *Yuki to doro (Snow and roads)*, July 1985, No.4, p.69-74, In Japanese. 6 refs.
Road icing, Chemical ice prevention, Salting, Road maintenance.

47-5158
Selection of tree species and patterns of planting for snowy regions. [Sekisetsu chiiki ni okeru jushu sentei to shokusai keishiki ni tsuite],
Oie, T., *Yuki to doro (Snow and roads)*, July 1985, No.4, p.75-81, In Japanese.
Snow hedges, Trees (plants), Forest strips, Protective vegetation, Japan.

47-5159
Characteristics and problems of snow and ice countermeasures on the Meishin Expressway. [Meishin kosoku doro ni okeru seppyo taisaku no tokushoku to mondaiten],
Kawashima, T., *Yuki to doro (Snow and roads)*, July 1985, No.4, p.82-92, In Japanese. 1 ref.
Road icing, Road maintenance, Safety, Accidents, Japan.

47-5160
***Development and improvement* of snow removal equipment at the Hokkaido Development Bureau.** [Hokkaido kaihatsukyoku ni okeru josetsu kikai no kaihatsu, kairyo],
Yamada, S., et al, *Yuki to doro (Snow and roads)*, July 1985, No.4, p.93-97, In Japanese.
Mikami, Y., Murakami, A.
Snow removal, Road maintenance, Vehicles.

47-5161
Final breakdown of budget items for snow and cold weather operations in 1983 and 1984. [Sekkan jigyo no seisan uchiwake (58 nendo, 59 nendo saishu)],
Iina, I., *Yuki to doro (Snow and roads)*, July 1985, No.4, p.98-99, In Japanese.
Snow removal, Road maintenance, Cold weather operation, Cost analysis, Japan.

47-5162
Science of snow and ice (5). [Yuki to kori no kagaku (5)],
Inoue, M., *Yuki to doro (Snow and roads)*, Oct. 1985, No.5, p.7-10, In Japanese.
Snow strength, Snow roads.

47-5163
Snow removal drains and snow melting drains. [Ryusetsuko to shoyusetsuko],
Okuma, T., *Yuki to doro (Snow and roads)*, Oct. 1985, No.5, p.21-26, In Japanese. 6 refs.
Snow removal, Snow melting, Artificial melting, Drains.

47-5164
Current status and problems of road heating facilities for expressways. [Kosoku doro ni okeru rodo hitingu setsubi no genkyo to mondaiten],
Murakuni, M., *Yuki to doro (Snow and roads)*, Oct. 1985, No.5, p.27-33, In Japanese.
Road icing, Road maintenance, Snow removal, Artificial melting, Snow melting, Heating.

47-5165
Model operations for towns of the north—surface layout of snow removal drains. [Hokkoku no machi zukuri moderu jigyo—ryusetsuko no menteki seibi],
Honda, M., *Yuki to doro (Snow and roads)*, Oct. 1985, No.5, p.34-39, In Japanese.
Snow removal, Road maintenance, Drains, Japan.

47-5166
Non-sprinkler snow melting by water pipe heating. [Musansui yusetsu (W.P.H) ni tsuite],
Yamagata Prefecture Civil Engineering Department, *Yuki to doro (Snow and roads)*, Oct. 1985, No.5, p.40-44, In Japanese.
Road maintenance, Snow removal, Artificial melting, Snow melting, Heating, Water pipes.

47-5167
Snow countermeasures in Joetsu City. [Joetsushi no bosetsu ni tsuite],
Joetsu City Construction Department, *Yuki to doro (Snow and roads)*, Oct. 1985, No.5, p.45-49, In Japanese.
Snow removal, Snowstorms, Road maintenance, Accidents, Cost analysis, Japan—Niigata Prefecture.

47-5168
Study on skid resistance of winter tires. [Toyu taiya no tate suberi masatsu seino chosa],
Kadoyama, Y., et al, *Yuki to doro (Snow and roads)*, Oct. 1985, No.5, p.50-53, In Japanese. 3 refs.
Ogino, H., Otsuka, T.
Road icing, Tires, Skid resistance.

47-5169
Development of equipment for dealing with high snowbanks. [Kosettei shori sochi no kaihatsu],
Iwamoto, T., et al, *Yuki to doro (Snow and roads)*, Oct. 1985, No.5, p.54-61, In Japanese.
Inoue, H.
Snowdrifts, Snow removal, Road maintenance, Vehicles.

47-5170
Avalanche countermeasures (2). [Yuki nadare taisaku (2)],
Kuriyama, H., *Yuki to doro (Snow and roads)*, Oct. 1985, No.5, p.62-66, In Japanese. 6 refs.
Avalanche engineering, Avalanche modeling, Avalanche forecasting, Road maintenance.

47-5171
Mechanical snow removal operations on temporary two-lane sections. [Zantei nishasen kukan ni okeru kikai josetsu sagyo ni tsuite],
Tono, A., et al, *Yuki to doro (Snow and roads)*, Oct. 1985, No.5, p.67-71, In Japanese.
Nakanishi, J.
Road maintenance, Snow removal, Japan.

47-5172
Snow removal in Fukui. [Fukui no josetsu],
Horikawa, I., *Yuki to doro (Snow and roads)*, Oct. 1985, No.5, p.72-76, In Japanese.
Road maintenance, Snow removal, Japan.

47-5173
Development of removal methods and equipment for dealing with snowbanks in the median strip. [Chuo bunritai no settei shori kikai to josetsu koho no kaihatsu],
Abe, T., *Yuki to doro (Snow and roads)*, Oct. 1985, No.5, p.77-84, In Japanese.
Snowdrifts, Snow removal, Road maintenance, Vehicles.

47-5174
Estimated budget requirements for snow and cold weather operations for 1986. [61 nendo sekkan jigyo yosan gaisan yokyu],
Iina, I., *Yuki to doro (Snow and roads)*, Oct. 1985, No.5, p.85-86, In Japanese.
Snow removal, Road maintenance, Cold weather operation, Cost analysis, Japan.

47-5175
New standards for studded tires. [Supaiku taiya shinkijun ni tsuite],
Yamanaka, Y., *Yuki to doro (Snow and roads)*, Oct. 1985, No.5, p.87-89, In Japanese.
Road icing, Tires, Standards.

