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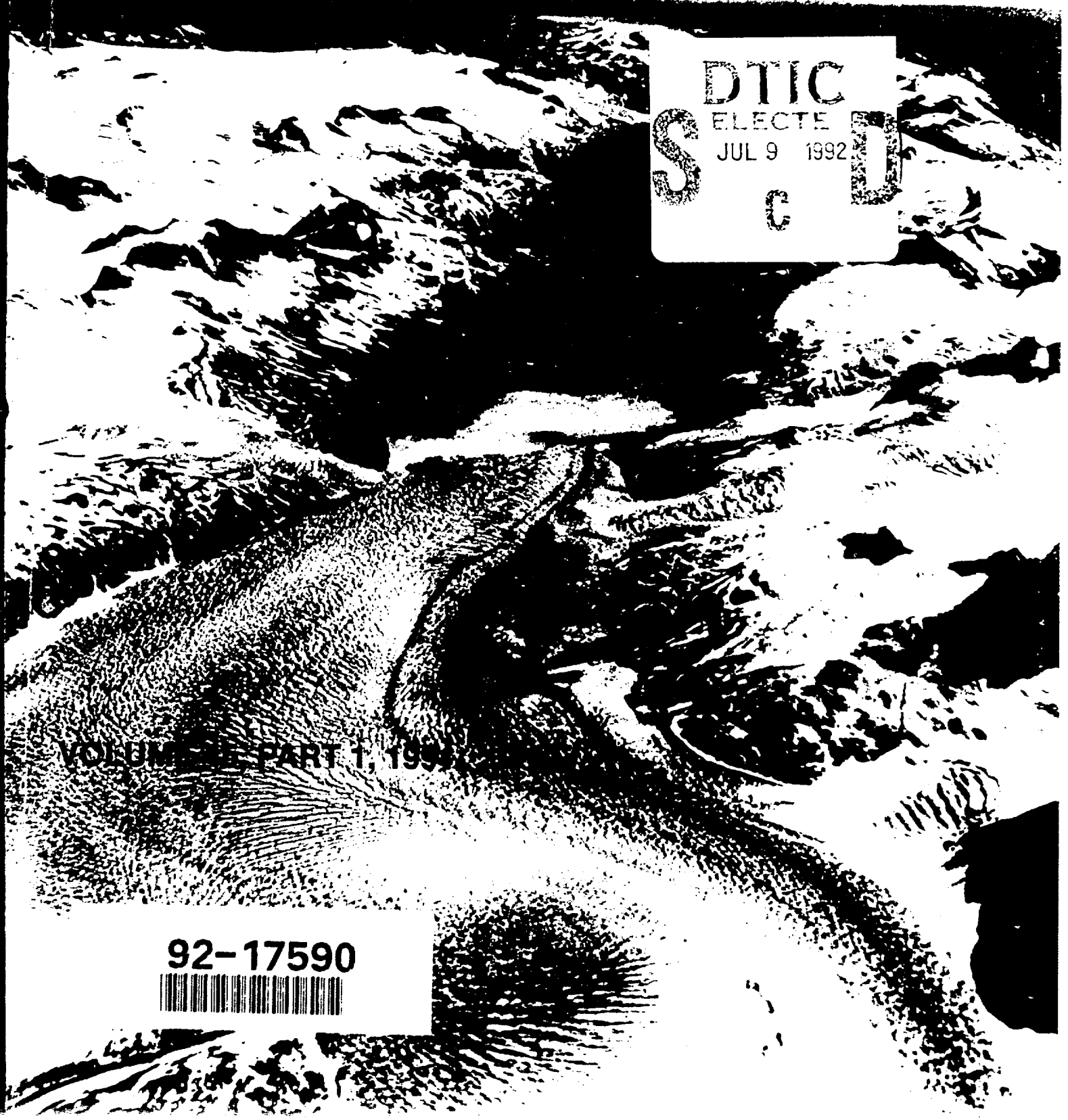
Bibliography on COLD REGIONS SCIENCE AND TECHNOLOGY



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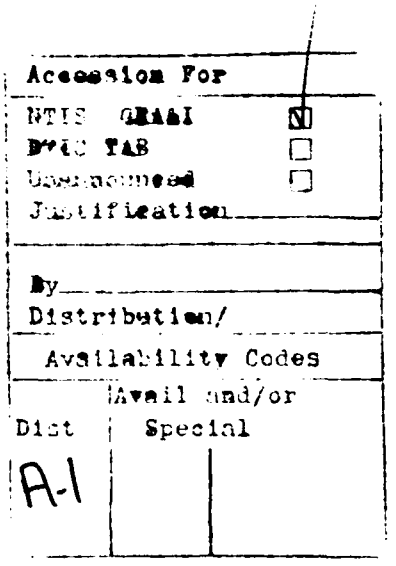
Bibliography on
COLD REGIONS SCIENCE AND TECHNOLOGY

VOLUME 45, PART 1

Stuart G. Hibben, Editor



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BIBLIOGRAPHY ON COLD REGIONS SCIENCE AND TECHNOLOGY
Volume 45, Part 1

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The present volume contains material accessioned between October 1990 and September 1991. It contains full citations of 3887 items, in many cases with abstracts. Indexing for the volume is issued as Volume 45, Part 2.

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Stuart G. Hibben, Head
Cold Regions Bibliography Project
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Glacier heat balance, Thermal regime, Ice temperature, Glacier surveys, Boreholes, Mountain glaciers, Canada—Northwest Territories—Axel Heiberg Island.

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Ice shelves, Glacier flow, Glacier mass balance, Analysis (mathematics), Ice models, Glacier friction, Antarctica—Crary Ice Rise.
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Glacial hydrology, Electrical measurement, Radio echo soundings, Subglacial drainage, Subglacial observations, Glacier surveys.

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Concrete admixtures, Concrete freezing, Heat transfer coefficient.

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Frost resistance, Concrete freezing, Salinity.

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Aerosols, Silver iodide, Smoke generators.

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Smoke generators, Aerosols, Cloud seeding, Ice formation, Ice nuclei.

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Aerosols, Silver iodide, Ice formation.

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Tundra, Vegetation, Arctic landscapes, USSR—Chukotskiy Peninsula.

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Underground pipelines, Environmental impact, Pipe laying, Research projects, Permafrost distribution, Discontinuous permafrost, Ground thawing, Slope stability, Soil temperature, Canada—Northwest Territories—Norman Wells.

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Forest ecosystems, Snow water equivalent, Runoff, Soil water, Snowmelt, Snow hydrology, Snow depth.

45-34

Collection of antarctic scientific explorations, No.5. Studies on glaciology.
Chinese Scientific and Technological Conference on Antarctic Glaciology, 1st, Lanzhou, Aug. 5-9, 1986, Beijing, Science Publishing House, 1988, 278p., In Chinese with English summaries. Refs. *passim*. For individual papers see F-42425 through F-42442 or 45-35 through 45-52.
Meetings, Glaciology.
This is a collection of papers presented at the 1st Chinese Scientific and Technological Conference on Antarctic Glaciology, held on Aug. 5-9, 1986 in Lanzhou. It consists of 18 full length papers reporting on research done on snow and ice stratigraphy, formation, thermal and physical properties, structure, chemistry, acoustics, and weathering processes in different antarctic regions.

45-35

Snow stratigraphy and ice formation on Law Dome, Antarctica.
Xie, Z., Collection of antarctic scientific explorations, No.5. Studies on glaciology, Beijing, Science Publishing House, 1988, p.1-21, In Chinese with English summary. 16 refs.
Snow stratigraphy, Snow physics, Meteorological factors, Antarctica—Law Dome.
Snow stratigraphic studies, together with crystallographic and oxygen isotope analyses, have affirmed the existence of a complete range of ice formation zones on the Law Dome. Between the coast and the Dome Summit the following progression is observed: ablation zone, infiltration-congelation zone (superimposed ice zone), infiltration zone, cold infiltration-recrystallization zone, regelation zone and recrystallization zone. The existence of a warm infiltration-recrystallization zone is hypothesized for the northeast coast as a result of the high accumulation in that area. The distribution of these zones on the Law Dome is asymmetric. Snow pits dug near the boundaries of the zones show a change of the type of ice formation with depth—evidence of climate change in recent years. Near Cape Folger (northwest coast) replacement of infiltration ice with infiltration-congelation ice indicates an increase of summer temperatures over the last ten years. (Auth. mod.)

45-36

Research on the stratigraphy of shallow snow/firn core in Wilkes Land, Antarctica.
Qin, D., Collection of antarctic scientific explorations, No.5. Studies on glaciology, Beijing, Science Publishing House, 1988, p.22-59, In Chinese with English summary. 21 refs.
Snow crystal structure, Firn stratification, Climatic changes, Ice cores, Antarctica—Wilkes Land.
Four cores from the Law Dome and 4 from Wilkes Land, drilled in different glacial zones at about 20 m depth, were analyzed. The following results are reported: a core from a dry snow and high accumulation zone, GC30, consists of fine grained crystals. The hardness varies between 4 and 6 m depth according to the melting events and corresponds well with the fluctuation of delta O-18 at that depth. Thirty-three annual layers (from 1951 to 1984) can be distinguished. The mean annual accumulation at GC30 is estimated at 326.2 kg/sq m/y, the maximum 516 kg/sq m/y (1976) and minimum 199.6 kg/sq m/y (1956). The mean annual temperatures from 1952 to 1981 show an increasing period during 1952-1961 and 1973-1981, and a relatively stable period during 1961-1973. The difference of mean annual temperatures between 1952 and 1981 is calculated to be approximately 3.9. Results from low accumulation zones indicate that the trend of climatic change is warming slowly in the past 100 years, particularly in the last 30 years. (Auth. mod.)

45-37

Characteristics of the initial densification of snow/firn in Wilkes Land, Antarctica.
Qin, D., et al, Collection of antarctic scientific explorations, No.5. Studies on glaciology, Beijing, Science Publishing House, 1988, p.60-74, In Chinese with English summary. 15 refs.
Young, N.W.
Snow density, Meteorological factors, Snow accumulation, Antarctica—Wilkes Land.
Of 14 snow/firn cores, drilled between 20 and 30 m depth in different areas of Wilkes Land, 5 are discussed in detail with the following conclusions: plots of all the density measured in each core against depth are of 3 different types; the snow/firn density increases with depth at all boreholes, and the densification rate is higher at the boreholes with higher mean annual temperature; the mean density of snow/firn in the top 1 m decreases southward. The mean densification rate is compared with the mean annual temperature and the mean annual accumulation over the past 40 years in the most southerly cores. The mean annual temperature is found to be the most important factor affecting the densification rate of surface snow or firn. At each borehole, for $\rho = 550$ kg/cu m, a linear relationship is found between log compressive viscosity coefficient of snow/firn and mean annual temperature for a constant density. (Auth. mod.)

45-38

Growth rate of shallow snow/firn crystals in Wilkes Land, Antarctica.
Qin, D., et al, Collection of antarctic scientific explorations, No.5. Studies on glaciology, Beijing, Science Publishing House, 1988, p.75-83, In Chinese with English summary. 17 refs.
Young, N.W., Thwaites, R.J.
Snow crystal growth, Ice crystal size, Meteorological factors, Antarctica—Wilkes Land.
Crystal size and growth rate in 7 shallow snow/firn cores drilled between 20 and 30 m depth in different areas of Wilkes Land were calculated, and the results are reported. For all drilling sites, the sorting coefficients of the crystal size distribution in each sample are between 1.2 and 1.8. The mean crystal size increases linearly with depth and with age. This linear relationship holds throughout the length of the cores. The growth rate in the top 10 m is about 1.5 to 2 times that below 10 m. This effect is explained by the different temperature regimes: in the top 10 m, seasonal temperature variation in the snow/firn has a significant effect on the crystal growth rate; below 10 m the temperature is almost constant throughout the year. The magnitude of the seasonal temperature variation and its effect on crystal growth rate increases from the interior to the coast. A linear relationship was found between the logarithm of the growth rate at various drilling sites and the mean annual temperature. (Auth. mod.)

45-39

Temperature regime and thermal property at the active layer of Law Dome, Antarctica.
Qin, D., et al, Collection of antarctic scientific explorations, No.5. Studies on glaciology, Beijing, Science Publishing House, 1988, p.84-92, In Chinese with English summary. 8 refs.
Young, W., Thwaites, R.J., Han, J.K.
Ice air interface, Ice temperature, Thermal conductivity, Thermal diffusion, Antarctica—Law Dome.
The temperature of the upper 20 m was measured at 4 sites, SL, LJ, LJ24 and BJ, during a period of 21 months at the western Law Dome. Analysis of temperature measurements shows that the penetrated velocity of the warm wave into the ice is different from site to site. The maximum velocity is into the glacial ice at SL, then into the firn, at LJ24 and BJ, and the minimum is into the alternate layer of ice and firn, at LJ. Thermal diffusivity and thermal conductivity are similar to the warm wave penetration. The melting water percolates into the firn and then refreezes, releasing specific latent heat at LJ. (Auth. mod.)

45-40

Ice crystallographic studies on Law Dome, Antarctica.
Xie, Z., Collection of antarctic scientific explorations, No.5. Studies on glaciology, Beijing, Science Publishing House, 1988, p.93-118, In Chinese with English summary. 36 refs.
Ice crystal structure, Ice crystal size, Ice composition, Antarctica—Law Dome.
Crystallographic studies of ice from two boreholes near Cape Folger show a change of microtexture and fabric of the ice crystals with depth. Six different layers can be identified: a deposition layer, with polygonally shaped crystals increasing in size with depth; a transition layer with porphyrblastic crystals; a fine grained layer with cataclastic crystals and strong, near vertical single-pole c-axis fabric. Air bubbles in the ice are elongated in the direction of ice flow; a coarse grained layer with large, interlocking, branched crystals and a multi-maximum (diamond pattern) C-axis fabric, a second fine grained layer with cataclastic and interlocking crystals, elongated air bubbles and a strong, single maximum fabric which is elongated in the direction of ice flow; and a second coarse grained layer with large interlocking branched crystals and a multi-maximum fabric. Comparisons with borehole inclination and oxygen isotope data show that the two layers of single maximum fabric correspond to two layers of high ice shear, and that the second layer contains ice dating back to the period of the last glaciation. (Auth. mod.)

45-41

Study of the structure of ice core from BHQ borehole on Law Dome, Antarctica.
Li, J., et al, Collection of antarctic scientific explorations, No.5. Studies on glaciology, Beijing, Science Publishing House, 1988, p.119-131, In Chinese with English summary. 16 refs.
Xie, Z., Huang, M.
Boreholes, Ice microstructure, Ice crystal structure, Recrystallization, Antarctica—Law Dome.
Studies carried out on an ice core about 400 m long, from the upper part of a BHQ borehole, show that the ice core microstructure varies markedly with depth. In the upper part of the borehole (down to 160 m depth), crystals change gradually from fine, equidimensional, equigranular and polygonal near the surface, to coarse and shape-complicated inside. The fabric pattern changes from a randomly oriented pattern to a weak girdle pattern. In the middle part of the borehole (between 200 and 300 m), the mean crystal area decreases gradually and the fabric pattern changes with increasing depth. At the bottom of the borehole (below 400 m), the coarsest crystals occur and the single-maximum fabric pattern seems to split. Taking into account the theory of deformation and recrystallization of ice and the temperature profile in the BHQ borehole, it is suggested that the formation and separation of the single-maximum fabric pattern is dependent on the rotation of C-axis and recrystallization. (Auth. mod.)

45-42

Preliminary study on acoustical characteristics of ice core from BHQ on the Law Dome, Antarctica.
Zhang, J., et al, Collection of antarctic scientific explorations, No.5. Studies on glaciology, Beijing, Science Publishing House, 1988, p.132-140, In Chinese with English summary. 4 refs.
Fu, R., Wang, W.
Ice acoustics, Acoustic measurement, Measuring instruments, Ice cores, Antarctica—Law Dome.
Sound wave instruments for rock parameter type SYC-2 and SYC-3 were used in a study on acoustical characteristics of ice cores from BHQ on the Law Dome. Sixteen samples of ice cores from various depths were tested at 258 K (-15 C). The maximum resolution of the instruments is 0.01 microsecond. The instruments emit square wave pulses, with a period of 1 ms and an adjustable pulse width of 0.2-5 microsecond. The sensor frequency is 1.25 MHz. The sampling interval for amplitude measurement is 0.1 microsecond. Based on the test results, dilatational and shear wave velocities and dynamic Poisson's ratio were calculated, and spectral analysis of frequency was made by means of fast Fourier transform. (Auth. mod.)

45-43

Repeated compression-annealing experiments for the ice from Antarctica.
Huang, M., et al, Collection of antarctic scientific explorations, No.5. Studies on glaciology, Beijing, Science Publishing House, 1988, p.141-152, In Chinese with English summary. 13 refs.
Wang, W., Li, J., Li, G., Xie, Z.
Ice crystals, Compressors, Ice creep, Strain tests, Strain measuring instruments, Rheology, Ice cores.
Three runs of repeated uniaxial compression-annealing experiments were conducted on a creep testing machine for snow and ice. The initial orientation fabric of specimens was single-maximum pattern or weak multi-maximum pattern with quite different mean crystal size. Experimental results show that under a warm temperature and large load, the original features of microstructure and fabric pattern will disappear finally, and a girdle multimaximum fabric pattern with fine equigranular microstructure will appear. Analysis of microstructure and fabric pattern shows that the formation mechanism of fabric pattern in these experiments is principally recrystallization. The creep curve shows that the secondary stage of creep is unstable, soon transforming to tertiary stage of creep. The ratios of the limit of strain rate to the minimum strain rate after the last compression for the three runs are 1.20, 1.32 and 1.56, respectively. (Auth. mod.)

45-44

Ice structure, bubble properties and stratigraphy in the BHQ1 ice core from Law Dome, Antarctica.
Han, J.K., et al, Collection of antarctic scientific explorations, No.5. Studies on glaciology, Beijing, Science Publishing House, 1988, p.153-163, In Chinese with English summary. 17 refs.
Young, N.W.
Ice crystals, Ice cores, Bubbles, Ice structure, Antarctica—Law Dome.
Four types of ice, characterized by the amount of melting and other processes operating at the surface during the transformation of snow to ice, can be distinguished in a 300 m deep core, drilled in 1982 near Cape Folger on the Law Dome ice cap. Crystal size increases with depth to a maximum at about 150 m. From there to about 220 m depth crystal size decreases, air bubbles become elongated, the verticality of the orientation fabric decreases as the vertical gradient of the horizontal veloci-

ty increases from 0.01/a to 0.1/a. Between 220 and 227 m there is an interleaving of two kinds of ice layers with different properties. Below 227 m, the crystal size is larger in association with a multi-maximum fabric (often of diamond pattern); the ice is fully microfractured; the velocity gradient is reduced to 0.02/a and there is a smaller bubble elongation. Stress relaxation and annealing under relatively warmer temperatures probably plays a significant role in the development of very large crystals and diamond type multi-maximum fabrics in the basal portion of the ice cap. The occurrence of microfractures within the core appears to be modulated by the physical properties or some effect of the deformation in the ice cap. (Auth. mod.)

45-45

Analysis of trace elements in BHQ ice core of Law Dome, Antarctica.

Zhang, Y., et al, Collection of antarctic scientific explorations, No.5. Studies on glaciology, Beijing, Science Publishing House, 1988, p.164-172, In Chinese with English summary. 21 refs.

Liu, Y., Li, G., Xiao, L., Xie, Z.

Impurities, Ice composition, Air pollution, Chemical analysis, Antarctica—Law Dome.

Trace elements in ice samples taken from Law Dome were analyzed with an instrumental neutron activation analysis technique. The results show that for all 14 elements there is no significant change in concentration in the past 5000 years, indicating that the environmental pollution in other continents does not impact Antarctica appreciably. Elements such as Al, Fe, etc. are mainly derived from crustal materials; Na and Mg have marine origin. Observed high enrichment factors for some volatile elements are more likely the results of natural processes. The enrichment factors for these 14 elements relative to crust show a similar pattern to that of atmospheric trace elements at the South Pole, suggesting that the elements in ice are derived from the atmosphere. Therefore the record of these elements preserved in the ice reflects the atmospheric element contents and their variation in history. (Auth. mod.)

45-46

Isotopic analyses of hydrogen and oxygen from BHQ ice core of Law Dome, Antarctica.

Jiang, G., et al, Collection of antarctic scientific explorations, No.5. Studies on glaciology, Beijing, Science Publishing House, 1988, p.173-178, In Chinese with English summary. 12 refs.

Ice dating, Paleoclimatology, Isotope analysis, Antarctica—Law Dome.

The curves of D and delta O-18 determined from an ice core drilled to 400 m deep on the Law Dome indicate relatively little climatic fluctuation in the past 5,000 years, with a mean value of -19.9 per mill for delta O-18 and of -164.5 per mill for delta D. The surface mean annual temperature is estimated to be -18.9 C in this period. (Auth.)

45-47

Depositional characteristics of the moraine formed by the continental ice sheet in the area near Casey Station, Antarctica.

Xie, Y., et al, Collection of antarctic scientific explorations, No.5. Studies on glaciology, Beijing, Science Publishing House, 1988, p.179-192, In Chinese with English summary. 11 refs.

Chemical analysis, Moraines, Geomorphology, Glacial deposits, Weathering, Antarctica—Casey Station.

The samples of Neoglacial moraine formed 2000-3000 years B.P., and the samples of the old moraine in Late Pleistocene near Casey Station were analyzed for their lithological character, the surface shape of quartz sand and their weathering extent. Results show that the old moraine was transported from inland, and the Neoglacial moraine from a neighboring region. The statistics of the surface shape of quartz sand observed under a stereoscope indicate that the psephicity of the quartz sand in the Neoglacial moraine is better than that of the old moraine, which means that the grinding action of the moraine in the ice sheet is a main process due to little active water in the ice. The secondary weathering action of the material results in the grain fragmenting with time, together with an enrichment of Ca + + in the old moraine. (Auth.)

45-48

Preliminary research on weathering process in Casey Station region, Antarctic.

Xie, Y., et al, Collection of antarctic scientific explorations, No.5. Studies on glaciology, Beijing, Science Publishing House, 1988, p.193-213, In Chinese with English summary. 11 refs.

Frost weathering, Moraines, Bottom sediment, Chemical analysis, Antarctica—Casey Station.

Sedimentological studies of the weathering processes of antarctic bedrock and moraines show the following: microfractures, less than 1 cm deep, and macrofissures were formed by the physical frost weathering process; the chemical composition of weathering products shows a differentiation according to their granularity, they are relatively enriched by rare earth elements of the Ce family; weathering clay minerals are mainly illite hydromica; the bedrock crust contains very small amounts of $CaCO_3$ and belongs to primitive debris slightly polluted by As. (Auth. mod.)

45-49

Physical properties of sea ice near Casey, Antarctica.

Allison, I., et al, Collection of antarctic scientific explorations, No.5. Studies on glaciology, Beijing, Science Publishing House, 1988, p.214-233, In Chinese with English summary. 21 refs.

Qian, S.

Ice physics, Sea ice distribution, Ice crystals, Heat flux, Ice water interface, Antarctica—Newcomb Bay.

Sea ice characteristics were examined at a number of sites in Newcomb Bay, near Casey Station, throughout 1983. The ice in this region is highly unstable, breaking out frequently in strong winds during winter months and then reforming, there appears to be little heat flux from the ocean to the underside of the ice; the dependence of the salinity of the ice on growth rate and thickness were found to be similar to that in arctic sea ice. Most of the ice growth was due to congelation, and the bulk of the ice was composed of columnar crystals with horizontal C-axis that shows some preferred alignment. At one site, however, there was a considerable proportion of frazil in the total ice column, which accreted rapidly when there was open water less than 100 m away. Multiyear ice from an almost enclosed bay to the south of Casey showed a very strong preferred alignment of the horizontal C-axis at almost all depths. It is suggested that these arise as a result of strong tidal currents. (Auth. mod.)

45-50

Achievements of recent Australian studies in ice mechanics.

Jacka, T.H., et al, Collection of antarctic scientific explorations, No.5. Studies on glaciology, Beijing, Science Publishing House, 1988, p.234-241, In Chinese with English summary. 10 refs.

Gao, X.

Ice creep, Rheology, Ice mechanics, Stresses, Ice crystal size.

The nature of the ice creep curve is first discussed and a new rheological model is introduced to help describe the elastic, inelastic and viscous stages of the creep curve. An ice flow law, i.e. the relation between applied stress and resulting minimum strain rate, is examined over a range of temperatures. Of more significance to the flow of polar ice masses, however, are the accelerating and tertiary stages of the creep curve in which the creep rate is higher, by a factor of about 3 for compression and up to 9 for shear, than the minimum creep rate. Along with the approach to tertiary creep rates and with the development of preferred orientation fabrics, crystal size has been found to attain an equilibrium value. The dependence of this equilibrium size on laboratory test temperature and stress is studied, and it is suggested that stress may have the greater effect on the final equilibrium crystal size. Finally, current and planned activities for further ice mechanics studies are outlined. (Auth. mod.)

45-51

Development conditions and mass balance of the glaciers near the Great Wall Station, Antarctica.

Ren, J., Collection of antarctic scientific explorations, No.5. Studies on glaciology, Beijing, Science Publishing House, 1988, p.242-247, In Chinese with English summary. 3 refs.

Glacier mass balance, Glacier formation, Snow accumulation, Snow air interface, Ablation, Antarctica—Great Wall Station.

The following results of studies of glacier formation and mass balance in the vicinity of the Great Wall Station are reported: mean annual air temperature is -2 to -3 C on the coast and around -4 C at the snow line. Annual precipitation is 600 to 800 mm on the coast and increases with altitude. The low temperature, usually below 0 C, in combination with the abundant precipitation mainly in solid state, brings about a condition of heat and moisture favorable to glacial development. The snow line in this region is 100 to 150 m a.s.l. The maximum of ablation depth on a glacial surface may reach about 1000 mm water equivalent, still the net ablation is much less than the net accumulation. (Auth. mod.)

45-52

Ice formation and temperature regime of the ice caps on Nelson and King George Islands, Antarctica.

Ren, J., Collection of antarctic scientific explorations, No.5. Studies on glaciology, Beijing, Science Publishing House, 1988, p.248-255, In Chinese with English summary. 11 refs.

Recrystallization, Glacier formation, Snow air interface, Snow stratigraphy, Antarctica—Nelson Island, Antarctica—King George Island.

From analysis of snow stratigraphy profiles and meteorological data obtained from Dec. 1985 to Mar. 1986, the following conclusions are reached: warm infiltration-recrystallization processes are the main factor in the ice formation of the Nelson I. ice cap, and warm infiltration-recrystallization, and cold infiltration-recrystallization, are responsible for the ice formation on the King George I. ice cap. It is noted that an infiltration-congelation zone (superimposed ice zone) was found on the ice caps, which has not been observed before on maritime glaciers. Temperatures measured in several boreholes of 10 m and more show a corresponding relation between temperature in the active layer and ice formation zone. Temperature in the active layer is highest in the warm infiltration-recrystallization zone, near or at 0 C, and drops gradually upwards and downwards from this zone. (Auth. mod.)

45-53

Antarctica, an ice territory. [La Antártica, un territorio de hielo].

Risso Valle, H., *Boletín antártico chileno*, Jan.-June 1990, 10(1), p.11-19, In Spanish. 15 refs.

Sea ice, Iceberg towing, Ice (construction material).

The principal features of the antarctic ice sheet, and the sea ice surrounding it, are discussed. A broad review is included of the law of the sea and its application to territorial-"sector" claims and boundaries. The possibilities of using ice as a resource—such as a source of water, or in construction, or as floating platforms, etc.—are examined and recommended.

45-54

Intensity of satellite radar-altimeter return power over continental ice: a potential measurement of katabatic wind intensity.

Remy, F., et al, *Journal of glaciology*, 1990, 36(123), p.133-142, 32 refs.

Brossier, C., Minster, J.F.

Ice sheets, Radar echoes, Wind velocity, Measurement, Topographic features, Surface roughness, Scattering, Glacier surfaces.

Analyzed, above continental ice, are the various factors which affect the power return of the Seasat radar altimeter as measured by its Automatic Gain Control (AGC). Corrections of effects due to the AGC loop control are first applied. AGC is then normalized by positioning the half-power point at the middle of the instrument receiving window. This operation is valid for both surface and volume scattering. Over a part of Antarctica between long. 90 deg and 150 E., the remaining variations of AGC are of the order of 15 dB. Most of these variations occur on a large scale (>100 km) and are correlated with the katabatic wind intensity. This indicated that AGC measures either surface roughness of the ice, which is related to wind intensity, or grain size which could also be dependent on the wind. *In-situ* measurements support the evidence that the radar altimeter is more sensitive to surface scattering. These data could therefore provide a measurement of the intensity of katabatic winds over the continental ice. (Auth. mod.)

45-55

Experiments on the growth of spongy ice near a stagnant point.

Lock, G.S.H., et al, *Journal of glaciology*, 1990, 36(123), p.143-150, 16 refs.

Foster, I.B.

Spongy ice, Ice crystal growth, Ice accretion, Supercooling, Air flow, Brines, Drops (liquids).

45-56

Thermal characteristics of the permafrost within an active rock glacier (Murtèl/Corvatsch, Grisons, Swiss Alps).

Mühll, D.V., et al, *Journal of glaciology*, 1990, 36(123), p.151-158, 32 refs.

Haeberli, W.

Permafrost thermal properties, Frozen ground temperature, Rock glaciers, Boreholes, Permafrost heat transfer, Thermal conductivity, Temperature measurement, Switzerland—Alps.

45-57

Surge of Bualtar Glacier, Karakoram Range, Pakistan: a possible landslide trigger.

Gardner, J.S., et al, *Journal of glaciology*, 1990, 36(123), p.159-162, 16 refs.

Hewitt, K.

Glacier surges, Glacier flow, Landslides, Glacial hydrology, Glacier surveys, Geologic processes, Pakistan—Karakoram Range.

45-58

Potential for basal melting under Summit, Greenland.

Firestone, J., et al, *Journal of glaciology*, 1990, 36(123), p.163-168, 16 refs.

Waddington, E.D., Cunningham, J.

Ice sheets, Glacier melting, Ice models, Paleoclimatology, Ice temperature, Glacier mass balance, Analysis (mathematics), Greenland.

45-59

Two-dimensional spreading and thickening of aufeis.

Schohl, G.A., et al, *Journal of glaciology*, 1990, 36(123), p.169-178, 6 refs.

Ettema, R.

Naleds, Slush, Freezing, Ice growth, Ice water interface, Layers, Culverts.

45-60

Theoretical determination of the characteristic equation of snow in the pendular regime.

Morris, E.M., et al, *Journal of glaciology*, 1990, 36(123), p.179-187, 18 refs.

Kelly, R.J.

Snow composition, Ice models, Mathematical models, Snow water content, Snow compaction, Capillarity, Analysis (mathematics).

45-61
Model for scaling avalanche speeds.
McClung, D.M., *Journal of glaciology*, 1990, 36(123), p.188-198, 37 refs.
Avalanche mechanics, Avalanche modeling, Fluid flow, Velocity, Rheology, Analysis (mathematics).

45-62
Mass balance of Rhonegletscher during 1882/83-1986/87.
Chen, J., et al, *Journal of glaciology*, 1990, 36(123), p.199-209, 44 refs.
Funk, M.
Glacier mass balance, Glacier ablation, Periodic variations, Glacier surveys, Temperature effects, Switzerland—Alps.

45-63
On the temperature distribution of glaciers in China.
Huang, M., *Journal of glaciology*, 1990, 36(123), p.210-217, 26 refs.
Glacier ice, Ice temperature, Temperature distribution, Glacier surveys, Mountain glaciers, Temperature measurement, China.

45-64
Response of the energy balance on the margin of the Greenland ice sheet to temperature changes.
Braithwaite, R.J., et al, *Journal of glaciology*, 1990, 36(123), p.217-221, 8 refs.
Olesen, O.B.
Glacier ablation, Air temperature, Temperature effects, Glacier heat balance, Surface energy, Snow cover effect, Radiation absorption, Greenland.

45-65
Simple energy-balance model to calculate ice ablation at the margin of the Greenland ice sheet.
Braithwaite, R.J., et al, *Journal of glaciology*, 1990, 36(123), p.222-228, 18 refs.
Olesen, O.B.
Glacier ablation, Ice models, Climatic factors, Glacier heat balance, Glacier melting, Radiation absorption, Greenland.

45-66
Numerical simulation of powder-snow avalanches.
Fukushima, Y., et al, *Journal of glaciology*, 1990, 36(123), p.229-237, 24 refs.
Parker, G.
Avalanche modeling, Mathematical models, Simulation, Snow density, Avalanche mechanics, Theories, Topographic effects.

45-67
Analysis and modeling of melt-water refreezing in dry snow.
Pfeffer, W.T., et al, *Journal of glaciology*, 1990, 36(123), p.238-246, 20 refs.
Illangasekare, T.H., Meier, M.F.
Snow melting, Meltwater, Seepage, Ice water interface, Freezing rate, Snow permeability, Mathematical models, Thermal analysis.

45-68
Design, development, field observations, and preliminary results of the coherent antarctic radar depth sounder (CARDS) of the University of Kansas, U.S.A.
Raju, G., et al, *Journal of glaciology*, 1990, 36(123), p.247-254, 8 refs.
Xin, W., Moore, R.K.
Radar, Electronic equipment, Design, Sounding, Ice sheets, Topographic features, Radar echoes.
A modern coherent antarctic radar depth sounder for probing the ice sheets of Antarctica and Greenland has been designed and developed by the University of Kansas. It was successfully tested during the austral summers of 1987 and 1988 at Downstream B and Upstream B, Antarctica. Ground-based measurements were made with the radar in a mobile hut hauled by a Sno-cat in 1987 and in a Spryte vehicle in 1988. This paper describes the design and field operations of the system. Some results of the 1987 operations at Downstream B are presented. (Auth. mod.)

45-69
PC-based portable ice-radar receiver.
Hammond, W.R., et al, *Journal of glaciology*, 1990, 36(123), p.255-257, 5 refs.
Sprenke, K.F.
Radar, Portable equipment, Sounding, Glacier thickness, Electronic equipment, Computer applications, Performance.

45-70
First discovery of fossil ice of 1000-1700 year B.P. in Japan.
Yoshida, M., et al, *Journal of glaciology*, 1990, 36(123), p.258-259, 5 refs.
Fossil ice, Ice dating, Snow cover effect, Japan.

45-71
Arctic investigations. Hörsholm, Denmark Hydraulic Institute, Aug. 1990, n.p., 38 refs.
Engineering, Research projects.

45-72
Yukon territory snow survey measurements. Historical summary 1958-1987. Whitehorse, Yukon Territory, Canada, Indian and Northern Affairs, Water Resources Division, 1989, 38p.
Snow surveys, Snow depth, Snow water equivalent, Canada - Yukon Territory.

45-73
Yukon territory snow survey bulletin and water supply forecast May 15, 1990. Whitehorse, Yukon Territory, Canada, Indian and Northern Affairs, Water Resources Division, May 1990, 24p.
Snow surveys, Runoff forecasting, Water supply, Air temperature, Snow water equivalent, Precipitation (meteorology), Weather, Snow pillows, Snow depth, River basins, Canada—Yukon Territory.

45-74
Yukon territory snow survey bulletin and water supply forecast May 1, 1990. Whitehorse, Yukon Territory, Canada, Indian and Northern Affairs, Water Resources Division, May 1990, 24p.
Snow surveys, Runoff forecasting, Water supply, Air temperature, Snow water equivalent, Precipitation (meteorology), Weather, Snow pillows, Snow depth, River basins, Canada—Yukon Territory.

45-75
Yukon territory snow survey bulletin and water supply forecast April 1, 1990. Whitehorse, Yukon Territory, Canada, Indian and Northern Affairs, Water Resources Division, Apr. 1990, 24p.
Snow surveys, Air temperature, Runoff forecasting, Water supply, Precipitation (meteorology), Snow courses, Snow water equivalent, Snow depth, Snow pillows, River basins, Weather, Canada—Yukon Territory.

45-76
Yukon territory snow survey bulletin and water supply forecast March 1, 1990. Whitehorse, Yukon Territory, Canada, Indian and Northern Affairs, Water Resources Division, Mar. 1990, 25p.
Snow surveys, Snow courses, Air temperature, Water supply, Precipitation (meteorology), Snow water equivalent, Snow depth, Snow pillows, Runoff forecasting, River basins, Weather, Canada—Yukon Territory.

45-77
Ice avalanches and overflows of glacial lakes. [Eislawinen und Ausbrüche von Gletscherseen].
Röthlisberger, H., *Schweizerische Naturforschende Gesellschaft. Jahrbuch*, 1978, p.170-212, In German with French summary. 63 refs.
Avalanche deposits, Icefalls, Glacial lakes.

45-78
Dynamic coupling of sea ice and water for an ice field with free boundaries.
Leppäranta, M., et al, *Tellus*, Aug. 1990, 42A(4), p.482-495, 29 refs.
Omstedt, A.
Sea ice, Ice friction, Ice water interface, Ice models, Drift, Wind factors, Ocean currents.

45-79
Relationships between elastic and rheological properties of sea ice and its texture. [Abhängigkeiten elastischer und rheologischer Eigenschaften des Meereises vom Eisgefüge].
Hellmann, H., *Berichte zur Polarforschung*, 1990, No.69, 99p., In German with English summary. Refs. p.89-94.
Sea ice, Rheology, Ice elasticity, Ice deformation, Porosity, Grain size, Viscoelasticity, Ice structure, Ice physics, Ice mechanics, Analysis (mathematics).
This work examines ice structure, its elastic properties, and the rheological behavior of sea ice samples (classed as columnar, granular, or brecciated) and correlates the results. A comparison is made between arctic and antarctic sea ice.

45-80
Alaskan oil spill bioremediation project. *U.S. Environmental Protection Agency. Office of Research and Development. Report*, Aug. 1989, EPA/600/8-89/073, 16p. PB90-216466.
Oil spills, Environmental protection.

45-81
Equipment for underwater surveys of hydraulic structures using acoustics. [Apparatura dlia podvodnykh obsledovanil gidrotekhnicheskikh sooruzhenil akustricheskim metodom].
Konovalov, V.V., et al, *Morskie inzhenernye izyskaniia i portovoe gidrotekhnicheskoe stroitel'stvo; sbornik nauchnykh trudov* (Marine engineering surveys and hydraulic construction in ports; collected scientific papers). Edited by I.U.M. Krylov, Moscow, Transport, 1989, p.13-20, In Russian. 3 refs.
Mar'ianov, V.B., Mirandov, V.L., Semenov, I.U.N.
Underwater acoustics, Hydraulic structures, Ice cover effect, Equipment.

45-82
Icebreakers and icebreaking. January 1978-December 1989. (A Bibliography from Oceanic Abstracts).
Springfield, VA, National Technical Information Service, Apr. 1990, 104p. PB90-865338.
Bibliographies, Icebreakers, Ice breaking, Ice formation, Design criteria.

45-83
Deicing techniques and equipment. April 1983-April 1990. (A bibliography from the NTIS Database).
Springfield, VA, National Technical Information Service, Apr. 1990, 90p. PB90-865254.
Bibliographies, Ice prevention, Ice removal.

45-84
Diagnostic-feasibility study of seven metropolitan area lakes. Part 2: Lake Riley. Final report.
Osgood, R.A., Chicago, IL, Environmental Protection Agency, Sep. 1983, 47p. PB90-194903.
Runoff, Water pollution, Algae, Snowmelt, United States—Minnesota—Riley, Lake.

45-85
Software set-up for data processing of depolarization due to rain and ice crystals in the Olympus Project. Research report.
van de Kamp, M.M.J.L., *Netherlands. Technische Hogeschool Eindhoven. Faculty of Electrical Engineering. Report*, Apr. 1989, ELT-89-E-218, 92p. PB90-191347.
Ice crystals, Rain, Computer programs, Data processing, Atmospheric attenuation, Measurement, Telecommunication.

45-86
Estimation of the recharge area contributing water to a pumped well in a glacial-drift, river-valley aquifer.
Morrissey, D.J., *U.S. Geological Survey. Water Resources Division. Water-supply paper*, 1989, USGC/Water-supply paper-2338, 50p. PB90-101289.
Ground water, Water supply, Mathematical models, Glacial deposits.

45-87
Development of analysis tools for high and low velocity ice indentation problems.
Vivatrat, V., *U.S. National Science Foundation. Division of Industrial and Science and Technical Innovation. Report*, Sep. 1987, NSF-ISI86-60042, 119p. PB90-189846.
Oil recovery, Offshore structures, Ice formation, Dynamic loads, Mathematical models, Ice models, Compressive properties, Stress strain diagrams.

45-88
Texture segmentation using localized spatial filtering. Final report.
Du, L.J., *U.S. Naval Research Laboratory. Report*, Jan. 26, 1990, NRL-MR-6586, 46p. ADA-218 064.
Radar, Filters, Sea ice, Oceans.

45-89
Radar detection of lightning and electric fields.
Metcalf, J.I., *U.S. Air Force Geophysics Laboratory. Technical report*, Aug. 16, 1989, GL-TR-89-0223, 34p. ADA-217 894.
Atmospheric electricity, Lightning, Radar echoes, Clouds (meteorology), Ice crystals, Electrical properties, Reflectivity, Storms, Polarization (waves).

45-90
Purity determination of standard analytical reference materials by differential scanning calorimetry.
Black, P.B., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, May 1990, SR 90-16, 6p., ADA-224 669, 11 refs.
Pidgeon, D.
Temperature measurement, Materials, Tests, Military research.
As part of the United States Army Toxic and Hazardous Materials Agency (USATHAMA) Quality Assurance program to maintain a set of high-purity (>98 mol%) Standard Analytical Reference Materials (SARMs), the SARMs' purity must be routinely monitored. This report presents data on melting temperature, freezing point depression and heat of fusion as

measured by differential scanning calorimetry (DSC) for the seven SARMs suited to DSC methods. These data were then used in the van't Hoff's equation to determine each munition standard's molar purity. The purity of each tested SARM was greater that 98 mol%, which confirmed the integrity of the SARMs.

45-91
Experimental frequency spectra of internal waves in an ice-covered high-latitude basin.
Pisarev, S.V., *Oceanology,* 1988 (Pub. Apr. 1989), 28(5), p.577-580, 9 refs.
Ocean waves, Ice cover effect.

45-92
Feasibility of using lasers and infrared heaters as UNREP icing countermeasures. Final report June-Dec. 1989.
Schultz, L.A., et al, *NKF Engineering, Inc., Columbia, MD. Arctic Technology Group. Report,* Dec. 29, 1989, NKF-4090-001, 267p. ADA-219 031.
Minnick, P.V.
Lasers, Infrared equipment, Ice removal, Ice prevention, Countermeasures.

45-93
Ice load measurements on board MS *Kemira,* winter 1989.
Gylden, R., et al, *Helsinki University of Technology, Espoo (Finland). Dept of Mechanical Engineering. Report,* 1989, M-93, 66p. PB90-201245.
Riska, K.
Ice formation, Ice loads, Loads (forces), Measurement, Statistical analysis, Stresses.

45-94
Sea ice properties studied from the icebreaker *Tor* during BEPERS-88.
Fransson, E., et al, *Sveriges Meteorologiska och hydrologiska Institut, Norrkoeping. Report,* Jan. 1990, SMHI-RO-10-1990, 86p. PB90-202078.
Håkansson, B., Omstedt, A., Stehn, L.
Sea ice, Ice physics, Remote sensing.

45-95
Fiscal year 1988 program report: Alaska Water Research Center.
Kane, D.L., *U.S. Geological Survey. Water Resources Division. Report,* Jan. 1990, USGS/G-1547-01, 65p. PB90-202151.
Research projects, Water supply, Ground water, Water pollution, Sediment transport, Nutrient cycle, Sewage treatment, Peat, Lakes, United States—Alaska.

45-96
Evaluation of a simplified ridge modelling method.
Comfort, G., et al, *Transport Canada. Transportation Development Centre. Report,* May 1990, TP 10202E, 2 vols., With French summary. Vol.1: Main report; vol.2: Appendices. 13 refs.
Abdelnour, R.
Ice models, Pressure ridges, Icebreakers, Ice breaking, Metal ice friction, Computer programs, Velocity.

45-97
Working group on river ice jams. Field studies and research needs.
Beltaos, S., et al, *National Hydrology Research Institute, Saskatoon, Saskatchewan. NHRI science report,* 1990, No.2, 121p., Refs. passim.
Gerard, R., Petryk, S., Prowse, T.D.
River ice, Ice jams, Research projects, Ice breakup, Ice surveys, Freezeup.

45-98
Fence characterization for intrusion detection systems.
Walsh, M.R., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* May 1990, SR 90-18, 23p., ADA-223 564, 2 refs.
Peck, L.
Equipment, Tests.
Equipment and test procedures for quantifying the normal stiffness, transverse stiffness, post rigidity and post plumbness of a chain-link fence are described. These parameters characterize the condition of the fence and determine its suitability for use with a fence-mounted intrusion detection system.

45-99
Ecological impact of oil and gas industry. Proceedings of the First All-Union Conference, Oct. 3-6, 1988, Nadym, USSR; Issue No.1, Pt. 2. [Ekologiia neftegazovogo kompleksa. Materialy 1 Vsesoiuznoĭ konferentsii, 3-6 oktiabria 1988 g., Nadym. Vypusk 1, Chast' 2],
Vsesoiuznaia konferentsiia "Ekologiia neftegazovogo kompleksa", 1-aia, Nadym, SSSR, 3-6 oktiabria, 1988, Moscow, VNIIPKtekhorgneftegazstroĭ, 1989, 235p., In Russian. Refs. passim. For selected papers see 45-100 through 45-110.
Novikov, I.P., ed.
Ecology, Environmental protection, Natural resources, Engineering, Permafrost preservation, Geocryology, Meetings, Tundra, Petroleum industry, Environmental impact, USSR.

45-100
Conducting ecological experiments for stationary engineering and geocryological studies of gas-deposit areas in Western Siberia. [Provedenie ekologicheskikh eksperimentov pri statsionarnom inzhenerno-geokriologicheskom izuchenii Zapadno-Sibirskoĭ gazonosnoĭ provintsii],
Moskalenko, N.G., et al, Vsesoiuznaia konferentsiia "Ekologiia neftegazovogo kompleksa", 1-aia, Nadym, SSSR, 3-6 oktiabria, 1988. Materialy; Vypusk 1, chast' 2 (First All-Union Conference on Ecology of the Oil and Gas Industry, Nadym, USSR, Oct. 3-6, 1988.) Proceedings; Issue No.1, Pt. 2. Edited by I.P. Novikov, Moscow, VNIIPKtekhorgneftegazostroĭ, 1989, p.3-15, In Russian. 12 refs.
Pavlov, A.V.
Geocryology, Environmental impact, Ecology, Engineering, Gas production, Taiga, Active layer, Vegetation, Forecasting.

45-101
Anthropogenic changes in geochemical composition of the arctic oil- and gas-bearing regions in the northeastern European territory of the USSR and Yamal Peninsula. [Antropogennye izmeneniia geokhimicheskogo fona zapoliarnykh neftegazonosnykh raĭonov severo-vostoka evropeĭskoĭ territorii SSSR i Iamala],
Evseev, A.V., et al, Vsesoiuznaia konferentsiia "Ekologiia neftegazovogo kompleksa", 1-aia, Nadym, SSSR, 3-6 oktiabria, 1988. Materialy; Vypusk 1, chast' 2 (First All-Union Conference on Ecology of the Oil and Gas Industry, Nadym, USSR, Oct. 3-6, 1988.) Proceedings; Issue No.1, Pt. 2. Edited by I.P. Novikov, Moscow, VNIIPKtekhorgneftegazostroĭ, 1989, p.15-21, In Russian. 5 refs.
Krasovskaia, T.M.
Environmental impact, Human factors engineering, Geochemistry, Ecology, Natural resources, Polar regions, Pollution, Snow composition, Peat.

45-102
Application of level-transect experiments for determining the structure and dynamics of cryogenic ecosystems in areas of oil and gas deposits. [Opyt primeneniia bazis-transekt dlia vyiavleniia struktury i dinamiki kriogennykh ekosistem na territorii mestorozhdeniĭ nefti i gaza],
Zaikanov, V.G., et al, Vsesoiuznaia konferentsiia "Ekologiia neftegazovogo kompleksa", 1-aia, Nadym, SSSR, 3-6 oktiabria, 1988. Materialy; Vypusk 1, chast' 2 (First All-Union Conference on Ecology of the Oil and Gas Industry, Nadym, USSR, Oct. 3-6, 1988.) Proceedings; Issue No.1, Pt. 2. Edited by I.P. Novikov, Moscow, VNIIPKtekhorgneftegazostroĭ, 1989, p.22-27, In Russian. 4 refs.
Zaikanova, I.N.
Geocryology, Ecosystems, Structural analysis, Dynamic properties, Periglacial processes, Active layer, Engineering geology, Vegetation, Topographic features, Tundra, Models.

45-103
Engineering and geological monitoring of geotechnical systems of gas fields in the Tyumen North: standards, methods, and technological security. [Inzhenerno-geologicheskiĭ monitoring geotekhnicheskikh sistem gazovykh promyslov tiumenskogo Severa, ego normativno-metodicheskoe obosnovanie i tekhnologicheskoe obespechenie],
Kravtsov, IU.V., et al, Vsesoiuznaia konferentsiia "Ekologiia neftegazovogo kompleksa", 1-aia, Nadym, SSSR, 3-6 oktiabria, 1988. Materialy; Vypusk 1, chast' 2 (First All-Union Conference on Ecology of the Oil and Gas Industry, Nadym, USSR, Oct. 3-6, 1988.) Proceedings; Issue No.1, Pt. 2. Edited by I.P. Novikov, Moscow, VNIIPKtekhorgneftegazostroĭ, 1989, p.32-36, In Russian.
Lovchuk, G.V., Manin, A.V., Trofimov, A.V.
Geocryology, Periglacial processes, Freeze thaw cycles, Gas production, Engineering, Permafrost beneath structures, Pipelines, Damage, Environmental impact.

45-104
Zoning chart for environmental protection of geocryological zones in Western Siberia. [Karta prirodookhrannogo raĭonirovaniia geologicheskoĭ sredy kriolitozony Zapadnoĭ Sibiri],
Mel'nikov, E.S., et al, Vsesoiuznaia konferentsiia "Ekologiia neftegazovogo kompleksa", 1-aia, Nadym, SSSR, 3-6 oktiabria, 1988. Materialy; Vypusk 1, chast' 2 (First All-Union Conference on Ecology of the Oil and Gas Industry, Nadym, USSR, Oct. 3-6, 1988.) Proceedings; Issue No.1, Pt. 2. Edited by I.P. Novikov, Moscow, VNIIPKtekhorgneftegazostroĭ, 1989, p.36-43, In Russian. 3 refs.
Moskalenko, N.G., Voĭtsekhovskaia, I.V.
Geocryology, Environmental protection, Ecosystems, Permafrost distribution, Freeze thaw cycles, Natural resources, Charts, Periglacial processes, Tundra, Topographic features, USSR—Siberia.

45-105
Modern equipment for study and control of thermal characteristics of natural resource regions in the North. [Sovremennoe oborudovanie dlia izucheniia i kontrolia teplofizicheskikh parametrov prirodnogo kompleksa na Severe],
Pavlov, A.V., et al, Vsesoiuznaia konferentsiia "Ekologiia neftegazovogo kompleksa", 1-aia, Nadym, SSSR, 3-6 oktiabria, 1988. Materialy; Vypusk 1, chast' 2 (First All-Union Conference on Ecology of the Oil and Gas Industry, Nadym, USSR, Oct. 3-6, 1988.) Proceedings; Issue No.1, Pt. 2. Edited by I.P. Novikov, Moscow, VNIIPKtekhorgneftegazostroĭ, 1989, p.52-58, In Russian. 10 refs.
Tsibul'skiĭ, V.R.
Permafrost thermal properties, Geocryology, Gas production, Heat transfer, Soil temperature, Measuring instruments.