47-5176
Building snowproof **cities (Aomori City).** [Bosetsu toshi no kensetsu (Aomori-shi)],
Nishiue, H., *Yuki to doro (Snow and roads)*, Jan. 1986, No.6, p.9-12, In Japanese. 1 ref.
Snow removal, Urban planning, Cold weather operation, Japan.

47-5177
Current status and development of snow removal equipment. [Josetsu kikai no genkyo to kaihatsu],
Kawabata, T., et al, *Yuki to doro (Snow and roads)*, Jan. 1986, No.6, p.27-32, In Japanese.
Nakai, N.
Snow removal, Road maintenance, Vehicles.

47-5178
Maintenance and inspection of snow removal equipment. [Josetsu kikai no toriatsukai to tenken seibi ni tsuite],
Sugiyama, A., et al, *Yuki to doro (Snow and roads)*, Jan. 1986, No.6, p.33-38, In Japanese. 2 refs.
Iijima, H.
Snow removal, Road maintenance, Vehicles, Lubricants.

47-5179
Reliability of snow removal equipment. [Josetsu kikai no shinraisei ni tsuite],
Nakamura, O., et al, *Yuki to doro (Snow and roads)*, Jan. 1986, No.6, p.39-45, In Japanese. 2 refs.
Kamimura, H.
Snow removal, Road maintenance, Vehicles.

47-5180
Snowproofing measures in Tonami City. [Tonami-shi no musetsu taisaku],
Fukuda, M., *Yuki to doro (Snow and roads)*, Jan. 1986, No.6, p.46-53, In Japanese.
Snow removal, Road maintenance, Japan.

47-5181
Development of technology for continuous transport of snow. [Yuki no renzoku yuso gijutsu no kaihatsu],
Hishita, T., et al, *Yuki to doro (Snow and roads)*, Jan. 1986, No.6, p.59-63, In Japanese.
Yamamoto, H.
Snow removal, Road maintenance, Drains.

47-5182
Texture and hardness of compacted snow. [Assetsu no soshiki to kodo],
Kobayashi, T., *Yuki to doro (Snow and roads)*, Jan. 1986, No.6, p.64-69, In Japanese. 10 refs.
Snow compaction, Snow hardness, Snow density, Snow strength, Trafficability, Road maintenance.

47-5183
Measures against coagulation of sodium chloride deicers for roads. [Romen toketsu boshizai (enka natoriumu) no koketsu taisaku],
Suzuki, M., *Yuki to doro (Snow and roads)*, Jan. 1986, No.6, p.70-74, In Japanese. 3 refs.
Road icing, Chemical ice prevention, Salting, Road maintenance.

47-5184
Snow removal in Hakkodata. [Hakkodata no josetsu],
Kudo, N., *Yuki to doro (Snow and roads)*, Jan. 1986, No.6, p.75-84, In Japanese.
Snow removal, Road maintenance, Japan—Aomori Prefecture.

47-5185
Snow and ice operations in the mountains and highways of Chugoku. (Chugoku jidoshado, sankanbu no seppyo sagyo),
Nagata, Y., et al, *Yuki to doro (Snow and roads)*, Jan. 1986, No.6, p.85-92, In Japanese.
Komatsu, S.
Snow removal, Road icing, Road maintenance, Cold weather operation, Japan.

47-5186
Snow management from door to door (application of a pipe transport system for snow water mixture). (Yuki shori toguchi kara toguchi e (yuki mizu kongo paipu yuso shisutemu no oyo)),
Sai, T., *Yuki to doro (Snow and roads)*, Jan. 1986, No.6, p.93-94, In Japanese.
Snow removal, Water pipes.

47-5187
Method for dealing with snow cornices. (Seppi shori no ichi hoho ni tsuite),
Aoki, S., *Yuki to doro (Snow and roads)*, Jan. 1986, No.6, p.94-95, In Japanese.
Snow cornices, Avalanche engineering, Snow stabilization, Tunnels.

47-5188
Control of the flow terminus of snow removal drains by water pipes. (Kakedoi ni yoru ryusetsuko ryumatsu shori),
Ojiya City Construction Department, *Yuki to doro (Snow and roads)*, Jan. 1986, No.6, p.96-97, In Japanese.
Snow removal, Drains, Water pipes.

47-5189
Bulletin on the budget for snow and cold weather operations for 1986. (Showa 61 nendo sekkan jigyo yosan sokuho),
Fujieda, H., *Yuki to doro (Snow and roads)*, Jan. 1986, No.6, p.99, In Japanese.
Snow removal, Road maintenance, Cold weather operation, Cost analysis, Japan.

47-5190
Groundwater contamination due to road de-icing chemicals—salt balance implications.
Howard, K.W.F., et al, *Geoscience Canada*, Mar. 1993, 20(1), p.1-8, 18 refs.
Haynes, J.
Road maintenance, Ice removal, Salting, Runoff, Ground water, Salinity, Mass balance, Water pollution, Watersheds, Hydrogeochemistry.

47-5191
Quenching of the dissociative electron attachment resonances of O2 physisorbed on amorphous ice.
Huels, M.A., et al, *Chemical physics letters*, July 30, 1993, 210(4-5-6), p.340-346, 43 refs.
Parenteau, L., Sanche, L.
Ice physics, Amorphous ice, Absorption, Oxygen, Ionization, Molecular structure, Molecular energy levels, Resonance, Surface properties.

47-5192
Removal of water soluble compounds with surface runoff on drained bogs of the Transural region.
Telitsyn, V.L., *Water resources*, Nov. 1993, 20(1), p.72-78, Translated from Vodnye resursy. 8 refs.
Swamps, Agriculture, Land reclamation, Water pollution, Runoff, Surface drainage, Frozen ground chemistry, Snow cover effect, Hydrogeochemistry.

47-5193
Chemical composition of snow near a mining and concentration plant: analysis of variability by multivariate statistical analysis methods.
Lazareva, I.P., et al, *Water resources*, Nov. 1993, 20(1), p.79-86, Translated from Vodnye resursy. 13 refs.
Feoktistov, V.M., Kharin, V.N., Siniakov, S.A.
Air pollution, Snow cover, Snow surveys, Snow composition, Ion density (concentration), Meltwater, Snow impurities, Chemical analysis, Statistical analysis.

47-5194
Gas homologues of methane and olefins near the earth surface in connection with hydrocarbon accumulations.
Vyshemirskiĭ, V.S., et al, *Russian geology and geophysics*, 1993, 33(2), p.1-4, Translated from Geologiia i geofizika.
Pastukh, P.I., Fomin, A.N., Shugurov, V.F.
Hydrocarbons, Natural gas, Snow cover, Snow composition, Bottom sediment, Sampling, Geochemistry, Exploration.

47-5195
Saltating particles over flat beds.
Nalpanis, P., et al, *Journal of fluid mechanics*, June 1993, Vol.251, p.661-685, 35 refs.
Hunt, J.C.R., Barrett, C.F.
Sediment transport, Wind factors, Velocity measurement, Eolian soils, Blowing snow, Snow mechanics, Simulation, Fluid mechanics, Analysis (mathematics).

47-5196
Application of data of short-term hydrometeorological studies to computations of river runoff.
Rozhdestvenskiĭ, A.V., et al, *Soviet meteorology and hydrology*, 1991, No.12, p.70-76, Translated from Meteorologiia i gidrologiia. 16 refs.
Lobanova, A.G.
Rivers, Runoff forecasting, Analysis (mathematics).

47-5197
Spatial-temporal variability of surface inversions in the Arctic.
Timerev, A.A., et al, *Soviet meteorology and hydrology*, 1991, No.7, p.39-44, Translated from Meteorologiia i gidrologiia. 17 refs.
Egorova, S.A.
Temperature inversions, Aerosols, Surface temperature.

47-5198
Dynamics of tritium deposition from atmospheric precipitation over the USSR territory and its removal into the surrounding seas in 1978-1989.
Katrich, I.IU., *Soviet meteorology and hydrology*, 1991, No.7, p.90-93, Translated from Meteorologiia i gidrologiia. 11 refs.
Precipitation (meteorology), Fallout, Water pollution, Isotopes, Arctic Ocean, USSR.

47-5199
State of pollution of terrestrial surface waters on the USSR territory in 1990.
Shekhovtsov, A.A., et al, *Soviet meteorology and hydrology*, 1991, No.7, p.101-106, Translated from Meteorologiia i gidrologiia.
Ovanesiants, A.M.
Rivers, Water pollution, Environmental impact, USSR.

47-5200
High resolution study of the platelet ice ecosystem in McMurdo Sound, Antarctica: photosynthetic and bio-optical characteristics of a dense microalgal bloom.
Arrigo, K.R., et al, *Marine ecology progress series*, Aug. 5, 1993, 98(1-2), p.173-185, 55 refs.
Robinson, D.H., Sullivan, C.W.
Sea ice, Algae, Photosynthesis, Microbiology, Antarctica—McMurdo Sound.
Microalgal absorption, biomass, and photophysiology were monitored in conjunction with the vertical attenuation of photosynthetically active radiation and spectral irradiance within the lower congelation ice and the platelet ice layer in McMurdo Sound in 1989. Between 89 and 99% of the algal biomass was located within the 0.68 m thick platelet layer where standing crop, measured as chlorophyll *a*, increased from 280 to 1090 mg/sq m between Oct. 26 and Dec. 3. Algal biomass was highly stratified within the platelet ice layer. An increasing fraction, 38 to 90%, of integrated chl *a* was collected from the upper 0.125 m of the platelet layer, near the base of the congelation ice. Algal pigments accounted for over 96% of total light attenuation (ice + particles) within this layer. Sea ice microalgae exhibited photosynthetic properties consistent with extreme shade adaptation, including low mean pigment-specific absorption, and low assimilation numbers both of which declined with depth. Vertical profiles revealed that low quantum yields for platelet ice assemblages were not a function of low temperature, as had previously been suspected, but vary with depth and hence light level. Microalgae at the platelet ice surface appeared well adapted to the ambient light field, while algae at depth appeared to retain excess photosynthetic capacity. (Auth. mod.)

47-5201
Storm-generated currents and offshore sediment transport on a sandy shoreface, Tibjak Beach, Canadian Beaufort Sea.
Héquette, A., et al, *Marine geology*, Aug. 1993, 113(3/4), p.283-304, 57 refs.
Hill, P.R.
Sediment transport, Ocean currents, Storms, Beaufort Sea.

47-5202
Chronology of Taylor Glacier advances in Arena Valley, Antarctica, using *in situ* cosmogenic He-3 and Be-10.
Brook, E.J., et al, *Quaternary research*, Jan. 1993, 39(1), p.11-23, 22 refs.
Glacial geology, Glacial deposits, Moraines, Age determination, Isotope analysis, Antarctica—Arena Valley.
This paper reports *in situ* measurements of He-3 and Be-10 in quartz sandstone boulders from Arena Valley, southern Victoria Land, to provide chronological constraints for a sequence of moraines related to expansions of Taylor Glacier and the East Antarctic Ice Sheet. Mean He-3 ages are 113,000 +/- 45,000 yr, 208,000 +/- 67,000 yr, 335,000 +/- 187,000 yr, and 1.2 +/- 0.2 myr, for Taylor II, III, IVa, and IVb moraines, respectively. Although the exposure ages appear consistent with the few previous age estimates, particularly with an isotope stage 5 age for Taylor II, each moraine exhibits a broad age distribution. The distribution probably results from a variety of factors, which may include prior exposure to cosmic rays, He-3 loss, erosion, postdepositional boulder movement, and radiogenic production of He-3. Nonetheless, the exposure ages provide direct chronological constraints for the moraine sequence, and suggest a maximum thickening of Taylor Glacier relative to the present ice surface of 500 m since the late Pliocene-early Pleistocene. (Auth. mod.)

47-5203
Are soil tongues in northeastern Indiana periglacial relics or active fingering zones.
Hinkel, K.M., *Quaternary research*, Jan. 1993, 39(1), p.75-83, 38 refs.
Soil structure, Soil formation, Soil analysis, Geomorphology, Periglacial processes, Patterned ground, Soil physics, United States—Indiana.

47-5204
Simplified numerical solution of the Miller model of secondary frost heave.
Fowler, A.C., et al, *Cold regions science and technology*, July 1993, 21(4), p.327-336, 19 refs.
Noon, C.G.
Frost heave, Forecasting, Mathematical models, Frozen ground mechanics, Phase transformations, Ice lenses, Capillarity, Ice water interface, Freezing front.