45-106
Problems and results of using cryomonitoring in the development of oil and gas fields in the Timan-Pechora area. [Nekotorye zadachi i itogi realizatsii kriomonitoringa pri osvoenii neftegazovykh mestorozhdeniĭ Timano-Pechorskoĭ provintsii],
Popkov, O.N., et al, Vsesoiuznaia konferentsiia "Ekologiia neftegazovogo kompleksa", 1-aia, Nadym, SSSR, 3-6 oktiabria, 1988. Materialy; Vypusk 1, chast' 2 (First All-Union Conference on Ecology of the Oil and Gas Industry, Nadym, USSR, Oct. 3-6, 1988.) Proceedings; Issue No.1, Pt. 2. Edited by I.P. Novikov, Moscow, VNIIPKtekhorgneftegazostroĭ, 1989, p.58-65, In Russian. 6 refs.
Maslov, A.D.
Permafrost thermal properties, Geocryology, Permafrost hydrology, Environmental protection, Temperature effects, Frozen ground temperature, Forecasting, Human effects engineering, Monitors, Tundra.

45-107
Typification of engineering effects in permafrost regions using numerical criteria. [K voprosu o tipizatsii tekhnogennykh vozdeĭstviĭ v kriolitozone s ispol'zovaniem kolichesktvennykh kriteriev],
Popkov, O.N., et al, Vsesoiuznaia konferentsiia "Ekologiia neftegazovogo kompleksa", 1-aia, Nadym, SSSR, 3-6 oktiabria, 1988. Materialy; Vypusk 1, chast' 2 (First All-Union Conference on Ecology of the Oil and Gas Industry, Nadym, USSR, Oct. 3-6, 1988.) Proceedings; Issue No.1, Pt. 2. Edited by I.P. Novikov, Moscow, VNIIPKtekhorgneftegazostroĭ, 1989, p.65-69, In Russian. 3 refs.
Seregina, N.V.
Permafrost thermal properties, Environmental impact, Geocryology, Engineering, Natural resources, Thermal effects, Forecasting, Analysis (mathematics), Vegetation factors, Temperature gradients.

45-108
Territorial plans for the environmental protection of gas- and oil-production areas in Western Siberia and the Far North, and aspects of the authors views on their fulfillment. [Territorial'nye kompleksnye skhemy okhrany prirody ob"ektov gaso- i neftedobychi Zapadnoĭ Sibiri i Kraĭnego Severa i voprosy avtorskogo nadzora za realizatsieĭ ikh reshenĭĭ],
Romanovskaia, N.V., et al, Vsesoiuznaia konferentsiia "Ekologiia neftegazovogo kompleksa", 1-aia, Nadym, SSSR, 3-6 oktiabria, 1988. Materialy; Vypusk 1, chast' 2 (First All-Union Conference on Ecology of the Oil and Gas Industry, Nadym, USSR, Oct. 3-6, 1988.) Proceedings; Issue No.1, Pt. 2. Edited by I.P. Novikov, Moscow, VNIIPKtekhorgneftegazostroĭ, 1989, p.107-112, In Russian.
Shchitinskiĭ, V.A.
Permafrost preservation, Gas pipelines, Environmental protection, Engineering, Ecology, Natural resources, Economic analysis.

45-109
Complex territorial plan for environmental protection of West Siberian oil-bearing regions. [Territorial'naia kompleksnaia skhema okhrany prirody Zapadno-Sibirskogo neftegazovogo kompleksa],
Abzalov, R.Z., et al, Vsesoiuznaia konferentsiia "Ekologiia neftegazovogo kompleksa", 1-aia, Nadym, SSSR, 3-6 oktiabria, 1988. Materialy; Vypusk 1, chast' 2 (First All-Union Conference on Ecology of the Oil and Gas Industry, Nadym, USSR, Oct. 3-6, 1988.) Proceedings; Issue No.1, Pt. 2. Edited by I.P. Novikov, Moscow, VNIIPKtekhorgneftegazostroĭ, 1989, p.128-135, In Russian. 11 refs.
Environmental protection, Tundra, Ecology, Petroleum industry, Waste disposal, Oil wells, Transportation, Environmental impact, Gas production, USSR—West Siberia.

45-110
Plan for environmentally protected areas: a component part of the comprehensive environmental protection plan (for example, the Tyumen and Tomsk regions). [Skhema prirodookhrannykh territoriĭ—sostavnaia chast' territorial'noĭ kompleksnoĭ skhemy okhrany prirody (na primere Tiumenskoĭ i Tomskoĭ oblastef)],
Isaeva-Petrova, L.S., et al, Vsesoiuznaia konferentsiia "Ekologiia neftegazovogo kompleksa", 1-aia, Nadym, SSSR, 3-6 oktiabria, 1988. Materialy; Vypusk 1, chast' 2 (First All-Union Conference on Ecology of the Oil and Gas Industry, Nadym, USSR, Oct. 3-6, 1988.) Proceedings; Issue No.1, Pt. 2. Edited by I.P. Novikov, Moscow, VNIIPKtekhorgneftegazostroĭ, 1989, p.148-158, In Russian. 21 refs.
Chubinin, O.A.
Ecosystems, Environmental protection, Environmental impact, Revegetation, Human factors engineering, Charts, Natural resources, USSR—Tyumen.

45-111
New system for controlled snow sliding on a roof.
Tamura, M., et al, *Seppyo*, June 1990, 52(2), p.81-90, *In Japanese with English summary.* 4 refs.
Hirayama, I., Miyauchi, S.
Snow slides, Roofs, Snow removal.

45-112
Sublimation rate of collected blowing snow in a cyclone type collector.
Sato, T., *Seppyo*, June 1990, 52(2), p.91-98, In Japanese with English summary. 11 refs.
Blowing snow, Snow evaporation, Meteorological instruments, Sublimation, Analysis (mathematics).

45-113
Ice core analysis.
Shoji, H., *Seppyo*, June 1990, 52(2), p.99-112, In Japanese. 48 refs.
Ice cores, Drill core analysis, Ice sheets, Paleoclimatology, Ice dating, Analysis (mathematics).
Ice cores as a record of past climatic changes are discussed. Examples are described from the Greenland and antarctic ice sheets. Analysis includes oxygen isotope and CO2 content. The references include many sources on Antarctica, almost all in English.

45-114
Internal structure of powder-snow avalanches.
Nishimura, K., *Seppyo*, June 1990, 52(2), p.113-116, In Japanese. 12 refs.
Snow cover structure, Avalanche mechanics.

45-115
Strength characteristics of rocks after having been at low temperature.
Inada, Y., et al, *Ehime University. Faculty of Engineering. Memoirs (Ehime daigaku kogakubu kiyo)*, Feb. 1982, 10(1), p.335-342, In Japanese with English summary. 3 refs.
Yagi, N., Shigenobu, J., Nakaya, Y.
Frozen rock strength, Underground storage, Low temperature tests, Liquified gases, Natural gas.

45-116
Effect of low temperature on polymeric binding agent for rock mass.
Inada, Y., et al, *Ehime University. Faculty of Engineering. Memoirs (Ehime daigaku kogakubu kiyo)*, Feb. 1982, 10(1), p.343-350, In Japanese with English summary. 2 refs.
Rito, F.
Soil stabilization, Frozen rock strength, Underground storage, Low temperature tests, Polymers, Liquified gases, Natural gas.

45-117
Easy method for estimating the strength of rocks at low temperature.
Inada, Y., et al, *Ehime University. Memoirs. Section 3. Engineering (Ehime daigaku kiyo. 3-bu. Kogaku)*, Feb. 1981, 9(4), p.477-487, In Japanese with English summary. 9 refs.
Yagi, N.
Frozen rock strength, Underground storage, Liquified gases, Natural gas.

45-118
Mechanical characteristics of rocks at low temperatures.
Inada, Y., et al, *Society of Materials Science, Japan. Journal (Zairyo)*, Dec. 1980, 29(327), p.1221-1227, In Japanese with English summary. 3 refs.
Yagi, N.
Frozen rock strength, Rock mechanics, Underground storage, Liquified gases, Natural gas, Analysis (mathematics).

45-119
Thermal properties of rocks at low temperatures.
Inada, Y., et al, *Society of Materials Science, Japan. Journal (Zairyo)*, Dec. 1980, 29(327), p.1228-1233, In Japanese with English summary. 4 refs.
Yagi, N.
Frozen rock temperature, Frozen rock strength, Underground storage, Liquified gases, Natural gas, Analysis (mathematics).

45-120
Mechanical characteristics of rocks related to cooling.
Inada, Y., et al, *Society of Materials Science, Japan. Journal (Zairyo)*, Oct. 1979, 28(313), p.979-985, In Japanese with English summary. 3 refs.
Yagi, N.
Frozen rock strength, Rock mechanics, Underground storage, Liquified gases, Natural gas.

45-121
Polartech '90.
International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, 759p., Refs. passim. For selected papers see 45-122 through 45-176 or A-42481, E-42484, F-42486, G-42482, G-42483, and G-42485.
Offshore drilling, Offshore structures, Ice loads, Mining, Ice navigation, Pipelines, Permafrost beneath structures, Ice cores, Ice jams, Sea ice distribution, Freeze thaw cycles.
This is a collection of papers presented at the 3rd Polartech conference held in Copenhagen, Aug. 14-16, 1990, focussing on the development and commercial application of polar technology, particularly hydrocarbon, hydropower and mining technology in polar regions. Logistics and protection of the sensitive polar environment are highlighted. Of a total of 79 papers presented, 6 are pertinent to Antarctica.

45-122
Barents Sea: petroleum resources and technological challenges.
Överli, J.M., International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.1-11, 14 refs.
Petroleum industry, Offshore drilling, Barents Sea.

45-123
Future of mineral resource development in Antarctica.
Westermeyer, W.E., et al, International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.92-100.
Johnson, P.A.
Minerals, Economic development, Natural resources.
Environmental considerations, lack of knowledge about Antarctica's mineral resource potential, and economic and political constraints on exploration and development are examined, with the conclusion that it does not appear likely that any minerals will be developed in Antarctica in the foreseeable future.

45-124
Surface energy balance and surface temperature in cold regions.
Lunardini, V.J., et al, MP 2767, International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.101-110, 23 refs.
Ibrahim, H.
Heat balance, Surface temperature, Soil air interface, Frost penetration, Thaw depth, Mathematical models, Seasonal freeze thaw, Soil freezing, Ground thawing.
The surface energy balance controls the surface temperature and hence the amount of energy exchanged between the cryosphere and the atmosphere. The temperature of the atmosphere is only one of the components of this energy balance and cannot, of itself, accurately describe the interaction between the atmosphere and soil masses in cold regions. A number of sites are available for which the seasonal values of the ground surface temperature and daily values of radiation and atmospheric conditions have been measured. The sites chosen for this study are particularly simple since the surfaces are paved and thus evapotranspiration need not be considered. Daily weather data were used to calculate radiation and sensible heat fluxes with standard equations. The calculated values agreed reasonably well with daily data for the sites and somewhat better for seasonal values. A simple phase change model for the ground mass allowed the seasonal (freeze or thaw) values of the ground surface temperature to be predicted; these predictions showed excellent agreement with measured quantities.

45-125
Foundation engineering and a new technique for thermal insulation of wall in Daxisoxinganling permafrost region, China.
Pang, G.L., et al, International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.111-116.
Kong, Y.M., Cao, F., Qi, Y.Z.
Permafrost beneath structures, Frost protection, Foundations, Walls.

45-126
Building foundation in saline permafrost.
Uhre, N., et al, International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.117-125.
Back-Madsen, C., Busk, E.
Permafrost beneath structures, Foundations, Saline soils, Engineering geology.

45-127
Causation and characteristics of regular transverse cracks of asphalt highways in northern China.
Wang, B.C., et al, International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.126-135, 5 refs.
Liang, Z.T., Chen, Y.M.
Pavements, Cracking (fracturing), Frost action, Analysis (mathematics), Road maintenance, Frost protection.

45-128
Engineering, logistics and technology in the Italian National Antarctic Research program.
Cervellati, R., International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.137-150.
Research projects, Logistics, Expeditions, Antarctica—Terra Nova Bay Station.
Activities of the 5th Italian expedition at Terra Nova Bay Station are summarized. Described are unloading and backload-

ing operations and transportation, the station's housing and research facilities and instruments, communication equipment, computer systems, and fuel storage arrangements.

45-129
Multi-model photogrammetry applied to arctic terrains using colour slides from Greenland.
Dueholm, K.S., et al, International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.151-160, 1 ref.
Pedersen, A.K.
Photogrammetry, Geological surveys, Stereophotography.

45-130
Engineering, technology, and logistics in the Arctic.
Myers, C.E., International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.163-170, 12 refs.
Research projects, Organizations, Legislation, Polar regions.

45-131
Facilities plan and protocol for the support of the National Science Foundation-sponsored Greenland Ice Sheet Project Two: deep ice core drilling effort.
Proenza, L.M., et al, International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.171-177, 3 refs.
Ice cores, Research projects, Drilling, Ice sheets, Greenland.

45-132
Alaska Beaufort Sea immersion test of welds of high-strength steels for icebreakers.
Inoue, T., et al, International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.178-187, 11 refs.
Horii, Y., Sekiguchi, S., Koseki, T., Sackinger, W.M.
Steels, Icebreakers, Welding, Corrosion.

45-133
Local corrosion of welds of Y.P.:440N/sq mm class high-strength steels produced by TMCP for icebreakers.
Inoue, T., et al, International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.188-196, 8 refs.
Koseki, T., Horii, Y., Tsuzuki, T.
Icebreakers, Steels, Welding, Corrosion.

45-134
Numerical simulation of ship manoeuvring motion in level ice.
Lindström, C.A., International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.198-208, 10 refs.
Ice navigation, Ships, Ice loads, Mathematical models.

45-135
Project criteria and future development of the telecommunications system for the National Program of Antarctic Research.
Blasi, L., et al, International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.213-224.
Corbelli, F., De Simone, M., Testa, M.
Research projects, Telecommunication, Antarctica—Terra Nova Bay Station.
The planning and installation of a communications system at Terra Nova Bay Station during the first 5 Italian expeditions are summarized. A plan for the 1990-1991 season to install an automatic station at Terra Nova Bay, linked to a satellite and to a short wave system and capable of receiving and transmitting data by remote control from Italy, is outlined.

45-136
Satellite transmission of vibration records of blasting operations in Greenland.
Madsen, N.K., et al, International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.225-234.
Lauritzen, E.K., Schneider, J.
Blasting, Data transmission, Greenland.

45-137
Severe freezing periods and the formation of ice jams at Salmon, Idaho.
Bilello, M.A., MP 2768, International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.235-244, 3 refs.
Ice jams, Floods, Meteorological factors, River ice, Air temperature, Degree days, United States—Idaho—Salmon River.

45-138
Ice concentrations affecting navigation to Scoresby Sund in East Greenland.
Christensen, F.T., et al, International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.245-256, 4 refs.
Lintrup, M.J., Zorn, R.
Sea ice distribution, Ice navigation, Pack ice, Ice edge, Ice conditions, Greenland.

45-139
Ice management procedure for the exploitation of deepwater oil fields in subarctic areas.
Di Cocco, N.R., et al, International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.257-269, 2 refs.
Trave, F.
Offshore structures, Ice loads, Safety, Ice detection, Ice reporting, Mathematical models.

45-140
Ice concentrations on the north east Greenland shelf.
Lintrup, M.J., et al, International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.272-281, 4 refs.
Christensen, F.T.
Sea ice distribution, Ice surveys, Ice conditions, Pack ice, Polynyas, Greenland Sea.

45-141
Overview of the OKN ice data acquisition program (IDAP) and its results to date.
Spring, W., et al, International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.283-298, 21 refs.
Sangolt, A.
Sea ice distribution, Ice surveys, Icebergs, Ice conditions, Offshore drilling, Barents Sea.

45-142
Long term ice forecasting potential in East Greenland waters.
Zorn, R., et al, International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90. Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.300-309, 3 refs.
Lintrup, M.J.
Sea ice distribution, Ice forecasting, Long range forecasting, Greenland Sea.

45-143
Scientific drilling in high latitudes.
Grout, R.M., et al, International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.338-350, 13 refs.
Oceanographic ships, Offshore drilling, Ocean bottom, Bottom sediment.
The Ocean Drilling Program has recently completed 30 cruises (60 months) of scientific ocean drilling. During this time the scientific research vessel *JOIDES Resolution* has completed six scientific expeditions to the high latitudes, including Legs 113, 114, 119 and 120 to the Weddell Sea, Atlantic Ocean, Kerguelen Plateau, and Prydz Bay. Scientific objectives during these cruises addressed the paleoceanographic, climatic and tectonic histories of these regions, as well as the nature and age of basement. The scientific and operational experiences in completing these scientific expeditions are summarized. (Auth. mod.)

45-144
Operating review of Molikpaq and Kulluk activities in the Beaufort Sea.
Thomas, T.J., et al, International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.351-374, 2 refs.
Wright, B.D.
Offshore structures, Offshore drilling, Ice control, Ice conditions, Beaufort Sea.

45-145
Sub-mud line protection and containment systems.
Gilbert, D., International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.375-391, 1 ref.
Offshore drilling, Offshore structures, Ice control.

45-146
Gas pipelining in permafrost zone: experimental study of geocryological, engineering-geological and ecological problems.
Antonov-Druzhinin, V.P., International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.392-404, 7 refs.
Gas pipelines, Permafrost beneath structures, Permafrost preservation, Ground thawing, Temperature control, Temperature effects.

45-147
Methods of ice design for offshore structures.
Foroughi, A.R., International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.405-427, 28 refs.
Offshore structures, Ice loads, Ice cover strength, Ice breaking, Analysis (mathematics).

45-148
Recent developments in structural concepts for Arctic Ocean platforms.
Gerwick, B.C., Jr., International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.428-441, 12 refs.
Offshore structures, Ice loads, Ice control, Countermeasures, Design.

45-149
Use of steel/concrete composite elements in arctic structures.
Gowda, S.S., et al, International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.442-455, 9 refs.
Hassinen, P., Stephens, M.
Offshore structures, Ice loads, Reinforced concretes, Walls, Shear strength.

45-150
Marine oil pipeline from Jameson Land, East Greenland.
Gravesen, H., International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.456-467, 12 refs.
Pipelines, Hydraulic structures, Ocean bottom, Ice scoring.

45-151
Problems of ice friction and strength characteristics control.
Igoshin, V.A., et al, International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.468-477, 10 refs.
Aitov, A.I.
Ice solid interface, Ice friction, Ice strength.

45-152
Prospects of installation techniques for arctic marine pipelines.
Kamyshev, M.A., International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.478-490, 3 refs.
Pipelines, Pipe laying, Hydraulic structures, Trenching, Ocean bottom, Ice crossings.

45-153
Technology of pipeline construction on the Yamburg gas condensate field.
Kurbatov, N.I., et al, International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.492-502.
Gabelaia, R.D.
Gas pipelines, Pipe laying, Permafrost beneath structures.

45-154
Onshore oil field development in East Greenland.
Mai, H., et al, International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.504-514, 4 refs.
Holm-Jensen, O.
Petroleum industry, Petroleum transportation, Pipelines, Ice navigation, Permafrost preservation, Greenland.

45-155
Ice feature influence on wide constructions and islands.
Mirzoev, D.A., International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.515-525, 4 refs.
Offshore structures, Ice loads, Ice solid interface, Caissons, Artificial islands, Ice models, Mathematical models.

45-156
Ice pressure measurements using PVDF-sensors.
Muhonen, A., et al, International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.526-538, 4 refs.
Koriseva, J.
Ice pressure, Measuring instruments, Ice loads, Ice solid interface, Polymers, Electrical properties, Analysis (mathematics).

45-157
Dynamic model of floating ice masses colliding with rigid structures.
Piola, S., International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.539-554, 5 refs.
Ice models, Ice loads, Ice solid interface, Mathematical models, Offshore structures, Water waves.

45-158
Shallow and deep ice coring devices developed by the Polar Ice Coring Office (PICO).
Proenza, L.M., et al, International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.555-564, 10 refs.
Kelley, J.J., Koci, B.R., Sonderup, J.M., Wumkes, M.
Ice coring drills, Drilling.

45-159
On the corrosion protection of cold natural gas pipelines buried in discontinuous permafrost.
Sackinger, W.M., International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.565-574, 12 refs.
Gas pipelines, Underground pipelines, Permafrost beneath structures, Pipeline insulation, Corrosion, Electrical resistivity.

45-160
On the use of brine and high-density immiscible liquids for spray ice removal.
Sackinger, W.M., et al, International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.575-581, 7 refs.
Lu, M.C.
Sea spray, Chemical ice prevention, Ice removal, Ship icing, Brines.

45-161
Engineering-geological monitoring of oil and gas production and transport geotechnical systems.
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Petroleum industry, Environmental impact, Permafrost preservation, Environmental protection.

45-162
Feasibility study of an oil production ship concept for arctic conditions.
Sandvik, P.C., International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.590-600, 12 refs.
Ice navigation, Floating structures, Offshore drilling, Ice loads, Ice control.

45-16.
Influence of cold climate on the service properties of elastomers, polymers and composites used in mechanical engineering.
Cherskiĭ, I.N., International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.603-613, 6 refs.
Polymers, Frost resistance, Cold weather performance, Low temperature tests, Cold stress.

45-164
Wear and tightness of moving seals.
Popov, S.N., et al, International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.614-623, 17 refs.
Korbankov, S.V., Kulaguin, V.A.
Sealing, Frost resistance, Low temperature tests, Polymers, Cold stress.

45-165
Environmental and cultural impact of arctic mining—a gold project in East Greenland.
Brooks, C.K., International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.624-634, 10 refs.
Gold, Mining, Environmental impact, Greenland.

45-166
Data basis for permafrost studies in Greenland.
Kern-Hansen, C., International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.635-644, 4 refs.
Permafrost distribution, Frozen rock temperature, Site surveys, Geological surveys, Water temperature, Electric power, Greenland.

45-167
Mineral resource exploration in Greenland.
Thorning, L., et al, International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.645-653, 6 refs.
Schönwandt, H.K.
Geological surveys, Minerals, Exploration, Natural resources, Greenland.

45-168
Glaciers and the hydropower planning for Greenland.
Weidick, A., International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.654-663, 13 refs.
Glacier surveys, Glacial hydrology, Electric power, Subglacial drainage, Meltwater, Greenland.

45-169
Environmental policy and waste management at the Italian antarctic station, Terra Nova Bay.
Cervellati, R., et al, International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.664-682, 3 refs.
Metalli, P., Testa, L., Voli, D.
Waste disposal, Environmental protection, Antarctica —Terra Nova Bay Station.
After a general review of the Antarctic Treaty system recommendations dealing with environmental protection policies, specific measures taken at the Italian Terra Nova Bay Station are discussed. These include a detailed waste management plan, a water treatment plant, incinerators, fuel tanks and a cogeneration system which are described and illustrated.

45-170
Environmental studies and regulations in relation to planned mining activities in Greenland.
Hansen, M.M., International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.684-698, 3 refs.
Mining, Environmental protection, Greenland.

45-171
Discharge measurements structures under arctic conditions: design and construction considerations.
Skretteberg, R., International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.699-708, 4 refs.
Hydraulic structures, Permafrost hydrology, Runoff, Stream flow, Flow measurement, Permafrost beneath rivers.

45-172
Frost-swelling damage and prevention of spillway dam of Fengman hydropower project.
Cao, Z.Y., International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.709-718.
Frost heave, Dams, Concrete freezing, Cracking (fracturing).

45-173
Arctic and antarctic mining while utilizing glacial ice for support of lateral walls.
Fangel, H., International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.720-726, 10 refs.
Mining, Ice (construction material), Glacier ice, Glacier flow.
Based on the premise that glaciology has established that glacial ice is an extremely viscous fluid, and that pressure and time will have their effect on the ice and make it flow like any liquid towards the lowest attainable energy and strain levels, the circumstances and methods for glacier ice exploitation, such as mining in Antarctica, are described.

45-174
Harm of the ice pressure and its prevention measures.
Pang, G.L., et al, International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.727-733.
Cao, F., Zhai, B.
Ice pressure, Ice solid interface, Ice control.

45-175
Design engineering problems of surface coal mines in arctic Alaska.
Sengupta, M., International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.735-743, 1 ref.
Coal, Mining, Frozen ground strength, Permafrost, Engineering geology, Slope stability, United States—Alaska—North Slope.

45-176
Rehabilitation and demolition after the closure of the zinc and lead mine "Black Angel" at Maarmorilik, Greenland
Asmund, G., et a., International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, Hörsholm, Denmark, Danish Hydraulic Institute, 1990, p.744-759, 6 refs.
Christophersen, J.B., Steensboe, J.
Mining, Waste disposal, Environmental protection, Greenland.

45-177
Full-scale test results for the two latest polar icebreakers.
Juurmaa, K., International Conference on Development and Commercial Utilization of Technologies in Polar Regions, Copenhagen, Denmark, Aug. 14-16, 1990. Proceedings. Polartech '90, 1990, 21p., For other papers of this conference see 45-121 through 45-176.
Icebreakers, Ice navigation, Ice breaking, Design, Performance, Tests.

45-178
Antarctica.
Weller, G., Encyclopedia of physical science and technology, 1990 yearbook, edited by R.A. Meyers, San Diego, Academic Press, c.1990, p.3-30, 8 refs.
DLC Q123.E4973 SCI RR
Ice sheets, Sea ice, Research projects, Polar regions.
Following a brief glossary of ice terms plus krill and a chronology of antarctic speculation, discovery, and exploration covering the period from the sixth century BC through the IGY, three major sections define the antarctic environment, review the development of antarctic scientific research, and discuss policies and issues which have arisen as a result of extended international presences in Antarctica. Most of the description of the antarctic environment settles on the prevalent forms of ice and the biological forms inhabiting the coastal regions and islands. The research programs also focus on these topics, but include aspects of the atmosphere above the continent, its historical climates and geological structures, and its circumjacent waters. The section on policy and issues outlines salient features of the Antarctic Treaty System, the structure of the Scientific Committee on Antarctic Research (SCAR), the antarctic minerals regime, marine life as resources, environmental protection and conservation, and tourism.

45-179
Permafrost regime in the Mackenzie Delta-Beaufort Sea region, N.W.T. and its paleoclimatic implications.
Allen, D.M., Ottawa, Ontario, Carleton University, 1988, 154p., National Library of Canada. Canadian Theses Services. Microfiche No.0-315-46268-X, M.S. thesis. Refs. p.129-134.
Permafrost distribution, Permafrost thickness, Permafrost dating, Paleoclimatology, Permafrost depth, Subsea permafrost, Permafrost thermal properties, Mathematical models, Canada—Northwest Territories—Mackenzie River Delta.

45-180
Modelling the evaporation of volatile liquids and spreading of chemicals on snow and ice.
Kawamura, P.I., et al, Technical Seminar on Chemical Spills, 4th, Toronto, Feb. 10-12, 1987. Proceedings, Ottawa, Ontario, Environment Canada, Technology Development and Technical Services Branch, 1987, p.53-76, 4 refs.
Mackay, D.
Pollution, Snow impurities, Evaporation, Mathematical models, Ice cover, Solubility, Wastes.

45-181
New generation of spill model.
Mackay, D., et al, Technical Seminar on Chemical Spills, 4th, Toronto, Feb. 10-12, 1987. Proceedings, Ottawa, Ontario, Environment Canada, Technology Development and Technical Services Branch, 1987, p.149-163, 4 refs.
Wilson, D.
Oil spills, Models.

45-182
Ice interaction with a rubble mound breakwater: a case study.
MacIntosh, K.J., Ottawa, Ontario, Carleton University, 1985, 121p., National Library of Canada. Canadian Theses services. Microfiche No.0-315-22220-4, M.Eng. thesis. 55 refs.
Lake ice, Ice solid interface, Embankments, Ice control, Ports, Ice loads, Offshore structures, Artificial islands, Mathematical models.

45-183
Influence of grain size on compressive strength of polycrystalline ice.
Cannon, N.P., Hanover, NH, Dartmouth College, Thayer School of Engineering, 1985, 75p., M.S. thesis. Refs. p.54-57.
Grain size, Compressive properties, Ice crystals, Stress strain diagrams, Ice mechanics, Cracking (fracturing), Analysis (mathematics).

45-184
Environmental effects of snow dumping: a literature review.
Scott, W.S., et al, *Journal of environmental management*, 1980, No.10, p.219-240, Refs. p.236-240.
Wylie, N.P.
Snow disposal, Snow impurities, Soil pollution, Environmental impact, Runoff, Ground water, Vegetation.

45-185
Ice propeller interaction forces.
Keinonen, A.J., et al, *Transport Canada. Transportation Development Centre. Report*, Apr. 1990, TP 10401E, 2 vols., With French summary.
Browne, R.P.
Ice cover strength, Ice solid interface, Propellers, Ice cover thickness, Ice loads, Hydrodynamics, Models.

45-186
Engineering analysis of ice/propeller interaction data. Summary report.
Laskow, V., et al, *Transport Canada. Transportation Development Centre. Report*, Oct. 1986, TP 8449E, 55p., With French summary. 3 refs. Also available in French as TP 8449F. For full report see 45-188.
Revill, C.
Ice loads, Ice solid interface, Propellers, Impact strength, Design criteria, Models, Statistical analysis.

45-187
Measurement of ice/propeller interaction parameters —MV *Robert LeMeur*. Supplemental report: summary.
Kirby, K., et al, *Transport Canada. Transportation Development Centre. Report*, Oct. 1986, TP 8448E, 22p., With French summary. Also available in French as TP 8448F. For full report see 45-189.
Laskow, V., Revill, C.
Ice solid interface, Propellers, Impact strength, Ice loads.

45-188
Engineering analysis of ice/propeller interaction data.
Laskow, V., et al, *Transport Canada. Transportation Development Centre. Report*, Oct. 1986, TP 8450E, 322p. + append., With French summary. 94 refs. For summary report see 45-186.
Revill, C.
Ice solid interface, Propellers, Design criteria, Ice loads, Impact strength, Models, Statistical analysis.

45-189
Measurement of ice/propeller interaction parameters —MV *Robert LeMeur*. Supplemental report.
Laskow, V., et al, *Transport Canada. Transportation Development Centre. Report*, Oct. 1986, TP 6841E, 156p. + append., With French summary. 7 refs. For summary report see 45-187.
Revill, C., Kirby, K.
Ice solid interface, Propellers, Impact strength, Ice loads.

45-190
Thermistor-based thermal conductivity measurement system.
Atkins, R.T., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, June 1990, SR 90-24, 11p. ADA-226 278.
Wright, E.A.
Measuring instruments, Construction materials, Measurement, Thermal conductivity, Thermistors, Soils, Analysis (mathematics).
This report describes a patented method for using commercially available thermistors to make *in-situ* thermal conductivity measurements with commonly available electronic equipment such as digital voltmeters. The emphasis is on the use of a single thermistor to measure the thermal conductivity of soils. Calibration techniques are explained and examples provided. Limits on this technique are discussed, including measurement range, material grain size, the amount of material needed for a valid measurement, and temperature stability. Specific examples of the use of this technique are provided for thermal conductivity measurements of soils, building materials, and the sludges in a sewage treatment plant. Data analysis is provided, including a statistical approach to finding the thermal conductivity in large volumes of material.

45-191
Complex formation between dimethyl methylphosphonate and hexafluoroisopropanol
Leggett, D.C., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, June 1990, SR 90-22, 3p., ADA-226 221, 8 refs.
Measurement, Charge transfer.
A solvent/water partitioning method was used to measure the complex formation between dimethyl methylphosphonate (DMMP) and hexafluoroisopropanol (HFIP). The highest formation constant was obtained when n-hexane was used as the partitioning solvent. Other solvents all interfered to some extent with complex formation, probably by interacting with HFIP. The log formation constant in carbon tetrachloride was 3.46 at 21 C, which was similar to literature estimates for other phosphonates. The data support formation of H-bond charge transfer complexes as the mechanism for HFIP interaction with phosphonates and as primarily responsible for HFIP extraction of these compounds from water.

45-192
Evaluation of a field kit for detection of TNT in water and soils.
Jenkins, T.F., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, June 1990, SR 90-20, 14p., ADA-224 670, 12 refs.
Schumacher, P.W.
Detection, Explosives, Military equipment.
Commercially available indicator tubes were evaluated for detection and measurement of TNT in water and soil. The tubes are intended for field use and can detect the presence of TNT in water and soil at concentrations as low as 40 micrograms/L and 0.5 micrograms/g respectively. Estimation of TNT concentration relies on measurement of stain length. Since the end point of the stain is diffuse, detecting the extent of stain length is very subjective. Therefore, it is imperative that standards and unknown samples be measured by the same analyst. Even when the same analyst makes all measurements, the accuracy and precision of concentration estimation is poor. Stain length was also found to depend on the sample matrix. Standards and samples must be matrix matched to enable proper calibration. Direct comparison of stain intensity, rather than length, to a standard at a criterion level successfully discriminated between standards with TNT concentrations above and below this level. The recommended soil extraction procedure using these indicator tubes was also evaluated. A 1-minute period of equilibration between soil and methanol resulted in incomplete TNT extraction. Percent recoveries were 58 to 70% of that achieved using a laboratory procedure involving an 18-hour equilibration period in a sonic bath. The percent extracted was directly related to the amount of TNT present in the soil.

45-193
Late Cenozoic geologic controls on placer-gold distribution in the Nome nearshore area.
Kaufman, D.S., et al, *U.S. Geological Survey. Bulletin*, 1989, No.1903, p.26-45, Refs. p.42-45.
Hopkins, D.M.
Geochronology, Glaciation, Sediments, Gold, Geologic processes, United States—Alaska—Nome.

45-194
Elemental composition, morphology and concentration of particles in firn and ice cores from DYE-3, Greenland.
Kumai, M., et al, *Bulletin of glacier research*, May 1990, No.8, MP 2769, p.1-18, 26 refs.
Langway, C.C., Jr.
Ice cores, Firn, Ice composition, Impurities, Scanning electron microscopy, X ray analysis, Greenland.
A variety of particles extracted from firn and ice core samples from DYE-3, Greenland, was investigated to characterize the type, nature and concentrations of material. A scanning electron microscope (SEM) and an energy dispersive X-ray (EDX) analyzer were employed to analyze particles in firn samples from three annual layers (1981-1983 A.D.) and ice core samples from depth of 833.412 m corresponding to 45 B.C. The particles were extracted by filtering the meltwater of each firn or ice

sample with a nuclepore membrane filter having 0.4 micron pore diameter. In the firn samples (1981-1983 A.D.) relatively high concentrations of clay and silt particles were found, and low concentrations of quartz, pine pollen, spores and spherule particles. Some spherules were identified as coal fly ash by SEM and EDX analysis. In the deep ice core samples from 45 B.C., relatively high concentrations of clay and silt particles were found, and some pine pollen, spores and spherules. Some spherules are possibly of extraterrestrial origin. The mean concentration of particles in firn samples from 1981-1983 was 6.4 times higher than that of ice cores from 611 A.D., 45 B.C. and 730 B.C. The mean concentration of spherules in the firn was 27.3 times higher than that of the ice cores. The increase of spherules in the recent firn is mostly a result of deposition of coal fly ash spherules from modern industrial sources.

45-195
Studies of structure, composition and temperature regime of sheet glaciers of Svalbard and Severnaya Zemlya: methods and outcomes.
Zagorodnov, V.S., et al, *Bulletin of glacier research*, May 1990, No.8, p.19-28, 8 refs.
Arkhipov, S.M.
Ice cores, Ice composition, Ice sheets, Glacier ice, Glacier surveys, Norway—Svalbard, USSR—Severnaya Zemlya.

45-196
Snow surveys on the north facing slope of Langtang Valley, Nepal Himalayas.
Ohta, T., et al, *Bulletin of glacier research*, May 1990, No.8, p.29-30, 1 ref.
Motoyama, H., Iida, H.
Snow surveys, Snow depth, Himalaya Mountains.

45-197
SEM observations of microparticles in antarctic ice cores.
Higashi, A., et al, *Bulletin of glacier research*, May 1990, No.8, p.31-53, 21 refs.
Fujii, Y., Takamatsu, S., Watanabe, R.
Ice cores, Impurities, Scanning electron microscopy, Ice composition, Cosmic dust.
Microparticles collected from melt water samples of deep ice cores retrieved at Mizuho Station and Advance Camp (AC) in East Queen Maud Land were examined under a scanning electron microscope (SEM), and their elemental composition data were obtained by the energy-dispersive X-ray spectroscopy (EDS). Many observed particles, mainly collected from AC, are morphologically classified into 5 categories. These categories were explained with typical photomicrographs and also with EDS data. Comparative studies are carried out with the stratospheric microparticles catalogued in NASA Cosmic Dust Catalogues. In spite of morphological resemblance between the ice core particles and the stratospheric ones, most of the former were of terrestrial origin. One extraterrestrial particle of chondritic elemental composition was found, in addition to several spherical particles which look like Fe-rich siderolite. Number concentration of microparticles counted on SEM micrographs of low magnification coincides well with that measured by the Coulter counter. Depth variation of the concentration does not show any significant modern anthropogenic effect on the firn of shallow depth. Rough estimate of the influx rate of extraterrestrial microparticles with sizes of 10 micron order derived from the data coincides with that derived astronomically or from the observations of stratospheric microparticles.

45-198
Air temperature and snow depth on Yala Glacier of Langtang Valley, Nepal Himalayas.
Motoyama, H., et al, *Bulletin of glacier research*, May 1990, No.8, p.55-60, 3 refs.
Ohta, T., Endo, Y., Iida, H.
Air temperature, Snow depth, Glacier surveys, Snow surveys, Himalaya Mountains.

45-199
Evolution of Quaternary glaciers and environmental change in the West Kunlun Mountains, Western China.
Zheng, B.X., et al, *Bulletin of glacier research*, May 1990, No.8, p.61-72, 17 refs.
Jiao, K.Q., Ma, Q.H., Li, S.J., Fushimi, H.
Quaternary deposits, Paleoclimatology, Glacier oscillation, Glaciation, Moraines, Geochronology, Mountain glaciers, China—Kunlun Mountains.

45-200
***Full year surface meteorological data at northwestern* Tibetan Plateau using an automatic observation system.**
Ohata, T., et al, *Bulletin of glacier research*, May 1990, No.8, p.73-85, 5 refs.
Kang, X.C., Takahashi, S.
Weather stations, Meteorological data, Air temperature, Meteorological instruments, Weather observations, China—Kunlun Mountains.

45-201
Preliminary studies on the temperature in the surface layer of Guozha Glacier and Chongce Ice Cap in the West Kunlun Mountains, China.
Shao, W.Z., et al, *Bulletin of glacier research*, May 1990, No.8, p.87-91, 3 refs.
Liu, Z.X.
Glacier ice, Ice temperature, Glacier heat balance, Mountain glaciers, Boreholes, Glacier surveys, China—Kunlun Mountains.

45-202
Diurnal variation of precipitation in Langtang Valley, Nepal Himalayas.
Ueno, K., et al, *Bulletin of glacier research*, May 1990, No.8, p.93-101, 9 refs.
Yamada, T.
Diurnal variations, Precipitation (meteorology), Mountains, Air temperature, Himalaya Mountains.

45-203
Outline of the Japanese Arctic Glaciological Expedition in 1989 (JAGE 1989).
Watanabe, O., et al, *Bulletin of glacier research*, May 1990, No.8, p.103-106, 1 ref.
Fujii, Y.
Glacier surveys, Expeditions, Ice cores, Greenland.

45-204
Airborne cryogenic frost-point hygrometer: user's guide.
Spyers-Duran, P.A., *National Center for Atmospheric Research. Technical note*, Apr. 1990, NCAR/TN-347+IA, 41p. PB90-221631.
Humidity, Airborne equipment, Manuals, Hygrometers, Measurement, Measuring instruments, Design, Dew point, Computer programs, Stratosphere.

45-205
Ice and fog: detection and warning systems. December 1985-May 1990. (A bibliography from the NTIS database). Springfield, VA, National Technical Information Service, June 1990, 95p. PB90-871542.
Bibliographies, Sea ice, Ice formation, Fog formation, Warning systems, Remote sensing, Aircraft icing.

45-206
Impact of NADP/NTN sampling protocols on winter storm estimates of wet deposition in central Pennsylvania.
Lynch, J.A., et al, *U.S. Environmental Protection Agency. Atmospheric Research and Exposure Laboratory. Project report*, May 1990, EPA/600/3-90/044, 33p. PB90-219411.
DeWalle, D.R., Horner, K.
Snow samplers, Precipitation gages, Snow composition, Chemical composition, Precipitation (meteorology), Air pollution, Rain.

45-207
Chemical composition of snow cover as an indicator of gas and dust emissions. [Khimicheskiĭ sostav snezhnogo pokrova kak indikator raznosa gazo-pylevykh vybrosov],
Shul'kin, V.M., Sikhote-Alinskiĭ biosfernyĭ raĭon: printsipy i metody ekologicheskogo monitoringa (Sikhote-Alin biosphere: principles and methods of ecological monitoring). Edited by A.M. Ivlev and IU.P. Badenkov, Vladivostok, ANSSSR, Dal'nevostochnyĭ nauchnyĭ tsentr, 1981, p.101-109, In Russian. 8 refs.
Snow impurities, Snow water content, Snow cover, Snow composition, Pollution, Dust, Minerals.

45-208
Geology and geochemistry of area: Transantarctic Mountains and Ross Island, Antarctica. Beijing, Science Publishing House, 1989, 321p., In Chinese with table of contents in English. Refs. p.274-284.
Ice cores, Ice composition, Isotope analysis, Antarctica—Transantarctic Mountains, Antarctica—Ross Island.
The physical geography and geological setting of the Dry Valleys and Ross I. are reviewed. The studies discussed cover the following material: petrology and geochemistry of metamorphic rocks; petrology, mineralogy and geochemistry of granites; geology and geochemistry of volcanic rocks; lithology and geochemistry of sedimentary rock of the Taylor series in Beacon Supergroup; quaternary sediments and isotopes in ice and water; paleomagnetic and geological evidence of the drifting of Antarctica; and meteorites in Antarctica. Two appendices with tabulated results of geochemical analyses or rocks, and 14 pages of plates, conclude this volume.

45-209
Specific luminance of dry road markings during different seasons. [Torra vägmarkeringars specifika luminans under olika årstider],
Lundkvist, S.O., *Sweden. Statens väg- och trafikinstitut. VTI meddelande*, 1990, No.624, 21p., In Swedish with English summary. 5 refs.
Tires, Road maintenance, Winter maintenance, Luminance.

45-210
Annual report of the Norwegian Polar Research Institute. [Årbok 1989],
Oslo. Norsk Polarinstitutt, Oslo, Norsk Polarinstitutt, 1989, 61p., Refs. p.36-44, 61.
Meetings, Research projects, Bibliographies, Organizations, Polar regions, Glacier mass balance, Glacier flow, International cooperation, Glacier oscillation.
This report presents both general polar events and specific field activities and publications of the institute staff, including the planning and organization of the Norwegian Antarctic Research Expedition and a pamphlet on "Norway in Antarctica." It also lists lectures and conference contributions as well as fellowship and project grants awarded in 1989. The article "Glaciers in the Kongsfjorden area" by O. Liestöl concludes the report.

45-211
Northern hydrology: Canadian perspectives.
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Hydrology, Stream flow, Permafrost, Meltwater, Canada.

45-212
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Hydrology, Geography, Permafrost distribution, Snow cover distribution, Ice conditions, Canada.

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Snow hydrology, Snow melting, Snow cover, Snowmelt, Runoff, Analysis (mathematics), Canada.

45-214
Permafrost hydrology.
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Permafrost hydrology.

45-215
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Subpermafrost ground water, Permafrost hydrology, Suprapermafrost ground water, Taliks, Unfrozen water content.

45-216
Hydrology of floating ice.
Gerard, R., *Environment Canada. National Hydrology Research Institute, Saskatoon, Saskatchewan. NHRI science report*, 1990, No.1, Northern hydrology: Canadian perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.103-134.
River ice, Lake ice, Ice cover effect, Water level, Ice (water storage), Ice jams, Stream flow.

45-217
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Glacial hydrology, Glacier surveys, Subglacial drainage, Meltwater, Water supply, Canada.

45-218
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Surface waters, Water chemistry, Limnology, Canada.

45-219
Regional energy balance.
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Heat balance, Radiation balance, Ice heat flux, Snow heat flux, Tundra, Analysis (mathematics).

45-220
Regional hydrology.
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Stream flow, Hydrology, Ice cover effect, Snow cover effect, Canada.

45-221
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Crocker, D.S., Haynes, B.D.
Freezing, Heat transfer, Analysis (mathematics), Liquid solid interfaces, Phase transformations, Stefan problem, Liquid cooling.

45-222
Zero-curtain effect: heat and mass transfer across an isothermal region in freezing soil.
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Nelson, F.E., Hinkel, K.M.
Soil freezing, Soil temperature, Latent heat, Soil chemistry, Soil water migration, Thermal analysis.

45-223
Saltation of snow.
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Gray, D.M.
Blowing snow, Snow surface, Snow erosion, Shear stress, Mathematical models, Wind factors, Mass flow.

45-224
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Driscoll, C.T., Jr., Van Dreason, R., Yatsko, C.P.
Lake water, Water pollution, Snowmelt, Meltwater, Watersheds, Limnology.

45-225
Collection of intact cores from a rocky desert and a glacial till soil.
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Blasdell, B., Blume, L.J.
Drill core analysis, Laboratory techniques, Glacial deposits, Soil water migration, Soil science.

45-226
Physical chemical properties of uncharged water clusters and one-dimensional ice based on quantal calculations.
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Lutrus, C.K., Salk, S.H.S.
Water structure, Ice models, Molecular structure, Hydrogen bonds, Latticed structures, Atmospheric composition, Chemical properties.

45-227
IGARSS '89 *quantitative remote sensing:* an economic tool for the nineties; Proceedings.
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Remote sensing, Sea ice distribution, Spaceborne photography, Radar photography, Icebergs, Ice cover effect, Snow cover structure, Meetings, Radar echoes, Sensor mapping, Resolution, Accuracy, Ice surface.

45-228
Comparison of sea ice type classification using polarimetric and nonpolarimetric synthetic aperture radar.
Winebrenner, D.P., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.1, IEEE Geoscience and Remote Sensing Society, 1989, p.34-36, 1 ref.
Rothrock, D.A., Stern, H.L.
Sea ice, Ice detection, Backscattering, Classifications, Radar photography, Dielectric properties, Accuracy.

45-229
Integration of digital elevation model parameters with LANDSAT and SPOT imagery for mapping mountain glaciers: building a glaciological information system.
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Howarth, P.J.
Mountain glaciers, Height finding, Sensor mapping, Data processing, Spaceborne photography, Glaciology, Climatic changes.

45-230
Geomorphic patterns produced by the last Canadian ice sheet: matching the scales of remote sensing with the frequency of natural variation.
Clark, C.D., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.1, IEEE Geoscience and Remote Sensing Society, 1989, p.97-100, 9 refs. For another version see IEEE transactions on geoscience and remote sensing, July 1990, p.503-508.
Boulton, G.S.
Terrain identification, Glacial erosion, Glacier flow, Remote sensing, Accuracy, LANDSAT, Geomorphology.

45-231
Climate change effects on the snowmelt hydrology of western North American mountain basins.
Rango, A., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.1, IEEE Geoscience and Remote Sensing Society, 1989, p.181-183, 5 refs. For another source see IEEE transactions on geoscience and remote sensing, Sep. 1990, p.970-974.
Van Katwijk, V.
Climatic changes, Snow hydrology, Snowmelt, Runoff, Models, Mountains, Water supply, Carbon dioxide.

45-232
Adaptation of the ISCCP cloud detection algorithm to combined AVHRR and SMMR arctic data.
Key, J., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.1, IEEE Geoscience and Remote Sensing Society, 1989, p.188-191, 12 refs.
Barry, R.G.
Cloud cover, Detection, Snow cover effect, Radiometry, Albedo, Climatic factors, Clouds (meteorology).

45-233
***Millimeter-wave* electronically scanned imaging radiometer system for shipborne ice navigation application.**
Healy, G., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.1, IEEE Geoscience and Remote Sensing Society, 1989, p.277-280, 2 refs.
Grant, C.
Sea ice, Ice detection, Ice navigation, Radiometry, Indicating instruments, Computer applications, Antennas, Ships.

45-234
Active microwave classification of sea ice.
Onstott, R.G., International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.1, IEEE Geoscience and Remote Sensing Society, 1989, p.369-374, 5 refs.
Sea ice, Classifications, Microwaves, Backscattering, Radar echoes, Ice conditions, Ice surface.

45-235
Combined active/passive microwave classification of sea ice.
Livingstone, C.E., International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.1, IEEE Geoscience and Remote Sensing Society, 1989, p.376-380, 45 refs.
Sea ice, Classifications, Radar echoes, Scattering, Microwaves, Radiometry, Ice conditions, Brightness, Remote sensing.

45-236
Discrimination of sea ice types using SAR backscatter statistics.
Shuchman, R.A., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.1, IEEE Geoscience and Remote Sensing Society, 1989, p.381-385, 5 refs.
Wackerman, C.C., Maffett, A.L., Onstott, R.G., Sutherland, L.L.
Sea ice, Classifications, Radar echoes, Backscattering, Statistical analysis, Airborne radar, Ice surface.

45-237
Detection and characterization of ice ridges in the Baltic Sea using CV-580 SAR imagery.
Johansson, R., International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.1, IEEE Geoscience and Remote Sensing Society, 1989, p.386-389, 4 refs.
Sea ice, Pressure ridges, Detection, Radar echoes, Backscattering, Ice conditions, Airborne radar, Baltic Sea.

45-238
LIMEX'87 ice surface characteristics and their effect upon C-band SAR signatures.
Drinkwater, M.R., *International Geoscience and* Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.1, IEEE Geoscience and Remote Sensing Society, 1989, p.390-393, 11 refs.
Sea ice, Ice surface, Ice conditions, Backscattering, Radar echoes, Ice melting, Surface properties, Airborne radar, Labrador Sea.

45-239
Extraction of sea ice information from SAR imagery.
Olaussen, T.I., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.1, IEEE Geoscience and Remote Sensing Society, 1989, p.394-399, 12 refs.
Johannessen, O.M., Karpuz, R.
Sea ice, Ice conditions, Classifications, Radar photography, Data processing, Ice floes, Airborne radar.

45-240
Residual snow patch mapping in arctic Canada using *LANDSAT TM images.*
Gray, J.T., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.2, IEEE Geoscience and Remote Sensing Society, 1989, p.562-565, 5 refs.
Lauriol, B., Bruneau, D., Briand, P.
Snow cover distribution, Sensor mapping, Spaceborne photography, Data processing, LANDSAT.

45-241
Automated ice motion tracking at the Alaska SAR facility.
Kwok, R., International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.2, IEEE Geoscience and Remote Sensing Society, 1989, p.608-611, 4 refs.
Sea ice distribution, Radar tracking, Airborne radar, Data processing, Remote sensing, Ice conditions.

45-242
Reflectance and transmittance of snow at high spectral resolution.
Dozier, J., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.2, IEEE Geoscience and Remote Sensing Society, 1989, p.662-664, 20 refs.
Davis, R.E., Nolin, A.W.
Snow optics, Specular reflection, Solar radiation, Albedo, Radiation absorption, Temperature gradients.

45-243
Study of textural and tonal information for classifying sea ice from SAR imagery.
Hirose, T.K., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.2, IEEE Geoscience and Remote Sensing Society, 1989, p.747-750, 5 refs.
McNutt, L., Paterson, J.S.
Sea ice, Classifications, Radar photography, Data processing, Ice surface, Remote sensing.

45-244
Ice classification algorithm development and verification for the Alaska SAR facility using aircraft imagery.
Holt, B., *et al, International Geoscience and* Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.2, IEEE Geoscience and Remote Sensing Society, 1989, p.751-754, 2 refs.
Kwok, R., Rignot, E.
Sea ice, Ice conditions, Classifications, Radar photography, Data processing, Airborne radar, Backscattering

45-245
Speckle reduction and maximum likelihood classification of SAR images from sea ice recorded during MIZEX 87.
Holbaek-Hanssen, E., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.2, IEEE Geoscience and Remote Sensing Society, 1989, p.755-758, 10 refs.
Sea ice, Classifications, Radar photography, Resolution, Data processing, Filters, Ice conditions, Accuracy.

45-246
Multivariate analysis of texture statistics for SAR sea ice discrimination.
Barber, D.G., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.2, IEEE Geoscience and Remote Sensing Society, 1989, p.759-762, 10 refs.
LeDrew, E.F.
Sea ice, Classifications, Radar photography, Data processing, Statistical analysis, Remote sensing.