47-5205
Model for thermally-induced stresses in multi-year sea ice.
Lewis, J.K., *Cold regions science and technology*, July 1993, 21(4), p.337-348, 24 refs.
Sea ice, Ice cover strength, Ice models, Ice heat flux, Rheology, Ice air interface, Thermal stresses, Stress concentration, Temperature effects, Viscoelasticity, Mathematical models.

47-5206
Topography of the upper and lower surfaces of 10 hectares of deformed sea ice.
Melling, H., et al, *Cold regions science and technology*, July 1993, 21(4), p.349-369, 27 refs.
Topham, D.R., Riedel, D.
Sea ice, Pack ice, Topographic surveys, Ice volume, Ice bottom surface, Topographic features, Fractals, Pressure ridges, Ice water interface, Statistical analysis.

47-5207
Estimate of the size of the damage zone beneath an indenter on ice.
Parsons, B.L., *Cold regions science and technology*, July 1993, 21(4), p.371-380, 33 refs.
Ice mechanics, Ice strength, Mechanical tests, Cracking (fracturing), Ice solid interface, Ice microstructure, Damage, Ice plasticity, Fractals.

47-5208
Droplet trajectories and icing-collision efficiencies for cylinders determined using LDV.
Yoon, B., et al, *Cold regions science and technology*, July 1993, 21(4), p.381-397, 13 refs.
Ettema, R.
Icing, Ice water interface, Ice accretion, Drops (liquids), Fluid dynamics, Velocity measurement, Lasers, Wind tunnels, Ice forecasting.

47-5209
Bore-hole survey at dome GRIP 1991.
Gundestrup, N.S., et al, *Cold regions science and technology*, July 1993, 21(4), p.399-402, 8 refs.
Dahl-Jensen, D., Johnsen, S.J., Rossi, A.
Ice sheets, Ice cores, Ice temperature, Recording, Boreholes, Physical properties, Rotary drilling, Performance, Accuracy, Greenland—Summit.

47-5210
Modeled variations of precipitation over the Greenland ice sheet.
Bromwich, D.H., et al, *Journal of climate*, July 1993, 6(7), p.1253-1268, 71 refs.
Robasky, F.M., Keen, R.A., Bolzan, J.F.
Climatology, Ice sheets, Glacier mass balance, Sea level, Glacial meteorology, Synoptic meteorology, Precipitation (meteorology), Periodic variations, Simulation, Greenland.

47-5211
Recent variations of snow cover and snowfall in North America and their relation to precipitation and temperature variations.
Karl, T.R., et al, *Journal of climate*, July 1993, 6(7), p.1327-1344, 48 refs.
Groisman, P.IA., Knight, R.W., Heim, R.R., Jr.
Climatology, Precipitation (meteorology), Snow accumulation, Snow cover distribution, Periodic variations, Snow water equivalent, Air temperature, Temperature effects, Climatic factors, United States.

47-5212
Association between extremes in North American snow cover extent and United States temperatures.
Leathers, D.J., et al, *Journal of climate*, July 1993, 6(7), p.1345-1355, 38 refs.
Robinson, D.A.
Climatology, Snow cover distribution, Snow cover effect, Records (extremes), Air temperature, Temperature variations, Atmospheric pressure, Correlation, Snow air interface, Climatic factors, United States.

47-5213
Global climate of September-November 1990: ENSO-like warming in the western Pacific and strong ozone depletion over Antarctica.
Mo, K.C., *Journal of climate*, July 1993, 6(7), p.1375-1391, 10 refs.
Climatology, Meteorological data, Global warming, Air temperature, Periodic variations, Polar atmospheres, Ozone, Atmospheric density.
This paper presents a global seasonal climate summary for the Sep-Nov. 1990 interval. Included are details which document an episode of atmospheric warming in the tropical western Pacific; above-normal air temperatures in the Northern Hemisphere; and ozone depletion in the antarctic stratosphere.

47-5214
Satellite retrieval of lower-tropospheric ice crystal clouds in the polar regions.
Wilson, L.D., et al, *Journal of climate*, July 1993, 6(7), p.1467-1472, 24 refs.
Curry, J.A., Ackerman, T.P.
Climatology, Polar atmospheres, Cloud cover, Remote sensing, Radiometry, Classifications, Ice detection, Ice crystal optics, Brightness, Accuracy.

47-5215
Comments on "Detection of climatic change in the western North American Arctic using a synoptic climatological approach".
Burn, C.R., et al, *Journal of climate*, July 1993, 6(7), p.1473-1478, Includes reply. 14 refs. For paper under discussion see 45-2535.
Kalkstein, L.S., Dunne, P.C., Ye, H.C.
Climatology, Synoptic meteorology, Climatic changes, Air temperature, Temperature variations, Atmospheric circulation, Global warming, United States—Alaska.

47-5216
Glacial icemelt in the Wind River Range, Wyoming.
Pochop, L.O., et al, Watershed Management Symposium, Durango, CO, July 9-14, 1990. Proceedings. Watershed planning and analysis in action. Edited by R.E. Riggins et al, New York, American Society of Civil Engineers, 1990, p.118-124, 12 refs.
DLC TC409.W38
Mountain glaciers, Glacier melting, Glacier surveys, Glacier mass balance, Meltwater, Watersheds, River basins, Water supply, Surface drainage, United States—Wyoming.

47-5217
Chaotic characteristics of snowmelt runoff: a preliminary study.
Wilcox, B.P., et al, Watershed Management Symposium, Durango, CO, July 9-14, 1990. Proceedings. Watershed planning and analysis in action. Edited by R.E. Riggins et al, New York, American Society of Civil Engineers, 1990, p.125-134, 9 refs.
Seyfried, M.S., Blackburn, W.H., Matison, T.H.
DLC TC409.W38
Snowmelt, Snow hydrology, Runoff, Periodic variations, Watersheds, Mathematical models, Forecasting.

47-5218
Possible climate change and its impact on snowmelt and water supply in California.
Roos, M., Watershed Management Symposium, Durango, CO, July 9-14, 1990. Proceedings. Watershed planning and analysis in action. Edited by R.E. Riggins et al, New York, American Society of Civil Engineers, 1990, p.135-144, 7 refs. For another version see 45-2130.
DLC TC409.W38
Snowmelt, Periodic variations, Climatic changes, Snow hydrology, Runoff forecasting, Watersheds, Water supply, United States—California.

47-5219
Effects of forest cover on a snowpack in the Sierra Nevada.
Kattelmann, R., Watershed Management Symposium, Durango, CO, July 9-14, 1990. Proceedings. Watershed planning and analysis in action. Edited by R.E. Riggins et al, New York, American Society of Civil Engineers, 1990, p.276-284, 22 refs.
DLC TC409.W38
Forest canopy, Vegetation factors, Snowmelt, Seasonal variations, Snow cover distribution, Snow accumulation, Snow water equivalent, Water supply, Runoff forecasting, United States—California—Sierra Nevada.

47-5220
Interactive computer model to simulate water quality of streamflow from forested watersheds in Arizona.
Ffolliott, P.F., et al, Watershed Management Symposium, Durango, CO, July 9-14, 1990. Proceedings. Watershed planning and analysis in action. Edited by R.E. Riggins et al, New York, American Society of Civil Engineers, 1990, p.285-292, 10 refs.
Guertin, D.P., Fogel, M.M.
DLC TC409.W38
Watersheds, Water supply, Stream flow, Water chemistry, Snowmelt, Runoff, Computerized simulation, United States—Arizona.

47-5221
Atmosphere during the Younger Dryas.
Mayewski, P.A., et al, *Science*, July 9, 1993, 261(5118), p.195-197, 29 refs.
Ice cores, Climatic changes, Atmospheric composition, Greenland.

47-5222
Carbon cycling in boreal forest and sub-arctic ecosystems: biospheric responses and feedbacks to global climate change.
Vinson, T.S., ed, *U.S. Environmental Protection Agency. Office of Research and Development. Report*, May 1993, EPA/600/R-93/084, 282p., Proceedings of the international workshop, Sep. 1991. For selected papers see 47-5223 through 47-5242. Refs. passim.
Kolchugina, T.P., ed.
Carbon dioxide, Ecosystems, Forest ecosystems, Soil air interface, Tundra, Models, Global change, Global warming, Climatic changes, Carbon.

47-5223
Warming the North: what happens?.
Woodwell, G.M., et al, *U.S. Environmental Protection Agency. Office of Research and Development. Report*, May 1993, EPA/600/R-93/084, p.1-8, 35 refs.
Houghton, R.A.
Global change, Global warming, Climatic changes, Forest ecosystems, Forest soils.

47-5224
Boreal carbon pools: approaches and constraints in global extrapolations.
Chapin, F.S., III, et al, *U.S. Environmental Protection Agency. Office of Research and Development. Report*, May 1993, EPA/600/R-93/084, p.9-20, 30 refs.
Matthews, E.
Forest ecosystems, Global change, Global warming, Climatic changes, Carbon dioxide, Soil air interface, Tundra, Vegetation factors, Soil chemistry.

47-5225
Planetary maximum CO2 and ecosystems of the North.
Zimov, S.A., et al, *U.S. Environmental Protection Agency. Office of Research and Development. Report*, May 1993, EPA/600/R-93/084, p.21-34, 27 refs.
Carbon dioxide, Global change, Global warming, Climatic changes, Ecosystems, Soil air interface, Thaw depth, Permafrost preservation, USSR—Siberia.

47-5226
Arctic atmospheric CO2 bimodal distribution.
Semiletov, I.P., et al, *U.S. Environmental Protection Agency. Office of Research and Development. Report*, May 1993, EPA/600/R-93/084, p.35-42, 24 refs.
Carbon dioxide, Polar atmospheres, Soil air interface, Tundra, USSR—Siberia.

47-5227
Marine humic acids as an important constituent of the dissolved organic carbon flux in the Bering and Chukchi Sea ecosystems.
Perminova, I.V., et al, *U.S. Environmental Protection Agency. Office of Research and Development. Report*, May 1993, EPA/600/R-93/084, p.43-49, 25 refs.
Petrosian, V.S.
Ecosystems, Sea water, Air water interactions, Carbon dioxide, Carbon, Bering Sea, Chukchi Sea.

47-5228
Residence time of carbon in soils of the boreal zone.
Kobak, K., et al, *U.S. Environmental Protection Agency. Office of Research and Development. Report*, May 1993, EPA/600/R-93/084, p.51-57, 9 refs.
Kondrasheva, N.
Cryogenic soils, Frozen ground chemistry, Soil chemistry, Chernozem, Meadow soils, Podsol, Carbon.

47-5229
Equilibrium analysis of projected climate change effects on the global soil organic matter pool.
Turner, D.P., et al, *U.S. Environmental Protection Agency. Office of Research and Development. Report*, May 1993, EPA/600/R-93/084, p.59-63, 17 refs.
Leemans, R.
Carbon dioxide, Climatic changes, Global warming, Soil air interface, Tundra, Steppes.

47-5230
Distribution and renovation time of soil carbon in boreal and subarctic ecosystems of European Russia.
Cherkinskiĭ, A.E., et al, *U.S. Environmental Protection Agency. Office of Research and Development. Report*, May 1993, EPA/600/R-93/084, p.65-69, 11 refs.
Goriachkin, S.V.
Soil profiles, Soil composition, Subarctic landscapes, Podsol, Alluvium, Carbon, USSR.

47-5231
Characteristics of forest biogeocenoses.
Pervova, N., *U.S. Environmental Protection Agency. Office of Research and Development. Report*, May 1993, EPA/600/R-93/084, p.79-85.
Carbon dioxide, Forest soils, Meadow soils, Frozen ground physics, Podsol, USSR—Moscow.

47-5232
Carbon storage in peat based on regionality of Russian mires.
Botch, M.S., *U.S. Environmental Protection Agency. Office of Research and Development. Report*, May 1993, EPA/600/R-93/084, p.101-107, 9 refs.
Peat, Swamps, Tundra, Global change, Carbon dioxide, Carbon, USSR—Siberia, USSR—Tomsk, USSR—Far East, USSR—Kola Peninsula, USSR—Karelia.

47-5233
Methane from northern peatlands and climate change.
Frolking, S., *U.S. Environmental Protection Agency. Office of Research and Development. Report*, May 1993, EPA/600/R-93/084, p.109-124, 38 refs.
Peat, Wetlands, Soil air interface, Climatic changes, Swamps, Tundra, Soil temperature, Mathematical models, Ice cores, USSR—Siberia, United States—Alaska.