45-247
Texture measures for sea-ice classification from radar images.
Shokr, M.E., International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.2, IEEE Geoscience and Remote Sensing Society, 1989, p.763-768, 9 refs. For another source see IEEE transactions on geoscience and remote sensing, July 1990, p.737-740.
Sea ice, Classifications, Radar photography, Data processing, Remote sensing, Ice surface.

45-248
Comparison of sea ice parameters retrieved from passive microwave (SSM/I), LANDSAT MSS and AVHRR imagery.
Schweiger, A.J., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.2, IEEE Geoscience and Remote Sensing Society, 1989, p.769-772, 13 refs.
Steffen, K.
Sea ice distribution, Radiometry, Remote sensing, Data processing, Microwaves, Ice conditions, Accuracy.

45-249
Sensitivity of passive microwave sea ice concentration algorithms to the selection of locally and seasonally adjusted tie points.
Steffen, K., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.2, IEEE Geoscience and Remote Sensing Society, 1989, p.773-776, 3 refs.
Schweiger, A.J.
Sea ice distribution, Remote sensing, Microwaves, Data processing, Accuracy, Radiometry, Radiometry, Spaceborne photography.
The sensitivity of passive microwave sea ice concentration algorithms to the selection of tie points was analyzed. Ice concentrations were derived with the NASA Team ice algorithm for global tie points and for locally and seasonally adjusted tie points. The passive microwave ice concentration from the Special Sensor Microwave Imager (SSM/I) were then compared to Landsat MSS derived ice concentrations. Preliminary results show a mean difference of SSM/I and Landsat derived ice concentrations for 50 x 50 km grid cells of 2.7% along the ice edge of the Beaufort Sea during fall with local tie points. The accuracy decreased to 9.7% when global tie points were used. During freeze up in the Beaufort Sea, with grey ice and nilas as dominant ice cover, the mean difference was 4.3% for local tie points and 13.9% for global tie points. For the spring ice cover in the Bering Sea, a mean difference of 4.4% for local tie points and 15.7% for global tie points was found. This large difference reveals some limitations of the NASA-Team algorithm under freeze-up and spring conditions (thin ice areas). In the Weddell Sea of the Antarctic, global tie points perform quite well, as the mean difference between Landsat and SSM/I derived ice concentrations was only 3.9%, compared to 2.1% for local tie points. This analysis indicates that the accuracy of ice concentration calculation based on passive microwave data could be greatly improved when varying sea ice properties are accounted for by the selection of locally and seasonally adjusted tie points. (Auth.)

45-250
Utilization of local texture transforms for adaptive filtering of SAR sea ice imagery.
Salter, D.F., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.2, IEEE Geoscience and Remote Sensing Society, 1989, p.777-779, 12 refs.
LeDrew, E.F.
Sea ice, Radar photography, Surface properties, Data processing, Resolution, Filters, Accuracy.

45-251
Spring surface circulation patterns detected using remote sensing of drifting ice floes in Hudson Bay, Canada.
Larouche, P., International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.2, IEEE Geoscience and Remote Sensing Society, 1989, p.780-782, 6 refs.
Sea ice, Ice floes, Drift, Ocean currents, Spaceborne photography, Wind factors, Remote sensing, Canada—Hudson Bay.

45-252
Knowledge based system for the interpretation of SAR images of sea ice.
McAvoy, J.G., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.2, IEEE Geoscience and Remote Sensing Society, 1989, p.844-847, 2 refs.
Krakowski, E.M.
Sea ice, Classifications, Ice conditions, Radar photography, Data processing, Computer programs, Sensor mapping.

45-253
Study on sea ice monitoring using MOS-1/MSR.
Cho, K., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.2, IEEE Geoscience and Remote Sensing Society, 1989, p.991-994, 3 refs.
Takeda, K., Maeda, K., Wakabayashi, H.
Sea ice, Ice conditions, Radiometry, Aerial surveys, Microwaves, Ice cover thickness, Brightness.

45-254
Simulation of sub-pixel terrain effects on radar backscattering of snow.
Shi, J., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.2, IEEE Geoscience and Remote Sensing Society, 1989, p.1009-1011, 4 refs.
Dozier, J.
Snow cover, Backscattering, Radar photography, Simulation, Topographic effects, Resolution, Remote sensing, Data processing.

45-255
Automated tracking of arctic ice floes in multitemporal SAR imagery.
McConnell, R., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.2, IEEE Geoscience and Remote Sensing Society, 1989, p.1112-1116, 4 refs.
Sea ice, Ice floes, Radar tracking, Radar photography, Data processing, Correlation, Sensor mapping, Surface structure.

45-256
Automated analysis of polar satellite imagery.
Banfield, J., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.2, IEEE Geoscience and Remote Sensing Society, 1989, p.1117-1120, 11 refs.
Rothrock, D.A.
Sea ice, Ice floes, Detection, Radar photography, Data processing, Computer simulation, Accuracy, Ice edge, Resolution.

45-257
Object-based feature-tracking algorithms for SAR images of the marginal ice zone.
Daida, J., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.2, IEEE Geoscience and Remote Sensing Society, 1989, p.1121-1124, 4 refs. For another source see IEEE transactions on geoscience and remote sensing, July 1990, p.573-589.
Vesecky, J.F.
Sea ice, Ice floes, Radar photography, Radar tracking, Data processing, Resolution, Surface properties, Ice edge.

45-258
Hough transform technique for extracting lead features from sea ice imagery.
Fetterer, F.M., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.2, IEEE Geoscience and Remote Sensing Society, 1989, p.1125-1128, 4 refs.
Holyer, R.J.
Sea ice, Pack ice, Spaceborne photography, Ice edge, Data processing, Infrared photography, Resolution.

45-259
Extraction of ridge feature characteristics from SAR images of sea ice.
Vesecky, J.F., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.2, IEEE Geoscience and Remote Sensing Society, 1989, p.1129-1132, 7 refs. For another source see IEEE transactions on geoscience and remote sensing, July 1990, p.740-744.
Smith, M.P., Samadani, R.
Sea ice, Pressure ridges, Radar photography, Surface properties, Data processing, Ice surface, Ice floes.

45-260
Automatic estimation of ice kinematics using remote sensing data.
Flesche, H., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.2, IEEE Geoscience and Remote Sensing Society, 1989, p.1133-1136, 12 refs.
Kloster, K., Olaussen, T.I., Johannessen, O.M.
Sea ice distribution, Drift, Spaceborne photography, Resolution, Data processing, Floating ice, Ice edge.

45-261
Preliminary observations of Labrador Sea marginal ice zone rheology using C-band SAR.
Drinkwater, M.R., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.2, IEEE Geoscience and Remote Sensing Society, 1989, p.1138-1141, 10 refs.
Squire, V.A.
Sea ice, Pack ice, Radar photography, Ice cover strength, Rheology, Shear flow, Plastic deformation, Surface properties.

45-262
Evaluation of ice conditions in the Northumberland Strait using C and X band SAR imagery.
Dechka, J.A., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.2, IEEE Geoscience and Remote Sensing Society, 1989, p.1142-1146, 4 refs.
Shaw, V.L., Bercha, F.G., Brown, T.G.
Sea ice, Ice conditions, Radar photography, Ice floes, Sensor mapping, Canada—New Brunswick—Northumberland Strait.

45-263
Ice kinematic measurements from aerial photography.
Brown, T.G., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.2, IEEE Geoscience and Remote Sensing Society, 1989, p.1148-1151, 5 refs.
Dechka, J.A., Steen, J.W.
Sea ice, Ice conditions, Aerial surveys, Photointerpretation, Oblique photography, Ice floes, Canada—New Brunswick—Northumberland Strait.

45-264
Determination of ice displacements from sequential SAR imagery.
Oliphant, K.D., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.2, IEEE Geoscience and Remote Sensing Society, 1989, p.1152-1155, 11 refs.
Sykes, J.F., Soulis, E.D.
Sea ice, Pack ice, Drift, Radar photography, Accuracy, Data processing, Resolution.

45-265
Results from ground-based radiometry of snow.
Hallikainen, M., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.3, IEEE Geoscience and Remote Sensing Society, 1989, p.1231-1234, 12 refs.
Jääskeläinen, V., Talvela, J.
Snow cover, Brightness, Radiometry, Radiation absorption, Snow cover structure, Scattering, Remote sensing.

45-266
Microwave satellite forecasting of snowmelt runoff.
Wankiewicz, A., International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.3, IEEE Geoscience and Remote Sensing Society, 1989, p.1235-1238, 12 refs.
Snowmelt, Runoff forecasting, River basins, Remote sensing, Microwaves, Brightness, Correlation, Watersheds.

45-267
Correlations of Scanning Multichannel Microwave Radiometer (SMMR) observations with snowpack properties of the Upper Colorado River basin for water year 1986.
Josberger, E.G., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.3, IEEE Geoscience and Remote Sensing Society, 1989, p.1239-1242, 4 refs.
Snow cover, Snow water equivalent, Radiometry, Brightness, Remote sensing, Correlation, Sensor mapping, United States—Colorado River.

45-268
Determination of areal snow water equivalent on the Canadian prairies using passive microwave satellite data.
Goodison, B.E., International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.3, IEEE Geoscience and Remote Sensing Society, 1989, p.1243-1246, 10 refs.
Snow cover distribution, Snow water equivalent, Microwaves, Remote sensing, Brightness, Radiometry, Snow depth, Snow surveys, Sensor mapping.

45-269
Decorrelation distance of snow in the Colorado River basin.
Chang, A.T.C., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.3, IEEE Geoscience and Remote Sensing Society, 1989, p.1247-1250, 6 refs.
Chiu, L.S.
Snow cover distribution, Snow accumulation, Snowmelt, Snow surveys, Statistical analysis, Seasonal variations, Snow water equivalent, Remote sensing.

45-270
Monitoring snow cover with synthetic aperture radar. [*Suivi de la couverture de neige au moyen d'un radar a ouverture synthetique*],
Bernier, M., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.3, IEEE Geoscience and Remote Sensing Society, 1989, p.1251-1255, In French with English summary. 7 refs.
Fortin, J.P.
Snow cover structure, Backscattering, Airborne radar, Radiometry, Microwaves, Snow optics, Snow density.

45-271
Operational mapping of snow cover in the United States and Canada using airborne and satellite data.
Carroll, T.R., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.3, IEEE Geoscience and Remote Sensing Society, 1989, p.1257-1259, 8 refs.
Baglio, J.V., Jr., Verdin, J.P., Holroyd, E.W., III.
Snow cover distribution, Sensor mapping, Snow surveys, Remote sensing, Snow water equivalent, Gamma irradiation, Snow hydrology.

45-272
Labrador ice margin experiment LIMEX'89; an overview.
Raney, R.K., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.3, IEEE Geoscience and Remote Sensing Society, 1989, p.1517-1519, 2 refs.
Argus, S.D., McNutt, L.
Research projects, Oceanography, Sea ice, Radar photography, Ice conditions, Remote sensing, Labrador Sea.

45-273
Wave evolution in the marginal ice zone: model predictions and comparisons with on-site and remote data.
Liu, A.K., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.3, IEEE Geoscience and Remote Sensing Society, 1989, p.1520-1523, 12 refs.
Holt, B., Vachon, P.W.
Ocean waves, Sea ice, Ice cover effect, Wave propagation, Attenuation, Ice models, Remote sensing, Labrador Sea.

45-274
LIMEX'89: active/passive microwave signatures of Newfoundland pack ice.
Livingstone, C.E., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.3, IEEE Geoscience and Remote Sensing Society, 1989, p.1524-1527, 7 refs.
Sea ice, Pack ice, Ice conditions, Scattering, Airborne radar, Radiometry, Radar photography, Ice surface, Aerial surveys, Labrador Sea.

45-275
Absolute calibration of the CCRS C-band SAR during BEPERS-88.
Ulander, L., International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.3, IEEE Geoscience and Remote Sensing Society, 1989, p.1528-1531, 7 refs.
Sea ice, Aerial surveys, Radar photography, Backscattering, Ice surface, Accuracy.

45-276
Azimuth dependence in SAR-imaging of open water leads in ice infested areas.
Askne, J., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.3, IEEE Geoscience and Remote Sensing Society, 1989, p.1532-1534, 6 refs.
Ulander, L.
Sea ice distribution, Radar photography, Polynyas, Backscattering, Wind factors, Air water interactions, Resolution.

45-277
Ice edge motion during MIZEX'87.
Sandven, S., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.3, IEEE Geoscience and Remote Sensing Society, 1989, p.1535-1538, 8 refs.
Johannessen, O.M.
Sea ice, Drift, Ice edge, Radar photography, Wind factors, Ice floes, Greenland Sea.

45-278
SAR and passive microwave observations of the Odden during MIZEX'87.
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Sea ice, Ice conditions, Ice formation, Radiometry, Airborne radar, Ice deterioration, Greenland Sea.

45-279
High performance inexpensive polarimetric radar for *in-situ* measurements.
Hoover, F.A., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.3, IEEE Geoscience and Remote Sensing Society, 1989, p.1820-1822, 5 refs. For another source see IEEE transactions on geoscience and remote sensing, July 1990, p.450-455.
Gogineni, S.P., Bredow, J.W.
Sea ice, Artificial ice, Scattering, Radar photography, Antennas, Design, Remote sensing.

45-280
Radar polarimeter measurements of snow.
Hallikainen, M., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.3, IEEE Geoscience and Remote Sensing Society, 1989, p.1829-1831, 4 refs.
Pulliainen, J.
Snow cover, Backscattering, Radar echoes, Airborne radar, Snow surface, Snow cover structure, Remote sensing.

45-281
Helicopter-borne 8-channel FFT scatterometer.
Hallikainen, M., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.3, IEEE Geoscience and Remote Sensing Society, 1989, p.1832-1835, 2 refs.
Airborne radar, Backscattering, Sea ice, Electronic equipment, Remote sensing.

45-282
Millimeter wave radiative transfer studies for precipitation measurements.
Vivekanandan, J., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.3, IEEE Geoscience and Remote Sensing Society, 1989, p.1910-1913, 8 refs.
Evans, F.
Precipitation (meteorology), Ice models, Radar echoes, Scattering, Radiometry, Ice density, Hail clouds.

45-283
Polarimetric radar measurements of artificial sea ice.
Onstott, R.G., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.3, IEEE Geoscience and Remote Sensing Society, 1989, p.1938-1941, 3 refs.
Gaboury, S.H.
Sea ice, Artificial ice, Backscattering, Radar echoes, Surface roughness, Microwaves.

45-284
Polarimetric scattering measurements on artificially grown sea ice.
Gogineni, S.P., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.3, IEEE Geoscience and Remote Sensing Society, 1989, p.1942-1944.
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Sea ice, Artificial ice, Radar echoes, Backscattering, Ice composition, Ice salinity.

45-285
Radar studies of low-salinity sea ice.
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Sea ice, Classifications, Radar echoes, Backscattering, Ice salinity, Sensor mapping, Baltic Sea.

45-286
Ice-type classifications from airborne pulse-limited radar altimeter return waveform characteristics.
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Hayne, G.S., Walsh, E.J.
Sea ice, Classifications, Radar echoes, Airborne radar, Wave propagation, Backscattering, Ice surface, Beaufort Sea.

45-287
Comparison of measurement and theory for backscatter from thick salinated and desalinated ice.
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Gogineni, S.P.
Sea ice, Backscattering, Artificial ice, Radar echoes, Ice surface, Microwaves.

45-288
International Ice Patrol Side-Looking Airborne Radar (SLAR) experiment 1988.
Osmer, S.R., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.4, IEEE Geoscience and Remote Sensing Society, 1989, p.2193-2196, 2 refs.
Alfultis, M.A.
Sea ice, Icebergs, Aerial surveys, Ice detection, Side looking radar, Radar photography.

45-289
Helicopter radar simulations from fine resolution airborne SAR imagery.
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Wessels, G., McAvoy, J.G.
Sea ice, Radar photography, Helicopters, Ice conditions, Simulation, Ice surveys, Ice navigation, Airborne radar.

45-290
Integrated ice surveillance system for support of offshore oil and gas exploration.
Rudkin, P., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.4, IEEE Geoscience and Remote Sensing Society, 1989, p.2229-2231, 3 refs.
Ripley, H., Gillis, S., Ludlow, K.
Airborne radar, Sea ice, Ice detection, Ice reporting, *Computer applications, Exploration, Ocean environments.*

45-291
***Statistical descriptions of keel-related features in the* under-ice draft distribution.**
Key, J., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.4, IEEE Geoscience and Remote Sensing Society, 1989, p.2346-2349, 9 refs.
McLaren, A.S.
Sea ice, Ice bottom surface, Ice structure, Acoustic measurement, Statistical analysis, Topographic features, Subglacial observations, Submarines.

45-292
Role of ice properties in wave-ice interaction during LIMEX '1987.
Winsor, W.D., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.4, IEEE Geoscience and Remote Sensing Society, 1989, p.2350-2354, 8 refs.
Clark, J.I., Eid, B.M., Morton, C.M.
Sea ice, Ocean waves, Ice floes, Ice water interface, Ice edge, Ice cover strength, Attenuation, Remote sensing.

45-293
Identification and volume estimation of icebergs by remote sensing in the Barents Sea.
Vefsnmo, S., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.4, IEEE Geoscience and Remote Sensing Society, 1989, p.2355-2358, 5 refs.
Lövås, S.M., Löset, S., Naess, T.
Sea ice, Icebergs, Ice detection, Spaceborne photography, Ice conditions, Ice volume, Offshore drilling, Barents Sea.

45-294
Observations of sea ice drift off Newfoundland using satellite imagery and ice beacons.
Peterson, I.K., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.4, IEEE Geoscience and Remote Sensing Society, 1989, p.2359-2362, 7 refs.
Prinsenberg, S.J.
Sea ice, Drift, Velocity measurement, Spaceborne photography, Icebergs, Wind factors, Labrador Sea.

45-295
***Estimation of the thickness of undeformed* first year ice using radar backscatter.**
Soulis, E.D., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.4, IEEE Geoscience and Remote Sensing Society, 1989, p.2366-2369, 17 refs.
Lennox, W.C., Sykes, J.F.
Sea ice, Ice cover thickness, Backscattering, Radar photography, Ice models, Drift, Analysis (mathematics), *Ice cover strength.*

45-296
Airborne SAR characteristics of arctic ice shelves and *multiyear landfast sea* ice, and the *detection of* massive ice calvings and ice islands.
Jeffries, M.O., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.4, IEEE Geoscience and Remote Sensing Society, 1989, p.2715-2718, 13 refs.
Sackinger, W.M.
Sea ice, Radar photography, Ice conditions, Ice shelves, Calving, Fast ice, Airborne radar.

45-297
Studies of ice sheet hydrology using SAR.
Bindschadler, R.A., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.4, IEEE Geoscience and Remote Sensing Society, 1989, p.2719-2721, 7 refs.
Vornberger, P.L.
Ice sheets, Glacial hydrology, Radar photography, Snow composition, Metamorphism (snow), Backscattering, Seasonal variations, Greenland.

45-298
Matched-filter technique for removing hyperbolic effects due to point scatterers: simulation and application on antarctic radar data.
Raju, G., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.4, IEEE Geoscience and Remote Sensing Society, 1989, p.2722-2725, For another source see IEEE transactions on geoscience and remote sensing, July 1990, p.726-729.
Moore, R.K.
Ice sheets, Ice surface, Scattering, Radar echoes, Filters, Accuracy, Data processing.
A modern coherent ice-probing radar (the University of Kansas coherent antarctic radar depth sounder or CARDS) for probing the ice sheets of Antarctica and Greenland was successfully operated on Downstream B, a dynamic glacier in West Antarctica, in the austral summer of 1987-88. The results clearly showed strong bottom echoes and several layered structures. (Auth. mod.)

45-299
Bottom characteristics of the antarctic ice sheet from radar.
Moore, R.K., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.4, IEEE Geoscience and Remote Sensing Society, 1989, p.2727-2729, 3 refs.
Xin, W., Raju, G.
Ice sheets, Ice bottom surface, Radar echoes, Backscattering, Ice models.
An important quantity in the study of movement of the antarctic glacial ice is the bottom roughness. The University of Kansas coherent antarctic radar depth sounder (CARDS) has made 150 MHz backscatter measurements through the ice cap for two field seasons. The bottom echoes have characteristics similar to those received from a radar altimeter over land or sea, and to the echoes used by astronomical radars to study characteristics of remote planetary objects. A simple scattering model is used to synthesize expected return pulses and is compared with those returned to CARDS from the bottom of the ice sheet. The model has two parameters: standard deviation of height and horizontal autocorrelation length of the bottom roughness. A least-squares fitting procedure allowed determination of the appropriate parameters for the observed roughness. Variations in different locations beneath the ice sheet indicated by these results are of direct interest to glaciologists. (Auth. mod.)

45-300
Slope correction by relocation for satellite radar altimetry.
Cooper, A.P.R., International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.4, IEEE Geoscience and Remote Sensing Society, 1989, p.2730-2733, 6 refs.
Ice sheets, Ice volume, Height finding, Radar echoes, Airborne radar, Accuracy, Slope orientation.

45-301
Coherent radar contour mapping of ice stream thickness.
Davis, C.H., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.4, IEEE Geoscience and Remote Sensing Society, 1989, p.2734-2737.
Moore, R.K., Raju, G., Xin, W.
Glacier thickness, Glacier mass balance, Ice surveys, Radar echoes, Basal sliding, Topographic maps.
Previous ice-sheet "radio-echo-sounding" systems used vacuum-tube technology and did not use coherent integration. The authors developed a 150 MHz radar system designed specifically for probing the continental ice of Antarctica. This system uses coherent integration and solid-state technology. Thus, only 20 W of peak output power can produce signal-to-noise ratios comparable to those of older high-power systems. This system was used to conduct a survey on Ice Stream B in West Antarctica in Dec. 1988. The survey concentrated on a 2 km by 10 km grid surveyed by Ian Whillans of Ohio State University. The measurements yielded an ice-thickness map with a 10 m contour interval. This contour map will be used by glaciologists to estimate the basal shear stress of the glacier and thereby estimate future glacial movement. (Auth. mod.)

45-302
Radiobrightness of freezing terrain.
Zuerndorfer, B., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.5, IEEE Geoscience and Remote Sensing Society, 1989, p.2748-2751, 21 refs. For another version see IEEE transactions on geoscience and remote sensing, July 1990, p.464-476.
England, A.W., Wakefield, G.H.
Radiometry, Frozen ground temperature, Soil freezing, Classifications, Freezing indexes, Remote sensing, Temperature measurement.

45-303
Textural characteristics of cloud- and ice-covered surfaces in polar regions.
Welch, R.M., et al, International Geoscience and Remote Sensing Symposium, Vancouver, Canada, July 10-14, 1989. Proceedings, Vol.4, IEEE Geoscience and Remote Sensing Society, 1989, p.2773-2776, 10 refs. For another source see IEEE transactions on geoscience and remote sensing, July 1990, p.520-528.
Kuo, K.S., Sengupta, S.K.
Ice cover, Cloud cover, Remote sensing, Accuracy, Classifications, Resolution, Photointerpretation.

45-304
SIBEX Physical Oceanography Workshop, Cambridge, U.K., Mar. 9-27, 1987.
BIOMASS Data Centre, *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series,* May 1990, No.62, 38p., 8 refs.
Sea ice distribution, Pack ice, Antarctica—Bransfield Strait, Antarctica—Prydz Bay, Drake Passage.
The SIBEX objective was a quantitative description of seasonal change, from early spring through to early winter, in interactions and processes within the pelagic ecosystems in the areas of Bransfield Strait, southern Drake Passage, and Prydz Bay. The physical oceanographic observations were made of temperature, salinity, oxygen, inorganic and total phosphorus, inorganic nitrates, inorganic nitrites, inorganic ammonium, inorganic silicates and pH. The Physical Oceanographic Workshop worked on the validation and initial analyses of the data and aimed to obtain quantitative descriptions of physical features of probable ecological significance within the designated SIBEX areas, and to detect seasonal variation in the phenomena. Methods used in the study are described, and results are discussed and presented in numerous tables and charts.

45-305
2.5-5.0 micrometer spectra of Io: evidence for H2S and H2O frozen in SO2.
Salama, F., et al, *Icarus,* Jan. 1990, 83(1), p.66-82, 28 refs.
Extraterrestrial ice, Ice spectroscopy, Radiation absorption, Ice composition, Amorphous ice, Reflectivity.

45-306
Effect of winter heat loss on treatment plant efficiency.
Wells, S.A., *Water Pollution Control Federation. Research journal,* Jan.-Feb. 1990, 62(1), p.34-39, 18 refs.
Waste treatment, Water treatment, Cold weather operation, Heat loss, Performance, Thermal regime, Aeration.

45-307
Numerical study of the influence of environmental conditions on lake-effect snowstorms over Lake Michigan.
Hjelmfelt, M.R., *Monthly weather review,* Jan. 1990, 118(1), p.138-150, 48 refs.
Snowstorms, Lake effects, Wind factors, Mathematical models, Meteorological factors, Simulation, United States—Michigan, Lake.

45-308
Dynamics of altitudinal tree-limits in Sweden: a review.
Kullman, L., *Norsk geografisk tidsskrift,* June 1990, 44(2), p.103-116, 111 refs.
Forest lines, Revegetation, Paleoclimatology, Climatic changes, Altitude, Climatic factors, Vegetation patterns.

45-309
Handbook on climate of the USSR. *Wright-Patterson AFB, OH. Foreign Technology Division. Translation,* Dec. 20, 1989, FTD-ID(RS)T-1032-89, 268p., ADA-220 579, Translation of Spravochnik po klimatu SSSR, n27, pt5, p.1-184, 1969.
Climate, Manuals, Meteorological data, Weather stations, Cloud cover, Snowstorms, Fog, Thunderstorms, Hail, USSR.

45-310
Handbook of climate of the USSR. Humidity of air, atmospheric precipitations, snow cover. *Wright-Patterson AFB, OH. Foreign Technology Division. Translation,* Dec. 7, 1989, FTD-ID(RS)T-1034-89, 288p., ADA-220 454, Translation of Spravochnik po klimatu SSSR, n27, pt4, p.1-213, 1968.
Manuals, Humidity, Precipitation (meteorology), Snow cover, Weather stations, USSR.

45-311
Fatigue characterization of Alaska paving materials (final report).
Coetzee, N.F., et al, *Alaska. Dept. of Transportation and Public Facilities. Report,* Aug. 1988, FHWA/AK/RD-88/12, 126p. PB90-219213.
Kaelber, K.
Cold weather tests, Concrete pavements, Bitumens, Fatigue (materials), Life (durability), Bituminous concretes.

45-312
Environmental measurements and analysis: arctic acoustics and experiments in the Marginal Ice Zone.
Meredith, R.W., et al, *U.S. Naval Ocean Research and Development Activity. [Report],* Aug. 1989, 75p. ADA-220 509.
Bucca, P.J., McCoy, K.
Ocean environments, Underwater acoustics, Acoustic measurement, Acoustics, Electrical resistivity, Sea ice, Spaceborne photography.

45-313
Millimeter-wave radar scattering from terrain: data handbook.
Haddock, T.F., et al, *U.S. Army Research Office. Technical report,* Jan. 30, 1990, ARO-26224.1-GS, 133p. ADA-220 770.
Ulaby, F.T.
Radar echoes, Wave propagation, Surface properties, Radar, Surface roughness, Manuals, Backscattering, Roads, Wet snow, Grasses, Electromagnetic prospecting, Ice, Moisture, Gravel.

45-314
Gas hydrate and acoustically laminated sediments: potential environmental cause of anomalously low acoustic bottom loss in deep-ocean sediments (final report).
Max, M.D., *U.S. Naval Research Laboratory. Report,* Feb. 9, 1990, NRL-9235, 72p. ADA-218 418.
Clathrates, Ocean bottom, Hydrates, Bottom sediment, Sediments, Water chemistry, Low frequencies, Low temperature research.

45-315
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Precipitation (meteorology), Weather forecasting, Snow accumulation, Statistical analysis, Accuracy, Seasonal variations, Weather observations.

45-316
Radar sounder (final report Aug. 1987-Sep. 1988).
Nathanson, F.E., et al, *U.S. Air Force Geophysics Laboratory. Technical report,* Sep. 1988, AFGL-TR-88-0300, 139p. ADA-219 801.
Slocumb, T., Brooks, L., McCandless, S.W., Crane, R.
Spacecraft, Clouds (meteorology), Radar, Sea ice, Altitude, Oceans, Reflection, Remote sensing, Sounding, Wind velocity.

45-317
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Cements, Manuals, Cement admixtures, Concretes, Winter concreting, Air entrainment, Concrete aggregates, Concrete curing, Concrete pavements.

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Meter/gate station design improvements: phase 1. Final report. *Chicago, IL. Gas Research Institute. Report,* July 1988, GRI-88/0368, 58p. PB90-187956.
Gas pipelines, Design, Pipeline heating, Frost heave, Hydrates.

45-319
Guidance document for selecting antiskid materials applied to ice- and snow-covered roadways (final report). *U.S. Environmental Protection Agency. Office of Air Quality Planning and Standards. Report,* Jan. 1990, EPA 450/3-90/007, 135p. PB90-183658.
Countermeasures, Road maintenance, Winter maintenance, Skid resistance, Ice control, Roads, Sands, Cost effectiveness.

45-320
Topographic and structural conditions in areas of gravitational spreading of ridges in the western United States.
Varnes, D.J., et al, *U.S. Geological Survey. Report,* 1989, PP-1496, 36p. PB90-181827.
Radbruch-Hall, D.H., Savage, W.Z.
Glacial geology, Topographic surveys, Rock mechanics, Geomorphology, Lithology, United States.

45-321
Acoustic and seismic signals from snow avalanches.
[Akusticheskie i seĭsmicheskie signaly ot snezhnykh lavin],
Firstov, P.P., et al, *Akademiia nauk SSSR. Doklady,* May-June 1990, 312(1), p.67-71, In Russian. 7 refs.
Sukhanov, L.A., Pergament, V.Kh., Rodionovskiĭ, M.V.
Snow acoustics, Seismic surveys, Avalanche formation, Avalanche forecasting, Noise (sound).

45-322
Mathematical modelling of the interaction between permafrost and a deposit of natural gas hydrates.
[Matematicheskoe modelirovanie vzaimodeĭstviia merzloĭ tolshchi i zalezheĭ gidratov prirodnogo gaza],
Tipenko, G.S., et al, *Moscow. Universitet. Seriia 4: geologiia,* Mar.-Apr. 1990, No.2, p.73-84, In Russian. 20 refs.
Seregina, N.V., Romanovskiĭ, N.N., Komarov, I.A.
Permafrost physics, Natural gas, Hydrates, Geocryology, Ground ice, Temperature effects, Mathematical models.

45-323
Condensed silica fume in concrete.
Malhotra, V.M., et al, Boca Raton, FL, CRC Press, Inc., 1987, 221p., Refs. passim.
Ramachandran, V.S., Feldman, R.F., Aitcin, P.C.
Frost resistance, Cements, Cement admixtures, Concrete freezing, Concrete durability, Concrete aggregates, Concrete admixtures, Concrete strength, Compressive properties, Flexural strength, Freeze thaw cycles, Mechanical properties, Air entrainment, Statistical analysis.

45-324
Road conditions and accidents in winter.
Hagiwara, T., et al, ASTM special technical publication No.1031. Surface characteristics of roadways: international research and technologies. Edited by W.E. Meyer and J. Reichert, Philadelphia, PA, American Society for Testing and Materials, 1990, p.442-453, 4 refs.
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Road maintenance, Winter maintenance, Skid resistance, Safety, Sliding, Road icing, Statistical analysis.

45-325
Mining in the Arctic.
Bandopadhyay, S., ed, International Symposium on Mining in the Arctic, 1st, Fairbanks, July 17-19, 1989. Proceedings, Rotterdam, A.A. Balkema, 1989, 244p., Refs. passim. For selected papers see 45-326 through 45-352.
Skudrzyk, F.J., ed.
Mining, Minerals, Drilling, Frozen rock strength, Permafrost, Land reclamation.

45-326
Overview of coal mining in Alaska.
Sims, J.F.M., Mining in the Arctic. International Symposium, 1st, Fairbanks, July 17-19, 1989. Proceedings. Edited by S. Bandopadhyay and F.J. Skudrzyk, Rotterdam, A.A. Balkema, 1989, p.3-8.
Coal, Mining, United States—Alaska.

45-327
History of the mineral industry in Alaska and, all that glitters is not gold.
Foley, J.Y., Mining in the Arctic. International Symposium, 1st, Fairbanks, July 17-19, 1989. Proceedings. Edited by S. Bandopadhyay and F.J. Skudrzyk, Rotterdam, A.A. Balkema, 1989, p.9-13, 13 refs.
Minerals, Natural resources, Mining, United States—Alaska.

45-328
Mining in Canada's north—a technical overview.
Udd, J.E., Mining in the Arctic. International Symposium, 1st, Fairbanks, July 17-19, 1989. Proceedings. Edited by S. Bandopadhyay and F.J. Skudrzyk, Rotterdam, A.A. Balkema, 1989, p.15-25, 2 refs.
Mining, Minerals, Natural resources, Permafrost distribution, Canada.

45-329
Exploitation of mineral resources in the north.
Proskuriakov, N.M., et al, Mining in the Arctic. International Symposium, 1st, Fairbanks, July 17-19, 1989. Proceedings. Edited by S. Bandopadhyay and F.J. Skudrzyk, Rotterdam, A.A. Balkema, 1989, p.27-32.
Shuvalov, IU.V.
Mining, Frozen rock strength, Rock excavation, Analysis (mathematics), Permafrost thickness.

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Future industrial development in the Arctic and growing global environmental concern.
Taagholt, J., Mining in the Arctic. International Symposium, 1st, Fairbanks, July 17-19, 1989. Proceedings. Edited by S. Bandopadhyay and F.J. Skudrzyk, Rotterdam, A.A. Balkema, 1989, p.33-41, 5 refs.
Minerals, Electric power, Natural resources, Greenland.

45-331
Achievements and future of mining above Arctic Circle.
Zou, Z.H., Mining in the Arctic. International Symposium, 1st, Fairbanks, July 17-19, 1989. Proceedings. Edited by S. Bandopadhyay and F.J. Skudrzyk, Rotterdam, A.A. Balkema, 1989, p.43-46, 6 refs.
Mining, Natural resources.

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Mining and construction machines, their design and uses in high mountains and the Arctic.
Alimov, O.D., Mining in the Arctic. International Symposium, 1st, Fairbanks, July 17-19, 1989. Proceedings. Edited by S. Bandopadhyay and F.J. Skudrzyk, Rotterdam, A.A. Balkema, 1989, p.59-61, 13 refs.
Mining, Drills, Equipment, Rock drilling.

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Investigation into the creep behavior of CRREL tunnel, Alaska.
Huang, S.L., et al, Mining in the Arctic. International Symposium, 1st, Fairbanks, July 17-19, 1989. Proceedings. Edited by S. Bandopadhyay and F.J. Skudrzyk, Rotterdam, A.A. Balkema, 1989, p.65-73, 11 refs.
Speck, R.C.
Tunnels, Frozen ground strength, Frozen ground mechanics, Creep, Permafrost physics, Rheology, Analysis (mathematics).

45-334
Cone penetrometer tests in permafrost—the Fox Tunnel, Alaska.
Ladanyi, B., et al, Mining in the Arctic. International Symposium, 1st, Fairbanks, July 17-19, 1989. Proceedings. Edited by S. Bandopadhyay and F.J. Skudrzyk, Rotterdam, A.A. Balkema, 1989, p.75-82, 24 refs.
Huneault, P.A.
Tunnels, Frozen ground strength, Penetration tests, Permafrost physics, Penetrometers, Mathematical models.

45-335
Major aspects of the operation of coal mines in/below the permafrost area on Svalbard.
Brugmans, P.J., Mining in the Arctic. International Symposium, 1st, Fairbanks, July 17-19, 1989. Proceedings. Edited by S. Bandopadhyay and F.J. Skudrzyk, Rotterdam, A.A. Balkema, 1989, p.87-93.
Coal, Mining, Permafrost, Norway—Svalbard.

45-336
Rock mechanics investigations in the Svea Coal Mine, Svalbard.
Myrvang, A.M., et al, Mining in the Arctic. International Symposium, 1st, Fairbanks, July 17-19, 1989. Proceedings. Edited by S. Bandopadhyay and F.J. Skudrzyk, Rotterdam, A.A. Balkema, 1989, p.95-103, 5 refs.
Utsi, J.
Coal, Mining, Frozen rock strength, Rock mechanics, Norway—Svalbard.

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Drilling, Ice drills, Mining.

45-338
Soviet experience of deep drilling in Antarctic.
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Ice coring drills, Thermal drills, Drilling, Analysis (mathematics).
Non-rotary electrothermal drills for ice core drilling in Antarctica are described. Included are diagrams of the TELGA and TBZS drills, and mathematical equations and graphs to calculate the relation of drill diameter to drill speed. A borehole with a depth of 2213 m was reached in Nov. 1988 at Vostok Station.

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Mining, Tailings, Waste treatment.

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Mining, Land reclamation, Waste treatment, Fungi, Revegetation.

45-347
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Mining, Minerals, Exploration, Natural resources, Economic development, United States—Alaska.

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Mining, Gold, United States—Alaska.

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Some aspects of mining in high mountain area above snow line in China.
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Mining, Mine shafts, Ventilation, Mountains, Slope stability, Altitude, Analysis (mathematics).

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Placer mining, Drilling, Slope stability, United States—Alaska.

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Two problems of 509 coal mine in north-west China.
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Mining, Frost protection, Safety, Fires.

45-352
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Placer mining, Frozen rocks.

45-353
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Clay soils, Lacustrine deposits, Soil compaction, Ice loads, Glacier thickness, Hydrodynamics, Ice sheets.

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45-360
Determination of surface velocity on the Val Pisella eastern rock glacier (upper Valtellina, central Alps). [Misure di velocità superficiale a. ..k glacier Orientale di Val Pisella (Gruppo del Cevedale, Alta Valtellina)].
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Weather stations, Temperature measurement, Air temperature, Maps, Correlation, Surface temperature, Temperature variations, Meteorological data, Canada—Northwest Territories—Baffin Island.

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Ice (water storage), Air conditioning, Ice formation, Heat transfer.

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Boundary element analysis for the flow around a submerged ice floe.
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Kuo, E.Y.T., *IEEE journal of oceanic engineering*, Oct. 1990, 15(4), p.361-372, 16 refs.
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Carbon cycle instability as a cause of the late Pleistocene ice age oscillations: modelling the asymmetric response.
Saltzman, B., et al, *Global biogeochemical cycles,* June 1988, 2(2), p.177-185, 33 refs.
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Climatic changes, Atmospheric composition, Carbon dioxide, Glacier oscillation, Models, Pleistocene.

45-368
Oden—Sweden's latest icebreaker built by GVA.
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Icebreakers, Design, Performance, Ships.

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Experimental study of microwave transmission in snowpack.
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Microwaves, Snow cover structure, Wave propagation, Snow electrical properties, Attenuation, Layers, Computer applications, Remote sensing.

45-370
Summer 1987 flooding in glacial basins of the Pennine Alps. [Crues de l'été 1987 dans les bassins versants glaciaires des Alpes Pennines],
Rey, Y., et al, *Revue de géographie alpine,* 1990, 78(1-2-3), p.115-124, In French with English summary. 5 refs.
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Glacier melting, Snowmelt, Runoff, Seasonal variations, Precipitation (meteorology), Switzerland—Alps.

45-371
Avalanches at Chamonix (Haute-Savoie, France). [Les avalanches à Chamonix (Haute-Savoie, France)],
Bravard, Y., *Revue de géographie alpine,* 1990, 78(1-2-3), p.125-143, In French with English summary. 5 refs.
Avalanches, Damage, Periodic variations, Countermeasures, Human factors, France—Chamonix.

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Experimental investigation of multielement airfoil ice accretion and resulting performance degradation.
Potapczuk, M.G., et al, *Journal of aircraft,* Aug. 1990, 27(8), p.679-691, 18 refs.
Berkowitz, B.M.
Aircraft icing, Ice accretion, Performance, Air flow, Wind tunnels, Hoarfrost.

45-373
Isotope variations in the temperate glaciers of the Eurasian Arctic.
Vaĭkmiae, R.A., *International journal of radiation applications and instrumentation part E—nuclear geophysics,* 1990, 4(1), p.45-55, 24 refs.
Glacier ice, Ice composition, Isotope analysis, Precipitation (meteorology), Paleoclimatology, Temperature effects, Periodic variations, Svalbard.

45-374
Contamination of the global environment as observed in the Arctic.
Pacyna, J.M., et al, *Global and planetary change,* May 1990, 2(1-2), p.149-157, 43 refs.
Winchester, J.W.
Geochemical cycles, Air pollution, Atmospheric composition, Snow impurities, Ice composition, Aerosols, Human factors.

45-375
Antarctic testbed for extraterrestrial operation and technology.
Bell, L., et al, Space 90: Engineering, construction, and operations in space II, Vol.2. Proceedings, edited by S.W. Johnson and J.P. Wetzel, New York, American Society of Civil Engineers, 1990, p.1188-1197, 1 ref.
Neubek, D.J.
DLC TL 797.S6 1990
Logistics, Cold weather operation, Cold weather construction, Utilities.
A remote and harsh environment, Antarctica has areas which are more similar to the Moon and Mars than anywhere else on Earth. The physical similarities, coupled with strong parallels between the general nature of crew activities, functional requirements and operational constraints on antarctic stations and prospective lunar/planetary bases offer instructive comparisons. These include operations and logistics; facility planning, design and construction; utility system selection and design; and development of automatic and telerobotic systems. The Sasakawa International Center for Space Architecture (SICSA) is planning an international research and technology demonstration facility in Antarctica to take advantage of these many analog opportunities. The Antarctic Planetary Testbed (APT) program will provide a basis for new insights into planning for Moon and/or Mars missions. (Auth.)

45-376
Antarctic ice sheet measurements using airborne radio echo sounder.
Uratsuka, S., et al, *Tsushin Sogo Kenkyujo kiho. Review of the Communications Research Laboratory,* Sep. 1989, 35(176), p.297-306, In Japanese with English summary. 5 refs.
Nishio, F., Ohmae, H., Mae, S.
Ice cover thickness, Ice sheets, Radar echoes, Radio echo soundings, Antarctica—Sör Rondane Mountains.
Observation of antarctic ice sheet thickness was carried out during the 27th Japanese Antarctic Research Expedition using a 179 MHz airborne radio echo sounder which is an application of a pulse radar. The radar indicated that maximum ice thickness was about 2800 m in the observing area. Z-scope data indicate fine multiple layers in the ice sheet. In addition, an estimation method for radio scattering characteristics of ice sheet surface, inner volume and the bedrock surface using radio echo sounding data is proposed. A-scope data from the sounder with wide antenna beams include information on the scattering characteristics at the ice sheet surface, within the ice sheet itself, and at the bedrock subsurface. Characteristics are modeled from the A-scope form by using the expanded radar equations which allow determination of the roughness of the ice sheet and bedrock surfaces. Incidence angle dependence in backscatter from crevasse regions indicates rough surfaces, and dependence from the bottom of the ice shelf suggests a very smooth subsurface. (Auth.)

45-377
Ice-core record: climate sensitivity and future greenhouse warming.
Lorius, C., et al, *Nature,* Sep. 13, 1990, 347(6289), p.139-145, 71 refs.
Jouzel, J., Raynaud, D., Hansen, J., Le Treut, H.
Ice cores, Gas inclusions, Ice composition, Climatic changes.
The prediction of future greenhouse-gas-induced warming depends critically on the sensitivity of Earth's climate to increasing atmospheric concentrations of these gases. Data from cores drilled in polar ice sheets show a remarkable correlation between past glacial-interglacial temperature changes and the inferred atmospheric concentration of gases such as carbon dioxide and methane. These and other paleoclimate data are used to assess the role of greenhouse gases in explaining past global climate change, and the validity of models predicting the effect of increasing concentrations of such gases in the atmosphere. Data from two Greenland ice cores, Camp Century and Dye 3, and from three antarctic cores, Vostok, Byrd, and Dome C, were used in this review. (Auth.)

45-378
Backscattering from frost on icy satellites in the outer solar system.
Verbiscer, A.J., et al, *Nature,* Sep. 13, 1990, 347(6289), p.162-164, 23 refs.
Helfenstein, P., Veverka, J.
Backscattering, Frost, Ice crystal structure.

45-379
Climatic variations in Late Miocene and Pliocene. [Izmeneniia klimata v pozdnem miotsene i pliotsene],
Borzenkova, I.I., et al, *Leningrad. Gosudarstvennyĭ gidrologicheskiĭ institut. Trudy,* 1985, Vol.339, p.93-118, In Russian. 60 refs.
Zubakov, V.A.
Paleoclimatology, Ice cover thickness.
A detailed chronological range of global climatic events of the Late Miocene-Pliocene period is developed. Warm intervals in the climate are investigated as being possibly analogous to a future climate. By using paleobotanical, paleontological and other data, a reconstruction of the climate (4.3-3.3 m.y.) is made as an acceptable analog of that of the mid 21st century, when a doubling of the current CO2 concentration in the atmosphere is expected. It is suggested that in the reconstruction of the climate tepid intervals, one must consider the possible destruction of the West Antarctic Ice Sheet which, as geological data show, was considerably reduced during the Late Miocene-Pliocene period. (Auth. mod.)

45-380
Climate sensitivity due to increased CO2: experiments with a coupled atmosphere and ocean general circulation model.
Washington, W.M., et al, *Climate dynamics,* June 1989, 4(1), p.1-38, 77 refs.
Meehl, G.A.
Climate, Carbon dioxide, Sea ice, Air temperature.
A version of the National Center for Atmospheric Research community climate model—a global, spectral (R15) general circulation model—is coupled to a coarse-grid (5 deg latitude-longitude, four-layer) ocean general circulation model to study the response of the climate system to increases of atmospheric carbon dioxide (CO2). Three simulations are run: one with an instantaneous doubling of atmospheric CO2 (from 330 to 660 ppm), another with the CO2 concentration starting at 330 ppm and increasing linearly at a rate of 1% per year, and a third with CO2 held constant at 330 ppm. Results at the end of 30 years of simulation indicate a globally averaged surface air temperature increase of 1.6 C for the instantaneous doubling case and 0.7 C for the transient forcing case. Inherent characteristics of the coarse-grid ocean model (low sea-surface temperatures (SSTs) in the tropics and higher-than-observed SSTs and reduced sea-ice extent at higher latitudes) produce lower sensitivity in this model after 30 years than in earlier simulations with the same atmosphere coupled to a 50 m, slab-ocean mixed layer. Variations on the parameters are introduced and their effects on the model are discussed. All graphs depicting the parameters used range from the equator to 90N and 90S. (Auth. mod.)

45-381
Ice-marginal thrusting of drift and bedrock: thermal regime, subglacial aquifers, and glacial surges.
Mooers, H.D., *Canadian journal of earth sciences,* June 1990, 27(6), p.849-862, With French summary. 60 refs.
Glacial deposits, Glacier melting, Subglacial drainage, Meltwater, Pleistocene, Glacier flow, Thermal regime, Glacier heat balance, Glacier tongues, Glacial geology.

45-382
Coping strategies and mood during cold weather training.
Vickers, R.R., Jr., et al, *U.S. Naval Health Research Center. Report,* 1989, No.89-47, 14p., 19 refs.
Kolar, D.W., Kelleher, D.L.
Military operation, Cold weather survival, Health.
Adverse emotional reactions are a recognized problem in cold weather operations. The present study tested the hypothesis that these reactions are related to coping strategies employed in the cold. The coping strategies and emoticnal status of men going through winter cold weather training were compared to those of men going through summer mountain warfare training. The men going through cold weather training reported higher levels of depressed mood, anger, and anxiety and lower levels of happiness and activity. These men also reported more frequent thoughts about other times and places as a means of coping. Coping strategies were moderately strong predictors of mood during both the winter and summer training programs, and analyses of covariance controlling for the group differences in coping by escapist thinking showed that this difference could account for the observed group differences in mood. The study confirmed that coping strategies are related to adverse emotional reactions in cold weather settings. Additional research to identify the specific factors in cold weather training that elicit maladaptive coping could help develop programs to foster positive coping. (Auth.)

45-383
Ecological monitoring of oil-gas construction in the cryolithozone. [Ekologicheskiĭ monitoring neftegazovogo stroitel'stva v kriolitozone],
Antonov-Druzhinin, V.P., et al, *Stroitel'stvo truboprovodov,* June 1990, No.6, p.21-23, In Russian.
Shishov, V.N.
Environmental protection, Cold weather construction, Petroleum industry, Ground ice, Soil water.

45-384
Analysis of Norman Wells core samples. Final report.
Patterson, D.E., et al, *Ottawa. Carleton University. Geotechnical Science Laboratories. Internal report,* Apr. 1987, IR 53, 60p. + appends., 10 refs.
Riseborough, D.W., Smith, M.W.
Permafrost samplers, Thermal conductivity, Boreholes, Drill core analysis, Ice cores, Peat, Ice coring drills, Sands, Unfrozen water content, Clay soils, Canada—Northwest Territories—Norman Wells.

45-385
Final report: analysis of thermal data and core specimens, Norman Wells Pipeline, part 2: physical and thermal properties, 1989.
Patterson, D.E., et al, *Ottawa. Carleton University. Geotechnical Science Laboratories. Internal report,* 1989, IR 57, 23p. + appends., 2 refs. For part 1 see 45-386.
Riseborough, D.W.
Physical properties, Thermal properties, Boreholes, Drill core analysis, Grain size, Ground ice, Canada—Northwest Territories—Norman Wells.

45-386
Final report: analysis of thermal data and core specimens, Norman Wells Pipeline, part 1: computer analysis, 1989.
Riseborough, D.W., *Ottawa. Carleton University. Geotechnical Science Laboratories. Internal report,* 1989, IR 57, 30p. + appends., 7 refs. For part 2 see 45-385.
Active layer, Soil temperature, Drill core analysis, Underground pipelines, Air temperature, Snow cover effect, Permafrost.

45-387
Detailed study of the physical and thermal properties of Norman Wells-Zama Pipeline core specimens. Final report.
Patterson, D.E., et al, *Ottawa. Carleton University. Geotechnical Science Laboratories. Internal report,* 1988, IR-56, 59p. + appends.
Riseborough, D.W.
Boreholes, Grain size, Thaw consolidation, Physical properties, Thermal properties, Thermal conductivity, Unfrozen water content, Dielectric properties, Ground ice, Peat, Sands, Canada—Northwest Territories—Norman Wells.

45-388
Canada-France ground freezing experiment: phase 8: fourth freeze cycle. *Ottawa. Carleton University. Geotechnical Science Laboratories. Internal report,* July 1989, IR 58, 73p., Refs. passim.
Soil freezing, Frost penetration, Frost heave, Soil mechanics, Soil temperature, Underground pipelines, Freeze thaw tests, Analysis (mathematics).

45-389
Canada-France ground freezing experiment: phase 7: spatial variability of heave around a pipeline and the effects of repeated freezing and thawing. *Ottawa. Carleton University. Geotechnical Science Laboratories. Internal report,* July 1988, IR 55, 35p., 14 refs.
Freeze thaw tests, Freeze thaw cycles, Frost heave, Soil temperature, Soil freezing, Underground pipelines, Frozen ground mechanics, Soil mechanics, Frost penetration, Mathematical models.

45-390
Third freeze cycle of the Canada-France ground freezing experiment. Final report. *Ottawa. Carleton University. Geotechnical Science Laboratories. Internal report,* Jan. 1988, IR 54, 76p., 8 refs.
Freeze thaw cycles, Freeze thaw tests, Frost heave, Unfrozen water content, Underground pipelines, Soil freezing, Soil mechanics, Soil temperature.

45-391
Implications of ice conditions for hydrocarbon production on the Grand Banks.
Hotzel, I.S., Ottawa, Canada, Carleton University, 198^, 139p., M.A. thesis. Refs. p.136-139.
Icebergs, Hydrocarbons, Ice solid interface, Offshore drilling, Offshore structures, Climatology, Ice models, Simulation.

45-392
Radioactivity profiles of the Chernobyl fallout on Tyrolean glaciers. [Aktivitätsprofile des Tschernobyl fallout auf Gletschern Tirols],
Ambach, W., et al, *Polarforschung,* 1989, 59(1/2), p.5-8, In German with English summary. 9 refs.
Blumthaler, M., Brunner, P., Eisner, H., Rehwald, W.
Radioactive isotopes, Fallout, Glacier ice, Austria—Tyrol.

45-393
Measuring blowing snow with a photo-electric particle counter at Pole Station, Antarctica.
Wendler, G., *Polarforschung,* 1989, 59(1/2), p.9-16, With German summary. 17 refs.
Snow crystals, Measuring instruments, Blowing snow, Wind (meteorology), Antarctica—Amundsen-Scott Station.
A photoelectric snow particle counter was built by G. Mimken, following the basic design by Schmidt (1977). This instrument was tested at South Pole Station, and later on, measurements in East Antarctica were carried out. It was found that the number of particles as well as the mean size of the particles increased with increasing wind speed; in other words, strong winds pick up not only more particles, but also larger ones. Compared to traditional snow traps, this instrument has a high time resolution, and does not disturb the wind field. Calculation of the total flux of snow agreed with those carried out by previous investigators in Antarctica who used conventional snow traps. The instrument performed well under extremely low temperature conditions. (Auth.)

45-394
On the roughness length Zo of the snow surface of the Filchner-Ronne Ice Shelf. [Über die Rauhigkeitslänge Zo der Schneeober-fläche des Filchner-Ronne-Schelfeises],
Heinemann, G., *Polarforschung,* 1989, 59(1/2), p.17-24, In German with English summary. 12 refs.
Snow surface, Surface roughness, Ice shelves, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
The roughness length Zo for the Filchner/Ronne ice shelf is determined experimentally from wind profiles under neutral conditions. Zo has a mean value of .0001 m, but shows large scatter. This can be explained by the fact that nearly all Zo values lie in the transitional region between smooth and rough surfaces in cases without snow drift. During snow drift, the roughness length can be approximated by the Charnock relation. (Auth.)

45-395
Concentric crater fill on Mars: an aeolian alternative to ice-rich mass wasting.
Zimbelman, J.R., et al, Lunar and Planetary Science Conference, 19th, Houston, TX, Mar. 14-18, 1988. Proceedings. Edited by G. Ryder and V.L. Sharpton, Lunar and Planetary Institute, 1989, p.397-407, 41 refs.
Clifford, S.M., Williams, S.H.
Mars (planet), Extraterrestrial ice, Ground ice, Creep, Eolian soils, Landforms, Rheology.

45-396
Phase diagram for ammonia-water mixtures at high pressures: implications for icy satellites.
Cynn, H.C., et al, Lunar and Planetary Science Conference, 19th, Houston, TX, Mar. 14-18, 1988. Proceedings. Edited by G. Ryder and V.L. Sharpton, Lunar and Planetary Institute, 1989, p.433-441, 28 refs.
Extraterrestrial ice, High pressure ice, Hydrates, Ice formation, High pressure tests, Low temperature tests, Phase transformations, Geologic processes.

45-397
Proton irradiation of SiHr-Fe(CO)5-H2O ices: production of refractory silicates and implications for the solar nebula.
Nuth, J.A., et al, Lunar and Planetary Science Conference, 19th, Houston TX, Mar. 14-18, 1988. Proceedings. Edited by G. Ryder and V.L. Sharpton, Lunar and Planetary Institute, 1989, p.565-569, 12 refs.
Moore, M.H.
Extraterrestrial ice, Chemical composition, Decomposition, Radiation absorption, Low temperature tests, Chemical properties, Infrared spectroscopy, Ice formation.

45-398
Effect of temperature and galvanization on the compressive strength of cold-formed angles.
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Blowing snow, Snowdrifts, Countermeasures, Mountains, Snowfences, Snow cover structure, Topographic effects, China—Tian Shan Mountains.

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Design, Snowdrifts, Snow evaporation, Snow density, Snow hydrology, Snow fences, Snow mechanics, Snow erosion, Roads, Wind velocity, Safety, Analysis (mathematics).

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Chacho, E.F., Jr.
Frozen ground mechanics, Unfrozen water content, Soil water migration, Thermal regime, Seepage, Ground water, Snowmelt, Frozen ground physics, Hydrology, Hydrologic cycle.
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reductions will drastically influence both the volume and peak values of runoff. Most existing hydrologic models do not take into consideration the changes that occur in the hydraulic properties of seasonally frozen soils. Therefore, these models cannot be calibrated to accurately predict runoff when there are large variances in hydrologic properties.

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Wolff, E.W., *Antarctic science*, Sep. 1990, 2(3), p.189-205, Refs. p.202-205.
Snow impurities, Ice composition, Air pollution

In their upper layers, the polar ice sheets contain a detailed record of changes in the atmosphere over the industrial period. Measurements from air bubbles in ice have shown that the CO2 content of the atmosphere has increased by 25% in the last 200 years, and that of CH4 has more than doubled. Ice core records have demonstrated a close correspondence between greenhouse gases and temperature during the last glacial cycle. Profiles of radioactive species in snow clearly document nuclear bomb tests in the atmosphere. Nitrate has more than doubled in Greenland snow over the industrial period, while sulphate has more than trebled. No significant trend is seen in antarctic snow for these anions. Pb increased 100-fold until the 1970s in Greenland snow, but concentrations appear now to be declining. A small increase is also recorded in antarctic snow. Impact on the atmosphere from local human activities in Antarctica is still mainly confined to small areas near stations. (Auth. mod.)

45-468

Snow accumulation and surface topography in the katabatic zone of eastern Wilkes Land, Antarctica.

Goodwin, I.D., *Antarctic science*, Sep. 1990, 2(3), p.235-242, 16 refs.

Snow accumulation, Snow cover distribution, Wind factors, Antarctica—Wilkes Land.

Snow accumulation and surface microrelief distributions, together with the surface katabatic wind pattern and elevation profiles, are presented for the eastern Wilkes Land katabatic wind zone. The broadscale net accumulation distribution displays a strong negative correlation with elevation, but on the mesoscale there are significant variations with respect to the elevation profile. The accumulation distribution was found to be dependent on slope aspect. Higher accumulation rates were observed on the northeast (windward) slope than those on the northwest (leeward) slope for the elevation range of 1870 m-2230 m. These higher accumulation rates are associated with the occurrence of longitudinal dunes deposited by precipitation, during synoptic events. The dependence of the accumulation distribution on aspect implies that synoptic and orographic processes are the major control on the depositional regime, and that maritime synoptic systems regularly penetrate eastern Wilkes Land to at least 2300 m elevation. (Auth.)

45-469

Calving and drift of iceberg B-9 in the Ross Sea, Antarctica.

Keys, H.J.R., et al, *Antarctic science*, Sep. 1990, 2(3), p.243-257, 45 refs.

Jacobs, S.S., Barnett, D.

Icebergs, Drift, Calving, Spaceborne photography, Antarctica—Ross Sea.

Major rifts in the Ross Ice Shelf controlled the Oct. 1987 calving of the 154 x 35 km B-9 iceberg, one of the longest on record. B-9 initially moved northwest for seven months until deflected southward by a subsurface current which caused it to collide with the ice shelf in Aug. 1988. It then completed a 100 km-radius gyre on the east-central shelf before resuming its northwesterly drift. Based upon weekly locations, derived from NOAA-10 and DMSP satellite and more frequent ARGOS data buoy positions, B-9 moved at an average speed of 2.4 km/day over the continental shelf. It was not grounded there at any time, but cast a large shadow of open water or reduced ice thickness during the austral winters. B-9 was captured by the continental slope current in May 1989, and attained a maximum velocity of 13 km/day before breaking into three pieces north of Cape Adare in early Aug. 1989. (Auth. mod.)

45-470

Icebergs as tracers of water movement in the Bransfield Strait.

Madejski, P., et al, *Antarctic science*, Sep. 1990, 2(3), p.259-263, 16 refs.

Rakusa-Suszczewski, S.

Icebergs, Drift, Ocean currents, Antarctica—Bransfield Strait.

The direction and velocity of iceberg drift were measured during 1987 by photogrammetric methods. Drift along the southern coast of King George I. followed the NE and ENE directions of wind and water currents. The highest mean velocities (0.6-0.8 m/s) were recorded in Mar. and Apr., and the lowest velocities (0.1-0.2 m/s) in winter, from May-July. From Aug.-Oct. velocities (0.4-0.6 m/s) were higher than in Nov.-Dec. (0.4-0.5 m/s). The waters flowing into Admiralty Bay came from the western part of the Bransfield Strait. (Auth.)

45-471

Weddell gyre: temperature maximum stratum.

Bagriantsev, N.V., et al, *Journal of geophysical research*, June 15, 1989, 94(C6), p.8331-8334, 14 refs.

Gordon, A.L., Huber, B.A.

DLC QC811.J6

Ocean currents, Sea ice distribution.

At depths below 200 m, relatively warm, salty water spreads poleward from the Antarctic Circumpolar Current (ACC). Significant poleward spreading is accomplished within the Weddell gyre of the Atlantic sector of the southern ocean. The primary inflow of warm deep water is derived from the southern edge of the ACC near 20-30E. The inflow spreads to the west along 65S and is divided into smaller "pools" of relatively warm water west of Maud Rise with a cold feature directly over the rise, in a manner shown by models of topographically generated eddies. Variability of the T-max stratum in the vicinity of Maud Rise arising from changes in the vigor of the large-scale circulation may influence the regional vertical heat fluxes, and be related to interannual variability of the sea ice cover and to the recurring polynya feature typical of the region. (Auth. mod.)

45-472

Incident of clear air precipitation.

Fisher, G.W., et al, *Weather*, Apr. 1989, 44(4), p.155-159, 9 refs.

Isaac, P., Bromley, A.M.

Precipitation (meteorology), Ice crystals, Antarctica—Ross Ice Shelf, Antarctica—Windless Bight.

Reports of clear air precipitation in polar regions are common, though not frequent occurrences. In the present case, clear air precipitation of ice crystals was observed at a field site in the Windless Bight region on the ice shelf south of Ross I. The observation was made on the morning of Dec. 28, 1986; from horizon to horizon there was no detectable cloud or hazy layer. This event was unusual in that there were several features different from those in previously reported examples, including the duration of the shower, about 4 hours; the large size of the ice crystals; and the relatively warm surface temperatures, -10 C to -14 C, with a shallow inversion aloft. These and other meteorological factors are discussed. It is suggested that clear air precipitation events may occur more often than is generally believed. (Auth. mod.)

45-473

Research into icings and icing processes in the USSR: major results and prospects.

Sokolov, B.L., et al, *Polar geography and geology*, Oct./Dec. 1989, 13(4), p.233-251, Translated from Materialy gliatsiologicheskikh issledovanii, No.67, 1989. 55 refs.

Alekseev, V.P., Markov, M.L., Kolotaev, V.I.

Research projects, Ice formation, Ice volume, Ground water, River ice.

45-474

Persistent accumulations of ice in the ocean.

Smirnov, V.I., *Polar geography and geology*, Oct./Dec. 1989, 13(4), p.271-278, Translated from Materialy gliatsiologicheskikh issledovanii, No.66, 1989. 15 refs.

Sea ice, Pack ice, Seasonal variations, Arctic Ocean.

45-475

Peculiarities of snow accumulation on Austfonna (Svalbard).

Sin'kevich, S.A., et al, *Polar geography and geology*, Oct./Dec. 1989, 13(4), p.279-285, Translated from Materialy gliatsiologicheskikh issledovanii, No.67, 1989. 8 refs.

Tarusov, A.V.

Snow surveys, Snow accumulation, Svalbard.

45-476

Origin and age of the "icy complex" in the north of West Siberia.

Danilov, I.D., et al, *Polar geography and geology*, Oct./Dec. 1989, 13(4), p.297-304, Translated from Akademiia nauk SSSR. Izvestiia, seriia geograficheskaia, No.1, 1990. 13 refs.

Parunin, O.B., Poliakova, E.I.

Ground ice, Sediments, Ice wedges, Peat.

45-477

Wind tunnel, field and numerical investigations of plume downwash and dispersion at an arctic industrial site (atmospheric dispersion, air quality).

Guenther, A.B., Pullman, Washington State University, 1989, 178p., University microfilms order No.-DA9015994, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, July 1990, 51(1), p.250.

Air flow, Air pollution, Soil air interface, Tundra, Dispersions.

45-478

Frost susceptibility of concrete in near-saturated states.

Soo, K.S., Ames, Iowa State University, 1989, 143p., University Microfilms order No.DA9014958, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, July 1990, 51(1), p.337.

Concrete freezing, Concrete strength, Frost resistance, Freeze thaw tests, Mathematical models, Saturation.

45-479

Mechanism of habit change for atmospheric ice crystal growth.

Lu, Q.J., Salt Lake City, University of Utah, 1989, 153p., University Microfilms order No.DA9015207, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, June 1990, 50(12), p.5681.

Ice crystal growth, Ice crystal structure, Ice physics, Water structure, Mathematical models.

45-480

Cyclic load effects on model pile behavior in frozen sand.

Stelzer, D.L., East Lansing, Michigan State University, 1989, 349p., University Microfilms order No.-DA9012065, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, June 1990, 50(12), p.5782.

Pile load tests, Frozen ground strength, Frozen ground mechanics, Sands, Frozen ground settling, Settlement (structural), Analysis (mathematics).

45-481

Geometrically nonlinear finite element analysis of a glulam timber dome.

Davalos, J.F., Blacksburg, Virginia Polytechnic Institute and State University, 1989, 289p., University Microfilms order No.DA9005005, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, June 1990, 50(12), p.5775.

Snow loads, Wooden structures, Analysis (mathematics), Roofs.

45-482

Ice-forming activity of the atmospheric aerosol.

Khorguani, V.G., *Akademiia Nauk SSSR. Izvestiia. Atmospheric and oceanic physics*, May 1989, 24(10), p.812-814, Translated from Izvestiia. Fizika atmosfery i okeana. 7 refs.

Cloud physics, Ice crystal growth, Aerosols, Ice nuclei, Heterogeneous nucleation, Temperature effects.

45-483

Generation of electromagnetic fields by fracture of the ice cover of marine areas.

Kachurin, L.G., et al, *Akademiia Nauk SSSR. Izvestiya. Atmospheric and oceanic physics*, May 1989, 24(10), p.815-817, Translated from Izvestiia. Fizika atmosfery i okeana. 6 refs.

Sea ice, Ice breaking, Electromagnetic properties, Radio waves, Wave propagation, Electric fields, Ice electrical properties, Ice navigation.

45-484

Monitoring river ice with Landsat images.

Gatto, L.W., *Remote sensing of environment*, 1990, Vol.32, MP 2773, p.1-16, 42 refs.

River ice, Spaceborne photography, Photointerpretation, LANDSAT, Ice navigation, Ice forecasting, Resolution, Classifications.

In the northern United States, ice can delay or stop river navigation in the winter and cause unexpected problems and emergencies. As part of a program to develop a river ice forecasting model, photointerpretation techniques were used to map the areal distributions of four classes of river ice along the navigable reaches of the Allegheny, Monongahela, and Ohio Rivers and the Illinois Waterway each winter from 1972 to 1985 from Landsat images. The four classes, 1) ice-free, 2) partial gray ice, 3) complete gray ice, and 4) white ice, were usually readily apparent on the images due to differences in gray tones produced by the various ice types and conditions that make up the different classes. Landsat-derived ice observations compared favorably with available ground and aerial observations 64-80% of the time. For many rivers in cold regions, Landsat images may be the only source of data on river ice.

45-485

Calculating formula of time-dependent temperature regime of frozen soil.

Wang, J.F., *Chinese science bulletin*, Jan. 1990, 35(2), p.128-133, 4 refs.

Frozen ground thermodynamics, Soil freezing, Thermal regime, Boundary value problems, Mathematical models, Frost penetration, Accuracy.

45-486

Endothermic model of percolation zone of a glacier and finding the analysis solution in moving coordinate.

Cai, B.L., et al, *Chinese science bulletin*, Feb. 1990, 35(3), p.223-226, 4 refs.

Wang, X.

Glacier melting, Glacier heat balance, Heat transfer, Mathematical models, Snow temperature, Meltwater.

45-487

Fundamental research on the supercooling phenomenon on heat transfer surfaces—investigation of an effect of characteristics of surface and cooling rate on a freezing temperature of supercooled water.

Saito, A., et al, *International journal of heat and mass transfer*, Aug. 1990, 33(8), p.1697-1709, 2 refs. For Japanese original see 44-1367.

Water, Supercooling, Freezing, Heat transfer, Ice formation, Cooling rate, Liquid solid interface, Temperature effects.

45-488
Colorado climate: temperature, precipitation, frost and growth data from selected stations. *U.S. Dept. of Agriculture. Soil Conservation Service, Lakewood, CO. Report.* Dec. 1, 1989, 290p. PB90-184870.
Frost, Precipitation (meteorology), Climate, Air temperature, Meteorological data, Weather forecasting, United States—Colorado.

45-489
Coal resources of the Susitna lowland, Alaska.
Merritt, R.D., *Alaska. Department of Natural Resources. Division of Geological and Geophysical surveys. Report of investigations,* Aug. 1990, 90-1, 181p. + appends., Refs. p.87-111.
Coal, Geology, Tectonics, Natural resources, Palynology, Paleobotany, Land development, Glacial deposits, Snowfall.

45-490
Two-dimensional time-dependent model of a convective cloud with detailed accounting for the microstructure of water and ice phases. [Dvumernaia nestatsionarnaia model' konvektivnogo oblaka s detal'nym uchetom mikrostruktury kapel'noĭ i kristallicheskoĭ faz],
Kogteva, E.A., et al, *Tsentral'naia aerologicheskaia observatoriia. Trudy,* 1989, No.172, p.41-55, In Russian with English summary. 8 refs.
Khain, A.P., Khvorost'ianov, V.I.
Clouds (meteorology), Cloud droplets, Microstructure, Ice crystals, Mathematical models.

45-491
Alaska's mineral industry, 1989.
Bundtzen, T.K., et al, *Alaska. Division of Geological and Geophysical Surveys. Special report,* 1990, No.44, 100p., 52 refs.
Swainbank, R.C., Deagen, J.R., Moore, J.L.
Gold, Natural resources, Metals, Minerals, Mining, International cooperation, Economic development, Cold weather operation, United States—Alaska.

45-492
Effect of grain size on the tensile strength of ice at two strain-rates.
Lee, R.W., Hanover, NH, Dartmouth College, Thayer School of Engineering, 1985, 114p., MS thesis. 30 refs.
Tensile properties, Cracking (fracturing), Grain size, Ice mechanics, Fracturing, Stress strain diagrams, Statistical analysis.

45-493
Frozen types of landscape structures in northwest Komsomolets Island (Severnaya Zemlya). [Merzlotnye tipy landshaftnykh struktur na severno-zapade ova Komsomolets (Severnaia Zemlia)],
Smirnov, I.P., *Geograficheskoe obshchestvo SSSR. Izvestiia,* Sep.-Oct. 1989, 121(5), p.388-393, In Russian. 22 refs.
Landscape types, Epigenesis, Sands, Geocryology, USSR—Severnaya Zemlya.

45-494
Equations for local ice energy dissipations during ship ramming.
Blanchet, D., et al, *Cold regions science and technology,* July 1990, 18(2), p.101-115, 30 refs.
Kivisild, H.R., Grinstead, J.
Floating ice, Ice breaking, Icebreakers, Impact tests, Ice strength, Mathematical models, Relaxation (mechanics), Ice solid interface, Dynamic properties.

45-495
Optimum deployment of satellite-tracked drifters to support iceberg drift forecasting.
Venkatesh, S., et al, *Cold regions science and technology,* July 1990, 18(2), p.117-131, 42 refs.
Sanderson, B., El-Tahan, M.
Icebergs, Drift, Forecasting, Drift stations, Velocity measurement, Ocean currents, Ice reporting, Human factors.

45-496
Role of irreversible thermodynamics and rheology in the regelation-flow phenomenon.
Wood, J.A., *Cold regions science and technology,* July 1990, 18(2), p.133-145, 21 refs.
Regelation, Ice water interface, Ice pressure, Rheology, Thermodynamics, Analysis (mathematics), Frozen ground thermodynamics.

45-497
Year-round temperature simulation of cold climate lakes.
Gu, R., et al, *Cold regions science and technology,* July 1990, 18(2), p.147-160, 27 refs.
Stefan, H.G.
Lakes, Lake water, Hydrothermal processes, Ice cover effect, Water temperature, Simulation, Seasonal variations, Bottom sediments, Heat transfer.

45-498
Facility to evaluate performance of aircraft ground de/anti-icing fluids subjected to freezing rain.
Laforte, J.L., et al, *Cold regions science and technology,* July 1990, 18(2), p.161-171, 4 refs.
Louchez, P., Bouchard, G., Ma, F.
Cold chambers, Cold weather tests, Aircraft icing, Antifreezes, Stability, Simulation, Rain, Test chambers, Chemical ice prevention, Specifications.

45-499
On the rate of heat transfer between a lake and an ice sheet.
Hamblin, P.F., et al, *Cold regions science and technology,* July 1990, 18(2), p.173-182, 21 refs.
Carmack, E.C.
Lake water, Lake ice, Ice water interface, Heat transfer coefficient, Water temperature, Turbulent boundary layer, Surface roughness.

45-500
Freeze and thaw point of wet clay and its determination.
Liu, Z.C., *Cold regions science and technology,* July 1990, 18(2), p.183-189, 13 refs.
Clays, Freezing points, Melting points, Soil water, Electric potential, Temperature measurement, Soil temperature, Supercooling, Freeze thaw tests.

45-501
Dumont d'Urville aerodrome, Terre Adélie, Antarctica.
Engler, M., et al, *Cold regions science and technology,* July 1990, 18(2), p.191-213.
Guichard, A., Letavernier, Y., Regrettier, J.F.
Cold weather construction, Ocean environments, Runways, Engineering geology, Airports, Bridges, Antarctica—Adélie Coast.
Under satisfactory technical and ecological conditions, a coastal airstrip with the necessary security requirements for medium carriers will be constructed in Terre Adélie by Oct. 1992. It will provide better opportunities for scientific research with air access from Dumont d'Urville to Dome "C", the planned research base; enable summer campaigns to benefit fully from the season without ice restrictions, and reduce the need for a passenger cargoboat. The only possibility for achieving this is to connect islands by means of a causeway along the same axis as the prevailing wind. The "Expeditions Polaires Françaises" have researched the site and have studied the local environment by collating all the observations concerning wind, sea swell, current, pack ice and geological features. These have led to a theoretical causeway model and consequently to an "experimental model" where studies of swell-ice-structure interactions, stability in the presence of ice and measurements of swellings, tide and porosity of the embankment have been made. Revetment tests have allowed for the construction of a bi-layered roadway. To date, the causeway reaches the last island. The main island has been blasted and a zone has been prepared for the future hangar and control tower. Nearly 4% of the cost of the project will be used to protect the fauna (new nesting zones, movement to protected areas, and enclosure of the airstrip). Observations made during the 1989 winter show that this causeway does not disturb the migration of Emperor penguins. (Auth. mod.)

45-502
Problems with the segregation potential theory by W. van Gassen and D.C. Sego—comments.
Konrad, J.M., *Cold regions science and technology,* July 1990, 18(2), p.215-216, 1 ref. For article being discussed see 44-833.
Soil freezing, Soil pressure, Frost heave.

45-503
New concept of frost-heave characteristics of soils, by Otto J. Svec—comments.
Nixon, J.F., et al, *Cold regions science and technology,* July 1990, 18(2), p.217-222, 11 refs. For article being discussed see 43-4447.
Konrad, J.M.
Soil tests, Soil freezing, Frost heave, Standards, Construction, Soil mechanics.

45-504
Pliocene-Pleistocene paleoceanography of the North Atlantic Ocean: nature and causes of climate variations on 10(4)-10(6) year time scales.
Raymo, M.E., New York, Columbia University, 1989, 182p., University Microfilms order No.DA9020594, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Sep. 1990, 51(3), p.1165.
Paleoclimatology, Sea ice, Ice air interface, Climatic changes, Ice edge, Ice volume, Pleistocene.

45-505
Role of thermal convection in heat and mass transport in the subarctic snow cover.
Sturm, M., Fairbanks, University of Alaska, 1989, 209p., University Microfilms order No.DA9017185, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Sep. 1990, 51(3), p.1169.
Snow thermal properties, Convection, Snow heat flux, Snow permeability, Metamorphism (snow), Depth hoar, Snow crystals, Mass transfer.

45-506
Two-dimensional free drift model for river ice cover formation.
Ho, C.F., Potsdam, N.Y., Clarkson University, 1990, 169p., University Microfilms order No.DA9019337, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Aug. 1990, 51(2), p.918.
River ice, Ice formation, Ice models, Drift, River flow, Frazil ice, Mathematical models, Ice cover thickness.

45-507
Evaporator analysis for application to water-source and ice-maker heat pumps.
Aceves-Saborio, S.M., Corvallis, Oregon State University, 1989, 213p., University Microfilms order No.DA9019150, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Aug. 1990, 51(2), p.915.
Ice makers, Heat transfer, Water flow, Defrosting, Evaporation.

45-508
Numerical study of an underground heat tube.
Sulaiman, F., East Lansing, Michigan State University, 1989, 171p., University Microfilms order No.DA9018751, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Aug. 1990, 51(2), p.949.
Heat pipes, Heat transfer, Frozen ground thermodynamics, Latent heat, Analysis (mathematics), Ice formation, Soil freezing.

45-509
Methodology for updating a conceptual snow model with snow measurements (streamflow forecasting).
Day, G.N., Baltimore, MD, Johns Hopkins University, 1990, 181p., University Microfilms order No.DA9018570, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Aug. 1990, 51(2), p.636.
Stream flow, Runoff forecasting, Snow water equivalent, Snow hydrology, Models.

45-510
Transient electromagnetics for permafrost.
Walker, G.G., Fairbanks, University of Alaska, 1988, 308p., University Microfilms order No.DA9017184, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Aug. 1990, 51(2), p.635.
Electromagnetic prospecting, Permafrost thickness, Subsea permafrost, Hydrates, Permafrost depth, United States—Alaska.

45-511
Airborne organic compounds in the Canadian Arctic and development of a collection method for organochlorines in air.
Patton, G.W., Columbia, University of South Carolina, 1989, 266p., University Microfilms order No.DA9017146, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Aug. 1990, 51(2), p.706.
Air pollution, Atmospheric composition, Sampling, Chemical analysis.

45-512
Measurement of sulfur dioxide reaction rates in wintertime orographic clouds.
Snider, J.R., Laramie, University of Wyoming, 1989, 365p., University Microfilms order No.DA9016668, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Aug. 1990, 51(2), p.800.
Air pollution, Atmospheric composition, Snow impurities, Clouds (meteorology).

45-513
Dynamics of the Pleistocene climate: observation and theory.
Maasch, K.A., New Haven, CT, Yale University, 1989, 159p., University Microfilms order No.DA9015836, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Aug. 1990, 51(2), p.634.
Pleistocene, Ice age theory, Paleoclimatology.

45-514
Mechanics of creep brittle materials, 1.
Cocks, A.C.F., ed, London, Elsevier Applied Science, 1989, 309p., Refs. passim. Proceedings of the European Mechanics Colloquium 239 "Mechanics of Creep Brittle Materials" held at Leicester University, UK, Aug. 15-17, 1988. For selected papers see 45-515 through 45-519.
Ponter, A.R.S., ed.
Ice mechanics, Ice loads, Ice creep, Ice cracks, Mathematical models, Ice solid interface.

45-515
Ice loading on offshore structures: the influence of ice strength.
Mills, M.R., et al, Mechanics of creep brittle materials, 1. Edited by A.C.F. Cocks and A.R.S. Ponter, London, Elsevier Applied Science, 1989, p.152-167, 13 refs.
Hallam, S.D.
Ice mechanics, Ice loads, Ice strength, Offshore structures, Ice solid interface.

45-516
Ice forces on wide structures: field measurements at Tarsuit Island.
Ponter, A.R.S., et al, Mechanics of creep brittle materials, 1. Edited by A.C.F. Cocks and A.R.S. Ponter, London, Elsevier Applied Science, 1989, p.168-187, 5 refs.
Brown, P.R.
Ice mechanics, Ice solid interface, Ice loads, Ice creep, Ice temperature, Ice salinity, Ice crystal size, Mathematical models.

45-517
Double torsion test applied to fine grained freshwater columnar ice, and sea ice.
Parsons, B.L., et al, Mechanics of creep brittle materials, 1. Edited by A.C.F. Cocks and A.R.S. Ponter, London, Elsevier Applied Science, 1989, p.188-200, 26 refs.
Snellen, J.B., Muggeridge, D.B.
Ice mechanics, Sea ice, Ice cracks, Ice strength, Ice creep.

45-518
Ice and steel—a comparison of creep and failure.
Sinha, N.K., Mechanics of creep brittle materials, 1. Edited by A.C.F. Cocks and A.R.S. Ponter, London, Elsevier Applied Science, 1989, p.201-212, 19 refs.
Ice mechanics, Steels, Grain size, Ice creep, Ice cracks, Cracking (fracturing), Mathematical models.

45-519
Micromechanics based model for the creep of ice including the effects of general microcracking.
Cocks, A.C.F., Mechanics of creep brittle materials, 1. Edited by A.C.F. Cocks and A.R.S. Ponter, London, Elsevier Applied Science, 1989, p.213-229, 12 refs.
Ice mechanics, Ice creep, Ice cracks, Ice loads, Ice deformation, Mathematical models.

45-520
Climatic variability and the hydrological cycle in the Canadian North: knowns and unknowns.
Lawford, R.G., Canadian Climate Program. Proceedings of the 3rd meeting on northern climate, Whitehorse, Sep. 7-8, 1988, Whitehorse, Yukon Territory, Canada, Dept. of the Environment, Atmospheric Environment Service, 1988, p.143-162, 23 refs.
Hydrologic cycle, Climate, Climatic changes, Ice breakup, Ecology, Glaciers, Snow cover, Permafrost, River ice, River basins, Ice cover, Canada.

45-521
Fracturing in earth dams with zones of frozen ground in shore-junctions. [Treshchinoobrazovanie gruntovykh plotin s merzlymi zonami grunta v mestakh beregovykh sopriazhenii].
Belan, V.I., *Izvestiia vysshikh uchebnykh zavedenii. Stroitel'stvo i arkhitektura*, May 1990, No.5, p.79-83, *In Russian. 2 refs.*
Earth dams, Frozen ground mechanics, Shores, Fracturing, Joints (junctions), Analysis (mathematics), Nomographs.

45-522
Surface heat budget of a polynya in the coastal waters off Queen Maud Land, Antarctica, during austral summer.
Ramesh Kumar, M.R., et al, *Continental shelf research*, Dec. 1989, 9(12), p.1063-1070, 10 refs.
Sadhuram, Y.
Polynyas, Sea water, Heat balance.
The daily surface heat budget of a polynya in the coastal waters off Queen Maud Land was studied for the period from 23 Dec. 1986 to Feb. 1987, using surface meteorological data collected on board the Swedish vessel M.S. *Thuleland*. The incoming solar radiation was the most important component in the surface heat budget; its mean value for the study period was about 209 W/sq m. The latent and sensible heat fluxes were in opposition and nearly balanced each other. The average net heat gain over the polynya for the study period was 141 W/sq m. From the mean heat storage values obtained from the temperature profiles, the heat gain at the surface is almost lost through advection and other interior physical processes in the top 50 m layer of the water column. This is reflected in sea surface temperature, which was almost steady during the study period. (Auth.)

45-523
Rift drift in floe flow; iceberg wakes in Arctic sea ice.
Nilsen, J.H., et al, *Continental shelf research*, Jan. 1, 1990, 10(1), p.81-86, 8 refs.
McClimans, T.A., Lövås, S.M.
Sea ice, Icebergs, Drift, Ocean currents, Barents Sea.

45-524
On the origin of the properties of the Arctic Ocean halocline north of Ellesmere Island: results from the Canadian Ice Island.
Jones, E.P., et al, *Continental shelf research*, May 1990, 10(5), p.485-498, 29 refs.
Anderson, L.G.
Sea water, Subglacial observations, Water chemistry, Salinity, Water temperature, Arctic Ocean.

45-525
Improved preventive maintenance: sealing cracks in flexible pavements in cold regions.
Chong, G.J., et al, *Transportation research record*, 1988, No.1205, p.12-19, 10 refs.
Phang, W.A.
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Aerial surveys, Ice navigation, Ice creep, Antarctica.
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Ice dams, Icebound lakes, Lake bursts, Landslides, Floods.

45-531
Development of field technology and methods for forecasting snowfall and snow accumulation. [Kosetsu sekisetsu yosoku ni tsuite no gengyoteki gijutsu shuho no kaihatsu], *Osaka kanku kishodai tokubetsu chosa hokoku (Osaka District Weather Station. Special investigation report)*, Mar. 1989, No.13, 187p., In Japanese.
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Weather forecasting, Snowfall, Snow accumulation, Snowstorms.

45-532
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U.S. Navy Symposium on Arctic/Cold Weather Operations of Surface Ships, Nov. 29-Dec. 1, 1989. Volume 1, U.S. Navy Symposium on Arctic/Cold Weather Operations of Surface Ships, Nov. 29-Dec. 1, 1989. Proceedings. Volume 1, Washington, D.C., Dept. of the Navy, [1989], 488p., Refs. passim. For selected papers see 45-533 through 45-549.
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Ships, Ice navigation, Design criteria, Performance, Oceanographic surveys, Ice conditions, Ice edge, Stability.

45-534
Practical limits of cold region environmental characteristics for the new design of conventional U.S. Navy surface ships.
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Ship icing, Ocean environments, Cold weather operation, Logistics, Ice conditions, Ice prevention.

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Cold exposure, Physiological effects, Countermeasures, Health, Military research, Radio waves.

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Willis, Z.S.
Marine meteorology, Weather forecasting, Ice forecasting, Sea ice distribution, Ice navigation, Ice edge, Meteorological data.

45-541
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Ship icing, Ice forecasting, Ice loads, Stability, Specifications, Icing rate, Ice accretion.

45-542
Forecasting superstructure icing for Navy combatants.
Ryerson, C.C., MP 2774, U.S. Navy Symposium on Arctic/Cold Weather Operations of Surface Ships, Nov. 29-Dec. 1, 1989. Proceedings. Volume 1, Washington, D.C., Dept of the Navy, [1989], p.287-296, 18 refs.
Ship icing, Superstructures, Ice forecasting, Ice models, Ice accretion, Research projects.
A quasi-deterministic model of superstructure icing is being developed through CRREL at the University of Alberta for forecasting ice growth and load distribution on a Spruance-class cruiser. The model will compute spray cloud liquid water content and trajectory with ship heading and speed, sea state and weather, and will evaluate the spray droplet energy budget. Spray salinity, brine drainage, ship attitude, and superstructure shape are evaluated for their effects upon ice growth and distribution. Spray flux cannot be numerically evaluated with the current understanding of hydrodynamic processes, and thus the model relies upon empirically derived algorithms for water delivery on a Navy ship. This paper describes the model structure, progress of the model development, and its potential utility.

45-543
Effectiveness of deicing chemicals in reducing ice adhesion to nonskid surfaces.
Lever, J.H., et al, MP 2715, U.S. Navy Symposium on Arctic/Cold Weather Operations of Surface Ships, Nov. 29-Dec. 1, 1989. Proceedings. Volume 1, Washington, D.C., Dept of the Navy, [1989], p.297-307, 12 refs.
Rand, J.H., Gooch, G.E.
Ice adhesion, Ice removal, Skid resistance, Ice accretion, Ship icing, Aircraft landing areas, Impact tests.
Through a series of laboratory tests, the effectiveness of 8 different deicing chemicals in reducing ice adhesion to the rough, nonskid surfaces used on aircraft carrier flight decks were examined. The test samples consisted of 18 in. x 18 in. coated steel plates, which were first sprayed with a light coating of liquid deicer which then accreted a uniform layer of freshwater glaze ice. To determine the shear adhesion strength, the iced samples were dropped onto a stiff spring, and the acceleration required to shed the ice was then measured. It was found that a relatively small amount of deicer, applied in advance of ice accretion, is extremely effective in reducing ice adhesion to nonskid surfaces. Such results suggest that advance application of deicing chemicals would significantly assist ice removal from carrier flight decks.

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Electro-expulsive ice removal application to vertical launch system hatch and to personnel access hatch.
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Ship icing, Ice removal, Electronic equipment, Ice deformation, Electric fields, Military research.

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Ship icing, Ice removal, Hydraulic jets, Steam, Hydrodynamics, High pressure tests.

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Falabella, G.J.
Ship icing, Ice removal, Heat pipes, Design, Heat flux, Structural analysis.

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Northstar 89 flight deck deicer and hot air wand evaluation on the U.S.S. America (CV66).
Rippman, J.A., et al, U.S. Navy Symposium on Arctic/Cold Weather Operations of Surface Ships, Nov. 29-Dec. 1, 1989. Proceedings. Volume 1, Washington, D.C., Dept of the Navy, [1989], p.397-407.
Hartmann, A.R., Smith, R.
Ship icing, Aircraft landing areas, Ice removal, Equipment, Ice melting, Snow removal, Air flow.

45-548
Northern latitude logistic support.
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Ship icing, Ice prevention, Ice removal, Infrared equipment, Lasers, Ice melting.

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Ship icing, Cold weather performance, Military operation, Ice prevention, Ice removal, Ice forecasting, Ice accretion, Countermeasures.

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Dawe, B.R., et al, *Transport Canada. Transportation Development Centre. Report,* Oct. 1989, TP 10078E, Var. p., With French summary. 3 refs.
Bryant, D., Finlayson, D.
Radar, Airborne radar, Detection, Rescue operations, Rescue equipment, Icing.

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O'Bryon, M.K., *U.S. Army Test and Evaluation Command. Report,* Sep. 1990, 8-WE-900-138-011, 32p. + appends.
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Glacier flow, Computer programs.

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Evaluation of two transport aircraft and several ground test vehicle friction measurements obtained for various runway surface types and conditions. A summary of test results from Joint FAA/NASA Runway Friction Program.
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Radar tracking, Snow electrical properties, Microwaves, Attenuation, Backscattering, Military research.

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Fisk, D.J.
Snow water content, Measurement.
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Pozdniakova, E.S., ed.
Economic development, Geocryology, Frozen rocks, Frozen rock strength, Frozen rock temperature, Air temperature, Seasonal freeze thaw, Soil water, Soil temperature, Thermodynamics, Heat balance, Taliks, Electric power, USSR—Yakutia.

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Economic development, Geocryology, Shores.

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Geocryology, Heat balance, Forecasting.

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Leĭbman, M.O.
Geocryology, Maps, Taliks, Frozen rock temperature, Statistical analysis, USSR.

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Klimovskiĭ, I.V.
Electric power, Forecasting, Classifications, Geocryology, Air temperature, Reservoirs.

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Landscape types, Mapping, Spaceborne photography, Geocryology, USSR—Yakutia.

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Kuznetsov, S.N.
Unfrozen water content, Terraces, Permafrost, Soil water, Frozen rock temperature, Statistical analysis, USSR—Yakutsk.

45-576
Variations in thickness of seasonally-thawing and seasonally-freezing layers of the Lena-Aldan interfluve. [Izmenchivost' moshchnosti sezonno-talogo i sezonno-merzlogo sloev Leno-Aldanskogo mezhdurech'ia],
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Rivers, Glaciation, USSR—Lena River.

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Frozen rocks, Mining.

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Earth dams, Soil water, Geocryology.

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This collection of five papers discusses the many practical problems, logistics, meteorological planning, flight history, and recovery operations for the first, very large (11.6 m cu ft) stratospheric balloon launched from Antarctica. The on-board Gamma Ray Advanced Detector was flown successfully to detect gamma ray emissions from Supernova 1987A. The 2500 lb payload was recovered from a 12,500 ft plateau by an LC-130 aircraft. Instrumentation for command control and telemetry, payload integration and testing, and the telemetry installed aboard the LC-130 are described. An overview of the performance of the ARGOS satellite tracking and data recovery system on this flight is provided.

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Frozen rocks, Ion diffusion, Unfrozen water content, Soil water migration, Geocryology, Clay minerals.

45-646
Role of heat exchange in the formation of the temperature conditions of permafrost rocks.
Bryksin, V.N., *Soviet engineering geology,* 1989, No.4, p.10-14, 16 refs. For Russian original see 44-1254.
Active layer, Permafrost heat transfer, Rocks, Soil temperature, Soil texture, Surface temperature, Seasonal freeze thaw.

45-647
Use of water of taliks above permafrost for water supply to oil fields.
Burchak, T.V., et al, *Soviet engineering geology,* 1989, No.4, p.15-24, 11 refs. For Russian original see 44-1255.
Demidiuk, L.M.
Taliks, Suprapermafrost ground water, Water supply, Oil wells, Flooding, Water reserves, Hydrogeology.

45-648
Theoretical and field study of temperature fields in thawing soils.
Bronfenbrener, L.E., et al, *Soviet engineering geology,* 1989, No.4, p.33-39, 14 refs. For Russian original see 44-1256.
Zavarin, E.R., Lysenko, V.N.
Ground thawing, Soil temperature, Temperature gradients, Temperature measurement, Heat transfer, Active layer, Mathematical models, Frozen ground thermodynamics.

45-649
Isotope study of natural water and ice of western Siberia.
Kritsuk, L.N., et al, *Soviet engineering geology,* 1989, No.4, p.48-64, 27 refs. For Russian original see 44-1257.
Poliakov, V.A.
Ground water, Ground ice, Isotope analysis, Chemical composition, Hydrogeochemistry, Chemical analysis.

45-650
Dependence of phase composition of water in freezing and frozen soils on external pressure.
Kondakov, V.V., et al, *Soviet engineering geology,* 1989, No.5, p.17-23, 10 refs. For Russian original see 44-2517.
Kondakova, O.A., Nikolaeva, G.V.
Soil freezing, Soil pressure, Unfrozen water content, Soil water, Phase transformations, Soil temperature, Geocryology.

45-651
Methods of calculating moisture migration in seasonal freezing and thawing of soils.
IAnitskii, P.A., *Soviet engineering geology,* 1989, No.5, p.36-44, 14 refs. For Russian original see 44-2518.
Ground thawing, Thaw depth, Moisture transfer, Seasonal freeze thaw, Analysis (mathematics), Seasonal variations, Soil temperature.

45-652
Determination of mean annual temperature of permafrost soil.
Khrustalev, L.N., et al, *Soviet engineering geology,* 1989, No.5, p.89-93, 5 refs. For Russian original see 44-2519.
Emel'ianova, L.V., Solov'ev, V.P., Nikiforov, V.V.
Permafrost, Soil temperature, Frozen ground strength, Temperature measurement, Accuracy, Periodic variations, Stefan problem.

45-653
Multiple glaciation and gold-placer formation, Valdez Creek Valley, western Clearwater Mountains, Alaska.
Reger, R.D., et al, *Alaska. Department of Natural Resources. Division of Geological and Geophysical Surveys. Professional report,* 1990, No.107, 30p., Refs. p.26-29.
Bundtzen, T.K.
Geophysical surveys, Placer mining, Glaciation, Stratigraphy, Exploration, Age determination, Glacial deposits, United States—Alaska—Clearwater Mountains.

45-654
Evaluation of state-of-the-art drilling platform icing models.
Brown, R.D., et al, *Canadian Climate Centre. Report,* 1989, No.89-10, 80p., With French summary. Refs. p.71-74.
Horjen, I.
Offshore structures, Ice accretion, Ice loads, Ice models, Mathematical models, Wind tunnels, Offshore drilling.

45-655
Effective permittivity of and scattering from wet snow and ice droplets at weather radar wavelengths.
De Wolf, D.A., et al, *IEEE transactions on antennas and propagation,* Sep. 1990, 38(9), p.1317-1325, 17 refs.
Russchenberg, H.W.J., Ligthart, L.P.
Precipitation (meteorology), Radar echoes, Scattering, Particles, Analysis (mathematics), Ice electrical properties, Orientation.

45-656
Measurements of under-ice broadband coherence.
Meredith, R.W., *Acoustical Society of America. Journal,* Aug. 1990, 88(2), p.1003-1010, 13 refs.
Underwater acoustics, Sea ice, Ice cover effect, Wave propagation, Acoustic measurement, Data processing, Reflection.

45-657
Influence of Hudson Bay runoff and ice-melt on the salinity of the inner Newfoundland Shelf.
Myers, R.A., et al, *Atmosphere-ocean,* June 1990, 28(2), p.241-256, With French summary. 37 refs.
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Sea water, Sea ice, Meltwater, Runoff, Salinity, Hydrologic cycle, Oceanography, Water chemistry, Canada—Labrador Sea.

45-658
Till genesis and hydrogeological properties.
Haldorsen, S., et al, *Nordic hydrology,* 1990, 21(2), p.81-94, 33 refs.
Krüger, J.
Hydrogeology, Glacial deposits, Soil formation, Soil composition, Ground water, Glaciation, Sedimentation.

45-659
Use of thermistors for spring road management.
Barcomb, J., *Transportation research record,* 1989, No.1252, p.12-20, 1 ref.
DLC TE7.H5
Thermistors, Road maintenance, Temperature measurement, Thaw weakening, Ground thawing, Subgrades, Trafficability.

45-660
Variability of thickness of ice and snow in arctic seas and its parameterization.
Appel', I.L., *Soviet meteorology and hydrology,* 1989, No.3, p.66-72, 17 refs. For Russian original see 43-4551.
Sea ice, Ice cover thickness, Variations, Ice surface, Hummocks, Mathematical models, Ice deformation, Ice deterioration, Snow cover effect.

45-661
Runoff from hummocky marshes of western Siberia.
Moskvin, IU.P., *Soviet meteorology and hydrology,* 1989, No.3, p.73-78, 9 refs. For Russian original see 43-4552.
Swamps, Runoff, Ground thawing, Snowmelt, Water balance, Measurement, Seasonal variations, Surface waters, USSR—Siberia.

45-662
Calculating ice jam water levels.
Buzin, V.A., *Soviet meteorology and hydrology,* 1989, No.3, p.79-84, 8 refs. For Russian original see 43-4553.
River ice, Ice jams, River flow, Water level, Banks (waterways), Flood forecasting, Hydrology.

45-663
Salting-out solvent extraction method for determining low levels of nitroaromatics and nitramines in water.
Miyares, P.H., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Aug. 1990, SR 90-30, 26p., ADA-227 761, 6 refs.
Jenkins, T.F.
Water content, Ground water, Water pollution, Explosives.
A protocol was developed for determining low levels of nitroaromatics and nitramines in ground water. Sample preparation employs salting-out extraction with acetonitrile and NaCl, further preconcentration of extract by solvent evaporation on a Kuderna-Danish concentrator, dilution of the concentrate with water, and filtration through a 0.5 micron Millex-SR filter. Separation is achieved using reversed-phase high-performance liquid chromatography with an LC-8 (3.3 cm) column using a 70.7/27.8/1.5 (v/v/v) water-methanol-THF eluent, and determination is obtained on a UV detector at 254 nm. This procedure provides far lower detection limits than the earlier protocol, which involved direct injection onto an LC-18 (25 cm) column eluted with 50/50 (v/v) methanol-water. The new method is capable of simultaneously determining RDX, TNB, DNB, TNT, 2,4-DNT, 2,6-DNT, 2-Am-DNT and 4-Am-DNT in less than five minutes, with reporting limits ranging from 0.02 to 0.84 microgram/L. Analytical recovery averaged greater than 95%.

45-664
Study of adhesion and friction of fluoroplast coating in contact with ice.
Igoshin, V.A., et al, *Soviet journal of friction and wear,* 1989, 10(4), p.83-87, Translated from Trenie i iznos. 16 refs.
Berdnikov, A.G.
Ice adhesion, Protective coatings, Metal ice friction, Ice solid interface, Thickness, Polymers, Mechanical tests.

45-665
Comparison of two methods of calculating soil freezing depth.
Gel'fan, A.N., *Soviet meteorology and hydrology,* 1989, No.2, p.78-83, 11 refs. For Russian original see 44-104.
Soil freezing, Frost penetration, Soil water migration, Mathematical models, Frost forecasting, Phase transformations.

45-666
Low-temperature destabilization of oil emulsion systems in water treatment technology.
Andrienko, N.M., *Soviet journal of water chemistry and technology,* 1989, 11(4), p.95-98, Translated from Khimiia i tekhnologiia vody. 3 refs.
Water treatment, Waste treatment, Decomposition, Freezing, Solid phases, Water pollution, Low temperature research.

45-667
Deicing of solids using radiant heating.
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Viskanta, R.
Radiant heating, Ice removal, Ice surface, Thermal conductivity, Ice solid interface, Ice adhesion, Transparency.

45-668
Geophysics in the study of permafrost.
Scott, W.J., et al, MP 2778, Geotechnical and environmental geophysics. Volume 1. Review and tutorial. Edited by S.H. Ward, Tulsa, Society of Exploration Geophysicists, 1990, p.355-384, Refs. p.376-384. For earlier version see 34-1682.
Sellmann, P.V., Hunter, J.A.
Permafrost structure, Permafrost distribution, Permafrost thermal properties, Permafrost physics, Permafrost depth, Geophysical surveys, Exploration, Geocryology, Acoustic measurement, Seismic surveys, Radar echoes.

45-669
Classification of the thermal regime of hydraulic-fill structures in the winter period of operation.
Panteleev, V.G., et al, *Hydrotechnical construction,* Jan. 1990(pub. July90), 24(1), p.36-40, Translated from Gidrotekhnicheskoe stroitel'stvo, Jan. 1990, p.31-34. 10 refs.
Frolov, A.N.
Cold weather operation, Hydraulic fill, Hydraulic structures, Ice cover thickness, Ice cover effect, Thermal regime, Heat capacity.

45-670
Characteristics of the formation of alassy peat bogs in northern Yakutia. [Osobennosti formirovaniia alasnykh torfianikov na severe IAkutii],
Vasil'ev, I.S., *Geografiia i prirodnye resursy,* July-Sep. 1989, No.3, p.82-87, In Russian. 16 refs.
Swamps, Paludification, Alassy, Peat.

45-671
Geochemistry of the snow cover around coal mines. [Geokhimiia snegovogo pokrova vblizi ugol'nogo razreza],
Makarov, V.N., *Geografiia i prirodnye resursy,* Jan.-Mar. 1990, No.1, p.37-44, In Russian. 7 refs.
Snow cover, Snow composition, Geochemistry, Environmental impact, Mining, Coal.

45-672
Fluctuations in Gebler's Glacier over 150 years. [Kolebaniia lednika Geblera za 150 let],
Reviakin, V.S., et al, *Geografiia i prirodnye resursy,* Jan.-Mar. 1990, No.1, p.89-93, In Russian. 13 refs.
Mukhametov, R.M.
Glacier oscillation, Moraines, Glacial deposits, Glacier tongues, Glacier surveys.

45-673
Some manifestations of the age factor in the soils of end-moraine landscapes of the Valday glaciation and periglacial zone. [O nekotorykh proiavleniiakh faktora vozrasta v pochvakh landshaftov konechnomorennykh obrazovanii Valdaiskogo oledeneniia i perigliatsial'noi zony],
IUrenkov, G.I., *Geografiia i prirodnye resursy,* Jan.-Mar. 1990, No.1, p.93-99, In Russian. 22 refs.
Moraines, Soil chemistry, Periglacial processes, Soil formation, Soil dating.

45-674
Lancaster Sound in the year 2000 (regional planning in the Canadian Arctic). [Proliv Lankaster v 2000 g. (Regional'noe planirovanie v Kanadskoi Arktike)],
Bondarenko, V.S., *Geografiia i prirodnye resursy,* Jan.-Mar. 1990, No.1, p.99-107, In Russian. 6 refs.
Regional planning, Shores, Economic development, Environmental protection, Canada—Northwest Territories—Lancaster Sound.

45-675
Security co-operation in the Arctic: a Canadian response to Murmansk.
Cox, D., et al, Ottawa, Arms Control Centre, Oct. 1989, 28p., Report of the panel on Arctic Arms Control; presented at the Canada-USSR Conference on Canadian-Soviet Arctic Co-operation, Ottawa, Oct. 24, 1989.
Rauf, T.
International cooperation, Military operation, Polar regions.