47-5234
Methane and carbon dioxide production and uptake in some boreal ecosystems of Russia.
Panikov, N.S., et al, *U.S. Environmental Protection Agency. Office of Research and Development. Report*, May 1993, EPA/600/R-93/084, p.125-138, 18 refs.
Zelenev, V.
Tundra, Ecosystems, Carbon dioxide, Wetlands, Soil air interface, Swamps, USSR—Ural Mountains, USSR—Syktyvkar, USSR—Tver, USSR—Moscow, USSR—Vorkuta.

47-5235
Boreal forests, the carbon cycle and global change: a challenge for ecologists.
Bonan, G.B., *U.S. Environmental Protection Agency. Office of Research and Development. Report*, May 1993, EPA/600/R-93/084, p.139-153, 63 refs.
Forest ecosystems, Soil air interface, Models, Carbon dioxide, Carbon, United States—Alaska.

47-5236
Forest fires in the former Soviet Union: past, present and future greenhouse gas contributions to the atmosphere.
Krankina, O.N., *U.S. Environmental Protection Agency. Office of Research and Development. Report,* May 1993, EPA/600/R-93/084, p.179-186, 17 refs.
Forest fires, Forest ecosystems, Soil air interface, Carbon dioxide, Carbon, USSR—Siberia, USSR—Far East.

47-5237
Assessing climate controls of northern forest soils and tree growth: reconstructing soil moisture, temperature and solution chemistry from monthly weather records.
Arp, P.A., et al, *U.S. Environmental Protection Agency. Office of Research and Development. Report,* May 1993, EPA/600/R-93/084, p.187-192, 12 refs.
Yin, X.W.
Forest soils, Trees (plants), Climatic factors, Soil temperature, Soil water, Snowmelt, Soil chemistry, Canada—Ontario.

47-5238
Carbon budget and succession dynamics of Canadian vegetation.
Cihlar, J., et al, *U.S. Environmental Protection Agency. Office of Research and Development. Report,* May 1993, EPA/600/R-93/084, p.215-220, 4 refs.
Apps, M.J.
Vegetation, Ecosystems, Tundra, Wetlands, Carbon, Canada.

47-5239
Quantifying regional changes in terrestrial carbon storage by extrapolation from local ecosystem models.
King, A.W., *U.S. Environmental Protection Agency. Office of Research and Development. Report,* May 1993, EPA/600/R-93/084, p.221-234, 47 refs.
Tundra, Mathematical models, Ecosystems, Forest ecosystems, Carbon dioxide, Carbon.

47-5240
Estimating carbon budgets of Canadian forest ecosystems using a national scale model.
Apps, M.J., et al, *U.S. Environmental Protection Agency. Office of Research and Development. Report,* May 1993, EPA/600/R-93/084, p.243-252, 22 refs.
Kurz, W.A., Price, D.T.
Forest ecosystems, Subarctic landscapes, Carbon dioxide, Soil air interface, Peat, Biomass, Models, Carbon, Canada.

47-5241
Regionalization as a tool for studying carbon cycling in the former Soviet Union.
Blanutsa, V., *U.S. Environmental Protection Agency. Office of Research and Development. Report,* May 1993, EPA/600/R-93/084, p.253-258, 8 refs.
Ecology, Environmental impact, Carbon, USSR—Irkutsk.

47-5242
Framework to quantify the natural terrestrial carbon cycle of the former Soviet Union.
Kolchugina, T.P., et al, *U.S. Environmental Protection Agency. Office of Research and Development. Report,* May 1993, EPA/600/R-93/084, p.259-275, 48 refs.
Vinson, T.S.
Ecosystems, Forest ecosystems, Biomass, Tundra, Steppes, Taiga, Deserts, Carbon, USSR.

47-5243
Annual northern expenditure plan 1990-1991.
Canada. Indian and Northern Affairs, Ottawa, 1993, 30p., With French version separately paged.
Research projects, Regional planning, Legislation, Cost analysis.

47-5244
Experimental and numerical analysis of floating ice beam impact forces against a sloped structure.
Coutermarsh, B.A., MP 3284, Hanover, NH, Dartmouth College, 1993, 51p., M.S. thesis. 10 refs.
Ice loads, Ice solid interface, Ice friction, Ice pressure, Pontoon bridges, Mathematical models.
Experiments were performed to determine the response of a floating ice beam to a vertically applied force. The data were used to calibrate a numerical finite element model of the floating ice. The ice was characterized as a linear elastic material in the numerical analysis, and the calibration data were used to assess this assumption as well as to develop a fluid influence coefficient matrix, to simulate the dynamic influence of the fluid beneath the ice beam. Finally, a scale model study was performed to determine actual impact forces generated by a floating ice beam against a 45 deg sloped structure. The numerical model developed was then compared to the actual data. The numerical model does well in predicting impact forces for all the beams at low velocity, and the force from the thicker ice beams at all velocities. Both the numerical and experimental forces show the same trends and appear to level off to approach a constant value with increasing beam length. The discrepancies between numerical predictions and experimental results are thought to be caused by damage to the experimental ice beams which is not accounted for in the numerical model.

47-5245
First annual West Antarctic ice sheet (WAIS) science workshop.
Bindschadler, R.A., ed, *U.S. National Aeronautics and Space Administration. NASA conference publication,* 1993, No.3222, 58p., Abstracts only. Presented at a workshop, Arlington, VA, Sep. 13-14, 1992.
Ice sheets, Glacier oscillation, Ice air interface, Ice cores, Global change, Paleoclimatology, Sea level, Antarctica.

47-5246
Tracer gas for meteorological analysis in the Fairbanks basin.
Rezek, J.F., et al, *Alaska. Department of Transportation and Public Facilities. Report,* May 1981, AK-RD-81-13, 33p. + appends., 5 refs.
Jurick, R.
Air pollution, Atmospheric composition, Atmospheric circulation, Environmental impact, Temperature inversions, United States—Alaska—Fairbanks.

47-5247
Annual report 1992.
Danish Polar Center, Copenhagen, 1993, 39p., Refs. p.35-39.
Organizations, Research projects, Cost analysis.

47-5248
Soil sampling and methods of analysis.
Carter, M.R., ed, Boca Raton, Lewis Publishers, 1993, 823p. (Pertinent p.755-814), Refs. passim. For selected papers see 47-5249 through 47-5253.
Soil freezing, Frozen ground thermodynamics, Freezing front, Frost forecasting, Soil surveys, Soil analysis.