45-676
Valley and terrace formation during fluvial morphogenesis in the area of the last continental glaciation (in the example of the Baltic region). [Dolino- i terrasoobrazovanie v usloviiakh fliuvial'nogo morfogeneza oblasti poslednego materikovogo oledeneniia (na primere Pribaltiki)],
Eberkhards, G.IA., *Geomorfologiia,* Jan.-Mar. 1990, No.1, p.102-107, In Russian with English summary. 8 refs.
Geomorphology, Terraces, Valleys, Land ice, Glacial rivers.

45-677
Technique of long range regional forecasting of dangerous phenomena (in the example of avalanches and mudflows in the Central Caucasus). [Metodika dolgosrochnykh regional'nykh prognozov opasnykh iavlenii (na primere lavin i selei Tsentral'nogo Kavkaza)],
Berri, B.L., et al, *Moscow. Universitet. Vestnik. Seriia 5: Geografiia,* July-Aug. 1990, No.4, p.46-52, In Russian. 7 refs.
Krasnushkina, E.R.
Long range forecasting, Avalanche forecasting, Mudflows, Air temperature, Statistical analysis.

45-678
Characteristics of the occurrence of gas hydrates in rocks at subzero temperatures. [Osobennosti sushchestvovaniia gazovykh gidratov v porodakh pri otritsatel'nykh temperaturakh],
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Istomin, V.A.
Frozen rocks, Rock properties, Hydrates, Mathematical models.

45-679
Features of the modern structure of the arctic continental border of Eurasia. [Osobennosti sovremennoi struktury arkticheskoi kontinental'noi okrainy Evrazii],
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Marine geology, Geophysical surveys, Shores.

45-680
Tectonics of the Barents-Kara platform. [Tektonika Barentsevo-Karskoi plity],
Senin, B.V., et al, Geologicheskie i geograficheskie problemy osvoeniia prirodnykh resursov severnykh morei. Sbornik statei (Geological and geographical problems in developing the natural resources of the northern seas. Collected articles). Edited by B.K. Ostistyi, G.I. Luka, E.IA. Patsiia, V.A. Potanin, A.L. Sorokin, and S.I. Cheredeev, Murmansk, Knizhnoe izdatel'stvo, 1988, p.10-18, In Russian. 11 refs.
Shipilov, E.V.
Tectonics, Geomorphology, Geophysical surveys, Arctic Ocean, USSR—Barents Sea, USSR—Kara Sea.

45-681
Ways of improving the noise immunity of towed receiving devices in marine seismic prospecting in northern sea areas. [Puti povysheniia pomekhoustoi-chivosti buksiruemykh priemnykh ustroistv pri morskoi seismorazvedke na akvatoriiakh severnykh morei],
Buravtsev, V.IU., et al, Geologicheskie i geograficheskie problemy osvoeniia prirodnykh resursov severnykh morei. Sbornik statei (Geologial and geographical problems in developing the natural resources of the northern seas. Collected articles). Edited by B.K. Ostistyi, G.I. Luka, E.IA. Patsiia, V.A. Potanin, A.L. Sorokin, and S.I. Cheredeev, Murmansk, Knizhnoe izdatel'stvo, 1988, p.34-42, In Russian. 6 refs.
Sokolov, I.I.
Noise (sound), Seismic surveys, Sea ice, Ice cover effect, Ice conditions, Acoustics, Analysis (mathematics), Models.

45-682
Geomorphological characteristics of the formation and dynamics of the Onĕga Cliffs littoral zone of the White Sea. [Geomorfologicheskie osobennosti stroeniie i dinamika beregovoi zony Onezhskikh shkher Belogo moria],
Matoshko, A.V., et al, Geologicheskie i geograficheskie problemy osvoeniia prirodnykh resursov severnykh morei. Sbornik statei (Geological and geographical problems in developing the natural resources of the northern seas. Collected articles). Edited by B.K. Ostistyi, G.I. Luka, E.IA. Patsiia, V.A. Potanin, A.L. Sorokin, and S.I. Cheredeev, Murmansk, Knizhnoe izdatel'stvo, 1988, p.62-69, In Russian. 7 refs.
Sorokin, A.L.
Littoral zone, Geomorphology, Fast ice, USSR—Onega Cliffs.

45-683
Synoptic processes impacting the Great Wall Station from January through March, 1985.
Chen, S.M., et al, China (People's Republic). Collection of antarctic scientific explorations. [Papers.] Vol.4, Beijing, Oceanic Publications Society, 1989, p.22-28, In Chinese with English summary. 3 refs.
Zhang, Y.P.
Snowfall, Polar regions, Antarctica—Great Wall Station.
Based on data collected from Jan.-Mar. 1985, 29 weather events are separated into 3 categories: rainfall, snowfall and strong wind, occurring in the general area of the Great Wall Station approximately once every 3-4 days. The rain weather condition is characterized by high pressure in East Antarctica, with a southward tendency of cyclone and high temperature. The snow condition is characterized by high pressure in West Antarctica, with a northward tendency of cyclone and low temperature. For strong wind processes, a strong gradient and great variation of surface pressure is observed. Wind direction changes with the cyclone track, and light rain or snowfall occurs in the process. (Auth. mod.)

45-684
Spatial and temporal characteristics of the antarctic sea ice and its relationship with typhoon over the western Pacific and the subtropic high of the Northern Hemisphere.
Bian, L., China (People's Republic). Collection of antarctic scientific explorations. [Papers.] Vol.4, Beijing, Oceanic Publications Society, 1989, p.45-54, In Chinese with English summary. 7 refs.
Sea ice distribution, Ice edge, Ice air interface, Antarctica—Weddell Sea, Antarctica—Ross Sea.
Based on data of the northern edge of antarctic sea ice (1973-1982), and by using harmonic analysis and power spectrum analysis, the following results are presented: the northern ice edge of the Ross Sea and East Antarctica is concave to the South Pole, while the northern edge at the Bay of Weddell Sea is convex to the equator; the northern ice edges of every 10 longitudes oscillate within the period of 3 to 5 years; for the northern ice edge of the Weddell Sea, the Ross Sea and Prydz Bay, quasi-3 year oscillations are clearly shown which coincide with the oscillations of a number of large scale general circulation systems and sea surface temperatures. There is a significant correlation between the sea ice in the Antarctic and typhoons over the western Pacific and the subtropic high of the Northern Hemisphere. (Auth. mod.)

45-685
Chemical composition of ice, snow and rain at the Great Wall Station in summer 1985.
Li, H.Z., et al, China (People's Republic). Collection of antarctic scientific explorations. [Papers.] Vol.4, Beijing, Oceanic Publications Society, 1989, p.107-112, In Chinese with English summary. 3 refs.
Chen, S.M.
Snow composition, Ice composition, Air pollution, Rain, Antarctica—Great Wall Station.
Samples of snow, rain, frozen rain, ice deposit, snow deposit and icebergs were collected and analyzed in summer 1985 near the

Great Wall Station. Results show that in the samples of snow, rain and frozen rain, the concentrations of Na+ and Cl- are significantly high; the ratio of Cl-/Na+ is close to that of sea water. A probable explanation is that precipitation is contaminated by sprinkling sea water. The concentrations of Na+ and Cl- are also high in icebergs, which were collected along the coast of King George I. For all samples, the average pH value is 7.0-7.7, which is much higher than the threshold value for acid rain. The electrical conductivities of these samples are significantly low, indicating that the air at the Great Wall Station is clean. (Auth. mod.)

45-686

Chemical analysis of precipitation at the Great Wall Station during April through November 1985.

Li, H., China (People's Republic). Collection of antarctic scientific explorations. [Papers.] Vol.4, Beijing, Oceanic Publications Society, 1989, p.126-129, *In Chinese with English summary*. 3 refs.

Snow composition, Air pollution, Rain, Antarctica—Great Wall Station.

Chemical component analysis of precipitation sampled during Apr.-Nov. 1985 at the Great Wall Station is discussed. Results, when compared to those obtained in summer, show that the ion concentration of winter precipitation is much higher. When the wind speed is greater than 10 m/s, certain concentrations, especially that of salt in rain and snow, increase significantly, probably due to sea spray and dust from other areas. Seasonal variations of concentration are found: generally low in Apr., stable in May and June, reaching their peak in July, and dramatically decreasing in Aug. The pH values show that the precipitation at the Great Wall Station is neutral, indicating unpolluted air. (Auth. mod.)

45-687

Polar oceanography. Part B: chemistry, biology, and geology.

Smith, W.O., Jr., ed, San Diego, Academic Press, 1990, p.407-760, Refs. passim. For individual papers see 45-688 through 45-690 or B-42687 through B-42690, E-42691, and J-42686. For Part A see 44-3974 or J-42170.

Sea ice distribution, Ice cover effect, Algae, Polar regions.

The six chapters of this second volume on polar oceanography deal with chemical oceanography, 4 ch. on biological oceanography divided by trophic structure (autotrophic processes, zooplankton, higher trophic levels, and the benthos), and particle fluxes in polar regions, since flux is a function of the physical, chemical, and biological regimes of the water column.

45-688

Chemical oceanography.

Jones, E.P., et al, Polar oceanography. Part B: chemistry, biology, and geology. Edited by W.O. Smith, Jr., San Diego, Academic Press, 1990, p.407-476, Refs. p.469-476.

Nelson, D.M., Tréguer, P.J.

Sea ice, Algae, Ocean environments.

Low temperatures are a dominating characteristic of the Arctic and Antarctic oceans. Both regions experience considerable cooling, and ice plays a major role in determining many of their features. The differences between the two oceans are, however, perhaps more striking than the similarities. The Arctic Ocean is an enclosed ocean, whereas the southern ocean's boundaries are open. The topographically constrained and limited exchange of water between the Arctic Ocean and the rest of the world's oceans is in marked contrast to the Antarctic, where exchange is not strongly restricted, and the waters formed in the Antarctic are found in many of the deep regions of the major oceans. The Arctic Ocean is mostly covered by ice much of the year, whereas the southern ocean undergoes considerable seasonal variation in ice cover. Finally, the Arctic Ocean is bordered by vast continental shelves with a large input of fresh water from rivers, whereas there is little freshwater input into the seas surrounding Antarctica. The distribution of many chemicals is determined not only directly by the unique characteristics of the polar oceans, but also indirectly by how these characteristics control biological processes that in turn influence chemical distributions.

45-689

Polar phytoplankton.

Smith, W.O., Jr., et al, Polar oceanography. Part B: chemistry, biology, and geology. Edited by W.O. Smith, Jr., San Diego, Academic Press, 1990, p.477-525, Refs. p.517-525.

Sakshaug, E.

Sea ice, Algae, Biomass.

This chapter attempts to contrast and compare algal biomass, growth, and distributions in the Arctic and Antarctic, and gives particular attention to the environmental conditions which modify growth and result in the unusual characteristics observed in polar algal communities. Polar systems are defined both oceanographically and geographically. The southern ocean is usually defined by that body of water south of the *Antarctic Convergence*; by this definition, the boundaries of the southern ocean change in both space and time.

45-690

Polar zooplankton.

Smith, S.L., et al, Polar oceanography. Part B: chemistry, biology, and geology. Edited by W.O. Smith, Jr., San Diego, Academic Press, 1990, p.527-598, Refs. p.581-598.

Schnack-Schiel, S.B.

Sea ice distribution, Plankton.

The adaptations that have evolved in pelagic zooplankton in response to the extreme conditions of the polar habitat are part of the subject of this chapter. An attempt is made to identify other factors in both polar environments that are of great importance in shaping the communities of organisms found, and to emphasize differences between the two poles that may give insight through comparison. Effects of circulation, seasonal ice cover, freshwater input, and bathymetry are some of the other factors which have great influence on community structure and population growth of pelagic zooplankton in the marine environments of the Arctic and Antarctic. The most striking and obvious difference between the two polar areas is the presence of *Euphausia superba* in the Antarctic and the complete absence of a similar organism in the Arctic.

45-691

Freezing earth pressure in open system.

Enokido, M., *Tsuchi to kiso (Soil mechanics and foundation engineering)*, Apr. 1990, 38(4), p.57-64, In Japanese with English summary. 6 refs.

Soil freezing, Frozen ground compression, Soil pressure.

45-692

Mechanical properties of frozen clays mixed with sandy soils.

Enokido, M., et al, *Tsuchi to kiso (Soil mechanics and foundation engineering)*, Nov. 1989, 37(11), p.31-36, In Japanese with English summary. 10 refs.

Nagase, H., Kameta, J.

Frozen ground mechanics, Frozen ground strength, Clay soils.

45-693

Subsurface buildings on the antarctic ice sheet: design, construction and maintenance of two stations of Japanese Antarctic Research Expedition.

Hannuki, T., *Tsuchi to kiso (Soil mechanics and foundation engineering)*, Jan. 1990, 38(1), p.5-12, In Japanese with English summary. 7 refs.

Residential buildings, Subsurface structures, Shelters.

Small residential buildings, ranging in floor space from 3.8 by 5.4 to 5 by 20 m, at the Japanese stations of Mizuho and Asuka, are described. At first in 1971, prefabricated, steel-frame, aluminum-panel, raised-floor units were built above ground, but subsequently were allowed to be covered by snow drifts, or were built in snow trenches and snow tunnels.

45-694

Unique foundation design approaches for permafrost regions relating to their geographical features.

Akagawa, S., *Tsuchi to kiso (Soil mechanics and foundation engineering)*, Jan. 1990, 38(1), p.13-19, In Japanese with English summary. 14 refs.

Permafrost beneath structures, Foundations, Topographic features.

45-695

Snow storage dam project.

Miyamoto, H., *Tsuchi to kiso (Soil mechanics and foundation engineering)*, Jan. 1990, 38(1), p.37-42, In Japanese with English summary.

Snow retention, Snow melting, Snowmelt, Water supply, Snow water equivalent.

45-696

Recent advances in study of water freezing and ice melting problems.

Fukusako, S., *Japanese Association of Refrigeration. Transactions*, 1990, 7(1), p.1-32, In Japanese with English summary. 278 refs.

Ice formation, Ice melting.

45-697

Free convection heat transfer along a horizontal ice cylinder immersed in seawater.

Fukusako, S., et al, *Japanese Association of Refrigeration. Transactions*, 1990, 7(1), p.57-64, In Japanese with English summary. 12 refs.

Kitayama, K., Tago, M.

Ice melting, Heat transfer, Ice water interface, Sea water.

45-698

Fundamental research on heat transfer characteristics in shell and tube type ice forming cold energy storage.

Saito, A., et al, *Japanese Association of Refrigeration. Transactions*, 1989, 6(3), p.221-233, In Japanese with English summary. 13 refs.

Utaka, Y., Okawa, S., Ishibashi, H.

Heat transfer, Ice formation.

45-699

Study on phase changes of heterogeneous composite materials: examination by comparing calculation models.

Hirasawa, Y., et al, *Japanese Association of Refrigeration. Transactions*, 1989, 6(2), p.161-166, In Japanese with English summary. 8 refs.

Saito, A., Takegoshi, E.

Thermal conductivity, Heat transfer, Phase transformations, Mathematical models.

45-700

On the freezing process with supercooling: measurements of the cooling rate affecting the freezing temperature of supercooled water.

Saito, A., et al, *Japanese Association of Refrigeration. Transactions*, 1989, 6(1), p.31-38, In Japanese with English summary. 5 refs.

Okawa, S., Tamaki, A.

Supercooling, Cooling rate, Freezing points, Heat transfer, Phase transformations.

45-701

Freezing characteristics of layered air-water flow in a horizontal circular tube.

Fukusako, S., et al, *Japanese Association of Refrigeration. Transactions*, 1989, 6(1), p.47-55, In Japanese with English summary. 11 refs.

Takahashi, M.

Water flow, Air flow, Ice formation, Heat transfer, Air water interactions, Phase transformations.

45-702

Characteristics of the appearance of local tectonic structures in the relief of the marginal belt of the Vladay glaciation and adjacent territories (in the example of the Smolensk and Vologda lake regions).

[Ob osobennostiakh proiavleniia lokal'nykh tektonicheskikh struktur v rel'efe kraevoĭ polosy Valdaĭskogo oledeneniia i sopredel'nykh territoriĭ (na primere Smolenskogo i Vologodskogo Poozeriĭ)].

[Urenkov, G.I., *Geograficheskoe obshchestvo SSSR. Izvestiia*, Jan.-Feb. 1989, 121(1), p.49-54, In Russian. 20 refs.

Tectonics, Periglacial processes, Isostasy, Geomorphology, Glaciation.

45-703

Landslides of cryogenic origin in the Tien Shan highlands. [Opolznii kriogennogo proiskhozhdeniia v vysokogor'e Tian'Shania].

Tarakanov, A.G., *Geograficheskoe obshchestvo SSSR. Izvestiia*, Jan.-Feb. 1989, 121(1), p.54-59, In Russian. 14 refs.

Moraines, Landslides, Origin, Permafrost, Frozen rocks.

45-704

Ice floes and glacier-dammed lakes of Altai during the Pleistocene. [Ledoemy i lednikovo-podprudnye ozera Altaia v pleistotsene].

Rudoĭ, A.N., *Geograficheskoe obshchestvo SSSR Izvestiia*, Jan.-Feb. 1990, 122(1), p.43-52, In Russian. 23 refs.

Ice floes, Glacial lakes, Icebound lakes, Ice dams, Pleistocene, Naleds.

45-705

Channels of glacial meltwater runoff and the possibility of paleogeographic reconstructions. [Kanaly stoka talykh lednikovykh vod i vozmozhnosti paleograficheskikh rekonstruktsiĭ].

Bol'shiianov, D.IU., et al, *Geograficheskoe obshchestvo SSSR. Izvestiia*, Jan.-Feb. 1990, 121(1), p.58-64, In Russian. 13 refs.

Verkulich, S.R.

Runoff, Meltwater, Rivers, Valleys, Glacial erosion, Gullies, Pleistocene.

45-706

Inventor of the ice generator. [Izobretatel' ledianogo generatora].

Konopleva, N., *Izobretatel' i ratsionalizator*, June 1990, No.6, p.8-10, In Russian.

Electric power, Ice melting.

45-707

Peculiarities of maintaining underground gas lines in the Far North. [Osobennosti ekspluatatsii podzemnykh gazoprovodov v usloviiakh Kraĭnego Severa].

Borovkov, V.A., *Gazovaia promyshlennost'*, Feb. 1989, No.2, p.30-31, In Russian.

Underground pipelines, Frozen ground mechanics, Gas pipelines, Cold weather operation, Deformation, Frozen ground temperature.

45-708

Thermal drilling in a permafrost zone. [Ognestruinoe burenie v zone rasprostraneniia mnogoletnemerzlykh gruntov].

Musienko, V.A., et al, *Gazovaia promyshlennost'*, July 1989, No.7, p.24-29, In Russian.

Styron, B.K., Sherstiuk, B.F., IAstrebov, E.K.

Thermal drills, Construction equipment, Permafrost.

45-709

Ship-based passive microwave observations in the western Weddell Sea during the winter and early spring.

Grenfell, T.C., Microwave remote sensing of the earth system, edited by A. Chedin, Hampton, VA, A. DEEPAK Publishing, 1989, p.141-148, 9 refs.

DLC G70.4.M5 1989

Ice cover thickness, Brines, Microwaves, Sea ice, Radiometry, Antarctica - Weddell Sea.

Multifrequency passive microwave observations from the Weddell Sea during the austral winter of 1986 for 40 to 60 cm thick first-year ice shows four identifiable signature types, three of which have also been observed for Northern Hemisphere sea ice, and one new type. This deficiency is thought to be a selection effect. The differences in these spectra are most pronounced at 90 GHz and should have only a small effect on existing satellite algorithms. The variations appear to be due to differences in brine volume at the snow/ice interface and structural variations in the snow layer. Cluster analysis for thin ice suggests that it may be possible to resolve young ice types and that, for a two-dimensional analysis, this would be best accomplished using observations at 18 GHz vertical polarization together with 90 GHz vertical polarization. (Auth.)

45-710

Development of valleys of small rivers in the central part of the Moscow marginal ice zone during the Quaternary period (in the example of the middle Protva River). [Razvitie dolin malykh rek v tsentral'noi chasti kraevoi zony moskovskogo oledeneniia v chetvertichnoe vremia (na primere srednei Protvy)].

Antonov, S.I., et al, *Geomorfologiia*, Jan.-Mar. 1989, No.1, p.62-67, In Russian with English summary. 10 refs.

Bolysov, S.I., Myslivets, V.I.

Geomorphology, River basins, Valleys, Ice edge, Glacial erosion.

45-711

One hundred years of arctic ice cover variations as simulated by a one-dimensional, ice-ocean model.

Häkkinen, S., et al, *Journal of geophysical research*, Sep. 15, 1990, 95(C9), p.15,959-15,969, 46 refs.

Mellor, G.L.

Sea ice distribution, Seasonal variations, Ice cover effect, Climatic changes, Ice models, Simulation, Heat flux, Ice water interface, Surface temperature, Arctic Ocean.

45-712

Calibration of gas pressure using the mercury melting curve in conjunction with eutectic ice-salt mixtures.

Lusk, J., *Measurement science & technology*, Sep. 1990, 1(9), p.852-856, 8 refs.

Laboratory techniques, Solutions, Freezing points, Temperature control, Gases, Pressure, Test equipment.

45-713

Stability of gas hydrates.

Rodger, P.M., *Journal of physical chemistry*, July 26, 1990, 94(15), p.6080-6089, 55 refs.

Hydrates, Gases, Stability, Computerized simulation, Low temperature research, Molecular energy levels, Latticed structures, Hydrogen bonds, Thermodynamic properties.

45-714

Recession of the Inland ice margin during the Holocene climatic optimum in the Jakobshavn Isfjord area of West Greenland.

Weidick, A., et al, *Global and planetary change*, Aug. 1990, 2(3-4), p.389-399, 24 refs.

Glacier oscillation, Climatic changes, Fossils, Radioactive age determination, Paleoclimatology, Subsurface investigations, Human factors, Paleobotany, Greenland, Jakobshavn Isfjord.

45-715

Soil development rates in the Transantarctic Mountains.

Bockheim, J.G., *Geoderma*, Aug. 1990, 47(1-2), p.59-77, 47 refs.

Soil formation, Desert soils, Geochronology, Soil dating, Ecosystems, Glacial deposits, Weathering, Soil composition, Antarctica, Transantarctic Mountains.

Soil chronosequences were identified at three sites (78-85S) within the Transantarctic Mountains for determining rates of soil development in Cold Desert ecosystems. More than 175 soils were sampled in xerous and ultraxerous environments on moraines containing sandstone and dolerite and ranging from late Holocene to pre-late Quaternary in age. Based on five linear and nonlinear models, highly significant correlations exist between drift age and the following surface boulder weathering features and soil properties: percentage of boulders containing desert varnish, spalling, and pitting; depths of staining, visible salts, ghosts (pseudomorphs), and coherence in soils; electroconductivity in the zone of salt enrichment; and total profile salts. In the absence of leaching, soluble salts readily accumulate in Cold Desert soils. A morphogenetic sequence of soluble salts is presented that relates field observations with laboratory data. Soil color is highly correlated with dithionite-extractable Fe. Within a site, the proportion of clasts equal to or greater than 15 mm on the surface of the desert pavement increases with time, due likely to deflation of fi[illegible] by strong winds. Therefore, the dominant processes in the Cold Desert soils are salinization, rubification (reddening due to oxidation of iron-bearing minerals), and desert pavement formation. (Auth. mod.)

45-716

Influence of shape on iceberg wave-induced velocity statistics.

Lever, J.H., et al, *Journal of offshore mechanics and arctic engineering*, Aug. 1990, Vol.112, MP 2779, p.263-269, 12 refs. For another version see 42-2093.

Sen, D., Attwood, D.

Icebergs, Drift, Velocity measurement, Physical properties, Water waves, Impact, Simulation, Offshore structures, Mechanical tests.

45-717

Winter observations of the atmosphere over antarctic sea ice.

Kottmeier, C., et al, *Journal of geophysical research*, Sep. 20, 1990, 95(D10), p.16,551-16,560, 15 refs.

Hartig, R.

Sea ice distribution, Ice air interface, Air temperature, Antarctica—Weddell Sea.

Near-surface data from 1986 and 1987 are discussed. Drift tracks of buoys for the subsequent 18 months document the sea ice motion of a large fraction of the complete Weddell gyre. Wind roses calculated from the buoy wind measurements show the large-scale rotational wind field over the Weddell Sea. The northward components of near-surface horizontal temperature gradients in winter vary between 1.3 and 2.6 K/100 km. Horizontal temperature gradients have a component toward the center of the gyre, which varies between 1 and 1.6 K/100 km in the central Weddell Sea. The marginal ice zone advances in autumn and retreats in spring with a speed significantly larger than the actual ice speed. Enhanced meridional temperature contrasts in the troposphere were found at the marginal ice zone. Significant mean horizontal temperature gradients of 1 to 5 K/100 km in the troposphere have also been detected in the continental marginal zone from *Polarstern* data and related aerological data of the Georg von Neumayer Station. (Auth. mod.)

45-718

Statistical study on sea ice in the Okhotsk Sea observed by GMS for 10 years.

Kano, Y., et al, *Oceanographical magazine (Kishocho obun kaiyo hokoku)*, Mar. 1989, 39(1-2), p.43-58, With Japanese summary. 6 refs.

Sato, K., Shirato, S.

Sea ice distribution, Ice surveys, Ice conditions, Ice edge, Spaceborne photography, Statistical analysis, Okhotsk Sea.

45-719

Geological and geophysical investigation of sedimentation and recent glacial history in the Gerlache Strait region, Graham Land, Antarctica.

Griffith, T.W., Houston, Rice University, 1988, 449p., M.S. thesis. Refs.p.320-332.

Glaciers, Glacial geology, Paleoclimatology, Antarctica—Gerlache Strait.

Piston cores, bottom grabs, and single-channel seismic data acquired during Deep Freeze/USARP cruises have been used to examine sedimentation and recent climatic history in the bays and fjords of the Gerlache Strait region (Antarctic Peninsula). The local climate and glacial setting exhibit profound influences on sedimentation via the processes associated with subglacial water. Visible sediment plumes are rare, and glacial ice above sea level is pristine white, indicating that debris is entering the water from the glaciers that are grounded below sea level. In the relatively warm and wet Palmer Archipelago, terrigenous muds and sands with a variable IRD component are ponding in every available bathymetric depression, and sediment gravity flow processes are common. Along the colder and drier Danco Coast, diatomaceous sediments drape uniformly across the rugged basement topography, rather than ponding, and resedimentation is rare. In both areas, sedimentation occurs in quiescent water. (Auth. mod.)

45-720

Modern sedimentary dynamics and Quaternary glacial history of Marguerite Bay, Antarctic Peninsula.

Kennedy, D.S., Houston, Rice University, 1988, 203p., M.A. thesis. Refs.p.144-152.

Ice models, Glacial deposits, Ice shelves, Antarctica—Marguerite Bay.

Piston cores and single-channel seismic data were acquired in Marguerite Bay to determine modern sedimentary conditions and recent glacial history of the area. Seismic data in the bay shows a rugged seafloor, having numerous deep troughs and a marked lack of sediment cover, with a thin layer of sediment over crystalline basement or older glacial deposits. Modern sedimentation consists predominantly of diatomaceous muds, ice-rafted debris is unimportant. These sediments show wind-driven or marine current influence. Piston cores are topped by diatomaceous muds, which are underlain by terrigenous muds and muddy gravels that were deposited beneath an ice shelf. Basal till sediments were recovered, reflecting deposition by a grounded marine ice sheet. A reconstruction of the glacial history of Marguerite Bay since the last glacial maximum shows grounded ice filling the bay in late Wisconsin time; rising sea level caused slow ice margin retreat and existence of an ice shelf throughout the Holocene. An ice margin recessional facies model has been developed. (Auth.)

45-721

Radar reflections from water injected into an antarctic glacier.

Davis, C.H., et al, *IEEE transactions on geoscience and remote sensing*, July 1990, 28(4), p.723-726, 7 refs.

Dean, R.H., Xin, W.

Glacier ice, Radar echoes, Specular reflection, Drilling, Glaciology, Subsurface investigations, Antarctica—West Antarctica.

A sequence of radar traverses on Ice Stream B in West Antarctica produced detailed images, showing specular reflections from temporary horizontal water layers injected by a hot-water drilling operation. The water layers were observed on two separate occasions at depths of 840 and 780 m. This is the first radar observation of water injected deep into an antarctic glacier. The horizontal openings that received the water are an unexpected structural form at such great depths. (Auth.)

45-722

Preliminary study of an advanced automatic station for marine data acquisition in Antarctica.

Gasparoni, F., et al, Oceans '89 Conference, Seattle, Washington, Sep. 18-21, 1989. Proceedings, Vol.5, New York, Institute of Electrical and Electronic Engineers, 1989, p.1646-1651.

Peronaci, M.

Oceanography, Weather stations, Telemetering equipment, Ice conditions, Data transmission, Meteorological data, Antarctica—Terra Nova Bay Station.

ENEA, the Italian organization that manages the Antarctic Project and Tecnomare, a research and engineering company, carried out a study aimed at setting up a highly advanced automatic station in Terra Nova Bay. This station should be capable of collecting meteorological, oceanographic and ice data from a wide range of sensors and transmitting them to a central processing facility in Italy. This paper presents the results of the study, highlighting the basic requirements of the station and discussing the resulting configuration proposed. (Auth. mod.)

45-723

International Ice Patrol's air-deployed bathythermograph system.

Alfultis, M.A., Oceans '89 Conference, Seattle, Washington, Sep. 18-21, 1989. Proceedings, Vol.5, New York, Institute of Electrical and Electronic Engineers, 1989, p.1652-1657, 2 refs.

Oceans, Water temperature, Temperature measurement, Telemetering equipment, Floating structures, Measuring instruments, Aerial surveys, Oceanography, Computer applications.

45-724

Soviet-French cooperation on the isotopic research of ice cores from Dome B-Vostok-Komsomolskaya-Mirny Traverse, East Antarctica.

Lorius, C., et al, *Geodätische und geophysikalische Veröffentlichungen. Reihe I*, 1990, No.15-16, GDR Symposium on Antarctic Research. Proceedings, Vol.1 and 2, p.287-289, 10 refs.

Korotkevich, E.S., Barkov, N.I., Petrov, V.N.

Ice cores, Isotope analysis, Paleoclimatology, Antarctica—East Antarctica.

Results of Soviet-French cooperative studies on ice cores from the East Antarctic Ice Sheet are presented. Surface temperature changes and elevation, snow accumulation, full glacial stages and climatic changes, deduced from isotopic profiles of the cores, are summarized.

45-725

On the genesis of the Shackleton Ice Shelf according to oxygen-isotope data.

Savatiugin, L., et al, *Geodätische und geophysikalische Veröffentlichungen. Reihe I*, 1990, No.15-16, GDR Symposium on Antarctic Research. Proceedings, Vol.1 and 2, p.291-298, 6 refs.

Vaikmiae, R.A.

Isotope analysis, Ice physics, Glacier formation, Paleoclimatology, Antarctica, Shackleton Ice Shelf.

The oxygen isotope profile of Shackleton Ice Shelf is discussed. Isotopic data indicate that the glacier is on the whole formed of local precipitations and contains no ice from the continental part of the Antarctic. It may be concluded also that no freezing of marine water from below takes place in the Shackleton Ice Shelf. (Auth.)

45-726
Isotope data from ice-cored moraines suggest a higher ice sheet surface in central Queen Maud Land (Antarctica) during cold stages.
Hermichen, W.D., et al. *Geodätische und geophysikalische Veröffentlichungen. Reihe I*, 1990, No.15-16, GDR Symposium on Antarctic Research Proceedings. Vol.1 and 2, p.301-306, 4 refs.
Kowski, P., Vafkmiae, R.A.
Ice cores, Ice cover thickness, Climatic changes, Isotope analysis, Antarctica--Queen Maud Land
Field studies carried out in the Humboldt Mountains in 1989 show that old moraine ridges which cover the NW margin of the Insel Range contain relictic ice of regional origin from former higher ice surface levels. The isotopic composition of this dead ice (it is generally depleted in oxygen-18 by 5-12 per mill in comparison with the present ice cover) leads to the conclusion that during the Late Quaternary, increases of ice volume in central Queen Maud Land were linked with cold (sub-) stages, exclusively. (Auth. mod.)

45-727
Oxygen-18 thermometer from snow of northern Queen Maud Land/Antarctica.
Hermichen, W.D., et al. *Geodätische und geophysikalische Veröffentlichungen. Reihe I*, 1990, No.15-16, GDR Symposium on Antarctic Research Proceedings. Vol.1 and 2, p.307-311, 4 refs.
Kowski, P., Vafkmiae, R.A.
Oxygen isotopes, Snow density, Paleoclimatology, Antarctica--Queen Maud Land.
An oxygen-18 thermometer was elaborated for the marginal area of Queen Maud Land near 12E on the basis of 14 longterm samples from stations at altitudes between 20 m a.s.l. and 1600 m a.s.l., i.e. over a range of mean annual temperature of -15 to -30 C. Some regional peculiarities are evident, the snow of the working area is generally more depleted in heavy water than precipitations accumulated in Wilkes Land under identical temperature conditions. The pattern is similar to that found in east Queen Maud Land. The slope of the isotope thermometer is significantly greater than that used up to now for paleoclimatic studies on ice in other parts of East Antarctica. (Auth. mod.)

45-728
Periglacial of the antarctic continent as a source of paleoglacial information.
Bardin, V.I., *Geodätische und geophysikalische Veröffentlichungen. Reihe I*, 1990, No.15-16, GDR Symposium on Antarctic Research. Proceedings. Vol.1 and 2, p.313-324, 25 refs.
Periglacial processes
Studies dealing with the history of antarctic glaciation development, carried out in Victoria Land, Queen Maud Land and Mac Robertson Land, are reviewed. It is concluded that data obtained from these studies do not indicate rapid and significant changes of the continental ice sheet of East Antarctica in Late Cenozoic, for its primary characteristic is stability. For determining the geochronology of glacial events, the use of a new method of establishing the time of rock release from the ice sheet, on the basis of He cosmogenic isotope studies, is suggested.

45-729
Major features of ice conditions in the Bellingshausen Sea.
Evseev, V.V., *Geodätische und geophysikalische Veröffentlichungen. Reihe I*, 1990, No.15-16, GDR Symposium on Antarctic Research. Proceedings. Vol.1 and 2, p.325-330.
Sea ice distribution, Ice edge, Polynyas, Fast ice, Ice navigation, Antarctica--Bellingshausen Sea
The extremely low temperatures and the ragged coastline of the Bellingshausen and Amundsen Seas are considered favorable conditions for the formation and development of fast ice and ice massives, making these seas the hardest to navigate. The coast between the Antarctic Peninsula and Cape Colbeck is considered to be the most difficult to approach. Some characteristics of the fast ice of the area are described, including volume, surface snow accumulation, and cracks developing under the action of tidal oscillation and swells. A strong cyclonic water circulation in the Bellingshausen Sea is noted.

45-730
Duration of the cycle of the Atlantic ice massif existence and typification of the processes causing its isolation.
Kozlovskii, A.M., *Geodätische und geophysikalische Veröffentlichungen. Reihe I*, 1990, No.15-16, GDR Symposium on Antarctic Research. Proceedings. Vol.1 and 2, p.331-339.
Sea ice distribution, Ice deterioration, Polynyas, South Atlantic Ocean.
Data are discussed and a table is presented showing the dates of isolation of the Atlantic ice massif (AIM) from the common belt of drifting ice, the dates of AIM minimum area, and the dates of AIM re-joining the drifting ice, for the seasonal cycles between 1971-72 and 1988-89. The duration of the cycle of the AIM existence varies between 100 and 140 days. Predominant processes determining AIM separation, divided into 3 types, are described.

45-731
Meteorological and hydrological conditions of meltwater genesis and distribution in Antarctica.
Loopmann, A., *Geodätische und geophysikalische Veröffentlichungen. Reihe I*, 1990, No.15-16, GDR Symposium on Antarctic Research. Proceedings. Vol.1 and 2, p.341-344.
Meltwater, Snowmelt, Glacier melting.
The genesis and runoff of meltwater in the coastal zone of Antarctica depends on the altitude of the surface of the lake, on the extent of snow and ice on the rocky base, on its character, and on the amount of moraine material on the ice surface. Tabulated data show that the runoff layer in the altitude scale of 0-100 m (in case of much snow and ice) is about 800 mm. On the rocky surface it doesn't exceed 50 mm, because most of the water evaporates, accumulates in the depressions, and ablates with the wind. About 50-150 mm is the runoff between the altitude scales 100-800 m, depending on lower air temperatures. (Auth. mod.)

45-732
Sea ice as biotope. [Das Meereis als Lebensraum].
Hempel, G., *Geodätische und geophysikalische Veröffentlichungen. Reihe I*, 1990, No.15-16, GDR Symposium on Antarctic Research. Proceedings. Vol.1 and 2, p.367-374, In German. 17 refs.
Sea ice, Ice physics, Algae, Antarctica--Weddell Sea.
Data obtained during the course of expeditions of the Winter Weddell Sea Project (WWSP '86) and EPOS I, 1988 are reviewed, covering the distribution, genesis and structure of the sea ice, the water column and bottom biota, ice algae, the seeding processes, and krill. Ecological features of the sea ice, making it a suitable habitat for many organisms, are discussed.

45-733
Sequence of leads in cooling gas stations in polar compressor stations. [Poriadok vvoda stantsii okhlazhdeniia gaza na zapoliarnykh KS].
Kosachev, V.P., et al. *Gazovaia promyshlennost'*, Jan. 1990, No.1, p.29-31, In Russian.
Kozachenko, V.A., Kotsiuba, V.I.
Electric equipment, Cold weather operation, Cooling systems

45-734
Testing of construction design. [Proverka konstruktivnogo reshenia].
Mironov, N.G., et al. *Gazovaia promyshlennost'*, Jan. 1990, No.1, p.40-41, In Russian.
Kharionovskii, V.V.
Gas pipelines, Cold weather tests, Cold weather operation, Design.

45-735
Geomorphology and paleogeography of the Malyi Naryn River basin. [Geomorfologiia i paleogeografiia basseina reki Malyi Naryn].
Sydykov, Dzh., Frunze, Ilim, 1989, 167p., In Russian. Refs. p.152-167.
Glaciation, Hydrography, Geomorphology, Quaternary deposits, River basins, Nival relief, Glacial deposits, Glaciers, Snow line, Permafrost, Air temperature--USSR--Malyi Naryn River.

45-736
Double-diffusive underwater ice formation. [O differentsial'no-diffuzionnom vnutrivodnom l'doobrazovanii].
Krylov, A.D., *Moscow Universitet. Vestnik. Serija 3: Fizika, astronomija*, July-Aug. 1989, 30(4), p.92-94, In Russian. 5 refs.
Diffusion, Ice physics, Ice formation, Underwater ice, Salinity, Water temperature, Analysis (mathematics).

45-737
Manifestation of the nonlinearity of temperature-salinity-density ratio near the Pacific subarctic front. [Proiavlenie nelinelnosti sootnoshenila temperatura-solenost'-plotnost' v zone subarkticheskogo fronta Tikhogo okeana].
Kuz'min, V.A., *Morskoi gidrofizicheskii zhurnal*, July-Aug. 1989, No.4, p.58-61, In Russian with English summary. 9 refs.
Salinity, Density (mass volume), Oceanography, Water temperature

45-738
Subarctic frontal zone in the central northern part of the Pacific Ocean in autumn. [Subarkticheskaia frontal'naia zona v tsentral'noi severnot chasti Tikhogo okeana v osenii period].
Kil'matov, T.R., *Morskoi gidrofizicheskii zhurnal*, July-Aug. 1989, No.4, p.62-64, In Russian with English summary. 7 refs.
Oceanography, Ocean currents, Salinity

45-739
Pollution of the environment by fluorine in the Far North. [Zagriaznenie ftorom okruzhaiushchei sredy v usloviiakh Krainego Severa].
Fedorov, A.S., et al. *Leningrad Universitet. Vestnik. Serina 3: Biologiia*, Aug. 1989, 3(17), p.95-100, In Russian with English summary. 7 refs.
Shakhov, S.M., Burkova, O.A.
Environmental impact, Soil pollution, Snow impurities, Water pollution

45-740
Soil formation in mining areas along the arctic coast of northeastern USSR. [Pochvoobrazovanie v tekhnogennykh landshaftakh arkticheskogo poberezh'ia Severo-Vostoka SSSR].
Andreev, D.P., et al. *Leningrad Universitet. Vestnik. Serina 3: Biologiia*, May 1989, 2(10), p.99-103, In Russian with English summary. 8 refs.
Pugachev, A.A.
Mining, Soil formation, Soil composition, Frost, Snow cover

45-741
Study of VLF electromagnetic fields in the arctic auroral zone. [Izuchenie elektromagnitnykh polei diapazona ONCh v avroral'noi zone Arktiki].
Gusev, A.I., et al. *Magnitosfernye issledovaniia*, 1986, No.8, p.32-35, In Russian with English summary. 7 refs.
Chernysh, G.N.
Very low frequencies, Electromagnetic prospecting, Polar regions.

45-742
Mechanized ice augers. [Mekhanizirovannye ledobury].
Tavrizov, V.M., *Stroitel'stvo truboprovodov*, Aug. 1990, No.8, p.38-39, In Russian.
Augers, Ice drills, Electric equipment, Design

45-743
Study on roads for the 21st century in snowy and cold regions. [Sekisetsu kanreichi ni okeru 21 seiki no doro kozo nado ni kansuru kenkyu]. *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1989(Pub. Feb.90), 33(2), p.5-24, In Japanese.
Highway planning, Cold weather operation.

45-744
Study on snow melting methods for roads in Hokkaido. [Hokkaido ni okeru doro no yusetsu hoho ni kansuru ikkosatsu].
Ninagawa, K., et al. *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1989(Pub. Feb.90), 33(2), p.87-92, In Japanese. 8 refs.
Abe, Y., Yagi, K.
Snow melting, Artificial melting, Road maintenance.

45-745
Development of water level observation systems for winter. [Toki suii kansoku shistemu no kaihatsu].
Nagasaka, T., et al. *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1989(Pub. Feb.90), 33(3), p.185-190, In Japanese.
Ohkama, M., Nishimura, Y.
Water level, River ice, Measuring instruments.

45-746
Frost forecasting from local weather reports. [Chiiki kisho joho o mochiita koso yosoku ni tsuite].
Fujita, T., et al. *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1989(Pub. Feb.90), 33(1), p.95-100, In Japanese. 2 refs.
Susuki, E., Mizutani, Y.
Frost forecasting, Weather observations.

45-747
Investigative report on improving the accuracy of radar rain and snow gages. [Reda usetsu ryoki no seido kojo ni kansuru kento hokoku].
Iwami, Y., et al. *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1989(Pub. Feb.90), 33(1), p.107-112, In Japanese. 2 refs.
Ipposhi, T., Minobe, N.
Precipitation gages, Snowfall, Radar

45-748
Tests on road snow removal (update): tests on urban snow removal. [Doro josetsu ni kansuru chose shiken (shinki): toshinai josetsu kansuru chosa shiken],
Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries), 1989(Pub. Feb.90), 33(1), p.171-188, In Japanese. 4 refs.
Snow removal, Road maintenance, Municipal engineering.

45-749
Performance tests on tires for snow removal trucks. [Josetsu torakku-yo taiya seino chosa shiken ni tsuite],
Tahata, O., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries),* 1989(Pub. Feb.90), 33(1), p.203-208, In Japanese.
Yamamoto, T.
Snow removal, Tires.

45-750
Tests on surface components of snow removal drains: tests on snow removal drain covers. [Ryusetsuko no menteki seibi ni kansuru chosa shiken: ryusetsuko tosetsu kogai chosa shiken],
Maeda, T., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries),* 1989(Pub. Feb.90), 33(1), p.209-214, In Japanese.
Yamamoto, T.
Snow removal, Drains, Covering.

45-751
Tests on improving the efficiency of snow removal equipment on snow removal trucks. [Josetsu torakku no josetsu sochi no koritsuka ni kansuru chosa shiken],
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Ushiki, S., Tsukagata, K.
Snow removal, Motor vehicles.

45-752
Tests on snowbreaks, windbreaks and obstacles to visibility: wind tunnel experiments on the Kaigen parking shelter at Toyotomi on National Highway 40. [Bosetsu, bofu oyobi shitei shogai ni kansuru chosa shiken: Ippan kokudo 40-go Toyotomi-cho Kaigen pakingu sheruta fudo jikken],
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Kataoka, H., Kurita, I.
Snow fences, Forest strips, Road maintenance, Wind tunnels, Protective vegetation.

45-753
Study on using snowmelt to develop farmland: tank model method. [Kaihatsu nochi ni okeru yusetsusui no riyo ni kansuru kento: tankumoderu-ho],
Sawada, N., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries),* 1989(Pub. Feb.90), 33(4), p.153-156, In Japanese. 7 refs.
Hideshima, Y., Takashima, T.
Snowmelt, Snow water equivalent, Water supply.

45-754
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Mizuno, Y.
Offshore structures, Foundations, Bituminous concretes.

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Endo, K., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries),* 1989(Pub. Feb.90), 33(4), p.287-292, In Japanese. 3 refs.
Umezawa, N., Tezuka, S.
Bubbling, Ice control, Ports.

45-756
Development and testing of ice thickness gages: progress report. [Hyokokei no kaihatsu shiken ni tsuite: keika hokoku],
Takashima, K., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries),* 1989(Pub. Feb.90), 33(4), p.293-298, In Japanese. 4 refs.
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Ice cover thickness, Thickness gages, Sea ice, Measuring instruments.

45-757
Study on freezing in harbors. [Konai keppyo ni kansuru chosa kenkyu],
Hirasawa, M., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries),* 1989(Pub. Feb.90), 33(4), p.299-304, In Japanese. 6 refs.
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Sea water freezing, Ports, Sea ice, Ice control.

45-758
Study on floating ice booms. [Futaishiki bohyotei ni kansuru ikkosatsu],
Mizuno, Y., *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries),* 1989(Pub. Feb.90), 33(4), p.305-310, In Japanese. 4 refs.
Ice booms, Floating structures, Ice control, Ports, Sea ice.

45-759
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International Symposium on the Hydrology of Wetlands in Temperate and Cold Regions, Joensuu, Finland, June 6-8, 1988, Helsinki, 1988, 105p., Refs. passim. For selected papers see 45-760 through 45-770.
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Swamps, Hydrology, Peat, Drainage.

45-760
Properties, geomorphology and classification of peatlands.
Maltby, E., International Symposium on the Hydrology of Wetlands in Temperate and Cold Regions, Joensuu, Finland, June 6-8, 1988. Proceedings. Vol.2, Helsinki, 1988, p.5-13, 30 refs.
DLC GB621.I59 1988 Vol.2
Swamps, Hydrology, Peat.

45-761
Up-to-date method to study marsh-ridden areas in West Siberia.
Novikov, S.M., International Symposium on the Hydrology of Wetlands in Temperate and Cold Regions, Joensuu, Finland, June 6-8, 1988. Proceedings. Vol.2, Helsinki, 1988, p.14-17, 4 refs.
DLC GB621.I59 1988 Vol.2
Swamps, Hydrology.

45-762
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DLC GB621.I59 1988 Vol.2
Swamps, Peat, Frost mounds.

45-763
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Swamps, Peat, Microclimatology.

45-764
Alteration of hydrological-ecological linkages in wetland soils: an example of pedogenic deflection on Exmoor, U.K.
Maltby, E., International Symposium on the Hydrology of Wetlands in Temperate and Cold Regions, Joensuu, Finland, June 6-8, 1988. Proceedings. Vol.2, Helsinki, 1988, p.30-36, 18 refs.
DLC GB621.I59 1988 Vol.2
Swamps, Soil formation, Soil microbiology, Soil chemistry, Human factors, Hydrology.

45-765
Hydrology of wetlands and man's influence on it.
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DLC GB621.I59 1988 Vol.2
Swamps, Hydrology, Drainage, Peat, Human factors.

45-766
Role of the structure of intraswamp basins for river runoff formation from swamps.
Ivanov, K.E., et al, International Symposium on the Hydrology of Wetlands in Temperate and Cold Regions, Joensuu, Finland, June 6-8, 1988. Proceedings. Vol.2, Helsinki, 1988, p.62-65.
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Swamps, Drainage, River basins.

45-767
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Shiklomanov, I.A., et al, International Symposium on the Hydrology of Wetlands in Temperate and Cold Regions, Joensuu Finland, June 6-8, 1988. Proceedings. Vol.2, Helsinki, 1988, p.66-71, 1 ref.
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DLC GB621.I59 1988 Vol.2
Swamps, Drainage, Land reclamation, Environmental impact.

45-768
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Jeglum, J.K.
DLC GB621.I59 1988 Vol.2
Swamps, Peat, Drainage, Water table.

45-769
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Sallantaus, T., International Symposium on the Hydrology of Wetlands in Temperate and Cold Regions, Joensuu, Finland, June 6-8, 1988. Proceedings. Vol.2, Helsinki, 1988, p.80-98, 44 refs.
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Swamps, Peat, Water chemistry, Drainage, Leaching, Water pollution.

45-770
First radiocesium profile and snow cover mass measurements.
Kasi, S.S.H., International Symposium on the Hydrology of Wetlands in Temperate and Cold Regions, Joensuu, Finland, June 6-8, 1988. Proceedings. Vol.2, Helsinki, 1988, p.101-105, 6 refs.
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Swamps, Peat, Fallout, Snow impurities, Snow water equivalent.

45-771
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Nemirovskaia, I.A., *Water resources,* May-June 1989, 16(3), p.273-280, Translated from Vodnye resursy. 5 refs.
Water pollution, Rivers, Petroleum products, Snow impurities, Ice composition, Absorption, Low temperature research, Bottom sediment.

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Cao, W.Z., et al, *International journal of heat and mass transfer,* Mar. 1990, 33(3), p.427-434, With French, German and Russian summaries. 12 refs.
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Solutions, Freezing, Solid phases, Liquid phases, Heat transfer, Liquid solid interfaces, Liquid cooling, Mass transfer.

45-773
Snow observation by satellite: a review.
Lucas, R.M., et al, *Remote sensing reviews,* Aug. 1990, 4(2), p.285-348, Refs. p.339-348.
Harrison, A.R.
Snow cover, Sensor mapping, Spacecraft, Spaceborne photography, Resolution, Radiometry, Detection, Radiometry, Radiowaves.

45-774
Radar reflectivity-ice water content relationships for use above the melting level in hurricanes.
Black, R.A., *Journal of applied meteorology,* Sep 1990, 29(9), p.955-961, 13 refs.
Atmospheric disturbances, Snow pellets, Water content, Radar echoes, Reflectivity, Airborne radar, Precipitation (meteorology), Particle [illegible]istribution

45-775
Surficial talus fabric and particle gliding over snow on Lassen Peak, California.
Pérez, F.L., *Physical geography*, Apr.-June 1990, 11(2), p.142-153, 41 refs.
Talus, Slope processes, Snow cover effect, Sliding, Geomorphology, Orientation, Rocks.

45-776
Selective photodissociation via specific core-to-bound excitations: a comparison of condensed layers of water, ammonia and methane.
Menzel, D., et al, *Physica scripta*, Apr. 1990, 41(4), p.588-593, 16 refs.
Ice physics, Hydrogen bonds, Molecular energy levels, Radiation absorption, Molecular structure, Low temperature research.

45-777
Phase transitions of water in brick during cooling.
Nakamura, M., et al, *American Ceramic Society. Bulletin*, Dec. 1985, 64(12), p.1567-1570, 14 refs.
Nabika, Y., Okuda, S.
Bricks, Hygroscopic water, Freezing points, Phase transformations, Temperature measurement, Ceramics, Frost action, Porous materials.

45-778
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Takanashi, K., Makino, T., Okuda, S.
Bricks, Hygroscopic water, Freezing points, Phase transformations, Heterogeneous nucleation, Cooling rate, Frost action, Bacteria.

45-779
X-ray study of high-density amorphous water.
Bosio, L., et al, *Physical review letters*, Feb. 3, 1986, 56(5), p.460-463, 10 refs.
Johari, G.P., Teixeira, J.
High pressure ice, Amorphous ice, Molecular structure, X ray analysis, Phase transformations, Heavy water, Water structure, X ray diffraction.

45-780
Safe vehicle speed on winter roads in blowing snow.
Fukuzawa, Y., et al, *Seppyo*, Sep. 1990, 52(3), p.171-178, In Japanese with English summary. 12 refs.
Takeuchi, M., Ishimoto, K., Isobe, K.
Blowing snow, Visibility, Safety.

45-781
Recent advancement of automatic weather station in Antarctica: recent advancement of unmanned observation of weather, snow and ice, Part 2.
Kikuchi, T., et al, *Seppyo*, Sep. 1990, 52(3), p.179-183, In Japanese. 6 refs.
Endoh, T.
Weather stations, Weather observations, Meteorological instruments, Recording instruments.
Japanese automatic weather stations using ARGOS and CMOS systems in Antarctica are briefly described. The data recorded include indoor temperature, air temperature, snow temperature, wind velocity, wind direction, air pressure, solar radiation, long wavelength radiation, indoor humidity, and snow pressure. A chart shows the periods of operation and periods of interruption of the automatic weather stations from Nov. 1984 to Apr. 1989. A sketch map is included showing the locations of the major manned and unmanned weather stations of all nations in Antarctica.

45-782
On the role of cryosphere in the global climate/environment.
Nakawo, M., *Seppyo*, Sep. 1990, 52(3), p.185-194, In Japanese. 34 refs.
Climatic changes, Glacier melting, Sea ice distribution, Snow cover distribution, Permafrost distribution.
A general review is given of the literature on global warming and the shrinkage of the cryosphere comprising the polar ice sheets, mountain glaciers, sea ice, extensive snow cover, and permafrost regions. Though the emphasis is on the Northern Hemisphere, many examples and references are cited on Antarctica. Most of the references are in English.

45-783
Countermeasures to blowing snow in Hokkaido and the development of visual range monitoring system by video camera.
Ishimoto, K., *Seppyo*, Sep. 1990, 52(3), p.195-202, In Japanese. 10 refs.
Visibility, Blowing snow, Measuring instruments, Road maintenance.

45-784
Relation between the center nucleus of snow crystals and aerosol particles in Arctic Canada.
Kikuchi, K., et al, *Hokkaido University, Sapporo, Japan. Faculty of Science. Journal. Series 7 (Geophysics)*, Feb. 1990, 8(5), p.415-435, 23 refs.
Taniguchi, T., Tsujimura, H.
Snow crystal nuclei, Aerosols, Atmospheric composition, Air pollution, Chemical composition.

45-785
Climatological study on the mechanism of graupel formation.
Harimaya, T., *Hokkaido University, Sapporo, Japan. Faculty of Science. Journal. Series 7 (Geophysics)*, Feb. 1990, 8(5), p.437-447, 7 refs.
Snow pellets, Precipitation (meteorology), Snow crystal growth, Air temperature, Climatic factors.

45-786
Quaternary age: paleogeography and lithology. [Chetvertichnyi period: paleogeografiia i litologiia], IAnshin, A.L., ed, Kishinev, Shtiintsa, 1989, 251p., In Russian with English summaries. Refs. passim. 28th International Geological Congress, Washington, 1989. For selected papers see 45-787 through 45-791.
Quaternary deposits, Stratigraphy, Geochronology, Correlation, Pleistocene, Loess, Moraines, Periglacial processes, Glaciation, Soil composition, Landforms, Plains, Glacial deposits.

45-787
Great periglacial runoff system in northern Eurasia and its significance in interregional correlations. [Velikaia prilednikovaia sistema stoka Severnoi Evrazii i ee znachenie dlia mezhregional'nykh korreliatsii],
Grosval'd, M.G., et al, Chetvertichnyi period: paleogeografiia i litologiia. K XXVIII Mezhdunarodnomu geologicheskomu kongressu, Washington, 1989 (Quaternary age: paleogeography and lithology. 28th International Geological Congress, Washington, 1989). Edited by A.L. IAnshin, Kishinev, Shtiintsa, 1989, p.5-13, In Russian with English summary. 22 refs.
Kotliakov, V.M.
Periglacial processes, Runoff, Correlation.

45-788
Chronostratigraphy of loess-soil formation and its significance in the correlation and periodization of glacial, periglacial, and coastal zones. [Khronostratigrafiia lessovo-pochvennoi formatsii i ee znachenie v korreliatsii i periodizatsii lednikovoi, perigliatsial'noi i primorskoi oblastei],
Velichko, A.A., et al, Chetvertichnyi period: paleogeografiia i litologiia. K XXVIII Mezhdunarodnomu geologicheskomu kongressu, Washington, 1989 (Quaternary age: paleogeography and lithology. 28th International Geological Congress, Washington, 1989). Edited by A.L. IAnshin, Kishinev, Shtiintsa, 1989, p.14-21, In Russian with English summary. 11 refs.
Loess, Soil formation, Correlation, Paleoclimatology, Geochronology, Stratigraphy.

45-789
Correlating marine, loess, and glacial-flatland formations. [Korreliatsiia morskoi, lessovoi i ravninno-lednikovoi formatsii],
Zubakov, V.A., Chetvertichnyi period: paleogeografiia i litologiia. K XXVIII Mezhdunarodnomu geologicheskomu kongressu, Washington, 1989 (Quaternary age: paleogeography and lithology. 28th International Geological Congress, Washington, 1989). Edited by A.L. IAnshin, Kishinev, Shtiintsa, 1989, p.21-24, In Russian with English summary. 5 refs.
Correlation, Loess, Landforms, Paleoclimatology, Pleistocene, Oceanography, Glacial geology, Stratigraphy.

45-790
Problems of stratigraphy and correlation of the middle Pleistocene of glacial and periglacial formations in the eastern half of the Russian plain. [Problemy stratigrafii i korreliatsii srednego pleistotsena lednikovoi i perigliatsial'noi formatsii vostochnoi poloviny Russkoi ravniny],
Udartsev, V.P., et al, Chetvertichnyi period: paleogeografiia i litologiia. K XXVIII Mezhdunarodnomu geologicheskomu kongressu, Washington, 1989 (Quaternary age: paleogeography and lithology. 28th International Geological Congress, Washington, 1989). Edited by A.L. IAnshin, Kishinev, Shtiintsa, 1989, p.193-200, In Russian with English summary. 14 refs.
Tsatskin, A.I.
Pleistocene, Correlation, Periglacial processes, Stratigraphy, Glacial geology, Soil composition, Geochronology, Plains.

45-791
Paleogeography and chronostratigraphy of the Pleistocene in northern Siberia (a review of the latest data). [Paleografiia i khronostratigrafiia pleistotsena severa Sibiri (obzor novelshikh dannykh)],
Arkhipov, S.A., Chetvertichnyi period: paleogeografiia i litologiia. K XXVIII Mezhdunarodnomu geologicheskomu kongressu, Washington, 1989 (Quaternary age: paleogeography and lithology. 28th International Geological Congress, Washington, 1989). Edited by A.L. IAnshin, Kishinev, Shtiintsa, 1989, p.201-214, In Russian with English summary. 29 refs.
Pleistocene, Correlation, Glacial deposits, Stratigraphy, Glaciation, Geochronology, Moraines.

45-792
Archaeological techniques and technology on Ross Island, Antarctica.
Ritchie, N.A., *Polar record*, Oct. 1990, 26(159), p.257-264, 25 refs.
Excavation, Permafrost, Cold weather operation, Equipment, Antarctica—Ross Island.
Major archaeological excavations have been conducted at Scott's 1910-13 expedition hut site on Cape Evans, Ross Island, over the past three years. The work has involved experimentation and the use of a wide range of equipment for excavating in ice and permafrosted ground, and to deal with specific problems encountered during archaeological fieldwork in a frozen environment such as Antarctica. The equipment, its operations, and advantages and disadvantages are described. (Auth.)

45-793
Climate studies with a coupled atmosphere-upper-ocean-ice-sheet model.
Fichefet, T., et al, *Royal Society of London. Philosophical transactions*, 1989, 329(A 1604), p.249-261, 50 refs.
Environment simulation, Climatic changes, Ice cover effect, Snow cover effect, Air temperature, Seasonal variations, Ice volume, Carbon dioxide, Ice air interface.

45-794
Experiences with a coupled global model.
Foreman, S.J., *Royal Society of London. Philosophical transactions*, 1989, 329(A 1604), p.275-288, 34 refs.
Climate, Sea ice, Ice models.
A coupled atmosphere-ocean-sea-ice model was developed at the U.K. Meteorological Office. This paper describes the ocean and sea-ice components of that model and some of the characteristics of the ocean model when driven by observed fluxes of heat, fresh water, and momentum during a long spin-up experiment. Aspects of a four-year integration of the coupled model are discussed. Many factors contribute to the simulation of the coupled model. Not only are the characteristics of the component models present, but the additional degrees of freedom introduced by the removal of fixed boundary conditions at the ocean surface also introduce new features into the simulation. Particular features that result from the interaction of the models used in the simulations described in this paper include a feedback between the sea-ice model and the simulations of the atmosphere model at high latitudes, and a warming of the tropical Pacific. The coupled model described in this study is examined and explained with reference to the arctic polar region. However, brief attention is given to the model *vis à vis* Antarctica, noting that the model results in insufficient ice in winter and excessive ice in summer. (Auth. mod.)

45-795
Approximate thermodynamics of the liquid-like layer on an ice sphere based on an interpretation of the wetting parameter.
Takagi, S., *Journal of colloid and interface science*, July 1990, 137(2), MP 2780, p.446-455, 17 refs.
Ice surface, Wettability, Ice water interface, Ice physics, Water films, Thermodynamic properties, Analysis (mathematics), Ice vapor interface.
The approximate thermodynamics of a liquid-like layer, which was originally developed for a planar ice surface based on an

interpretation of the wetting parameter, is extended to a spherical ice surface to help discover the effects of the liquid-like layer on the properties of an ice surface.

45-796
Bridge and roadway frost: occurrence and prediction by use of an expert system.
Takle, E.S., *Journal of applied meteorology*, Aug. 1990, 29(8), p.727-734, 8 refs.
Road icing, Ice forecasting, Frost forecasting, Bridges, Computer applications, Road maintenance.

45-797
Apparent persistence effects in the Nelspruit area from silver iodide seeding for hail suppression.
Mather, G.K., et al, *Journal of applied meteorology*, Aug. 1990, 29(8), p.806-811, 8 refs.
Bigg, E.K., Renton, S.
Hail prevention, Cloud seeding, Silver iodide.

45-798
Methods of blast-excavating frozen ground using slit and borehole charges. [Metody vzryvnogo rykhleniia *merzlykh gruntov shchelevymi i shpurovymi zariadami*],
IUrko, A.A., *Promyshlennoe stroitel'stvo*, Aug. 1988, No.8, p.12-13, In Russian. 1 ref.
Blasting, Rock excavation, Frozen ground, Explosives.

45-799
"Sever" fireproof coatings. [Ognezashchitnye pokrytiia "Sever"],
Sorin, V.S., et al, *Promyshlennoe stroitel'stvo*, June 1988, No.6, p.29-30, In Russian.
Savitskaia, N.I., Karimov, F.A.
Protective coatings, Fires, Cold weather performance.

45-800
Steel gallery supports for construction in the north. [Stal'nye opory galerei dlia stroitel'stva na severe],
Buldakov, IU.K., et al, *Promyshlennoe stroitel'stvo*, Mar. 1990, No.3, p.12-14, In Russian. 2 refs.
Shafrai, S.D.
Cold weather construction, Steel structures, Supports, Design.

45-801
Temperature field in a system of excavations during ice formation. [Temperaturnoe pole v sisteme vyrabotka-massiv pri obrazovanii l'da],
Kol'chik, IU.N., et al, *Promyshlennaia teplotekhnika*, 1990, 12(4), p.47-51, In Russian with English summary. 5 refs.
Cherniak, V.P.
Rock excavation, Frozen rock temperature, Ice formation, Mathematical models.

45-802
Characteristics of air coolers with varying spaced finning during hoarfrost formation. [Kharakteristiki vozdukhookhladitelei s razlichnym shagom orebreniia v usloviiakh ineeobrazovaniia],
Chepurnoi, M.N., et al, *Promyshlennaia teplotekhnika*, 1989, 11(3), p.29-32, In Russian with English summary. 6 refs.
Lomakin, V.N., Sadovskiĭ, S.P.
Cooling systems, Heat transfer coefficient, Hoarfrost, Analysis (mathematics).

45-803
Erosion processes in the tundra zone of the European USSR. [Erozionnye protsessy v tundrovoĭ zone ETS],
Zharkova, IU.G., et al, *Moscow. Universitet. Vestnik. Seriia 5: Geografiia*, May-June 1990, No.3, p.106-111, In Russian. 6 refs.
Liubimov, B.P.
Tundra, Erosion, Slope processes, Slope orientation, Vegetation, Snowflakes.

45-804
Path-averaged turbulent heat fluxes from scintillation measurements at two wavelengths.
Andreas, E.L., *Society of Photo-Optical Instrumentation Engineers. Proceedings*, Apr. 1990, Vol.1312, MP 2781, p.93-105, 26 refs.
Scintillation, Heat flux, Turbulent flow, Analysis (mathematics).
Measuring the scintillation of two electromagnetic waves that have propagated over a horizontal path near the earth's surface is tantamount to measuring the turbulent surface fluxes of sensible and latent heat, if the wavelengths were chosen correctly. The author calls this the two-wavelength method, and shows how to choose the two wavelengths and how to find the heat fluxes from a scintillation variable, the refractive index structure parameter. We optimize the two-wavelength method by pairing a short wavelength *one in the visible or infrared regions with a long wavelength one in the millimeter or radio regions*. With such a two-wavelength combination, sensible heat and latent heat will, typically, have uncertainties of 10-20% when the Bowen ratio, Bo = sensible heat divided by latent heat, obeys $2.5 < Bo < 0.015$ or $0.03 < Bo < 5$.

45-805
Identification of two distinct structural and dynamical domains in an amorphous water cluster.
Buch, V., *Journal of chemical physics*, Aug. 15, 1990, 93(4), p.2631-2639, 29 refs.
Amorphous ice, Water structure, Molecular structure, Low temperature research, Temperature effects, Molecular energy levels.

45-806
Pavement response and load restrictions on spring thaw-weakened flexible pavements.
Rutherford, M.S., *Transportation research record*, 1989, No.1252, Design, management, and operation of pavements, p.1-12, PB90-239526, 11 refs. For another version see 43-1821.
Road maintenance, Pavements, Thaw weakening, Trafficability.

45-807
Bering, Chukchi, and Beaufort Seas coastal and ocean zones. Strategic assessment data atlas.
U.S. Ocean Assessments Division. Strategic Assessment Branch, Rockville, MD, NOAA, Nov. 1988, 128 leaves, Refs. passim.
Maps, Marine biology, Animals, Economic development, Ecology, Tides, Sea ice, Oceanography, International cooperation, Environmental protection.

45-808
Evaluation of South Dakota Deicer No.2 and calcium magnesium acetate by shear testing.
Ashworth, T., et al, *Transportation research record*, 1989, No.1246, Winter maintenance, roadside management, and rating routine maintenance activities, p.1-8, PB90-239492, 10 refs.
Weyland, J.A., Lu, L.L., Ewing, A.P., Wheeler, R.D.
Chemical ice prevention, Road maintenance, Salting.

45-809
Time, temperature, and relative humidity in deicing of highways using sodium chloride or magnesium chloride with a metal corrosion inhibitor.
Goyal, G., et al, *Transportation research record*, 1989, No.1246, Winter maintenance, roadside management, and rating routine maintenance activities, p.9-17, PB90-239492, 14 refs.
Lin, J., McCarthy, J.L.
Chemical ice prevention, Road maintenance, Salting.

45-810
Comparative field study of the operational characteristics of calcium magnesium acetate and rock salt.
Manning, D.G., et al, *Transportation research record*, 1989, No.1246, Winter maintenance, roadside management, and rating routine maintenance activities, p.18-26, PB90-239492, 10 refs.
Crowder, L.W.
Chemical ice prevention, Road maintenance, Salting.

45-811
1987-1988 City of Ottawa, Ontario, Canada deicer field trials.
Hamilton, G.B., et al, *Transportation research record*, 1989, No.1246, Winter maintenance, roadside management, and rating routine maintenance activities, p.27-38, PB90-239492.
Miner, W.M., Simmonds, J.
Chemical ice prevention, Road maintenance.

45-812
Field deicing comparison of calcium magnesium acetate and salt during 1987-1988 in Wisconsin.
Smith, R.L., Jr., *Transportation research record*, 1989, No.1246, Winter maintenance, roadside management, and rating routine maintenance activities, p.39-48, PB90-239492, 1 ref.
Chemical ice prevention, Road maintenance, Salting.

45-813
Arctic Marine Transportation Program, 1979 to 1986. Executive summary.
Voelker, R.P., *U.S. Maritime Administration. Report*, Feb. 1990, MA-RD-840-90004, 91p. + appends., PB90-235383, 33 refs. and list of 64 reports published under the program.
Marine transportation, Icebreakers, Ice navigation, Research projects.

45-814
Prediction of snow avalanches in maritime climates.
Conway, H., et al, *Washington State Department of Transportation. Technical report*, Dec. 1989, WA-RD-203.2, 139p. + appends., PB90-208695, Refs. p.135-139. For paper included as Appendix C see 45-815.
Raymond, C.F.
Avalanche forecasting, Snow cover stability, Avalanche formation, Climatic factors, Rain.

45-815
Observations relating to wet snow stability.
Conway, H., et al, *Washington State Department of Transportation. Technical report*, Dec. 1989, WA-RD-203.2, Appendix C. 12p., PB90-208695, 22 refs. Presented at the International Snow Science Workshop, Whistler, British Columbia, 1988.
Breyfogle, S., Wilbour, C.R.
Wet snow, Snow cover stability, Avalanche forecasting.

45-816
Wind tunnel simulation of antarctic snowdrifting.
Kim, D.H., et al, *University of Sidney, Australia. School of Civil and Mining Engineering. Research report*, Oct. 1989, No.602, 15p., PB90-184565, Refs. p.11-15.
Kwok, K.C.S., Rohde, H.F.
Blowing snow, Snowdrifts, Wind tunnels, Simulation, Wind factors.
A closed circuit boundary layer wind tunnel with a working section 900 mm wide and 600 mm high was built in the School of Civil and Mining Engineering, the University of Sydney, for the study of antarctic snowdrifting. Turbulent shear flow was simulated in the working section by using a series of screens, a rectangular fence 100 mm in height, and by covering the floor of the working section with low-pile carpet. Scaled wind model over an open flat terrain, exclusive of the model snow, was generated in the wind tunnel. The simulated flow is considered to represent a typical coastal area of Australian Antarctic Territory. Sodium bicarbonate was chosen as model snow out of a number of different materials tested. The result of snowdrifting simulation using the model snow around an elevated antarctic building was compared with field data of Mitsuhashi (1982). The mean wind velocity profiles of the snow blowing over the snow-covered terrain was also simulated. (Auth. *mod.*)

45-817
Satellite image atlas of glaciers of the world.
Williams, R.S., Jr., ed, *U.S. Geological Survey. Professional paper*, 1989, No.1386-H, 48p., PB90-230095, Refs. passim. For individual papers see 45-818 and 45-819.
Ferrigno, J.G., ed.
DLC GB2401.72R42S28 1988
Glacier surveys, Spaceborne photography, Mountain glaciers.

45-818
Glaciers of Irian Jaya, Indonesia.
Allison, I., et al, *U.S. Geological Survey. Professional paper*, 1989, No.1386-H, Satellite image atlas of glaciers of the world. Edited by R.S. Williams, Jr., and J.G. Ferrigno, p.1-20, PB90-230095, 16 refs.
Peterson, J.A.
DLC GB2401.72.R42S28 1988
Glacier surveys, Spaceborne photography, Mountain glaciers, Indonesia—Irian Jaya.

45-819
Glaciers of New Zealand.
Chinn, T.J.H., *U.S. Geological Survey. Professional paper*, 1989, No.1386-H, Satellite image atlas of glaciers of the world. Edited by R.S. Williams, Jr., and J.G. Ferrigno, p.21-48, PB90-230095, 42 refs.
DLC GB2401.72.R42S28 1988
Glacier surveys, Spaceborne photography, Mountain glaciers, New Zealand.

45-820
Clustering of ice nucleation protein correlates with ice nucleation activity.
Mueller, G.M., et al, *Cryobiology*, Aug. 1990, 27(4), p.416-422, 24 refs.
Wolber, P.K., Warren, G.J.
Ice formation, Heterogeneous nucleation, Bacteria, Organic nuclei, Chemical analysis, Nucleating agents.

45-821
Anti-icing chitin coating system development.
Bowers-Irons, G.L.A., et al, Salt Lake City, UT, Technical Research Associates, June 30, 1990, 16p., ADA-223 889, 26 refs.
Miller, C.T., Lai, A.
Protective coatings, Chemical ice prevention.

45-822
Arctic acoustics ultrasonic modeling studies.
Chamuel, J.R., Wellesley Hills, MA, Sonoquest/Advanced Ultrasonics Research, Mar. 1990, 136p., ADA-224 165, 98 refs.
Ice acoustics, Underwater acoustics, Ice bottom surface, Ice cover thickness, Ice cracks, Acoustic measurement, Ice water interface.

45-823
Arctic environmental facilities: test capabilities. *U.S. Naval Ocean Systems Center. Report*, May 1990, NOSC-TD-1728, 17p. ADA-224 414.
Test chambers, Cold chambers, Environment simulation, Ice models, Artificial ice.

45-824
Effects of numbers, sizes and crystal structures on measurements of ice hydrometeors.
Berthel, R.O., *U.S. Air Force Geophysics Laboratory. Report*, Mar. 28, 1990, GL-TR-90-0072, 21p., ADA-224 389, 5 refs.
Precipitation (meteorology), Ice crystal size, Particle size distribution, Ice crystals.

45-825
New perspectives on freezing and melting.
Oxtoby, D.W., *Nature*, Oct. 25, 1990, 347(6295), p.725-730, 76 refs.
Freezing, Melting, Metals, Snow, Ice, Crystals.

45-826
Study of the content of technogeneous gamma-emitting radionuclides in antarctic snow samples.
Adjarova, L., et al, *Bulgarska akademiia na naukite. Doklady*, 1990, 43(1), p.45-48, 6 refs.
Antonov, A., Mikhnevski, N.
Snow samplers, Isotope analysis, Snow physics, Radioactive isotopes, Radioactivity.
Bulgarian specialists (as part of the 33rd Soviet Antarctic Expedition) studied environmental radioactivity—specifically, in snow cover. Seven samples were taken from a snowdrift in the eastern part of the Schirmacher Oasis (70 deg 46S and 11 deg 50E). Three significant results were obtained: (1) it is possible *to assume that the nuclide 40 K in antarctic snows is equal to* the global equivalent in the atmosphere; (2) identification of technogeneous nuclides produced by the Chernobyl accident points to a considerable exchange between the northern and southern hemispheres; and (3) there was a change in the isotope correlations in the measured samples, especially for 137 Cs:110m Ag (Auth.)

45-827
Dynamics of the elastic ice sheet.
Kajaste-Rudnitski, J., *Finland. Technical Research Centre. Publications*, May 1990, No.64, 60p., 5 refs.
Ice loads, Ice solid interface, Wave propagation, Offshore structures, Damping, Elastic waves, Ice mechanics, Dynamic properties, Mathematical models.

45-828
Heavy snowfalls in the territories of the Ukraine and Moldavia. [Sil'nye snegopady na territorii Ukrainy i Moldavii],
Mironchenko, G.V., et al, *Kiev. Ukrainskiĭ regional-'yĭ nauchno-issledovatel'skiĭ gidrometeorologicheskiĭ institut. Trudy*, 1989, No.233, p.110-118, In Russian. 3 refs.
Shoshin, V.M.
Snowfall, Atmospheric disturbances, Snow depth, Air temperature, Statistical analysis.

45-829
Chemical compositions of aerosol particles and snowfalls in Alta, northern Norway.
Lee, D.-I., et al, *Environmental science, Hokkaido University*, Dec. 1989, 12(2), p.169-178, 12 refs.
Kikuchi, K., Taniguchi, T.
Aerosols, Snow composition, Air pollution, Wind direction, Sampling, Chemical properties, Norway.

45-830
Clast-fabric strength in periglacial slope deposits as a function of clast size and shape.
Yamamoto, K., *Environmental science, Hokkaido University*, Dec. 1989, 12(2), p.187-197, 16 refs.
Periglacial processes, Slope processes, Sediment transport, Solifluction, Rocks, Physical properties.

45-831
Northern prairie wetlands.
Van der Valk, A.G., ed, Ames, Iowa State University Press, 1989, 400p., Refs. passim. For selected papers see 45-832 through 45-836.
DLC QH104.5.G73N67 1989
Swamps, Hydrology, Ecology, Plains, Ground water, Drainage.

45-832
Hydrologic studies of wetlands in the northern prairie.
Winter, T.C., Northern prairie wetlands. Edited by A. Van der Valk, Ames, Iowa State University Press, 1989, p.16-54, 65 refs.
DLC QH104.5.G73N67 1989
Swamps, Hydrology, Plains, Ground water, Climate, Runoff.

45-833
Chemical characteristics of water in northern prairie wetlands.
LaBaugh, J.W., Northern prairie wetlands. Edited by A. Van der Valk, Ames, Iowa State University Press, 1989, p 56-90, 71 refs.
DLC QH104.5.G73N67 1989
Swamps, Plains, Water chemistry, Lake water, Ground water, Salinity.

45-834
Nitrogen and phosphorus dynamics and the fate of agricultural runoff.
Neely, R.K., et al, Northern prairie wetlands. Edited by A. Van der Valk, Ames, Iowa State University Press, 1989, p.92-131, Refs. p.122-131.
Baker, J.L.
DLC QH104.5.G73N67 1989
Swamps, Plains, Drainage, Nutrient cycle, Pollution, Agriculture, Runoff.

45-835
Vegetation of wetlands of the prairie pothole region.
Kantrud, H.A., et al, Northern prairie wetlands. Edited by A. Van der Valk, Ames, Iowa State University Press, 1989, p.132-187, Refs. p.179-187.
Millar, J.B., Van der Valk, A.G.
DLC QH104.5.G73N67 1989
Swamps, Plant ecology, Plains, Vegetation patterns, Hydrology, Drainage.

45-836
Water and wetland resources of the Nebraska sandhills.
Novacek, J.M., Northern prairie wetlands. Edited by A. Van der Valk, Ames, Iowa State University Press, 1989, p.340-384, Refs. p.378-384.
DLC QH104.5.G73N67 1989
Swamps, Plains, Hydrology, Water reserves.

45-837
Sea-ice thickness measurement using a small airborne electromagnetic sounding system.
Kovacs, A., et al, *Geophysics*, Oct. 1990, 55(10), MP 2782, p.1327-1337, 21 refs.
Holladay, J.S.
Sea ice, Ice acoustics, Electromagnetic prospecting, Ice cover thickness, Acoustic measurement, Airborne equipment, Drift.
The evaluation of a small electromagnetic induction sounding system for use in airborne measurement of sea-ice thickness is discussed, as are the results from arctic field testing. Also outlined are the system noise and drift problems encountered during arctic field evaluation, problems which adversely affected the quality of the sounding data. The sea-ice sounding results indicate that for ice floes with moderate relief it should be possible to determine thickness to within 5 percent, but that because of sounding footprint size and current model algorithm constraints, steep-sided pressure ridge keels cannot be well defined. The findings also indicate that with further system improvement the day of routine sea-ice thickness profiling from an airborne platform is close at hand.

45-838
Influence of environmental conditions on acoustical properties of sea ice.
Jezek, K.C., et al, *Journal of the Acoustical Society of America*, Oct. 1990, 88(4), MP 2783, p.1903-1912, 13 refs.
Stanton, T.K., Gow, A.J., Lange, M.A.
Sea ice, Ice acoustics, Ice thickness.
Sonar echo amplitude data have been collected at carrier frequencies of 188 and 120 kHz from the underside of different sea ice types. Histograms of normal incidence echo amplitudes were formed from over 90 samples of each ice type. Experiments were conducted on saline ice grown in an outdoor pond under relatively controlled conditions at the USA Cold Regions Research and Engineering Laboratory (CRREL), and on the sea ice cover in the Fram Strait. Analysis shows marked variations (about a factor of 5) in the magnitude of the coherent reflection *coefficients as congelation ice at the bottom of an ice sheet* evolves from a growing dendritic interface to an ablating, thermally altered interface. Larger differences (about a factor of 10) are observed between growing congelation ice and slush ice, used to simulate frazil. These results indicate that important variations in acoustic regime exist in areas where different ice types are intermingled.

45-839
Liquid chromatographic method for determination of explosives residues in soil: collaborative study.
Bauer, C.F., et al, *Journal of the Association of Official Analytical Chemists*, 1990, 73(4), MP 2784, p.541-552, 13 refs.
Koza, S.M., Jenkins, T.F.
Explosives, Soil pollution, Statistical analysis.
A collaborative study of a sonic extraction/liquid chromatographic method for determining nitroaromatic and nitramine explosives in soil was conducted at 8 participating laboratories. Analytes HMX, RDX, TNB, DNB, tetryl, TNT, and 2,4-DNT were measured in duplicate for 4 field-contaminated soils and 4 spiked standard-matrix soils. Concentrations ranged from detection limits of about 1 microgram/g to nearly 1000 micrograms/g. Results were evaluated with and without data identified as outliers, which were often caused by electronic integrator miscalculation of chromatographic peak response. When outliers are excluded, method repeatability (within-laboratory relative standard deviation) for all analytes except tetryl is less than 5% for spiked soils and less than 18% for field-contaminated soils. Relative standard deviation generally decreases as analyte concentration increases. Reproducibility (between-laboratory relative standard deviation), except for tetryl and DNT, is less than 7% for spiked soils and 26% for field-contaminated soils. Thus, collaborators have nearly equivalent performance on spiked samples. For field-contaminated soils, some additional imprecision seems to result from the variability of extraction recoveries. Analyte recoveries from spiked soils are 95-97% for HMX, RDX, TNT, and DNT (similar to recoveries from aqueous samples); 92-93% for DNB and TNB; and 70% for tetryl. Poor results for tetryl (due to thermal degradation) are correctable if sonic bath temperatures are maintained near ambient. The method has been approved interim official first action by AOAC.

45-840
Comparison of test methods for determination of flexural strength in urea model ice.
Borland, S.L., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Aug. 1990, SR 90-28, 9p., ADA-227 781, 12 refs.
Urea, Ice models, Flexural strength, Ice strength.
Laboratory tests were performed in a basin to compare ice flexural strength of urea ice obtained by three different beam test methods. *The beam test methods used were the in-situ* three-point loaded simple beam test, the out-of-water three-point loaded simple beam test and the *in-situ* cantilever beam test. There is essentially no difference in flexural strength determined from either of the three-point beam tests, and the flexural strength obtained from either of the three-point beam tests is also approximately equal to the value determined from the *in-situ* cantilever beam test. A reduction in flexural strength with increases in beam length-to-thickness ratio was observed for portions of the data set.

45-841
Laboratory investigation of the use of geotextiles to mitigate frost heave.
Henry, K.S., *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, Aug. 1990, CR 90-06, 28p., ADA-227 335, 27 refs.
Soil water, Frost heave, Countermeasures, Hydraulics, Frost penetration, Pavements.
Frost action beneath pavements can lead to several problems, including thaw weakening, which leads to cracking and subsequent pumping of fine soil particles onto the surface, as well as hazardous conditions caused by differential heaving. This study utilized data and frost-susceptible soil collected at Ravalli County Airport, Hamilton, Montana, to study the use of geotextiles to mitigate frost heave. The ability of geotextiles to reduce frost heave in subgrade material by creating a capillary break was assessed by inserting disks of fabric in soil samples and subjecting them to laboratory frost heave tests. Frost heave tests were also conducted to classify the frost susceptibilities of soils at the airport. Soil moisture characteristics and unsaturated hydraulic conductivities were determined for soils tested as well as for one of the geotextiles used. Results of the laboratory investigation indicate that certain geotextiles show promise for use as capillary breaks. In laboratory tests, the presence of geotextiles led to the reduction of frost heave by amounts up to about 60%. It is speculated that the capillary break action provided by the geotextile is attributable to the pore size and structure of the material and the surface properties of the fibers.

45-842
Global climatic events of the Neogene. [Global'nye klimaticheskie sobytiia neogena],
Zubakov, V.A., Leningrad, Gidrometeoizdat, 1990, 222p., In Russian with English summary and table of contents. 494 refs.
Climatic changes, Humidity, Geochronology, Paleoclimatology, Glaciation.

45-843
Comparative SO2 infrared spectra: type I and II clathrate hydrate films, large gas-phase clusters, and anhydrous crystalline films.
Fleyfel, F., et al, *Journal of physical chemistry*, Sep. 6, 1990, 94(18), p.7032-7037, 24 refs.
Richardson, H.H., Devlin, J.P.
Clathrates, Films, Gas inclusions, Ice formation, Scavenging, Infrared spectroscopy, Molecular structure.

45-844
Sludge freezing in shallow layers.
Vesilind, P.A., et al, *Journal of environmental engineering*, May-June 1990, 116(3), p.646-650, 6 refs.
Sludges, Freezing rate, Layers, Design criteria, Waste treatment, Analysis (mathematics).

45-845
Laboratory study on the scavenging of SO2 by snow crystals.
Mitra, S.K., et al, *Atmospheric environment*, 1990, 24A(9), p.2307-2312, 26 refs.
Barth, S., Pruppacher, H.R.
Snow crystal growth, Scavenging, Clouds (meteorology), Chemical analysis, Vapor diffusion, Air pollution.

45-846
Extensional and compressional instabilities in icy satellite lithospheres.
Herrick, D.L., et al, *Icarus*, May 1990, 85(1), p.191-204, 15 refs.
Stevenson, D.J.
Extraterrestrial ice, Ground ice, Frozen ground compression, Rheology, Ice composition, Topographic features.

45-847
Evolution of topography on comets II. Icy craters and trenches.
Colwell, J.E., et al, *Icarus*, May 1990, 85(1), p.205-215, 15 refs.
Jakosky, B.M., Sandor, B.J., Stern, S.A.
Extraterrestrial ice, Topographic features, Ice sublimation, Radiation absorption, Heat balance, Albedo, Topographic effects.

45-848
Titan and other icy satellites: dielectric properties of constituent materials and implications for radar sounding.
Thompson, W.R., et al, *Icarus*, Aug. 1990, 86(2), p.336-354, 72 refs.
Squyres, S.W.
Extraterrestrial ice, Dielectric properties, Radar echoes, Attenuation, Sounding, Remote sensing, Wave propagation.

45-849
Ice and minerals on Callisto: a reassessment of the reflectance spectra.
Roush, T.L., et al, *Icarus*, Aug. 1990, 86(2), p.355-382, 43 refs.
Extraterrestrial ice, Specular reflection, Ice composition, Admixtures, Spectra, Albedo, Ice spectroscopy.

45-850
Evolution of sea ice optical properties during fall freeze-up.
Perovich, D.K., *Society of Photo-Optical Instrumentation Engineers. Proceedings*, 1990, Vol.1302, MP 2789, Ocean optics 10, p.520-531, 16 refs.
Sea ice, Ice optics, Sea water freezing, Albedo, Freeze-up, Snow cover effect.
During the seasonal transition from summer to winter conditions a profound transformation occurs in a sea ice cover. As air temperatures drop, the ice cools causing a reduction in the brine volume, melt ponds freeze, new ice forms in areas of open water, and the surface becomes snow-covered. There is a corresponding evolution in the optical properties of the ice cover with albedos increasing and transmittances decreasing. As part of the drift phase of the Coordinated Eastern Arctic Experiment (CEAREX), spectral albedos and reflectances in the visible and near-infrared (400-1100 nm) were measured during fall freeze-up. Observed albedos are presented for first-year ice, multiyear ice, and new-ice cases. In general, albedos increased as freeze-up progressed, with the increase being most pronounced at shorter wavelengths. There was a sharp increase in albedo associated with the surface becoming snow-covered. The greatest temporal changes occurred in a freezing lead where albedos increased from 0.1 for open water to 0.9 for snow-covered young ice in only a few days. The evolution of the transmitted radiation field under the ice was estimated using a simple two-stream radiative transfer model in conjunction with observations of ice morphology and thickness. Light transmission decreased dramatically due to ice cooling, snowfall, and declining incident solar irradiances.

45-851
Constitutive model for frozen sand.
Adachi, T., et al, *Journal of energy resources technology*, Sep. 1990, 112(3), p.208-212, 14 refs.
Oka, F., Poorooshasb, H.B.
Frozen ground strength, Sands, Mathematical models, Frozen ground mechanics, Shear stress, Temperature effects.

45-852
Ice prediction systems prove their worth in winter cost savings.
McDonald, A., et al, *Highways*, Sep. 1990, 58(1965), p.19-20, 2 refs.
Lister, J.
Road icing, Ice forecasting, Ice detection, Cost analysis, Road maintenance.

45-853
Asphalt performance at low temperatures.
Bieżysko, S.J., *Highways and transportation*, Mar. 1990, 37(3), p.20-25, 17 refs.
Roads, Bitumens, Cracking (fracturing), Tensile properties, Cold weather performance, Admixtures, Countermeasures.

45-854
Effect of changes in the geocryological conditions in the basin of reservoirs on functioning of northern hydroelectric stations.
Kudoiarov, L.I., et al, *Hydrotechnical construction*, Aug. 1990, 24(2), p.55-60, Translated from Gidrotekhnicheskoe stroitel'stvo, Feb. 1990. 3 refs.
Onikienko, T.S.
Permafrost beneath rivers, Reservoirs, Permafrost transformation, Water level, Design, Electric power, Geocryology, Water balance.

45-855
Ice conditions in pools of the dam of the Kolyma hydroelectric station during initial operation.
Kozhevnikova, T.E., et al, *Hydrotechnical construction*, Aug. 1990, 24(2), p.104-107, Translated from Gidrotekhnicheskoe stroitel'stvo, Feb. 1990.
Sakharova, N.B.
Dams, Water flow, Channels (waterways), Ice cover, Ice conditions, Stability, Cold weather operation, Electric power.

45-856
Anomalous radar backscattering from ice particles in a cloud in the 0.3-0.8 mm ice-transparency "window".
Aivazian, G.M., *Soviet journal of contemporary physics*, 1989, 24(1), p.51-56, Translated from Akademiia nauk Armianskoi SSR. Izvestiia. Fizika. 10 refs.
Backscattering, Cloud droplets, Hailstone growth, Ice formation indicators, Ice physics, Hail clouds, Supercooled clouds, Analysis (mathematics).

45-857
Dynamics of wetland landscapes and reliability of prediction of their development.
Aaviksoo, K.D., et al, *Soviet journal of ecology*, July-Aug. 1989(Pub. Mar.90), 20(4), p.221-226, Translated from Ekologiia. 23 refs.
Kadarik, Kh.R.
Swamps, Landscape development, Long range forecasting, Landscape types, Vegetation patterns, Spaceborne photography, Mathematical models.

45-858
Snow cover and freezing and thawing of soil in pine forests of the Kama River region.
Korepanov, A.A., *Soviet forest sciences*, 1989, No.5, p.54-58, 15 refs. For Russian original see 44-2352.
Snow depth, Snow accumulation, Freeze thaw cycles, Soil freezing, Ground thawing, Snow cover effect, Soil water, Forest soils.

45-859
Freezing and thawing of soil in spruce forests of the middle taiga in European USSR.
Deriugin, A.A., *Soviet forest sciences*, 1989, No.2, p.81-88, 5 refs. For Russian original see 43-4067.
Soil freezing, Ground thawing, Thawing rate, Thaw depth, Forest soils, Taiga.

45-860
Chemogenic heaving of frozen rocks upon their interaction with aqueous solutions.
Lebedenko, IU.P., *Moscow University geology bulletin*, 1989, 44(3), p.57-66, 14 refs. For Russian original see 44-1341.
Frost heave, Frozen rock strength, Deformation, Frozen rock temperature.

45-861
Concerning the near-surface circulation in the subarctic frontal zone (on the basis of satellite data).
Ginzburg, A.I., et al, *Soviet journal of remote sensing*, Jan.-Feb. 1986(Pub. Jan. 90), 6(1), p.6-12, Translated from Issledovanie zemli iz kosmosa. 16 refs.
Fedorov, K.N.
Subpolar regions, Ocean currents, Spaceborne photography.

45-862
Divergent redistribution of ice in the Northern Arctic Ocean (analysis of space images).
Nazirov, M., *Soviet journal of remote sensing*, Mar.-Apr. 1987(Pub. July 90), 7(2), p.244-254, 8 refs. For Russian original see 41-4618.
Sea ice distribution, Spaceborne photography, Photointerpretation, Ocean currents, Drift, Mathematical models.

45-863
Effect of hydrometeors on the characteristics of radar images of sea ice.
Aleksandrov, V.IU., *Soviet journal of remote sensing*, Mar.-Apr. 1987(Pub. 90), 7(2), p.255-264, 11 ref. For Russian original see 41-4619.
Ice surveys, Sea ice distribution, Radar photography, Precipitation (meteorology), Photointerpretation, Analysis (mathematical), Arctic Ocean.

45-864
Identification of regional features of the marshes of western Siberia, using space images.
Gorozhankina, S.M., *Soviet journal of remote sensing*, May-June 1986(Pub. Mar. 90), 6(3), p.358-372, Translated from Issledovanie zemli iz kosmosa. 10 refs.
Swamps, Photointerpretation, Spaceborne photography, Geomorphology.

45-865
Space photos for the evaluation of engineering-geological conditions of Lower Irtysh lake-bog flatlands.
Svitnev, A.I., *Soviet journal of remote sensing*, May-June 1987(Pub. June 90), 7(3), p.517-528, Translated from Issledovanie zemli iz kosmosa. 17 refs.
Peat, Engineering geology, Geomorphology, Photointerpretation, Spaceborne photography, Swamps, Soils.

45-866
Engineering and economic aspects of using a freon vapor-driven turbine for conversion of the thermal energy of arctic sea water into electricity.
Moskvicheva, V.N., et al, *Soviet journal of applied physics*, Nov.-Dec. 1987(Pub. May-June 88), 2(3), p.72-77, Translated from Akademiia nauk SSSR. Sibirskoe otdelenie. Izvestiia. Seriia tekhnicheskikh nauk. 7 refs.
Ogurechnikov, L.A.
Electric power, Cost analysis, Heat transfer coefficient, Water temperature, Air temperature, Design.

45-867
Development of three-dimensional internal waves in a sea with ice cover. [Razvitie trekhmernykh vnutrennikh voln v more s ledianym pokrovom].
Bukatov, A.E., et al, *Morskoĭ gidrofizicheskiĭ zhurnal*, Nov.-Dec. 1986, No.6, p.3-9, In Russian with English summary. 10 refs.
Zharkov, V.V.
Ice cover effect, Water waves, Ice water interface, Mathematical models, Sea ice.

45-868
Circulation of the subarctic North Pacific: properties and variations of water masses. [Kita Taiheiyo akantai junkan: suikai no tokusei to henshitsu].
Ohtani, K., et al, *Kaiyo (marine sciences monthly)*, Apr. 1990, 22(4), p.169-173, In Japanese. 11 refs.
Nagata, Y.
Ocean currents, Ice water interface, Water temperature.

45-869
Interannual variability of cold water at the bottom of the continental shelf of the southeastern Bering Sea. [Beringukai nantobu tairikubotei reisui no kenen hendo].
Ohtani, K., et al, *Kaiyo (Marine sciences monthly)*, Apr. 1990, 22(4), p.230-235, In Japanese. 15 refs.
Azumaya, T., Sato, T.
Ocean currents, Water temperature, Air water interactions, Atmospheric circulation, Ocean bottom, Bering Sea.

45-870
High-speed powder-snow avalanches.
Maeno, N., *Journal of geography (Chigaku zasshi)*, 1989, 98(6), p.761-767, In Japanese. 22 refs.
Avalanche mechanics, Avalanche formation, Snow cover structure, Snow cover stability.

45-871
Judging technique of impermeability of frozen wall formed under closure type freezing procedure.
Tobe, N., *Japan Society of Civil Engineers. Proceedings (Doboku gakkai ronbunshu)*, June 1989, No.406, p.137-146, In Japanese with English summary. 9 refs.
Walls, Artificial freezing, Permeability, Soil freezing, Waterproofing, Analysis (mathematics).

45-872
Research on low temperature properties of asphalts.
Moriyoshi, A., et al, *Japan Society of Civil Engineers. Proceedings (Doboku gakkai ronbunshu)*, Aug. 1989, No.408, p.131-138, In Japanese with English summary. 18 refs.
Fujiwara, M.
Pavements, Bitumens, Brittleness, Low temperature tests, Cold stress, Thermal stress, Cracking (fracturing).

45-873
Experimental study for improvement of cement-asphalt compound materials for slab track to make them fit for cold climate use.
Watanabe, K., et al, *Japan Society of Civil Engineers. Proceedings (Doboku gakkai ronbunshu)*, Aug. 1989, No.408, p.205-214, In Japanese with English summary. 15 refs.
Tottori, S., Harada, Y.
Railroad tracks, Mortars, Frost resistance.

45-874
Properties of concrete mixed with sand frozen by liquid nitrogen.
Negami, Y., et al, *Japan Society of Civil Engineers. Proceedings (Doboku gakkai ronbunshu)*, Feb. 1990, No.414, p.79-87, In Japanese with English summary. 13 refs.
Goto, S., Kurita, M., Kuwahara, T.
Liquefied gases, Artificial freezing, Concrete strength, Concrete hardening.

45-875
Deflection of floating ice in proximity of a pressure field moving at a low velocity. [Progib plavaiushchego l'da vblizi dvizhushcheĭsia s maloĭ skorost'iu oblasti davleniĭ].
Bukatov, A.E., et al, *Morskoĭ gidrofizicheskiĭ zhurnal*, Mar.-Apr. 1988, No.2, p.3-8, In Russian with English summary. 7 refs.
Zharkov, V.V.
Ice loads, Floating ice, Ice mechanics, Ice cover, Sea ice, Velocity, Ice cover thickness, Analysis (mathematics).

45-876
Method of distinguishing the Pacific subarctic front using the relation between temperature, salinity, and density. [O metode vydeleniia Tikhookeanskogo subarkticheskogo fronta s ispol'zovaniem T-S-*rho*-sviazeĭ].
Kuz'min, V.A., *Morskoĭ gidrofizicheskiĭ zhurnal*, Nov.-Dec. 1988, No.6, p.60-62, In Russian. 6 refs.
Subpolar regions, Water temperature, Ocean currents, Salinity, Density (mass/volume), Pacific Ocean.

45-877
Methods of forecasting hail.
Fedchenko, L.M., et al, *Soviet meteorology and hydrology*, 1989, No.4, p.36-42, Translated from Meteorologiia i gidrologiia. 14 refs.
Goral, G.G., Mal'bakhova, N.M.
Hail, Forecasting, Hail clouds.

45-878
Reaction of sea ice to aerosol pollution of the atmosphere.
Savchenko, V.G., et al, *Soviet meteorology and hydrology*, 1989, No.4, p.85-90, Translated from Meteorologiia i gidrologiia. 15 refs.
Nagurnyĭ, A.P., Makshtas, A.P.
Sea ice, Ice cover, Air pollution, Thermodynamics, Aerosols, Ice air interface, Ice mechanics, Mathematical models, Ice models, Snow cover.

45-879
Analytical investigation of stationary and self-oscillation regimes of hail formation.
Smirnov, V.I., *Soviet meteorology and hydrology*, 1989, No.5, p.37-43, Translated from Meteorologiia i gidrologiia. 3 refs.
Hail clouds, Hailstone growth, Analysis (mathematics).

45-880
Development of chairs of engineering geology, hydrogeology, and cryopedology in the geology department.
Sergeev, E.M., et al, *Moscow University geology bulletin*, 1989, 44(2), p.47-59, For Russian original see 44-1340.
Vsevolozhskiĭ, V.A., Ershov, E.D.
Education, Engineering geology, Geocryology, Hydrogeology.

45-881
Background concentrations of low-molecular chlorinated hydrocarbons in the antarctic atmosphere and snow water.
Tulupov, P.E., et al, *Soviet meteorology and hydrology*, 1989, No.6, p.54-58, Translated from Meteorologiia i gidrologiia. 9 refs.
Hydrocarbons, Snow water content, Air pollution, Snow impurities.
Data are presented on the application of a method of gas chromatographic determination of low-molecular chlorinated hydrocarbons in the air and snow water, to obtain experimental data on the conditions of air and snow pollution in the Antarctic from Apr. 1985 through Feb. 1986. The experimental results showing the background concentrations of trichloromethane (CHCl3), tetrachloromethane (CCl4), trichloroethylene (C2HCl3) and tetrachloroethylene (C2Cl4) in the surface layer of the antarctic atmosphere are discussed. At the same time as the concentration of components in snow water was practically unchanged during the entire observation period, in the surface layer of the atmosphere the appearance of a clearly expressed maximum, which exceeds the global concentration of CHCl3, C2HCl3 and C2Cl4 by 5-9 times, is observed in Sep. The CCl4 content is approximately constant. The appearance of maxima is explained by the features of synoptic processes in the Southern Hemisphere. (Auth. mod.)

45-882
Bacterioplankton in the marginal ice zone of the Weddell Sea: biomass, production and metabolic activities during austral autumn.
Cota, G.F., et al, *Deep-sea research*, July 1990, 37(7A), p.1145-1167, Refs. p.1165-1167.
Kottmeier, S.T., Robinson, D.H., Smith, W.O., Jr., Sullivan, C.W.
Algae, Ice edge, Ice cover effect, Microbiology, Antarctica—Weddell Sea.
Observations of microbial distributions and metabolic activities were made during early austral autumn, 1986, in the marginal ice zone of the Weddell Sea. Bacterioplankton had distributions and activities similar to those of phytoplankton within the marginal ice zone. Pronounced productivity maxima were present seaward of the ice edge. Although biomass and productivity maxima for algae and bacteria were largely superimposed spatially, there was no obvious relationship between these biological features and the density field. Rates of primary production in early autumn, adjacent to a nearly stationary ice edge, were much lower than rates observed in spring when the ice edge was retreating. However, bacterial production rates were comparable during both seasons. During autumn, secondary production by bacterioplankton in the upper 100 m often equaled or exceeded primary productivity; integrated bacterial production in open water areas averaged 76% of primary production. Mean bacterial growth rates in ice-covered and open water regions were 0.33 and 0.58 d, respectively, or from 5 to 11 times those of phytoplankton. Rates and ratios of macromolecular synthesis by bacterioplankton were comparable with previous temperate and polar studies. Several lines of evidence indicate that this ice edge bloom was dominated by heterotrophic processes. (Auth. mod.)

45-883
On the relation between polar continentality and climate: studies with a nonlinear seasonal energy balance model.
Hyde, W.T., et al, *Journal of geophysical research*, Oct. 20, 1990, 95(D11), p.18,653-18,668, 35 refs.
Kim, K.Y., Crowley, T.J., North, G.R.
Sea ice distribution, Climatic factors, Models, Snow accumulation.
The seasonal cycle of surface temperature is largely controlled by the land-sea distribution. Previous studies with a two-dimensional, seasonal energy balance model (EBM) suggested that large annual cycles on supercontinents could produce sufficiently high summer temperatures to melt summer snow, even when the continents were located in polar regions. The above calculations were done with a linear model. This paper tests the sensitivity of these conclusions to seasonally varying snow albedo feedback by developing a new nonlinear two-dimensional, seasonal EBM. The model satisfactorily reproduces the present annual and semi-annual cycles, plus snow and sea ice margins. Experiments are described for a series of idealized supercontinent configurations; in addition, the effect is examined of changing land-sea distributions on the climate of Greenland and Antarctica. Supercontinent model simulations are similar to the previously published linear model results, and provide further support for the hypothesis that ice-free states could occur on polar supercontinents. (Auth. mod.)

45-884
Antarctic ice sheet during the Late Neogene.
Mercer, J.H., Palaeoecology of Africa and surrounding islands, Vol. 18. Edited by J.A. Coetzee, Rotterdam, A.A. Balkema, 1987, p.21-33, Refs. p.30-33.
DLC QE993.P28
Glaciation, Paleoclimatology, Algae, Glacial deposits, Antarctica—East Antarctica.
Until recently the ice sheet in East Antarctica was believed to have changed little since first covering the continent in the late Middle Miocene. Recent discoveries of marine diatoms apparently of Pliocene age and of plant remains, including wood of a *Nothofagus* species, associated with glacial sediments of the Sirius Formation at high elevations in the Transantarctic Mountains, have dramatically changed this picture. The presence of open-marine embayments and the growth of vegetation, including tree species, at latitude 85S, implies that ice was temperate at sea level. Such conditions may have prevailed during a warm interval centred about 8 Ma. This chronology is supported by the characteristics of the *Nothofagus* wood, which closely resembles that of one species in southern South America and one in Tasmania. Reasons are given for believing that the antarctic *Nothofagus* species was not introduced from South America during the Pliocene, but was an antarctic survival, probably related to the Tasmanian species and part of an endemic plant assemblage whose hardiest constituents were extinguished by the terminal Miocene refrigeration. (Auth. mod.)