47-5249
Sampling frozen soils.
Tarnocai, C., Soil sampling and methods of analysis. Edited by M.R. Carter, Boca Raton, Lewis Publishers, 1993, p.755-765, 5 refs.
Soil surveys, Soil analysis, Permafrost samplers, Permafrost structure, Ground ice, Core samplers, Coring, Augers.

47-5250
Hydrological properties of frozen soil.
Perfect, E., et al, Soil sampling and methods of analysis. Edited by M.R. Carter, Boca Raton, Lewis Publishers, 1993, p.767-781, 48 refs.
Kay, B.D.
Frozen ground thermodynamics, Permafrost hydrology, Soil freezing, Soil water migration, Unfrozen water content.

47-5251
Thermal properties of frozen soils.
Van Loon, W.K.P., et al, Soil sampling and methods of analysis. Edited by M.R. Carter, Boca Raton, Lewis Publishers, 1993, p.783-795, 29 refs.
Van Haneghem, I.A., Perfect, E., Kay, B.D.
Frozen ground thermodynamics, Permafrost heat balance, Soil freezing, Heat capacity, Thermal conductivity.

47-5252
Frost heave potential.
Konrad, J.M., Soil sampling and methods of analysis. Edited by M.R. Carter, Boca Raton, Lewis Publishers, 1993, p.797-806, 18 refs.
Frost heave, Frost forecasting, Soil freezing, Freezing front, Frost resistance.

47-5253
Depth of frost penetration.
Schellekens, F.J., et al, Soil sampling and methods of analysis. Edited by M.R. Carter, Boca Raton, Lewis Publishers, 1993, p.807-814, 15 refs.
Williams, P.J.
Frost penetration, Soil freezing, Freezing front, Frost forecasting.

47-5254
Avalanche prediction in Scotland: 1. A survey of avalanche activity.
Ward, R.G.W., *Applied geography,* Apr. 1984, 4(2), p.91-108, 16 refs.
Avalanches, Surveys, Distribution, Classifications, Meteorological factors, Avalanche forecasting, Periodic variations, United Kingdom—Scotland.

47-5255
Avalanche prediction in Scotland: 2. Development of a predictive model.
Ward, R.G.W., *Applied geography,* Apr. 1984, 4(2), p.109-133, 24 refs.
Avalanche forecasting, Safety, Meteorological factors, Snow accumulation, Snow cover stability, Temperature effects, Correlation, Models, United Kingdom—Scotland.

47-5256
Glacial and climatic history of the central Peruvian Andes.
Wright, H.E., Jr., et al, *National geographic research,* 1989, 5(4), p.439-445, 12 refs.
Seltzer, G.O., Hansen, B.C.S.
Mountain glaciers, Pleistocene, Alpine glaciation, Glacier oscillation, Climatic changes, Quaternary deposits, Palynology, Radioactive age determination, Peru—Andes.

47-5257
Heavy snowfall during an arctic outbreak along the Colorado Front Range.
Wesley, D.A., et al, *National weather digest,* Aug. 1990, 15(3), p.2-19, 17 refs.
Weaver, J.F., Pielke, R.A.
Precipitation (meteorology), Snowfall, Snowstorms, Snow accumulation, Atmospheric physics, Air flow, Air temperature, Meteorological factors, Topographic effects, Weather forecasting, Synoptic meteorology, United States—Colorado.

47-5258
Distribution of icicles.
Croft, P.J., et al, *National weather digest,* Aug. 1990, 15(3), p.34.
Shulman, M.D.
Weather observations, Icing, Dendritic ice, Ice formation, Physical properties.

47-5259
Comments on "Heavy snowfall during an arctic outbreak along the Colorado Front Range".
Auer, A.H., Jr., et al, *National weather digest,* May 1991, 16(2), p.19-21, Includes reply. 4 refs. For paper under discussion see 47-5257.
Wesley, D.A., Weaver, J.F., Pielke, R.A.
Snowstorms, Fronts (meteorology), Snowfall, Snow accumulation, Weather forecasting, Synoptic meteorology, Atmospheric physics, Air flow, Thermodynamics, Temperature effects.

47-5260
Sea ice edge forecast verification program for the Bering Sea.
Wohl, G.M., *National weather digest,* Nov. 1991, 16(4), p.6-12, 7 refs.
Sea ice distribution, Ice edge, Ice forecasting, Accuracy, Air ice water interaction, Meteorological factors, Statistical analysis, Bering Sea.

47-5261
Global beryllium 10 cycle.
McHargue, L.R., et al, *Reviews of geophysics,* May 1991, 29(2), p.141-158, Refs. p.155-158.
Damon, P.E.
Geochemistry, Radioactive isotopes, Geophysical surveys, Isotope analysis, Sediments, Radioactive age determination, Glacier ice, Ice cores, Paleoclimatology.

47-5262
Effects of drifting on snow loads on large roofs.
Irwin, P.A., et al, Structures Congress '93, Irvine, CA, Apr. 19-21, 1993. Proceedings, Vol.1. Structural engineering in natural hazards mitigation. Edited by A. Ang et al, New York, American Society of Civil Engineers, 1993, p.508-513, 8 refs.
Gamble, S.L.
DLC TA654.6.S87
Roofs, Safety, Snow loads, Snowdrifts, Blowing snow, Snow air interface, Forecasting, Design criteria, Simulation.

47-5263
Reliability-based design of transmission towers under wind and ice loadings.
Cho, H.N., et al, Structures Congress '93, Irvine, CA, Apr. 19-21, 1993. Proceedings, Vol.2. Structural engineering in natural hazards mitigation. Edited by A. Ang et al, New York, American Society of Civil Engineers, 1993, p.1125-1130, 6 refs.
Lee, S.J.
DLC TA654.6.S87
Power line icing, Stability, Wind factors, Ice loads, Ice cover effect, Countermeasures, Engineering, Design criteria.

47-5264
Heat transfer from a heated cylinder buried in a frozen porous medium in an enclosure with a cooled top surface.
Oosthuizen, P.H., et al, International Conference on Advanced Computational Methods in Heat Transfer, 2nd, Milan, Italy, July 1992. Vol.2. Natural/forced convection and combustion simulation. Edited by L.C. Wrobel et al, Southampton, UK, Computational Mechanics Publications, 1992, p.457-475, 26 refs.
Nguyen, T.H.
DLC QC319.8.I55
Pipes (tubes), Underground pipelines, Porous materials, Water temperature, Freezing points, Convection, Liquid solid interfaces, Heat transfer, Analysis (mathematics), Artificial freezing.