45-885
Periglacial landforms and processes of the subantarctic and antarctic islands.
Hall, K., Palaeoecology of Africa and surrounding islands, Vol.18. Edited by J.A. Coetzee, Rotterdam, A.A. Balkema, 1987, p.383-392, Refs. p.390-392.
DLC QE993.P28
Paleoclimatology, Periglacial processes, Patterned ground.
There is a wide assemblage of periglacial landforms on the southern islands and a number of valuable studies have been undertaken. In this species-poor environment a strong relationship is often found between plant life and the patterned ground. As land areas in the vast southern ocean are very limited, the palaeoenvironmental and palaeoclimatological evidence provided by fossil and active periglacial features and processes is of the utmost importance. A brief summary of much of the available periglacial literature is presented in an attempt to generate interest in this field of study on the southern islands. (Auth. mod.)

45-886
Climate, tree-ring, and glacial fluctuations in the Rio Frias Valley, Rio Negro, Argentina.
Villalba, R., et al, *Arctic and alpine research*, Aug. 1990, 22(3), p.215-232, 41 refs.
Moraines, Age determination, Glacier oscillation, Climatic changes, Periodic variations, Argentina—Mount Tronador.

45-887
Experiments on lichen growth. I. Seasonal patterns and environmental controls.
Benedict, J.B., *Arctic and alpine research*, Aug. 1990, 22(3), p.244-254, 52 refs.
Lichens, Growth, Seasonal variations, Snow cover effect, Temperature effects, Photosynthesis

45-888
Dinitrogen fixation (acetylene reduction) in primary succession near Mount Robson, British Columbia, Canada.
Blundon, D.J., et al, *Arctic and alpine research*, Aug. 1990, 22(3), p.255-263, 46 refs.
Dale, M.R.T.
Plants (botany), Growth, Nutrient cycle, Moraines, Soil dating, Soil analysis, Forest ecosystems, Canada—British Columbia.

45-889
Phytoplankton dynamics in three Rocky Mountain lakes, Colorado, U.S.A.
McKnight, D.M., et al, *Arctic and alpine research*, Aug. 1990, 22(3), p.264-274, 39 refs.
Plankton, Growth, Lakes, Snowmelt, Seasonal variations, Hydrologic cycle, Limnology, United States—Colorado.

45-890
Relationships among depth to frozen soil, soil wetness, and vegetation type and biomass in tundra near Bethel, Alaska, U.S.A.
Gross, M.F., et al, *Arctic and alpine research*, Aug. 1990, 22(3), p.275-282, 54 refs.
Hardisky, M.A., Doolittle, J.A., Klemas, V.
Tundra, Biomass, Active layer, Soil water, Nutrient cycle, Decomposition, Remote sensing, United States—Alaska.

45-891
Surface energy balance of a perennial snowbank, Melville Island, Northwest Territories, Canada.
Young, K.L., et al, *Arctic and alpine research*, Aug. 1990, 22(3), p.290-301, 48 refs.
Lewkowicz, A.G.
Snow cover stability, Surface energy, Snowmelt, Radiation absorption, Heat balance, Diurnal variations, Albedo.

45-892
Past and present permafrost distribution in the Turtmanntal, Wallis, Swiss Alps.
Van Tatenhove, F., et al, *Arctic and alpine research*, Aug. 1990, 22(3), p.302-316, 34 refs.
Dikau, R.
Permafrost distribution, Permafrost indicators, Rock glaciers, Alpine landscapes, Paleoclimatology, Mapping, Switzerland—Walliser Alps.

45-893
Estimate of snow avalanche debris transport, Kaghan Valley, Himalaya, Pakistan.
Bell, I., et al, *Arctic and alpine research*, Aug. 1990, 22(3), p.317-321, 12 refs.
Gardner, J.S., De Scally, F.A.
Avalanche deposits, Sediment transport, Avalanche erosion, Pakistan—Punjab Himalaya.

45-894
Effects of glacial surging on sedimentation in a modern ice-contact lake, Alaska.
Smith, N.D., *Geological Society of America. Bulletin*, Oct. 1990, 102(10), p.1393-1403, 41 refs.
Glacier surges, Glacial lakes, Glacial erosion, Sedimentation, Suspended sediments, Dislocations (material), United States—Alaska—Carroll Glacier.

45-895
Ice sublimation and rheology: implications for the Martian polar layered deposits.
Hofstadter, M.D., et al, *Icarus*, Apr. 1990, 84(2), p.352-361, 28 refs.
Murray, B.C.
Mars (planet), Ice sublimation, Ice creep, Ice composition, Ground ice, Extraterrestrial ice, Dust, Rheology, Ice composition.

45-896
Recent water release in the Tharsis region of Mars.
Mouginis-Mark, P.J., *Icarus*, Apr. 1990, 84(2), p.362-373, 32 refs.
Mars (planet), Extraterrestrial ice, Ground ice, Water erosion, Volcanoes, Water transport.

45-897
Influence of CO ice on the activity and near-surface differentiation of comet nuclei.
Fanale, F.P., et al, *Icarus*, Apr. 1990, 84(2), p.403-413, 25 refs.
Salvail, J.R.
Extraterrestrial ice, Ice sublimation, Carbon dioxide, Ice deterioration, Computerized simulation, Ice structure, Dust.

45-898
Ice island: a floating platform for valuable geophysical studies in the Arctic Ocean.
Hobson, G., *Earth in space*, Dec. 1989, 2(4), p.9-11.
Ice islands, Oceanography, Research projects, Icebergs.

45-899
Beryllium oxide: a frost-preventing insulator.
Ribbing, C.G., *Optics letters*, Aug. 15,1990, 15(16), p.882-884, 15 refs.
Hoarfrost, Ice formation, Ice prevention, Coatings, Thermal radiation, Condensation, Optical properties, Electrical insulation.

45-900
Sea-ice kinematics as determined by remotely-sensed ice drift: seasonal space and time scales.
Lewis, J.K., et al, *Photogrammetric engineering and remote sensing*, Aug. 1989, 55(8), p.1113-1121, 14 refs.
Giuffrida, M.R.
Sea ice distribution, Drift, Seasonal variations, Remote sensing, Velocity measurement, Time factor.

45-901
Morphology of a multi-year ice ridge in the High Arctic.
Connors, D.N., et al, *Photogrammetric engineering and remote sensing*, Aug. 1989, 55(8), p.1123-1128, 13 refs.
Levine, E.R., Shell, R.R.
Ice surveys, Ice floes, Ice bottom surface, Topographic features, Pressure ridges, Acoustic measurement, Subglacial observations.

45-902
Computer simulation of ice control with thermal-bubble plumes—line source configuration.
Baddour, R.E., *Canadian journal of civil engineering*, Aug. 1990, 17(4), p.509-513, With French summary. 19 refs.
Ice control, Bubbling, Computerized simulation, River ice, Thermal diffusion, Temperature effects.

45-903
Heat and mass balance of an ablating ice jam.
Prowse, T.D., *Canadian journal of civil engineering*, Aug. 1990, 17(4), p.629-635, With French summary. 7 refs.
River ice, Ice jams, Ice breakup, Hydrothermal processes, Ablation, Heat flux, Porosity, Mass balance, Canada--Northwest Territories—Liard River.

45-904
Influence of snow density on conductivity of snowfall measured by AC method.
Asano, K., et al, *Electrical engineering in Japan*, Oct. 1990, 110(2), p.19-26, Translated from Denki gakkai ronbunshi, Aug. 1989. 14 refs.
Higashiyama, Y., Matsuda, H.
Snow electrical properties, Snow density, Electrical resistivity, Electrical insulation, Snow cover effect, Electrical measurement, Power lines.

45-905
Precipitating snow clouds during winter monsoon seasons influenced by topography of the Shakotan Peninsula, Hokkaido Island, Japan (SHAROP).
Kikuchi, K., et al, *Environmental science, Hokkaido University*, June 1987, 10(1), p.109-128, 8 refs.
Azumane, S., Murakami, M., Taniguchi, T.
Clouds (meteorology), Snowfall, Radar echoes, Forecasting, Topographic effects, Wind direction, Precipitation (meteorology), Japan—Hokkaido.

45-906
Simplification of cold weather concreting with new antifreezing admixtures (Part 4).
Watanabe, H., et al, *Hokkaido kaihatsukyoku kaihatsu doboku kenkyujo geppo (Hokkaido Development Bureau Civil Engineering Research Institute. Monthly report)*, Nov. 1989, No.438, p.14-21, In Japanese with English summary. 3 refs.
Sakai, K., Hamabe, K., Takada, M.
Winter concreting, Concrete admixtures, Antifreezes.

45-907
Expansion and shrinkage behavior of concrete subjected to freezing and thawing.
Watanabe, H., et al, *Hokkaido kaihatsukyoku kaihatsu doboku kenkyujo geppo (Hokkaido Development Bureau Civil Engineering Research Institute. Monthly report)*, Oct. 1989, No.437, p.16-29, In Japanese with English summary. 4 refs.
Sakai, K.
Concrete freezing, Freeze thaw tests, Concrete strength.

45-908
Braking and starting performance with winter tires (2nd report).
Ninagawa, K., et al, *Hokkaido kaihatsukyoku kaihatsu doboku kenkyujo geppo (Hokkaido Development Bureau Civil Engineering Research Institute. Monthly report)*, June 1989, No.433, p.11-16, In Japanese with English summary. 3 refs.
Hattori, K., Yagi, K.
Tires, Rubber ice friction, Traction, Skid resistance.

45-909
Snow collection mechanism and capacity of snow fence.
Takeuchi, M., *Hokkaido kaihatsukyoku kaihatsu doboku kenkyujo geppo (Hokkaido Development Bureau Civil Engineering Research Institute. Monthly report)*, Mar. 1989, No.430, p.10-15, With Japanese summary. 9 refs.
Snow fences, Blowing snow, Snowdrifts.

45-910
Simplification of winter concreting with a new type of antifreeze admixture (Part 3).
Watanabe, H., et al, *Hokkaido kaihatsukyoku kaihatsu doboku kenkyujo geppo (Hokkaido Development Bureau Civil Engineering Research Institute. Monthly report)*, Dec. 1988, No.427, p.1-17, In Japanese with English summary. 2 refs.
Sakai, K., Takada, M., Umezawa, K.
Winter concreting, Concrete admixtures, Antifreezes.

45-911
Selection of asphalt surface course mixture for pavements in cold areas: considerations from freezing and thawing tests.
Tsukahara, K., et al, *Hokkaido kaihatsukyoku kaihatsu doboku kenkyujo geppo (Hokkaido Development Bureau Civil Engineering Research Institute. Monthly report)*, July 1988, No.422, p.24-31, In Japanese with English summary. 5 refs.
Kumagai, S., Hoshi, T.
Pavements, Freeze thaw tests, Bitumens, Aggregates, Frost resistance.

45-912
Seasonal Ice Zone Experiment.
Sandven, S., *Norwegian oil review (Norsk olje revy) and Arctic news record*, 1990, 6(4), p.26-27.
Side looking radar, Sea ice distribution, Ice surveys, Ice forecasting, Remote sensing.

45-913
Way through the ice. *Norwegian oil review (Norsk olje revy) and Arctic news record*, 1990, 6(4), p.37-38,40.
Ice navigation, Northwest passage, Icebreakers, Marine transportation.

45-914
Shipping in ice. *Norwegian oil review (Norsk olje revy) and Arctic news record*, 1990, 6(4), p.41-43.
Icebreakers, Oceanographic ships.

45-915
Role of Antarctica in the climate of the Southern Hemisphere as revealed by modeling studies: a brief review.
Satyamurti, P., et al, *Revista brasileira de meteorologia*, Dec. 1986, 1(2), p.39-50, 38 refs.
Rao, V.B., Yamazaki, Y.
Ice cover effect, Sea ice distribution, Climate.
A brief review of the observed features of climate of Antarctica and the results of climatic simulation are given. Several interesting aspects of the climate of the Antarctic region such as the role of topography and the effect of surface thermal inversions are discussed. The deficiencies of the General Circulation Models in simulating the observed features are mentioned. (Auth.)

45-916
Passive microwave radiometry over Antarctica.
Kidd, C., et al, *International journal of remote sensing*, Oct. 1990, 11(10), p.1969-1973, 8 refs.
Lucas, R.M.
Remote sensing, Ice sheets, Sea ice, Radiometry, Antarctica.
The processing and display of images of Antarctica from data obtained by the Special Sensor Microwave Imager (SSM/I) is described, and a general description of ice and snow distribution in Antarctica as observed by the SSM/I is presented. (Auth.)

45-917
Ice nucleation by alcohols arranged in monolayers at the surface of water drops.
Gavish, M., et al, *Science*, Nov. 16, 1990, 250(4983), p.973-975, 24 refs.
Popovitz Biro, R., Lahav, M., Leiserowitz, L.
Nucleation, Water chemistry, Alcohols.

45-918
Fallout in snow.
Philippot, J.C., *Nature*, Nov. 1, 1990, 348(6296), p.21, 2 refs.
Snow composition, Fallout, Antarctica—Amundsen-Scott Station.
Referring to the inconclusive results of Dibb et al *vis à vis* the possibility of South Pole fallout having emanated from the Chernobyl accident, the present author categorically expresses his belief that the fallout at Amundsen-Scott Station did indeed come from the Chernobyl accident, based on measurements of the Cs-137/Cs-134 ratio.

45-919
Beta radiation from snow.
Dibb, J.E., et al, *Nature*, May 3, 1990, 345(6270), p.25.
Mayewski, P.A., Buck, C.S., Drummey, S.M.
Snow composition, Fallout, Antarctica—Amundsen-Scott Station.
At a 6-meter deep snowpit 38 km NE of the South Pole radioactive snow was detected and is reported here. Chemical elements identified in the snow layers have been age dated. An unexpected radioactive layer between 10-20 cm was detected but its source is not positively known. The possibility that the layer may emanate from the Chernobyl accident is considered, but the examination is inconclusive.

45-920
Characteristics of nonmetallic tire chains in Hokkaido.
Hattori, K., et al, *Hokkaido kaihatsukyoku doboku shikenjo geppo (Hokkaido Development Bureau Civil Engineering Research Institute. Monthly report)*, Dec. 1987, No.415, p.13-20, In Japanese with English summary. 2 refs.
Kadoyama, Y., Sato, H.
Tires, Skid resistance, Plastics snow friction, Traction, Rubber snow friction.

45-921
Study on simplification of winter concreting using the new type antifreeze admixtures (Part 2).
Watanabe, H., et al, *Hokkaido kaihatsukyoku doboku shikenjo geppo (Hokkaido Development Bureau Civil Engineering Research Institute. Monthly report)*, Nov. 1987, No.414, p.14-38, In Japanese with English summary. 2 refs.
Ohashi, T., Hideshima, S., Umezawa, K.
Winter concreting, Concrete admixtures, Antifreezes.

45-922
Development of a vehicle-mounted blowing snow monitor.
Ishimoto, K., et al, *Hokkaiso kaihatsukyoku doboku shikenjo geppo (Hokkaido Development Bureau Civil Engineering Research Institute. Monthly report)*, Oct. 1987, No.413, p.13-17, In Japanese with English summary. 5 refs.
Takeuchi, M.
Blowing snow, Visibility, Monitors, Measuring instruments.

45-923
Experiments to improve frost heaving test methods.
Mizushima, T., et al, *Hokkaido kaihatsukyoku doboku shikenjo geppo (Hokkaido Development Bureau Civil Engineering Research Institute. Monthly report)*, June 1987, No.409, p.1-10, In Japanese with English summary. 7 refs.
Kumagai, S., Sato, S.
Frost heave, Frost resistance, Soil tests, Subgrade soils, Roadbeds.

45-924
Groundwater flow simulation considering snowmelt.
Watanabe, K., et al, *Hokkaido kaihatsukyoku doboku shikenjo geppo (Hokkaido Development Bureau Civil Engineering Research Institute. Monthly report),* Mar. 1987, No.406, p.25-43, In Japanese with English summary. 10 refs.
Segawa, A.
Snowmelt, Ground water, Runoff, Water flow, Snow hydrology, Mathematical models.

45-925
Study on simplification of winter concreting using the new type of antifreeze admixtures.
Watanabe, H., et al, *Hokkaido kaihatsukyoku doboku shikenjo geppo (Hokkaido Development Bureau Civil Engineering Research Institute. Monthly report),* Sep. 1986, No.400, p.27-36, In Japanese. 1 ref.
Ohashi, T., Imai, M.
Winter concreting, Concrete admixtures, Antifreezes.

45-926
Prevention of snow accretion on traffic signs. [Sunoporu no chakusetsu boshi],
Takeuchi, M., et al, *Hokkaido kaihatsukyoku doboku shikenjc geppo (Hokkaido Development Bureau Civil Engineering Research Institute. Monthly report).* Sep. 1986, No.400, p.37-39, In Japanese. 3 refs.
Nohara, T.
Snow accumulation, Safety, Blowing snow, Road maintenance.

45-927
Observations of snow loads on drainage ditches at the gratings. [Sakkyoko ni yoru haisuiro uchi no sekisetsu kaju no kansoku],
Komatsu, J., et al, *Hokkaido kaihatsukyoku doboku shikenjo geppo (Hokkaido Development Bureau Civil Engineering Research Institute. Monthly report).* Sep. 1986, No.400, p.40-48, In Japanese. 3 refs.
Hideshima, Y., Tanaka, K.
Snow loads, Channels (waterways), Drainage, Culverts.

45-928
Two or three looks at the properties of freezing indexes. [Toketsu shisu no tokusei ni kansuru 2,3 no kosatsu],
Arita, M., *Hokkaido kaihatsukyoku doboku shikenjo geppo (Hokkaido Development Bureau Civil Engineering Research Institute. Monthly report).* June 1986, No.397, p.40-50, In Japanese. 5 refs.
Freezing indexes, Road icing, Meteorological data, Statistical analysis.

45-929
Current state of the design and construction of reinforced earth (terre armé) walls in snowy and cold regions. [Sekisetsu kanreichi ni okeru hokyo tsuchi (teruarume) kabe koho no sekkei shiko no genjo],
Noto, S., *Hokkaido kaihatsukyoku doboku shikenjo geppo (Hokkaido Development Bureau Civil Engineering Research Institute. Monthly report),* Jan. 1986, No.392, p.29-33, In Japanese. 4 refs.
Earthwork, Walls, Soil stabilization.

45-930
Functional specifications for second-generation ice navigation system. Final report.
Gautier, C., et al, *Transport Canada. Report,* July 1990, TP-10565E, 100p. + appends., With French summary. 27 refs.
Gorman, R.
Ice navigation, Ice detection, Ice reporting, Radar, Data processing.

45-931
Alaska's high-rank coals. *Alaska. Division of Geological and Geophysical Surveys. Information circular,* Aug. 1990, No.33, 36p., 17 refs.
Coal, Mining, Natural resources, Exploration, Geological surveys, Economic development, United States - Alaska.

45-932
Converting digital passive microwave radiances to kelvin units of brightness temperatures.
Farmer, L.D., et al, *U.S. Naval Ocean Research and Development Activity. NORDA technical note,* Sep. 1990, No.427, MP 2821, 16p., ADA-228 407, 7 refs.
Eppler, D.T., Lohanick, A.W.
Sea ice, Brightness, Radiance, Microwaves, Radiometry.

45-933
Environmental influences on mine detection.
Hogan, A.W., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Aug. 1990, SR 90-31, 6p., ADB-149 274, 16 refs.
Leggett, D.C., Lacombe, J.
Mines (ordnance), Detection, Vapor transfer, Explosives, Military operation, Analysis (mathematics).
Research has been conducted to determine the probable influence of the environment on the operational use of chemical vapor "sniffing" devices for standoff mine detection. Experiments indicate that the external surfaces of mines become contaminated with TNT during storage and that this contamination provides a strong vapor source, detectable by several types of sniffing devices. A model calculation is performed to determine the TNT vapor generated by a "standard" minefield pattern. This calculation, carried out over the several Pasquill categories, estimates the source strengths of TNT vapor emanating from contaminated mine surfaces at 100-m horizontal distance from the minefield. Additional operational meteorological problems that need to be solved relate to airborne or ground platforms to carry the sniffing devices, and possible rates of advance consistent with varying meteorological conditions.

45-934
Model study of the Cazenovia Creek ice control structure.
Gooch, G.E., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Aug. 1990, SR 90-29, 31p., ADA-228 032, 8 refs.
Deck, D.S.
Ice control, Ice jams, Ice prevention, Flood control, Ice models.
An ice control structure was chosen as a solution to ice-jam flooding of the business and residential communities of West Seneca and Buffalo, New York, along Cazenovia Creek. A model study was proposed to evaluate its performance before actual construction. This report describes the design, execution, and results of the model study, which led to the eventual acceptance of the proposed ICS by the U.S. Army Engineer District, Buffalo.

45-935
In-situ detection of contaminant plumes in ground water.
Seitz, W.R., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Aug. 1990, SR 90-27, 12p., ADA-228 409, 53 refs.
Ground water, Water pollution, Spectroscopy, Hydrocarbons, Ions.
Ground-water contaminants can be detected in situ by making spectroscopic measurements through fiber optics. In addition to direct measurements, it is possible to couple fiber optics with chemical indicators that interact with the contaminants to enhance their detectability. Direct fluorescence measurements have been used to sensitively detect aromatic hydrocarbons in fossil fuels. Direct Raman measurements are also possible but can only detect relatively high concentrations (greater than 0.1%). Parts per billion levels of nitroaromatics and halogenated hydrocarbons can be detected using indicators that react to form colored products. The rate at which the absorbance of the colored product increases is proportional to concentration. Refractive index measurements offer a rugged reversible approach to detecting organic contaminants in the low parts per million range. All of these techniques require further development before they can be reliably used on a routine basis. Other spectroscopic techniques are considered in the report, but are not considered ready for in-situ ground-water monitoring at this time.

45-936
Compendium of environmental data collected during the Iceshelf-88 exercise.
Bucca, P.J., *U.S. Naval Oceanographic and Atmospheric Research Laboratory. Technical note,* May 1990, No.32, n.p., ADA-223 518, 1 ref.
Drift stations, Underwater acoustics, Oceanographic surveys, Ice navigation, Ocean currents, Meteorological data.

45-937
Ice forces on flat, vertical indentors pushed through floating ice sheets.
Nakazawa, N., et al, *U.S. Army Cold Regions Research and Engineering Laboratory,* May 1990, SR 90-14, 62p., ADA-223 420, 37 refs.
Sodhi, D.S.
Ice loads, Ice cover strength, Ice cracks, Cracking (fracturing), Penetration tests, Impact tests.
Structures placed in an ice environment should be able to withstand the ice forces that are produced by the motion of a floating ice sheet. To observe the crushing failure of ice and to characterize the magnitude and nature of ice forces, an experimental study was conducted by pushing vertical, flat indentors through floating ice sheets made up of freshwater, columnar ice. Depending on the velocity of the indentor, ductile or brittle behavior of ice was observed. Microcracks and macrocracks were observed during the tests. The energy used to produce the maximum ice force was found to be approximately the same for different indentor velocities. The positions of the resultant forces were found to be in the center of the contact area. The area of the ice damaged by the first peak loading of the indentor was about the same, even when the indentor velocities were different. Acoustic emission signals were measured during indentation experiments, and these were found to correlate with the ice force that produces strain and microcracking in the ice.

45-938
Breaking of sea ice by ocean waves.
Allan, A.J., *Scott Polar Research Institute. Sea Ice Group. Technical report,* June 1975, No.75-1, 12p. + appends.
Ocean waves, Ice breakup, Ice water interface, Sea ice, Ice edge, Ice cover strength.

45-939
Antarctic automatic weather station data for the calendar year 1989.
Keller, L.M., et al, Madison, University of Wisconsin, Sep. 1990, 354p.
Weidner, G.A., Stearns, C.R.
Meteorological data, Weather stations, Air temperature, Atmospheric pressure, Wind velocity, Wind direction.

45-940
East Greenland ice extent 1982-86 and the occurrence of ice edge mesoscale features.
Cowan, A.M., et al, *Scott Polar Research Institute. Sea Ice Group. Technical report,* 1987, No.87-1, 7p + appends., 2 refs.
Wadhams, P., Schofield, M., Heap, R., Jackson, M., Southern, R.
Ice edge, Sea ice distribution, Ice surveys, Ocean currents.

45-941
Experimental study of wave-ice interaction and floe flexure in the pack ice of the Labrador current.
Wadhams, P., et al, *Scott Polar Research Institute. Sea Ice Group. Technical report,* 1984, No.84-1, n.p., 20 refs.
Cowan, A.M., Allan, A.J.
Ocean waves, Ice water interface, Ice edge, Ice floes, Analysis (mathematics), Ice cover strength, Flexural strength.

45-942
MIZEX 83 data summary.
Squire, V.A., et al, *Scott Polar Research Institute. Sea Ice Group. Technical report,* 1983, No.83-1, 154p.
Wadhams, P., Cowan, A.M., O'Farrell, S.P., Weintraub, R.
Ice edge, Sea ice distribution, Ice surveys, Oceanographic surveys.

45-943
Preliminary report on field operations in the Bering Sea during spring 1979.
Squire, V.A., *Scott Polar Research Institute. Sea Ice Group. Technical report,* 1979, No.79-2, 27p., 8 refs.
Ocean waves, Ice water interface, Ice edge, Ice floes, Bering Sea.

45-944
Data report on the Weddell Ice Dynamics Experiment.
Crane, D.R., et al, *Scott Polar Research Institute. Sea Ice Group. Technical report,* 1990, No.90-2, n.p., 4 refs.
Bull, D.
Drift stations, Drift, Ocean currents, Wind velocity, Oceanographic surveys, Meteorological data, Antarctica—Weddell Sea.
Eleven drifting buoys were launched in the Weddell Sea in Feb., Mar., and Oct. 1989, in an area from about 10W to 54W and 67S to 75S, to measure atmospheric pressure, air temperature, water temperature, wind speed, wind direction, current speed, current direction, ice temperature, and ice orientation. The current speed averaged between .02 and .03 of the wind speed over short intervals and .028 over the long term.

45-945
Literature survey and report on arctic pollution including investigation of the ozone depletion.
Blackburn, D., et al, *Scott Polar Research Institute. Sea Ice Group. Technical report,* 1990, No.90-1, 24p.
Davis, N.
Bibliographies, Air pollution, Water pollution.

45-946
Melting and mixing processes near icebergs and in ice covered regions.
Gilmour, P., *Scott Polar Research Institute. Sea Ice Group. Technical report,* Sep. 1990, No.90-1, 34p., 39 refs.
Ice water interface, Meltwater, Sea water, Ice melting, Water temperature, Salinity, Underwater acoustics, Analysis (mathematics), Icebergs.

45-947
Comparative study of the oceanic temperature, salinity and sound-speed fields near ice faces.
Sykes, P., *Scott Polar Research Institute. Sea Ice Group. Technical report,* 1989, No.89-4, 16p. + appends., 13 refs.
Underwater acoustics, Ice water interface, Sound transmission, Water temperature, Salinity.

45-948
Antarctic iceberg size distribution: icebergs produced by the Wordie Ice Shelf.
Sykes, P., *Scott Polar Research Institute. Sea Ice Group. Technical report,* 1989, No.89-3, 18p. + figs., 19 refs.
Icebergs, Ice surveys, Statistical analysis, Antarctica—Wordie Ice Shelf.
The size distribution of 2330 out of 2510 icebergs calved from the Wordie Ice Shelf was determined from a satellite image taken on Feb. 24, 1988. Seventeen icebergs over 3 km long and 163 less than 300 square meters in area were not included. The 2330 icebergs ranged in length from 29.0 m to 2945.8 m with an average of 321 m and in width from 10.3 m to 1781.8 m with an average of 151 m.

45-949
Iceberg data report.
Hirst, J.F., et al, *Scott Polar Research Institute. Sea Ice Group. Technical report,* July 1989, No.89-2, 79p., 4 refs.
Beard, M., Williams, R.G.
Icebergs, Ice water interface, Oceanographic surveys.

45-950
Measurements of strain in sea ice during FRAM 3.
Williams, R.G., et al, *Scott Polar Research Institute. Sea Ice Group. Technical report,* 1989, No.89-1, 7p. + appends., 3 refs.
Moore, S.C., Wadhams, P., Beard, M.
Ocean waves, Ice water interface, Ice cover strength.

45-951
Salinity history of the northern Atlantic during the last deglaciation.
Broecker, W.S., *Paleoceanography,* Aug. 1990, 5(4), p.459-467, 22 refs.
Paleoclimatology, Glacier melting, Salinity, Meltwater, Sea water.

45-952
Salt oscillator in the glacial Atlantic? 1. The concept.
Broecker, W.S., et al, *Paleoceanography,* Aug. 1990, 5(4), p.469-477, 37 refs.
Bond, G., Klas, M., Bonani, G., Wolfli, W.
Salinity, Paleoclimatology, Climatic changes, Glacier melting, Meltwater, Sea water, Ice cores, Ocean currents.

45-953
Surface sediment diatom distribution and Holocene paleotemperature variations in the Greenland, Iceland and Norwegian Sea.
Koc Karpuz, N., et al, *Paleoceanography,* Aug. 1990, 5(4), p.557-580, 64 refs.
Schrader, H.
Paleoclimatology, Climatic changes, Plankton, Bottom sediment, Marine deposits, Water temperature, Surface temperature, Drill core analysis.

45-954
Airborne trace metals in snow on the Japan Sea side of Japan.
Ecker, F.J., et al, *Atmospheric environment,* 1990, 24A(10), p.2593-2600, 23 refs.
Hirai, E., Chohji, T.
Snow impurities, Aerosols, Chemical analysis, Metals, Sampling, Atmospheric circulation, Japan.

45-955
Major element chemistry, *delta 2*H, *delta 18*O and Sr-87/Sr-86 in a snow profile across central Scandinavia.
Andersson, P., et al, *Atmospheric environment,* 1990, 24A(10), p.2601-2608, 25 refs.
Löfvendahl, R., Åberg, G.
Snow composition, Snow impurities, Atmospheric composition, Chemical analysis, Sampling, Air pollution, Scandinavia.

45-956
Predicting roof snow loads on gabled structures.
Sack, R.L., et al, *Journal of structural engineering,* Oct. 1990, 116(10), p.2763-2779, 20 refs.
Giever, P.M.
Roofs, Snow loads, Forecasting, Sliding, Buildings, Computerized simulation, Mechanical tests.

45-957
Transfer of hydrogen from NADPH to NAD+ in frozen aqueous solution.
Aso, Y., et al, *Agricultural and biological chemistry,* 1990, 54(8), p.2187-2188, 7 refs.
Yamasaki, N., Hatakeyama, T., Gotoh, S.
Frozen liquids, Solutions, Hydrogen, Chemical analysis, Low temperature research.

45-958
Study of the frozen water-poly(vinyl alcohol) system by H-2 and C-13 NMR spectroscopy.
Gusev, D.G., et al, *Magnetic resonance in chemistry,* 1990, Vol.28, p.651-655, 14 refs.
Lozinskiĭ, V.I., Vainerman, E.S., Bakhmutov, V.I.
Frozen liquids, Solutions, Water structure, Molecular energy levels, Ice spectroscopy, Polymers, Unfrozen water content, Nuclear magnetic resonance.

45-959
Scientists discover problems using Chernobyl fallout for dating the Greenland ice sheet.
Dibb, J.E., *Earth in space,* Nov. 1989, 2(3), p.8-9, 1 ref.
Ice sheets, Ice dating, Fallout, Sampling, Snow composition, Radioactivity, Snow stratigraphy, Greenland.

45-960
Climate change, hydrology, and water resources.
Gleick, P.H., *Reviews of geophysics,* Aug. 1989, 27(3), p.329-344, Refs. p.341-344.
Climatic changes, Hydrologic cycle, Water reserves, Environment simulation, Carbon dioxide, Runoff.

45-961
Discussion of Hirano and Aniya's (1988,1989) explanation of glacial-valley cross profile development.
Harbor, J.M., et al, *Earth surface processes and landforms,* June 1990, 15(4), p.369-381, Includes original authors' reply. 28 refs. For article being discussed see 44-55.
Hirano, M., Aniya, M.
Glacial erosion, Glacier friction, Valleys, Geomorphology, Glaciology.

45-962
Climate of the last thousand years. [Le climat des mille dernières années],
Jones, P.D., *Recherche,* Mar. 1990, 21(219), p.304-312, In French. 29 refs.
Climatic changes, Climatology, Air temperature, Glacier oscillation, Temperature measurement.

45-963
Structure of water. [La Structure de l'eau],
Eagland, D., *Recherche,* May 1990, 21(221), p.548-552, In French. 20 refs.
Water structure, Molecular structure, Ice crystal structure, Hydrogen bonds.

45-964
Water cycle and climate. [Le cycle de l'eau et le climat],
Peixoto, J.P., et al, *Recherche,* May 1990, 21(221), p.570-579, In French. 14 refs.
Oort, A.H.
Hydrologic cycle, Water balance, Climatic factors, Atmospheric circulation, Climatology.

45-965
Observations of wave/ice interactions and ambient noise generation in the Marginal Ice Zone.
Rottier, P., *Scott Polar Research Institute Sea Ice Group. Technical report,* 1989, 89-5, 36 leaves, 34 refs.
Sea ice, Ice acoustics, Ice edge, Sound transmission, Ice breaking, Ice water interface, Fracturing, Ice cover effect, Wave propagation.

45-966
When the melting and freezing points are not the same.
Berry, R.S., *Scientific American,* Aug. 1990, 263(2), p.68-74, 7 refs.
Solids, Melting points, Freezing points, Solid phases, Liquid phases, Molecular structure, Computerized simulation, Temperature effects, Phase transformations.

45-967
Two-dimensional numerical modelling of large motions of floating bodies in waves.
Sen, D., et al, International Conference on Numerical Ship Hydrodynamics, 5th, Hiroshima, Japan, Sep. 25-29, 1989. Pt. I, 1989, p.257-277, 42 refs.
Pawlowski, J.S., Lever, J.H., Hinchey, M.J.
Ships, Hydrodynamics, Wave propagation, Water waves, Computerized simulation, Viscosity, Floating structures ϕ60 $MP 2786.
A numerical method is described which simulates in the time domain the propagation of steep two dimensional periodic waves and the large motions induced by the waves on free floating bodies. The method allows for mild transient phenomena. In addition to several numerical results, computations of the sway forces and the roll and heave motions induced by steep periodic waves on a floating body restrained in the sway mode are presented and compared with the results of specially conducted model tests

45-968
Determination of the fluid-elastic stability threshold in the presence of turbulence: a theoretical study.
Lever, J.H., et al, *Journal of pressure vessel technology,* Nov. 1989, Vol.111, MP 2787, p.407-419, 27 refs.
Rzentkowski, G.
Fluid flow, Turbulent flow, Pipes (tubes), Stability, Fatigue (materials), Vibration, Heat transfer, Elastic properties.
A model has been developed to examine the effect of the superposition of turbulent buffeting and fluid-elastic excitation on the response of a single flexible tube in an array exposed to cross-flow. Turbulence is shown to have a significant effect on the determination of the stability threshold for the array. Different stability criteria are compared, and an attempt is made to provide some guidance in the interpretation of response curves from actual tests.

45-969
Effects of pH and freeze-thaw on photosynthetic oxygen evolution of photosystem II particles incorporated into phosphatidylglycerol bilayers.
Nénonéné, E.K., et al, *Journal of plant physiology,* 1990, Vol.136, p.615-620, 31 refs.
Fragata, M.
Plant physiology, Photosynthesis, Freeze thaw tests, Oxygen, Chemical properties, Hydrogen bonds.

45-970
Solidification of an alloy cooled from above: Part 1. Equilibrium growth.
Kerr, R.C., et al, *Journal of fluid mechanics,* July 1990, Vol.216, p.323-342, 19 refs.
Woods, A.W., Worster, M.G., Huppert, H.E.
DLC QA901.J87
Solutions, Solid phases, Freezing, Convection, Liquid cooling, Mathematical models, Thermodynamic properties, Metals.

45-971
Cryogenic precipitation of calcium carbonate: myth or reality. [Précipitations cryogèniques de carbonates de calcium: mythe ou réalité],
Van Vliet-Lanoë, B., et al, *Centre de géomorphologie de Caen. Bulletin,* June 1990, 38, p.55-65, In French with English summary. 30 refs.
Dumont, J.L., Verrecchia, E.
Minerals, Geologic processes, Geocryology, Ice lenses, Solids.

45-972
Analysis of the hydrogen bond in ice.
White, J.C., et al, *Journal of chemical physics,* Dec. 1, 1990, 93(11), p.8029-8035, 19 refs.
Davidson, E.R.
Ice structure, Molecular structure, Hydrogen bonds, Molecular energy levels, Ice physics, Charge transfer.

45-973
Boundary integral approach to unstable solidification.
Strain, J., *Journal of computational physics,* Dec. 1989, 85(2), p.342-389, 59 refs.
Stefan problem, Supercooling, Liquid cooling, Liquid phases, Liquid solid interfaces, Analysis (mathematics), Phase transformations.

45-974
Antifreeze admixtures for cold regions concreting: a literature review.
Korhonen, C.J., *U.S. Army Cold Regions Research and Engineering Laboratory,* Sep. 1990, SR 90-32, 14p., ADA-228 560, 35 refs.
Winter concreting, Concrete admixtures, Antifreezes.
Winter concreting practices in the U.S. are geared toward assuring that chemical admixtures can be used to depress the freezing point of mix water, thereby allowing cement to hydrate at below-freezing temperatures. With these admixtures, strength gain at low temperature lags that of additive-free concrete at room temperature, but nevertheless, strength gain is significant. Though questions still remain on the short- and long-term effects of these admixtures on concrete, they appear to offer an economical alternative to conventional concreting practices.

45-975
Longitudinal floating ice control structures: a new concept for reducing ice jam flood levels.
Calkins, D.J., *U.S. Army Cold Regions Research and Engineering Laboratory,* Sep. 1990, CR 90-07, 9p., ADA-228 561, 14 refs.
Ice control, Ice jams, River ice, Floating structures, Ice booms.
A floating ice control structure placed in the streamwise direction of a river was analyzed to determine its effectiveness in reducing ice jam thicknesses. The theory describing the thickness for river ice jams was modified to analyze these longitudinal structures, providing the computational verification that ice jam thicknesses could be reduced where the mode of thickening

is internal collapse. These longitudinal structures may provide a new tool to use in modifying the river ice regime, both at freeze-up and break-up. The concept was applied to the Salmon River at Salmon, Idaho, where it was estimated that a 0.9 m drop in river stage was possible using one structure in the center of the channel.

45-976

Laboratory test for measurement of adhesion strength of spray ice to coated flat plates.

Mulherin, N.D., et al, *U.S. Army Cold Regions Research and Engineering Laboratory,* May 1990, CR 90-02, 44p., ADA-228 559, 17 refs.

Richter-Menge, J.A., Tantillo, T.J., Gould, L.D., Durell, G.D., Elder, B.C.

Ship icing, Sea spray, Ice adhesion, Chemical ice prevention, Protective coatings, Ice removal, Laboratory techniques.

Four commercial icephobic coatings were selected as candidates for preventing and/or easing the removal of seaspray and atmospheric icing on shipboard superstructures. This study was undertaken to compare the force required to shear freshwater ice from flat test plates coated with the candidate materials. Twelve replicates each of the four different coatings and two different control surfaces (a total of 72 samples) were subjected to laboratory spray icing. The samples were iced and shear tested at -10 +/- 1 C at a constant crosshead displacement rate of 0.0381 cm/s. This shear rate was higher by at least an order of magnitude than that in most previous shear studies, ensuring a brittle failure at the ice/coating interface. The method produced virtually 100% ice/coating adhesion in every test, which eliminated analysis problems associated with cohesive failure. Results showed that all four of the experimental coatings exhibited higher mean shear values than either of the two controls. Although the mean shear values for the various coatings were very similar in absolute magnitude, ranging from 71 to 119 kPa, statistical analysis showed a significant difference in surface performance with greater than 97% confidence.

45-977

Electrical conductivity and pH in snow and ice samples from various glacier areas.

Kamiyama, K., et al, *Antarctic record,* July 1990, 34(2), p.119-129, 8 refs.

Fujii, Y., Watanabe, O., Yamada, T.

Glaciers, Electrical resistivity, Ice composition, Snow composition, Antarctica—Showa Station.

Electrical conductivity (EC) and pH of melted snow and ice samples from Nepal, Patagonia, arctic regions and Antarctica are compared. Most samples showed regional differences in means and ranges of EC and pH values. Low concentrations of dissolved substances, however, were accompanied by low ECs and approximately constant pH values, independent of the regions. Higher values of EC brought about regional pH differences. The pH increased with higher EC values in coastal Antarctica (Showa Station), Nepal and Patagonia. In contrast, pH decreased with the increased EC in snow from inland Antarctica. The values of EC and pH in the Greenland samples are similar to those in the inland region of Antarctica. (Auth. mod.)

45-978

Note on the natural remanent magnetizations of dirt-ice layers collected from the bare ice field in East Antarctica.

Funaki, M., *Antarctic record,* July 1990, 34(2), p.131-138, 16 refs.

Colored ice, Remanent magnetism, Impurities, Antarctica—East Antarctica.

Natural remanent magnetizations (NRMs) of 5 dirt-ice layers including tephra collected from the Allan Hills in Southern Victoria Land, the Yamato Mountains and the Sör Rondane Mountains were investigated. Magnetization was measured only in the dirt-ice layers recognized by the naked eye; magnetizations in the clear-ice were weak for any significant measurements. The uniform NRM directions were obtained in the dirt-ice layers with upward directions. Those of the oriented 2 samples (A, E) were almost parallel to the present geomagnetic field direction *in situ.* A possible mechanism is rearrangement of the magnetic grains adjusting the NRM directions to the geomagnetic field direction due to partial melting of the ice around the grains by solar radiation. (Auth. mod.)

45-979

Variation of the vertical distribution of the sea ice temperature near Syowa Station, Antarctica from September 1984 to January 1985.

Matsuda, O., et al, *Antarctic record,* July 1990, 34(2), p.139-144, 10 refs.

Ishikawa, S., Kawaguchi, K., Nishizawa, H.

Sea ice, Ice temperature, Temperature distribution, Antarctica—Showa Station.

Monthly observation of vertical distribution of sea ice temperature was carried out near Showa Station from Sep. 1984 to Jan. 1985. Ice thickness varied between 139 cm and 155 cm. Since the bottom ice temperature resembled the underlying seawater temperature, while the surface ice approached the air temperature, distribution of temperature generally showed a steep gradient across the ice. Ice temperature at the surface and the bottom varied from -15.2 to -0.3 C and from -2.0 to -0.3 C, decreasing with depth. The minimum ice temperature rose from Sep. to Jan. (Auth. mod.)

45-980

Borehole drilling for sewage disposal and rise of the hole's bottom at Asuka Station, East Antarctica.

Ishizawa, K., et al, *Antarctic record,* July 1990, 34(2), p.145-155, In Japanese with English summary. 10 refs.

Takeuchi, S., Takahashi, A.

Boreholes, Borehole instruments, Thermal drills, Sewage disposal, Polar regions, Antarctica—Asuka Station.

A borehole for sewage disposal was drilled in the snow at Asuka Station in Jan. 1987. The borehole, 400 mm in diameter and 27.5 m in depth, was drilled at 50 m apart form the main hut using a steam drilling system. The drilling speed was 4 m/h between the surface to 20 m depth. Total amount of kerosene used for melting snow and steam generation was 110 liters. Sewage stored in 3 tanks is directed to the borehole through a heated pipe. The bottom of the borehole rose about 7 m in the first 5 months; after that the rising speed decreased gradually. The bottom rose 11.6 m up during a period of 3 years when 594 kl waste water was discharged. If we assume the contaminated area is cone-shaped, the cone's radius is calculated as 13.7 m. (Auth.)

45-981

Field surveys on terrestrial biology in the vicinity of Syowa Station, East Antarctica, 1986-1987 (JARE-27).

Inoue, M., et al, *Antarctic record,* July 1990, 34(2), p.156-174, In Japanese with English summary. 3 refs.

Sato, Y., Naito, Y.

Cold storage, Cold weather construction, Antarctica—Showa Station.

Field surveys of terrestrial biology, carried out Jan. 1986-Feb. 1987 in conjunction with a 5 year study of the antarctic ecosystem in the ice free areas near Showa Station, are described. A biological observation hut was constructed at the mouth of the Yukidori Valley; plans of the interior and roof of the hut are presented. A large number of samples for taxonomic studies of lichens were collected along the Soya and Prince Olav coasts.

45-982

Report of the glaciological field party in the Sör Rondane Mountains region, 1989-1990 summer season (JARE-31).

Motoyama, H., et al, *Antarctic record,* July 1990, 34(2), p.225-234, In Japanese with English summary. 1 ref.

Azuma, N., Decleir, H., Huybrechts, P.

Glacier flow, Glacier mass balance, Meteorological data, Antarctica—Sör Rondane Mountains.

The summer party of JARE-31 carried out maintenance of automatic meteorological stations, glaciological and weather observations, and drilling tests from late Dec. 1989 to Jan. 1990, in the Sör Rondane Mountains region. Three prototypes of electromechanical ice drills for deep core sampling, using antifreezing liquid, were successfully tested on Jennings Glacier, and the dynamics of glacier movement were studied. Mass balance measurements were conducted on glaciers of Brattnipane Peaks. (Auth. mod.)

45-983

Dangerous wind velocities and glaze icing in mountainous regions. [Opasnye skorosti vetra i gololednye otlozheniia v gornykh raĭonakh]

Podrezov, O.A., Leningrad, Gidrometeoizdat, 1990, 222p., In Russian. 181 refs.

Icing, Wind factors, Glaze, Ice loads, Wind velocity, Statistical analysis.

45-984

Concrete structures with nonmetallic reinforcements. [Betonnye konstruktsii s nemetallicheskim armirovaniem]

Saliia, G.Sh., et al, Moscow, Stroiizdat, 1990, 143p. (Pertinent p.88-96), In Russian. 63 refs.

Shagin, A.L.

Concrete strength, Reinforced concretes, Cold weather performance.

45-985

Improving the strength of gas pipelines under complicated conditions. [Povyshenie prochnosti gazoprovodov v slozhnykh usloviiakh]

Kharionovskiĭ, V.V., Leningrad, Nedra, 1990, 179p., In Russian. 98 refs.

Gas pipelines, Frozen ground mechanics, Underground pipelines, Frost heave, Analysis (mathematics).

45-986

Radar sounding of the surface of the Earth from space. [Radiolokatsiia poverkhnosti Zemli iz kosmosa]

Nazirov, M., et al, Leningrad, Gidrometeoizdat, 1990, 200p., In Russian. 237 refs.

Pichugin, A.P., Spiridonov, IU.G.

Radar echoes, Remote sensing, Ice shelves, Radar photography, Glaciers, Spaceborne photography, Side looking radar, Sea ice, Ice cover, Land ice, Fast ice, Icebergs, Maps.

This book presents the results of scientific and engineering investigations concerned with the design and operation of side-looking radar (SLR) on board Soviet environmental satellites. Physical and technical characteristics of SLR and other satellite sensors have been compared, and algorithms of SLR calibration and digital data processing have been analyzed. Scientific and methodological problems in obtaining data from ocean surfaces, and sea and land ice cover, are discussed in detail. The final chapter is devoted to the characteristics of land ice: radioglaciological landscapes of Antarctica, eolian mesostructures of antarctic glacier surfaces, radar observations from space of the dynamics of ice shelves and the drift of icebergs in Antarctica, and an analysis of radar maps of ice cover in Greenland. (Auth. mod.)

45-987

Seasonal growth bands in pingo ice.

Mackay, J.R., *Canadian journal of earth sciences,* Aug. 1990, 27(8), p.1115-1125, With French summary. 45 refs.

Pingos, Ice growth, Seasonal variations, Ice structure, Permafrost heat transfer, Ice composition, Geochemistry, Isotope analysis.

45-988

Quantifying freeze/thaw-induced variability of soil strength.

Kok, H., et al, *American Society of Agricultural Engineers. Transactions,* Mar.-Apr. 1990, 33(2), p.501-506, 26 refs.

McCool, D.K.

Soil strength, Freeze thaw cycles, Shear strength, Soil tests, Soil water, Agriculture.

45-989

Ice under pressure.

Chang, R., et al, *Journal of chemical education,* Sep. 1990, 67(9), p.789-790, 1 ref.

Skinner, J.F.

Ice melting, Ice pressure, Experimentation, Melting points, Education.

45-990

Permafrost and other frozen ground.

Williams, P.J., *Endeavour,* 1990, 14(3), p.117-123, 15 refs.

Soil freezing, Ground thawing, Frozen ground thermodynamics, Permafrost structure, Frozen ground mechanics, Porosity, Climatic changes.

45-991

Observations on falling motion of natural ice crystals. [Osservazioni sulla dinamica di caduta di cristalli di ghiaccio atmosferici]

Ferrari, A., et al, *Revista di meteorologia aeronautica,* July-Dec. 1989, 49(3-4), p.137-146, In Italian with French and English summaries. 16 refs.

Miserocchi, M.

Precipitation (meteorology), Snow crystals, Ice crystal size, Velocity measurement, Ice crystal structure, Fluid flow.

45-992

Equation of state and metallization of ice under very high pressure.

Hama, J., et al, *Journal of physics: condensed matter,* Oct. 8, 1990, 2(40), p.8107-8111, 14 refs.

Shiomi, Y., Suito, K.

Ice physics, High pressure ice, Phase transformations, Molecular structure, Extraterrestrial ice, Latticed structures.

45-993

Elastic properties of a tungsten monocarbide-based metalloceramic at low temperatures.

Ul'ianov, V.L., et al, *Glass and ceramics,* Mar-Apr. 1990, 47(3-4), p.93-95, Translated from Steklo i keramika, Mar. 1989. 6 refs.

Botaki, A.A., Nesterenko, V.P., Chernov, I.P.

Cermets, Elastic properties, Low temperature tests, Temperature effects, Construction.

45-994

On determining ice accumulation rates in the past 40,000 years using *in situ* cosmogenic C-14.

Lal, D., et al, *Geophysical research letters,* Aug. 1990, 17(9), p.1303-1306, 21 refs.

Jull, A.J.T.

Ice dating, Ice sheets, Radioactive age determination, Accuracy, Ice accretion, Radiation absorption, Atmospheric composition, Ice composition.

45-995

Reflection cracking studies at Thule Air Base, Greenland using AC 2.5 and fabrics.

Eaton, R.A., et al, *Association of Asphalt Paving Technologists Technical Sessions. Proceedings,* Feb. 1980, Vol.49, MP 2785, p.381-396, 7 refs.

Godfrey, R.N.

DLC TE270.A8

Runways, Cracking (fracturing), Pavements, Countermeasures, Cold weather performance, Bituminous concretes, Interfaces, Greenland—Thule Air Base.

45-996
Endogenic model of permanent variations in the climate of the Earth. [Endogennaia model' vekovoĭ izmenchivosti klimata Zemli].
Kovalenko, V.D., et al, *Sredneaziatskiĭ regional'nyĭ nauchno-issledovatel'skiĭ gidrometeorologicheskiĭ institut. Trudy*, 1990, Vol.133, p.111-124, In Russian. 9 refs.
Kizim, L.D., Nikolaev, V.G., Pashestiuk, A.M.
Climatic changes, Temperature variations, Paleoclimatology, Sea ice, Glacier melting.

45-997
Long range forecasting of runoff from the Murgab and Tedzhen Rivers during the growing season. [Dolgosrochnyĭ prognoz vegetatsionnogo stoka rek Murgab i Tedzhen].
Shentsis, I.D., et al, *Sredneaziatskiĭ regional'nyĭ nauchno-issledovatel'skiĭ gidrometeorologicheskiĭ institut. Trudy*, 1990, Vol.133, p.129-144, In Russian. 6 refs.
Long range forecasting, Runoff, Rivers, Snow depth, Snow accumulation, Synoptic meteorology.