47-5265
Complete model for the laminar flow of supercooled liquid water.
Ismail, K.A.R., et al, International Conference on Advanced Computational Methods in Heat Transfer, 2nd, Milan, Italy, July 1992. Vol.1. Conduction, radiation and phase change. Edited by L.C. Wrobel et al, Southampton, UK, Computational Mechanics Publications, 1992, p.335-349, 12 refs.
Padilha, A.
DLC QC319.8.I55
Laminar flow, Water flow, Supercooling, Phase transformations, Solidification, Freezing front, Liquid solid interfaces, Heat transfer coefficient, Temperature effects, Mathematical models.

47-5266
Thermodynamic properties and thermal equations of the state of high-pressure ice phases.
Chizhov, V.E., *Journal of applied mechanics and technical physics*, Sep. 1993, 34(2), p.253-262, Translated from Prikladnaia mekhanika i tekhnicheskaia fizika. 26 refs.
Ice physics, High pressure ice, Ice water interface, Ice melting, Thermodynamic properties, Phase transformations, Low temperature research, Temperature effects, Mathematical models.

47-5267
Modelling the last ice-age cycle with 2-D climate models.
Herterich, K., et al, *Palaeography, palaeoclimatology, palaeoecology*, July 1993, 103(1-2), p.107-116, 14 refs.
Berger, A.
Paleoclimatology, Climatic changes, Pleistocene, Ice sheets, Ice volume, Periodic variations, Insolation, Air ice water interaction, Simulation.

47-5268
Dense medium radiative transfer theory for two scattering layers with a Rayleigh distribution of particle sizes.
West, R., et al, *IEEE transactions on geoscience and remote sensing*, Mar. 1993, 31(2), p.426-437, 29 refs.
Tsang, L., Winebrenner, D.P.
Snow cover, Remote sensing, Radar echoes, Attenuation, Snow density, Scattering, Particle size distribution, Mathematical models, Theories.

47-5269
***Azorella selago* Hook. used to estimate glacier fluctuations and climatic history in the Kerguelen Islands over the last two centuries.**
Frenot, Y., et al, *Oecologia*, Aug. 1, 1993, 95(1), p.140-144, 26 refs.
Climatic changes, Glacier oscillation, Periodic variations, Moraines, Plant ecology, Phenology, Correlation, Growth, Geomorphology, Kerguelen Islands.
This paper combines geomorphological observations and a new biological dating technique to propose a reconstruction of the cool and warm events in the Kerguelen Is. during the last two centuries. The usual dating methods, such as dendrochronology or C-14 dating, are not applicable on Kerguelen. Therefore, the radial growth of *Azorella selago* Hook., a cushion-forming Umbelliferae species, was used to estimate the absolute age of deglaciated areas. Glacial margins in the vicinity of the Glacier Ampère constitute the most complete chronosequence studied in this part of the world and illustrate 7 warming-cooling cycles. This new dating technique is validated by the close relationship between the calculated ages of these climatic events and the results of several studies in other circumantarctic regions. The Glacier Ampère reached its maximum extent at the end of the 18th century. Since 1799, two discrete phases may be distinguished: the first period (1799-1965) is characterized by small glacier fluctuations (1 km retreat overall) whereas in the second period (1966 to the present) the retreat is much more rapid (about 3 km). The current dramatic glacial retreat on Kerguelen is apparently related to a major change in climate, and could illustrate a more general southern hemispheric pattern of glacial fluctuations. (Auth. mod.)

47-5270
Enhanced bedrock weathering in association with late-lying snowpatches: evidence from Livingston Island, Antarctica.
Hall, K., *Earth surface processes & landforms*, Mar. 1993, 18(2), p.121-129, 34 refs.
Periglacial processes, Weathering, Bedrock, Rock properties, Nivation, Snowmelt, Snow cover effect, Mechanical tests, Antarctica—Livingston Island.
An indication of the extent of weathering on different aspects of rock outcrops on Livingston I. was obtained by means of a Schmidt hammer, a cone indenter and measurement of weathering rind thickness. Results show that weathering, particularly chemical weathering, is enhanced on the lee side of outcrops where snow accumulates as a result of prolonged wetting by the melting snow. Rock moisture and temperature data indicate that the south-facing, snow-accumulation side of obstacles have high rock moisture levels and maintain relatively high temperatures. Whilst chemical weathering is greater on the leeward side of outcrops, mechanical processes are greater on the windward side. The presence of late-lying snow thus appears to exert a strong influence on weathering. (Auth.)

47-5271
Advances in sea-ice research based on remotely sensed passive microwave data.
Barry, R.G., et al, *Oceanography*, 1993, 6(1), p.4-12, 35 refs.
Oceanography, Aerial photography, Sea ice distribution, Ice edge, Ice surveys, Remote sensing, Microwaves, Radiometry, Spaceborne photography, Brightness.
This paper surveys the unique contributions that have been made to knowledge of polar sea ice since the early 1970s through the application of passive microwave remote sensing techniques, supported chiefly on satellite platforms. The combination of all-weather capability and the absence of any dependence of microwave emission on solar radiation permits satellite borne radiometric surveys to yield data particularly suited to polar applications. (Auth. mod.)

47-5272
Molecular dynamics study of the structure of a long chain amphiphile monolayer adsorbed on ice Ih.
Bell, K.P., et al, *Journal of chemical physics*, Sep. 1, 1993, 99(5), p.4160-4167, 29 refs.
Rice, S.A.
Ice physics, Ice surface, Substrates, Ice solid interface, Adsorption, Polymers, Monomolecular films, Molecular structure, Orientation, Molecular energy levels, Simulation.

47-5273
Dissipative quantum tunneling of rotational defects in ice. The Pauling potential.
Consolini, G., et al, *Journal of chemical physics*, Sep. 1, 1993, 99(5), p.4227-4228, 9 refs.
Bruni, F., Careri, G.
Ice physics, Ice structure, Molecular structure, Molecular energy levels, Defects, Orientation, Dielectric properties, Temperature effects.