45-998
Model study of the wave-driven impact of bergy bits with a semi-submersible platform.
Lever, J.H., et al, *Journal of offshore mechanics and arctic engineering*, Nov. 1990, Vol.112, MP 2788, p.313-322, 21 refs. For another version see 43-2650.
Colbourne, B., Mak, L.M.
Icebergs, Ice loads, Offshore structures, Impact tests, Ocean waves, Hydraulic structures, Analysis (mathematics).
This paper describes model bergy bit (semi-submersible impact tests conducted in the 58 m wave tank at Memorial University. The objective of the tests was to develop a method to accumulate statistics on the locations and velocities of wave-driven iceberg/structure impacts. A single irregular sea state was used and 30 trials were conducted in each test series to accumulate the desired statistics. During each run, a camera system tracked the motions of both the bergy bit and the semi-submersible. This data and the geometry of both bodies was transferred to a CAD (computer-aided design) facility, which then recreated each test by redrawing the positions of the two bodies at each time step. In this manner, the impact locations and times without the obstruction of the water surface were determined, and the desired impact velocities and kinetic energies were computed. This paper describes the test and analysis techniques, and presents results for one test series. It also describes a new method to estimate impact kinetic energies using only open-water velocity data.

45-999
Highway snow control research in Japan.
Itagaki, K., *U.S. Army Cold Regions Research and Engineering Laboratory*, Sep. 1990, SR 90-33, 60p., ADA-228 937, 129 refs.
Snow removal, Road maintenance, Artificial melting, Research projects, Snow melting, Snow fences, Japan.
The wide range of Japanese efforts to control snow and ice on highways is reviewed. Many studies parallel U.S. and European research, but extensive basic studies of applications of modern high technology are noted as well.

45-1000
Oil contamination of antarctic ice. [La contaminación por petróleo en el hielo antártico].
Ventajas, L., et al, *Buenos Aires. Instituto Antártico Argentino. Contribución*, 1990, No.381, 23p., In Spanish with English, German and French summaries.
Genest, E.
Sea ice, Impurities, Ice composition, Oil spills.
The effects and political and environmental implications of oil spills in antarctic waters are analyzed, considering the sea ice as a source of contamination, accumulation, and a probable vehicle for the diffusion of contaminants. The existing agreements and regulations of the Antarctic Treaty System regarding pollution from oil spills and the effects on the sea ice are examined. The permeation of sea ice by carcinogenic polynucleate hydrocarbons, or their equally harmful derivatives, and the far-reaching consequences to the marine environment and its ecosystems, are discussed. (Auth. mod.)

45-1001
Heating and melting of small icy satellites by the decay of Al-26.
Prialnik, D., et al, *Astrophysical journal*, May 20, 1990, 355 (1-pt.1), p.281-286, 33 refs.
Bar-Nun, A.
Extraterrestrial ice, Ice melting, Ice composition, Ice models, Radioactive isotopes, Thermal radiation.

45-1002
Physical and infrared spectral properties of CO2 in astrophysical ice analogs.
Sandford, S.A., et al, *Astrophysical journal*, May 20, 1990, 355(1-pt.1), p.357-372, 71 refs.
Allamandola, L.J.
Extraterrestrial ice, Carbon dioxide, Ice spectroscopy, Infrared spectroscopy, Ice composition, Spectra, Condensation, Simulation.

45-1003
Proceedings of the International Symposium on Antarctic Research.
Guo, K., ed, Tianjin, China Ocean Press, 1989, 540p., Refs. passim. For individual papers see A-42967, B-42998 through B-43009, B-43011, E-42973, E-42975 through E-42987, E-42989 through E-42992, E-42995, F-42968 through F-42972, F-42974, H-43012 through H-43014, I-43019, I-43021 through I-43026, I-43034, J-43010, J-43015 through J-43018, K-42996, K-43020, K-43027 through K-43033, K-43035, L-42988, L-42993, L-42994, L-42997, or 45-1004 through 45-1012.
Chinese Committee on Antarctic Research.
Meetings, Research projects.
This volume contains a collection of papers presented at the International Symposium on Antarctic Research, mainly by Chinese scientists working in the areas of glaciology, geography, geology, geophysics, biology, medicine, physical and chemical oceanography, meteorology, and upper atmospheric physics. Much of the data reported was obtained at the Great Wall Station.

45-1004
Physical characteristics of the snow and ice cover of Law Dome, East Antarctica.
Xie, Z., et al, International Symposium on Antarctic Research. Proceedings, Tianjin, China Ocean Press, 1989, p.8-22, 32 refs.
Li, J., Young, N.W.
Ice physics, Snow physics, Ice crystal size, Antarctica—Law Dome.
An outline is presented of the main snow and ice cover characteristics from data obtained during oversnow traverses at Law Dome. The Dome's ice cap is about 200 km in diameter with a maximum surface elevation of 1390 m. There is strong east-west gradient in accumulation rate across the ice cap, from values in excess of 1000 kg sq m/a in the east to 0-250 kg sq m/a in the west. This variation in accumulation rate has a dominant influence on the distribution of physical properties and attributes of the ice cap. The distribution of ice formation zones is asymmetric: the elevation of boundaries between the zones is much lower on the east than on the west side. Surface velocity of the ice cap is much greater in the east than in the west. Mean annual surface temperature varies linearly with elevation over a narrow range from -9 to -21 C. The average densification rate in the firn layer varies linearly with accumulation rates on Law Dome. Measurements of crystal growth rate in firn suggest that, at temperatures warmer than -20 C, the activation energy parameter for this process is dependent on temperature. Analyses of deep ice cores show that the distribution within the ice cap of the properties of crystal size and c-axis orientation are primarily determined by the dynamics of the cap. (Auth. mod.)

45-1005
Measurement of ice thickness on the Nelson Island ice sheet.
Qian, S., et al, International Symposium on Antarctic Research. Proceedings, Tianjin, China Ocean Press, 1989, p.28-32, 2 refs.
Liu, C.
Ice cover thickness, Radio echo soundings, Antarctica—Nelson Island.
During the summer season of 1987-1988, radio-echo sounding measurements of the Nelson I. ice sheet showed two sections of 14.7 km in total length, consisting of 148 measuring points and showing a clear bedrock pattern. The pattern of Section "E" is different from that of Section "N" because of the different directions of ice movement. The maximum thickness of the Nelson I. ice sheet is 169 m at Point E86, the average ice thickness is about 120 m. (Auth. mod.)

45-1006
Development of ice crystal anisotropy in shear and comparisons of flow properties in shear and compression.
Gao, X., et al, International Symposium on Antarctic Research. Proceedings, Tianjin, China Ocean Press, 1989, p.32-40, 15 refs.
Jacka, T.H., Budd, W.F.
Ice cores, Ice crystal structure, Anisotropy, Compressive properties, Shear strain, Antarctica—Law Dome.
Simple shear and uniaxial compression experiments were performed on several laboratory prepared ice samples. Three crystal orientation fabrics obtained at 240 m depth from the ice core extracted from BHF, near the coast of Law Dome, are shown. At this depth, a peak of high shear zone was observed. Also shown are 3 crystal orientation fabric plots from the laboratory experiments. The fabric developed from the laboratory experiments is similar to that exhibited in the high shear zone in the ice core. Although the development of a particular crystal anisotropy may not be unique to a particular stress configuration, it seems likely that the laboratory and field fabrics illustrated have been developed under similar stress configurations, i.e. simple shear to strains in excess of about 0.

45-1007
Ice crystal orientation fabrics and related glaciological parameters from neighbouring antarctic core sites.
Jacka, T.H., et al, International Symposium on Antarctic Research. Proceedings, Tianjin, China Ocean Press, 1989, p.41-52, 24 refs.
Gao, X.
Ice cores, Ice crystal structure, Shear stress, Antarctica—Law Dome.
Crystal orientation fabrics and related data are presented from 2 ice cores drilled near the summit of Law Dome. Small circle girdle crystal orientation fabrics, indicative of an internal stress configuration consisting predominantly of compression, are exhibited by the core from site A001. The surface and bedrock elevation data suggest that A001 is a near stationary summit point on Law Dome. Although site BHD is only 1 km from site A001, the BHD crystal orientation fabrics exhibit single maximum patterns, suggesting an internal stress configuration dominated by simple shear. Site BHD is lower than A001, and apparently is sufficiently removed from the stationary point for strains in shear to have developed this fabric pattern. By analyzing annual layer thicknesses (obtained from oxygen isotope values) the vertical strain in the two ice cores is calculated. The importance of examining the development of ice crystal orientation fabrics with respect to the stress configuration and the total strain undergone is emphasized. (Auth. mod.)

45-1008
Structural characteristics of snow firn at the surface part on Law Dome ice cap, Antarctica.
Han, J.K., et al, International Symposium on Antarctic Research. Proceedings, Tianjin, China Ocean Press, 1989, p.53-63.
Young, N.W.
Ice crystal structure, Firn, Ice cores, Antarctica—Law Dome.
The visual and inner structural characteristics of snow firn above the firn-ice transition depth at the surface part of Law Dome ice cap has been investigated by the analysis of 4 cores collected from different ice formation zones. Results of measurements show that the snow firn density variation at each ice formation zone can be described as a quadric curve against depth, and the firn-ice transition depths increase as the zones change from wet to dry. Generally, the crystal size of snow firn increases with depth. The fabric feature, similar to that of a temperate glacier observed in the core from wet snow zones, suggests some homogeneity of the crystal deposition and recrystallization conditions. The influence of the seasonal temperature difference and the caused temperature gradient on the recrystallization of snow firn crystals is seen. Observation did not show any other structural difference of the crystals in the thicker ice layers from that of the firn besides their bigger size. (Auth. mod.)

45-1009
Evolution of the antarctic ice sheet since Late Pleistocene.
Zhang, Q., International Symposium on Antarctic Research. Proceedings, Tianjin, China Ocean Press, 1989, p.67-73, 43 refs.
Glaciation, Glacier mass balance, Pleistocene.
Based on research carried out in the Vestfold Hills in 1981, a few correlated questions on the evolution of antarctic ice sheet, such as glacial advance and recession, climatic and sea level changes and glacial-isostatic rebound since the Late Pleistocene, are discussed. (Auth. mod.)

45-1010
Comparison of periglacial landforms between the Vestfold Hills, East Antarctica and the Fildes Peninsula of King George Island, West Antarctica.
Zhang, Q., International Symposium on Antarctic Research. Proceedings, Tianjin, China Ocean Press, 1989, p.74-81, 9 refs.
Periglacial processes, Geocryology, Freeze thaw cycles, Landforms, Antarctica—Vestfold Hills, Antarctica—Fildes Peninsula.
A comparison of main features between antarctic continental and maritime periglacial landforms is discussed, based on several years of work carried out in the Vestfold Hills. The yearly freeze thaw cycles, as a most important index to control periglacial processes, are described. (Auth. mod.)

45-1011
Antarctic periglacial environment and the formation mechanism of "sorted circles" in the Fildes Peninsula.
Cui, Z., et al, International Symposium on Antarctic Research. Proceedings, Tianjin, China Ocean Press, 1989, p.82-90.
Xie, Y., Liu, G.
Periglacial processes, Geocryology, Freeze thaw cycles, Antarctica—Fildes Peninsula.
In the Great Wall Station area, the annual average temperature is -2.2 C, the annual precipitation is 612.4 mm, and the active layer is 0.40-1.20 m thick. According to the periglacial-geomorphological development and distributional characteristics, the Fildes Peninsula and its adjacent islands may be divided into periglacial-geomorphological areas at different levels of development. This paper summarizes the developmental process and mechanism of polygon or sorted circles, and reviews the genetic features of the periglacial geomorphological development in this area.

45-1012
Australian studies in antarctic weather and climate.
Streten, N.A., International Symposium on Antarctic Research. Proceedings, Tianjin, China Ocean Press, 1989, p.411-417.
Low temperature research, Research projects, Climate.
The Antarctic Science Advisory Committee (ASAC), which has the responsibility of advising the Australian government on field and Australia-based research and monitoring programs in Antarctica, has identified 7 broad areas of scientific investigation including "Research into the role played by the antarctic in Australian and global weather and climate." In this context the research extends not only across the broad disciplines of meteorology and climatology but also into oceanography, glaciology, geochemistry and geomorphology. Research is pursued within the Australian Universities, the Commonwealth Scientific and Industrial Research Organization (CSIRO), the Bureau of Meteorology, and the Antarctic Division. Some of the programs carried out in these fields in recent years are listed. (Auth. mod.)

45-1013
Determination of alkaline earth metals in Japanese rain and snow by ICP emission spectrometry.
Dokiya, Y., et al, *International journal of environmental analytical chemistry*, 1987, 32(2), p.145-165, 4 refs.
Precipitation (meteorology), Snow impurities, Chemical properties, Sampling, Spectroscopy, Chemical analysis, Metals, Seasonal variations, Japan.

45-1014
Effect of frost heave deformations on airport pavement.
Dolinchenko, V.A., et al, *Soil mechanics and foundation engineering*, Jan.-Feb. 1990, 27(1), p.12-13, Translated from Osnovaniia, fundamenty i mekhanika gruntov, Jan.-Feb. 1990. 2 refs.
Kul'chitskiĭ, V.A., Usanov, S.A.
Runways, Pavements, Cracks, Frost heave, Deformation, Frost action.

45-1015
Thermal analysis of engine inlet anti-icing systems.
Al-Khalil, K.M., et al, *Journal of propulsion and power*, Sep.-Oct. 1990, 6(5), p.628-634, 12 refs.
Aircraft icing, Ice prevention, Jet engines, Thermal analysis, Surface temperature, Heat transfer, Drops (liquids), Air flow.

45-1016
Cross-polarized radar reflections from wet snow and ice droplets at weather radar wavelengths.
De Wolf, D.A., et al, *IEEE transactions on antennas and propagation*, Nov. 1990, 38(11), p.1843-1847, 4 refs.
Russchenberg, H.W.J., Ligthart, L.P.
Radar echoes, Wet snow, Reflectivity, Dielectric properties, Precipitation (meteorology), Analysis (mathematics), Backscattering.

45-1017
Frozen and alive.
Storey, K.B., et al, *Scientific American*, Dec. 1990, 263(6), p.92-97, 5 refs.
Storey, J.M.
Animals, Freezing, Survival, Thawing, Cryobiology, Interstitial ice, Chemical analysis.

45-1018
Effect of surface ice on solar pond performance.
Atkinson, J.F., *Solar energy*, 1990, 45(4), p.207-214, 19 refs.
Ponds, Heat sources, Ice cover effect, Ice growth, Solar radiation, Heat flux, Mathematical models, Salt water.

45-1019
Phosphatase enzyme activity at subzero temperatures in arctic tundra soils.
Neal, J.L., *Soil biology and biochemistry*, 1990, 22(6), p.883-884, 16 refs.
Tundra, Organic soils, Biomass, Nutrient cycle, Soil chemistry, Temperature effects.

45-1020
Solar heating of a stratified ocean in the presence of a static ice cover.
Perovich, D.K., et al, *Journal of geophysical research*, Oct. 15, 1990, 95(C10), MP 2790, p.18,233-18,245, 32 refs.
Maykut, G.A.
Solar radiation, Sea ice, Sea water, Radiation absorption, Meltwater, Water temperature, Ice water interface, Ice cover effect, Canada—Northwest Territories—Mould Bay.

45-1021
Anatomy of a freezing lead.
Gow, A.J., et al, *Journal of geophysical research*, Oct. 15, 1990, 95(C10), MP 2791, p.18,221-18,232, 19 refs.
Meese, D.A., Perovich, D.K., Tucker, W.B.
Sea water freezing, Ice growth, Freezeup, Ice structure, Ice composition, Ice sampling, Ice cover thickness, Ice air interface, Heat loss.

45-1022
Volume- and surface-binding energies of ice systems containing CO, CO2, and H2O.
Sandford, S.A., et al, *Icarus*, Sep. 1990, 87(1), p.188-192, 11 refs.
Allamandola, L.J.
Extraterrestrial ice, Ice physics, Ice surface, Surface energy, Ice composition, Carbon dioxide, Ice temperature, Surface properties.

45-1023
D/H on Mars: effects of floods, volcanism, impacts, and polar processes.
Carr, M.H., *Icarus*, Sep. 1990, 87(1), p.210-227, 63 refs.
Mars (planet), Extraterrestrial ice, Atmospheric composition, Surface waters, Ice sublimation, Floods, Geologic processes, Volcanoes.

45-1024
Similarity solutions for a Voellmy model of snow avalanches with finite mass.
Hutter, K., et al, *Acta mechanica*, 1990, 82(1-2), p.99-127, 13 refs.
Nohguchi, Y.
Avalanche mechanics, Avalanche modeling, Mathematical models, Rheology, Fluid flow, Friction, Basal sliding.

45-1025
Spin-lattice relaxation and molecular dynamics of supercooled water.
Zavodovskiĭ, A.G., *Russian journal of physical chemistry*, Aug. 1989, 63(8), p.1170-1172, Translated from Zhurnal fizicheskoĭ khimii, Aug. 1989. 7 refs.
Water, Supercooling, Molecular energy levels, Nuclear magnetic resonance, Low temperature research, Latticed structures.

45-1026
Anomalies in the viscosity of amorphous ice.
Shavlov, A.V., *Russian journal of physical chemistry*, Aug. 1989, 63(8), p.1206-1207, Translated from Zhurnal fizicheskoĭ khimii, Aug. 1989. 4 refs.
Amorphous ice, Viscosity, Light transmission, Temperature effects, Ice relaxation, Transparence, Low temperature research.

45-1027
Fate of N-15-labelled fertilizer applied on snow at two forest sites in British Columbia.
Preston, C.M., et al, *Canadian journal of forest research*, Oct. 1990, 20(10), p.1583-1592, With French summary. 46 refs.
Marshall, V.G., McCullough, K., Mead, D.J.
Trees (plants), Growth, Snow cover effect, Snowmelt, Soil chemistry, Nutrient cycle, Biomass, Leaching, Canada—British Columbia.

45-1028
Studies of naleds and naled processes in the USSR (principal results and prospects). [Issledovaniia naledeĭ i naledthings protsessov v SSSR (osnovnye itogi i perspektivy)],
Sokolov, B.L., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Nov. 1989, No.67, p.3-15, In Russian with English summary. 55 refs.
Alekseev, V.R., Markov, M.L., Kolotaev, V.I.
Naleds, Icing, Ice formation.

45-1029
Complex glaciological mapping in the studies of geographical regularities of glacial-nival systems. [Kompleksnoe gliatsiologicheskoe kartografirovanie pri issledovanii geograficheskikh zakonomernosteĭ nival'no-gliatsial'nykh sistem],
Khodakov, V.G., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Nov. 1989, No.67, p.17-24, In Russian with English summary. 10 refs.
Osokin, N.I., Moiseeva, G.P., Il'ina, E.A.
Mapping, Nivation, Glaciology, Snow cover distribution, Ground ice, Glaciers.

45-1030
Cartographic analysis of the interrelations in glacier systems. [Kartograficheskiĭ analiz vzaimosviazeĭ v lednikovykh sistemakh],
Glebova, L.N., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Nov. 1989, No.67, p.24-29, In Russian with English summary. 8 refs.
Zverkova, N.M., Khromova, T.E., Chernova, L.P.
Glaciers, Glacier surveys, Mapping, Glacier ablation.

45-1031
Snow cover in mountain systems of the Earth (the practice of classification). [Snezhnyi pokrov v gornykh sistemakh zemli (opyt klassifikatsii)],
Getker, M.I., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Nov. 1989, No.67, p.30-38, In Russian with English summary. 2 refs.
Ivanovskaia, T.E.
Classifications, Snow water equivalent, Snow cover distribution, Snow cover stability, Snow line.

45-1032
Stability and variability of the maximum water equivalent of snow cover in the altitudinal-landscape zones of the southern slope of the Great Caucasus. [Ustoĭchivost' i izmenchivost' maksimal'nykh snegozapasov v vysotnolandshaftnykh zonakh iuzhnogo sklona Bol'shogo Kavkaza],
Kadomtseva, T.G., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Nov. 1989, No.67, p.38-44, In Russian with English summary. 10 refs.
Loktionova, E.M.
Snow water equivalent, Snow cover stability, Snow surveys, Landscape types.

45-1033
Mapping snow cover in the mountains of Afghanistan by means of space photography. [Kartografirovanie snezhnosti v gorakh Afganistana s ispol'zovaniem kosmicheskikh s'emok],
Kravtsova, V.I., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Nov. 1989, No.67, p.44-49, In Russian with English summary. 7 refs.
Mapping, Snow cover distribution, Avalanche forecasting, Spaceborne photography.

45-1034
Methods of mapping snowmelt and glacier runoff in mountainous countries. [Kartograficheskie metody issledovaniia talogo snegovogo i lednikovogo stoka gornykh stran],
Ananicheva, M.D., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Nov. 1989, No.67, p.49-55, In Russian with English summary. 8 refs.
Dreĭer, N.N.
Mapping, Snowmelt, Runoff, Hydrology.

45-1035
Dividing territories of Kazakhstan according to the development of river ice. [Raionirovanie territorii Kazakhstana po razvitiiu ledovykh iavleniĭ na rekakh],
Bellinson, M.M., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Nov. 1989, No.67, p.56-61, In Russian with English summary. 8 refs.
River ice, Ice breakup, Freezeup, Statistical analysis.

45-1036
Formation of the chemical composition of natural ice in Siberia and the Far East. [Formirovanie khimicheskogo sostava prirodnykh l'dov Sibiri i Dal'nego Vostoka],
Ivanov, A.V., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Nov. 1989, No.67, p.62-67, In Russian with English summary. 20 refs.
Ice composition, River ice, Naleds, Lake ice, Ground ice.

45-1037
Geography of the distribution of avalanches on the earth. [Geografiia rasprostraneniia snezhnykh lavin na zemnom share],
Glazovskaia, T.G., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Nov. 1989, No.67, p.68-73, In Russian with English summary. 4 refs.
Miagkov, S.M.
Avalanche forecasting, Avalanche formation

45-1038
Current trends in the development of the glacier system of Elbrus Mountain. [Sovremennye tendentsii razvitiia lednikovoi sistemy El'brusa].
Voitkovskiĭ, K.F., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Nov. 1989, No.67, p.73-80, In Russian with English summary. 10 refs.
Glacier surveys, Glacial erosion, Glacier oscillation, Glacier ablation.

45-1039
Technology and capabilities of airborne topographic mapping of glacier fluctuations (in the example of the glaciation of the Akshiyrak Range). [Tekhnologiia i vozmozhnosti aerotopograficheskogo kartografirovaniia izmeneniĭ lednikov (na primere oledeneniia khrebta Akshiĭrak)].
Kuz'michenok, V.A., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Nov. 1989, No.67, p.80-87, In Russian with English summary. 6 refs.
Glacier oscillation, Mapping, Glacier surveys, Space-borne photography, Statistical analysis.

45-1040
Study of glacier fluctuations in Tien Shan as a trend in glaciological predictions. [Izuchenie kolebaniĭ lednikov Tian'-Shania kak napravlenie gliatsiologicheskogo prognozirovaniia].
Serebriannyĭ, L.R., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Nov. 1989, No.67, p.87-91, In Russian with English summary. 13 refs.
Orlov, A.V., Solomina, O.N.
Glacier oscillation, Forecasting, Glacier formation, Glacial erosion, Moraines.

45-1041
Degradation of glaciers of the northern Tien Shan during the Holocene. [O degradatsii oledeneniia na severnom Tian'-Shane v golotsene].
Mel'nikova, A.P., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Nov. 1989, No.67, p.91-97, In Russian with English summary. 26 refs.
Bakov, E.K.
Radioactive age determination, Glacial erosion, Pollen.

45-1042
Stratification of ice cores from Spitsbergen used for glacioclimatic reconstructions. [Stratifikatsiia lednikovykh kernov Shpitsbergena v tseliakh gliatsioklimaticheskikh rekonstruktsiĭ].
Vaĭkmiae, R.A., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Nov. 1989, No.67, p.97-103, In Russian with English summary. 19 refs.
Punning, IA.-M.K.
Ice cores, Glacier surveys, Radioactive isotopes, Glacier ablation.

45-1043
Reconstruction of the Holocene climate from the results of ice core studies on the Vavilov Dome, Severnaya Zemlya. [Rekonstruktsiia klimata golotsena po rezul'tatam issledovaniia ledianogo kerna lednika Vavilova na Severnoĭ Zemle].
Kotliakov, V.M., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Nov. 1989, No.67, p.103-108, In Russian with English summary. 11 refs.
Ice cores, Climatology, Moisture, Glaciation.

45-1044
Results of ice core investigations on the slope of the antarctic ice sheet. [Rezul'taty izucheniia ledianogo kerna iz skvazhiny na sklone antarkticheskogo lednikovogo pokrova].
Petrov, V.N., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Nov. 1989, No.67, p.108-116, In Russian with English summary. 24 refs.
Barkov, N.I., Lipenkov, V.IA., Ivanov, V.S.
Ice sheets, Ice cores, Ice cover thickness, Antarctica.
The results of structural studies of the ice core obtained from a 750 m deep borehole, drilled at a distance of 73 km from the Mirnyy Station, are discussed. The data obtained testify to the existence of an internal gliding plane within a glacier body, placed at a depth of 230 m. Analysis of the results of the total gas content in ice allowed an estimation of the altitudinal changes of the glacier surface in the Holocene. It was found that the thickness of the antarctic ice sheet in the area situated 200-300 km from the present-day coastal line at the beginning of the Holocene, evidently exceeded its present-day thickness by 400-500 m. (Auth. mod.)

45-1045
Numerical experiments on the reconstruction of the paleoclimate, based on results of the thermometry of a deep borehole at Vostok Station, Antarctica. [Chislennye eksperimenty po rekonstruktsii paleoklimata na osnove rezul'tatov termometrii glubokoĭ skvazhiny na stantsii vostok v Antarktide].
Barkov, N.I., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Nov. 1989, No.67, p.116-121, In Russian with English summary. 12 refs.
Blinov, K.V., Petrov, V.N., Salamatin, A.N.
Paleoclimatology, Ice sheets, Ice temperature, Temperature measurement, Mathematical models.
Computerized experiments have led to the hypothesis that for the last several tens of thousands of years no significant variations of the accumulation rate in the central part of Antarctica have taken place. It was assumed that, on average during the Holocene, the thickness of the antarctic ice sheet in the area of Vostok Station was greater than at present and reached 3800 m. The discrepancy between the experimental and theoretical thermograms was found to be near 0.05 C. Optimum values of the parameters describing the theoretical thermogram were evaluated and possible fluctuations shown. Possible causes for the discrepancy as well as promising directions for further investigations are discussed. (Auth. mod.)

45-1046
Selection of CO2 samples for the determination of the absolute age of ice sequences using the radio carbon method. [Otbor prob CO2 dlia opredeleniia absoliutnogo vozrasta lednikovykh tolshch radiouglerodnym metodom].
Zemtsov, A.A., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Nov. 1989, No.67, p.122-126, In Russian with English summary. 7 refs.
Shkurko, A.M., Mitin, S.V.
Carbon dioxide, Ice dating, Radioactive age determination.

45-1047
Reconstruction of the bedrock of Antarctica after deglaciation. [Rekonstruktsiia korennogo rel'efa Antarktidy posle degliatsiatsii].
Suetova, I.A., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Nov. 1989, No.67, p.127-131, In Russian with English summary. 9 refs.
Berliant, A.M., Lazarev, G.E., Ushakov, S.A.
Isostasy, Ice loads, Altitude, Earth crust, Antarctica.
Analysis of the maps: the "Value of isostatic elevation of Antarctica after the release of glacial load" and the "Bedrock of Antarctica after deglaciation" yielded the following results: the total mass of the Earth's crust, elevated due to deglaciation, equals 6.2 million cu km; the mean value of isostatic elevation is 450 m. It was also possible to determine the mean altitude and area of Antarctica within its geographical and geophysical limits. Comparison of the mean altitude (500 m) of the reconstructed bedrock, of the area of Antarctica (16.620 million sq km) in its geographical limits (like the Earth's crust) to the same morphometric properties of the other continents shows that its mean altitude would not differ from the rest of the continents. (Auth. mod.)

45-1048
25th anniversary of the Laboratory on Avalanches and Mudflows of the Department of Geography of Moscow State University. [25 let problemnoĭ laboratorii snezhnykh lavin i selei geograficheskogo fakul'teta MGU].
Laptev, M.N., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Nov. 1989, No.67, p.131-132, In Russian.
Troshkina, E.S.
Laboratories, Avalanches, Mudflows.

45-1049
New approach to solving thermophysical problems of paleoglaciology. [Novyĭ podkhod k resheniiu teplofizicheskikh problem paleogliatsiologii].
Faĭko, L.I., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Nov. 1989, No.67, p.133-138, In Russian with English summary. 7 refs.
Glaciology, Ice cover effect, Temperature effects, Glacier melting, Paleoclimatology, Sea ice.

45-1050
Estimating subsurface melting of an ice layer. [Raschet podpoverkhnostnogo taianiia ledianogo sloia].
Volkov, V.E., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Nov. 1989, No.67, p.138-143, In Russian with English summary. 11 refs.
Chizhov, V.E.
Ice models, Solar radiation, Ice melting, Subsurface investigations, Mathematical models.

45-1051
Thermal conditions of the cold period of the year in the largest mountain-glacier countries of non-polar latitudes. [Termicheskie usloviia kholodnogo perioda goda v krupnelshikh gornolednikovykh stranakh vnepoliarnykh shirot].
Davidovich, N.V., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Nov. 1989, No.67, p.144-152, In Russian with English summary. 8 refs.
Air temperature, Altitude, Glacier alimentation.

45-1052
Characteristics of ice formation on temperate glaciers. [Osobennosti l'doobrazovaniia na teplykh lednikakh].
Bazhev, A.B., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Nov. 1989, No.67, p.153-162, In Russian with English summary. 11 refs.
Ice formation, Glacier ablation, Glacier alimentation, Glacier mass balance, Snow, Firn.

45-1053
Formation of the annual mass balance of a conic summit glacier. [Formirovanie godovogo balansa massy lednika konicheskoĭ vershiny].
Kunakhovich, M.G., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Nov. 1989, No.67, p.163-169, In Russian with English summary. 9 refs.
Glacier mass balance, Snowfall, Glacier ablation.

45-1054
Trends in current fluctuations of Alpine glaciers. [Tendentsii sovremennykh kolebaniĭ lednikov Al'p].
Tiulina, T.IU., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Nov. 1989, No.67, p.169-175, In Russian with English summary. 8 refs.
Glacier oscillation, Glacier mass balance, Glacier ablation.

45-1055
Alimentation of rock glaciers of Tien Shan. [O pitanii kamennykh gletcherov Tian'-Shania].
Tarakanov, A.G., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Nov. 1989, No.67, p.175-183, In Russian with English summary. 59 refs.
Glacier alimentation, Rock glaciers, Moraines.

45-1056
International conference on mountain ecology in Tsakhkadzor. [Mezhdunarodnaia konferentsiia po gornoĭ ekologii v Tsakhkadzore].
Ananicheva, M.D., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Nov. 1989, No.67, p.184, In Russian.
Meetings, Ecology, Mountains.

45-1057
Impact of climate on the temperature distribution of ice in the ice divide of the Austfonna (Nordaustlandet). [Vliianie klimata na raspredelenie temperatury vo l'du na ledorazdele Vostochnogo ledianogo polia (Severo-Vostochnaia Zemlia)].
Larina, T.B., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Nov. 1989, No.67, p.185-190, In Russian with English summary. 9 refs.
Zagorodnov, V.S.
Climatic factors, Glacier surfaces, Glacier thickness, Temperature distribution, Mathematical models, Norway- Nordaustlandet.

45-1058
Characteristics of snow accumulation on the Austfonna (Spitsbergen). [Osobennosti akkumuliatsii snega na Vostochnom ledianom pole (Shpitsbergen)].
Sin'kevich, S.A., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Nov. 1989, No.67, p.190-194, In Russian with English summary. 8 refs.
Tarusov, A.V.
Snow accumulation, Snow surveys, Hydrodynamics, Models.

45-1059
Mass balance of Spitsbergen glaciers during the 1985/86, 1986/87, and 1987/88 balance years. [Balans massy lednikov Shpitsbergena v 1985/86, 1986/87 i 1987/88 balansovykh godakh].
Troitskiĭ, L.S., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Nov. 1989, No.67, p.194-197, In Russian with English summary. 4 refs.
Glacier mass balance, Glacier ablation, Glacier surveys.

45-1060
Mass balance and ice flow velocity of the Davydov Glacier according to 1984-1985 studies. [Balans massy i skorost' dvizheniia lednika Davydova po issledovaniiam 1984-1985 gg.],
Aizin, V.B., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Nov. 1989, No.67, p.197-202, In Russian with English summary. 12 refs.
Zakharov, V.G.
Glacier mass balance, Glacier flow, Glacier ablation, Velocity measurement, Glacier alimentation, Climatic factors.

45-1061
Evaluation of the Davydov Glacier reaction to man-made destruction of its terminus. [Otsenka reaktsii lednika Davydova na iskusstvennoe udalenie ego kontsa],
Aizin, V.B., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Nov. 1989, No.67, p.202-206, In Russian with English sumamry. 5 refs.
Chugunov, V.A.
Glacier tongues, Mathematical models, Glacier flow.

45-1062
Some characteristics of a temporal series of constituents of the mass balance of a glacier. [Nekotorye svoistva vremennykh riadov sostavliaiushchikh balansa massy lednika],
Uvarov, V.N., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Nov. 1989, No.67, p.206-209, In Russian with English summary. 4 refs.
Glacier mass balance, Glacier ablation, Precipitation (meteorology), Air temperature.

45-1063
Formation and regime of the discharge of suspended sediments in the glacier-nourished Adishura River. [Formirovanie i rezhim stoka vzveshennykh nanosov lednikovoi reki Adishura],
Karalashvili, T.V., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Nov. 1989, No.67, p.210-212, In Russian with English summary. 4 refs.
Suspended sediments, Glacial deposits, Glacial rivers, Turbidity, Air temperature.

45-1064
Conditions for the formation of extremely large avalanches in the Elbrus area for the last 20 years (1967-1987). [Usloviia formirovaniia osobo krupnykh lavin v Priel'brus'e za poslednie 20 let (1967-1987 gg.)],
Troshkina, E.S., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Nov. 1989, No.67, p.213-217, In Russian with English summary. 4 refs.
Climatic factors, Avalanche formation, Seasonal variations, Snowfall.

45-1065
Gaseous-hydrate mechanism of the genesis of low-mineralized massive ice in marine sediments. [O gasovo-gidratnom mekhanizme genezisa malomineralizovannykh plastovykh l'dov v morskikh otlozheniiakh],
Ivanov, A.V., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Nov. 1989, No.67, p.217-219, In Russian with English summary. 4 refs.
Hydrates, Marine deposits, Bottom sediment, Ice formation.

45-1066
Kinetics of changes in configuration of cooled ice bodies immersed in water. [Kinetika izmeneniia formy okhlazhdennykh ledianykh tel, pogruzhennykh v vodu],
Kirov, M.V., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Nov. 1989, No.67, p.219-222, In Russian with English summary. 6 refs.
Smorygin, G.I.
Stefan problem, Freezing, Ice growth, Ice physics.

45-1067
Third All-Union Conference on the problems of naled formation. [Tret'e vsesoiuznoe soveshchanie po problemam naledevedeniia],
Alekseev, V.R., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Nov. 1989, No.67, p 223-227, In Russian.
Naleds, Meetings.

45-1068
Terskol workshop on geoinformation systems of mountain territories. [Terskol'skil seminar po geoinformatsionnym sistemam gornykh territorii],
Kravtsova, V.I., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Nov. 1989, No.67, p.228-232, In Russian.
Meetings, Data processing, Computer applications, Snow cover, Avalanches, Glaciology, Remote sensing.

45-1069
Third scientific assembly of the International Association of Hydrological Sciences in Baltimore. [Tret'ia nauchnaia assamblei Mezhdunarodnoi assotsiatsii gidrologicheskikh nauk v Baltimore],
Krenke, A.N., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Nov. 1989, No.67, p.232-236, In Russian.
Meetings, Hydrology, Glaciers, Snow accumulation.

45-1070
International symposium on Ice and Climate. [Mezhdunarodnyi simpozium "Led i klimat"],
Glazovskii, A.F., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Nov. 1989, No.67, p.236-246, In Russian.
Meetings, Paleoclimatology, Ice cores, Ice air interface, Ice water interface, Sea ice, Glaciers, Models.

45-1071
Meeting of the office of the International Commission on Snow and Ice in Davos. [Zasedanie biuro Mezhdunarodnoi komissii snega i l'da v Davose],
Kotliakov, V.M., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Nov. 1989, No.67, p.246-249, In Russian.
Meetings, Research projects, Snow, Ice.

45-1072
Drilling and geophysical studies of the borehole in the Vavilov Ice Dome (Severnaya Zemlya) in 1988. [Burenie i geofizicheskie issledovaniia skvazhiny na lednike Vavilova (Severnaia Zemlia) v 1988 godu],
Vasil'ev, N.I., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Nov. 1989, No.67, p.249, In Russian.
Boreholes, Drilling.

45-1073
Scientific workshop on glaciology at the Institute of Geography of the USSR Academy of Sciences (January-June 1989). [Nauchnyi seminar po gliatsiologii v Institute geografii AN SSSR (ianvar'-iiun' 1989 g.)],
Psareva, T.V., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Nov. 1989, No.67, p.250, In Russian.
Glaciology, Meetings.

45-1074
Glaciers and climate: some new aspects of investigating the problems. [Ledniki i klimat: nekotorye novye aspekty izucheniia problemy],
Voloshina, A.P., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Nov. 1989, No.67, p.251-260, In Russian with English summary. 9 refs.
Glaciers, Glacier mass balance, Climatic factors, Synoptic meteorology, Statistical analysis.

45-1075
Volume and routing of late-glacial runoff from the southern Laurentide Ice Sheet.
Teller, J.T., *Quaternary research*, July 1990, 34(1), p.12-23, Refs. p.21-23.
Pleistocene, Ice sheets, Glacier melting, Runoff, Ice models, Computerized simulation, Meltwater, Glacial hydrology, Computer programs.

45-1076
Production of phreatic explosions in the interaction of lava and ice.
Vinogradov, V.N., et al, *Volcanology and seismology*, Apr. 1990, 9(1), p.89-98, Translated from Vulkanologiia i seismologiia. 10 refs.
Murav'ev, IA.D., Nikitina, I.M., Salmatin, A.N.
Volcanoes, Ice sheets, Ice melting, Explosion effects, Steam, Vapor pressure, Mathematical models, Fluid flow.

45-1077
Identification of geothermal anomalies by snow-cover temperature survey.
Lialin, G.N., *Volcanology and seismology*, Nov. 1989, 8(1), p.53-66, Translated from Vulkanologiia i seismologiia. 10 refs.
Geothermometry, Snow cover, Snow temperature, Soil temperature, Geological surveys, Temperature measurement, Temperature variations, Subsurface investigations, Correlation.

45-1078
Ice jam mitigation.
Belore, H.S., et al, *Canadian journal of civil engineering*, Oct. 1990, 17(5), p.675-685, With French summary. 39 refs.
Burrell, B.C., Beltaos, S.
River ice, Ice jams, Ice control, Countermeasures, Flooding, Ice cover strength, Damage, Engineering.

45-1079
Effect of hydrometeorological factors on spreading of oil products in reservoirs.
Al'khimenko, A.I., *Hydrotechnical construction*, Oct. 1989, 23(4), p.199-204, Translated from Gidrotekhnicheskoe stroitel'stvo, Apr. 1989. 6 refs.
Oil spills, Reservoirs, Water pollution, Ice cover effect, Water flow, Wind factors, Ice water interface, Water waves.

45-1080
High speed numerical technique to solve coupled moving boundary value heat problems.
Sharma, R.K., et al, *Computers & mathematics with applications*, 1990, 19(4), p.1-8, 14 refs.
Majumdar, P.
Liquid solid interfaces, Phase transformations, Boundary value problems, Heat transfer, Computer applications, Analysis (mathematics).

45-1081
2M3 isothermal cloud chamber for the study of artificial ice nuclei.
Feng, D., et al, *Acta meteorologica Sinica*, 1990, 4(4), p.494-502, 13 refs.
Wang, Y., Chen, R., Jiang, G.
Cloud chambers, Artificial nucleation, Ice nuclei, Silver iodide, Laboratory techniques, Cloud seeding, Nucleating agents.

45-1082
Comparison of the uranium-series age of Yamato K-26 ice with those of Allan Hills and Lewis Cliff ice.
Fireman, E.L., *Antarctic journal of the United States*, 1989, 24(5), p.47-48, 11 refs.
Ice dating, Antarctica—Yamato Mountains, Antarctica—Allan Hills, Antarctica—Lewis Cliff.
The physical properties and the chemical compositions of the particulates in the Lewis Cliff and Allan Hills tephra have been studied. The tephra, in the samples with known ages, consists mainly of glass shards. The Yamato glass shards resemble magmas associated with volcanos in the South Sandwich Is. The Lewis Cliff and Allan Hills shards resemble magmas associated with volcanos in the McMurdo group. A table compares the results of measurements in Yamato K-26 ice with those in Allan Hills 85-1 and Lewis Cliff ice. The uranium abundance in Yamato tephra is 0.02 p.p.m., which is 250 times lower than in the Allan Hills 85-1 tephra, nevertheless, the ice is datable by the uranium-series method. The radium-226 thorium-230 age of K-26 ice is approximately 38,000 years old.

45-1083
Gravity measurements across and between the meteorite-bearing icefields west-southwest of the Allan Hills.
Fudali, R.F., *Antarctic journal of the United States*, 1989, 24(5), p.48-50, 4 refs.
Glacier flow, Antarctica—Allan Hills.
The 1983-1984 antarctic search team for meteorites landed at a site north of Griffin Nunatak, from which it journeyed overland to Elephant Moraine to collect meteorites on the blue ice there. Subsequently, it moved overland to the Far Western Icefield, and finally it moved east-northeast to the Allan Hills. Twenty-four topographic and gravity stations were established along this latter traverse and tied into the triangulation and gravity stations on the Main icefield. The survey delineates a rolling surface with a net elevation drop of 135 m between stations 105 and 34, a distance of 55 km. Also surveyed were several stations along a north-south line across the Far Western Icefield that define an elevation drop of 33 m in 13 km, i.e., about the same average rate of decline from south to north as from west to east. There are nonquantitative slope estimates suggesting a strong northward component for the ice flow west of the Main Icefield. If so, the partial bedrock barriers beneath the western icefields lie across the ice movement direction, and are truly separate barriers with ice flowing unimpeded between them. Each icefield is a separate meteorite stranding surface. The possibility is suggested of finding only a few rare meteorites, as direct falls, in and on the firn between the blue icefields west of Allan Hills.

45-1084
Radio-echo sounding survey across the Allan Hills Icefield.
Delisle, G., et al, *Antarctic journal of the United States*, 1989, 24(5), p.50-52, 4 refs.
Sievers, J., Schultz, L.
Radio echo soundings, Glacier ablation, Antarctica Allan Hills.
A radio-echo sounding comprehensive study of the subice topography of the Allan Hills Icefield and the adjacent Near Western Icefield was carried out, with the primary objective being to understand the glaciology of the area and how it relates

to the meteorite fields. Results indicate that (if current conditions persist) all the ice entering the Allan Hills Icefield today will be ablated, and all the meteorites it contains will eventually be exposed. It appears that more ice is currently ablated than is supplied, meaning that the Allan Hills Icefield is probably in a state of thermal decay at this time. During the course of these investigations, 198 meteorites were found.

45-1085
Microfossil assemblages in "deforming till" from Upstream B, West Antarctica: implications for ice-stream flow models.
Scherer, R.P., *Antarctic journal of the United States*, 1989, 24(5), p.54-55, 10 refs.
Glacier flow, Ice models, Antarctica—West Antarctica.
Sediments underlying grounded ice at the Upstream B camp in central West Antarctica were collected during the 1988-1989 field season. The ice sheet at the drill site is 1,030 m thick and the glacier bed lies 644 m below sea level. About 10 cu cm of sediment was made available for preliminary microfossil study. This paper reports the initial findings of diatom analysis with respect to ice stream flow models. It is suggested that the 600 m, low-sonic-velocity sediment column underlying deforming till at Upstream B is Oligocene and older

45-1086
Freezing of water and wastewater sludges.
Vesilind, P.A., et al, *Journal of environmental engineering*, Sep.-Oct. 1990, 116(5), MP 2792, p.854-862, 20 refs.
Martel, C.J.
Sludges, Freezing, Waste treatment, Freeze thaw cycles, Freezing rate, Ice crystal growth, Hygroscopic water, Colloids.

45-1087
Solidification of an alloy cooled from above. Part 2. Non-equilibrium interfacial kinetics.
Kerr, R.C., et al, *Journal of fluid mechanics*, Aug. 1990, Vol.217, p.331-348, 17 refs. For Pt.1 see 45-970.
Woods, A.W., Worster, M.G., Huppert, H.E.
Liquid cooling, Freezing, Liquid solid interfaces, Solid phases, Solutions, Crystal growth, Phase transformations, Magma, Thermodynamics.

45-1088
Infrared spectra of T2O ice.
Kanesaka, I., et al, *Journal of chemical physics*, Oct. 15, 1990, 93(8), p.6113-6114, 13 refs.
Hayashi, H., Kita, H., Kawai, K.
Ice structure, Ice spectroscopy, Infrared spectroscopy, Spectra, Ice physics, Low temperature research.

45-1089
Trends '90: a compendium of data on global change.
Boden, T.A., et al, Oak Ridge, TN, Oak Ridge National Laboratory, 1990, 257p. + appends., Refs. passim.
Kanciruk, P., Farrell, M.P.
Ice cores, Atmospheric composition, Manuals.
This document is a source of frequently used global change data. This first issue includes estimates for global and national CO2 emissions from the burning of fossil fuels and from the production of cement, historical and modern records of atmospheric CO2 and methane concentrations, and several long-term temperature records. Included are tabular and graphical presentations of the data, discussions of trends in the data, and references to publications that provide further information. Data are presented in a two-page format, each dealing with a different data set. All data are available in digital form from the Carbon Dioxide Information Analysis Center. Antarctic monitoring stations included in this compilation are South Pole, Amundsen-Scott, Halley Bay, Palmer, Vostok, Siple and Byrd Stations. (Auth. mod.)

45-1090
Radiometeorological studies in marine conditions. [Radiometeorologicheskie issledovaniia nad morem],
Mikhailov, N.F., et al, Leningrad, Gidrometeoizdat, 1990, 206p., In Russian. 143 refs.
Ryzhkov, A.V., Shchukin, G.G.
Refraction, Air temperature, Air water interactions, Meteorological factors, Precipitation (meteorology), Sea ice, Radio waves, Microwaves, Wave propagation, Icebergs, Water waves, Polar regions, Statistical analysis, Analysis (mathematics), Snowflakes, Ice crystals.
This work discusses the propagation of UHF waves above the sea surface under different meteorological conditions in polar regions, including Antarctica. R-f propagation is examined, with consideration given to the interaction of microwave radiation, the atmosphere, and sea surface. The relationship between thermal microwave emission of the "atmosphere-sea" system near the horizon and microwave propagation characteristics is evaluated. The effects of propagation conditions on radar characteristics of the sea surface and radiometeorological properties of clouds and precipitation over the sea are discussed. (Auth. mod.)

45-1091
Geostatistical analyses of radio-echo data from Scharffenbergbotnen, Dronning Maud Land, East Antarctica.
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The microparticle concentration in an ice core from the coast area, East Antarctica, has been measured by a Coulter counter and optic counting. It is proposed that the microparticle concentrations in different areas are different, especially from the coast to the inland areas of Antarctica. After comparison with microparticle concentrations from other cores, it is also proposed that there is a lag between the coldest climate (i.e. 18 ka bp) and the highest microparticle concentration. (Auth.)

45-1145
Neon measurements of individual Greenland sediment particles: proof of an extraterrestrial origin and comparison with EDX and morphological analyses.
Olinger, C.T., et al, *Earth and planetary science letters*, Oct. 1990, 100(1-3), p.77-93, 37 refs.
Maurette, M., Walker, R.M., Hohenberg, C.M.
Lacustrine deposits, Sediments, Ice sheets, Minerals, Greenland.

45-1146
Sea ice modelling: a report on Hibler's dynamic thermodynamic sea ice model.
Gray, N., *Scott Polar Research Institute. Sea Ice Group. Technical report*, 1989, No.89-6, 61p., 6 refs.
Sea ice, Ice models, Sea water freezing, Ice mechanics, Mathematical models, Computer programs.

45-1147
Draft supplemental environmental impact statement; Kodiak Harbor, Alaska.
U.S. Army Corps of Engineers. Alaska District, Anchorage, AK, Nov. 1990, 86p. + appends., 46 refs.
Environmental impact, Ports, Water pollution, Icing.

45-1148
Water resources data for Alaska, water year 1989.
Lamke, R.D., et al, *U.S. Geological Survey. Water-data report*, May 1990, AK 89-1, 224p. PB90-270620.
Van Maanen, J.L., Bigelow, B.B., Still, P.J., Kemnitz, R.T.
Hydrologic cycle, Surface waters, Ground water, Water pollution, Flow rate, Lakes, Sediments, Water temperature, Water level, Sampling, Rivers.

45-1149
Wild ice: Antarctic journeys.
Naveen, R., et al, Washington, DC, Smithsonian Institution Press, 1990, 222p.
Monteath, C., De Roy, T., Jones, M.
Photography, Photographic techniques, Snow, Ice, Antarctica.
This work is a primarily photographic compendium of the ecosystem of Antarctica. Each author photographer naturalist devotes a chapter—based on his or her personal experiences—to a given topic; dramatic color photographs are accompanied by vignettes. The final chapter, entitled "Perspectives on Antarctic Photography," provides detailed information for photographers who might be embarking on a trip to Antarctica. Advice is offered on clothing, gear bags, camera bodies, auto-wind mechanisms, lenses, tripods, filtration, film, exposure, lighting, composition, depth of field, working with the wildlife, and snow photography. The authors offer this work as a testament to the pristine nature of Antarctica, and emphasize the need for concerted international efforts to maintain it that way.

45-1150
Failures of agricultural buildings in Estonia caused by snow loads.
Keskküla, T., *Forensic engineering*, 1990, 2(1-2), p.195-200.
Buildings, Snow loads, Damage, Design criteria, Structural analysis, USSR—Estonia.

45-1151
Modelling the behaviour of oil spills in ice-infested waters.
Venkatesh, S., et al, *Atmosphere-ocean*, Sep. 1990, 28(3), p.303-329, With French summary. 47 refs.
El-Tahan, H., Comfort, G., Abdelnour, R.
Oil spills, Ocean environments, Floating ice, Drift, Mathematical models, Ice cover effect, Viscosity, Sea ice distribution.

45-1152
Moisture susceptibility behavior of asphalt concrete and emulsified asphalt mixtures using the freeze-thaw pedestal test.
Bolzán, P.E., *Transportation research record*, 1989, No.1228, p.9-16, 2 refs.
DLC TE7.H5
Concrete pavements, Bituminous concretes, Moisture, Damage, Freeze thaw tests, Concrete aggregates.

45-1153
Evaluation of effects of deicing additives on properties of asphalt mixtures.
Mogawer, W.S., et al, *Transportation research record*, 1989, No.1228, p.41-53, 11 refs. For another version see 44-3268.
Stuart, K., Lee, K.W.
DLC TE7.H5
Pavements, Bituminous concretes, Chemical ice prevention, Performance, Admixtures, Computer applications, Road icing, Tensile strength.

45-1154
Properties of asphalt-oil shale ash bituminous mixtures under normal and freeze-thaw conditions.
Al-Massaid, H., et al, *Transportation research record*, 1989, No.1228, p.54-62, 12 refs.
Khedaywi, T., Smadi, M.
DLC TE7.H5
Construction materials, Hydrocarbons, Bituminous concretes, Freeze thaw tests, Concrete pavements, Physical properties, Aggregates.

45-1155
Isotopic studies of calcite, pyrite, and wood from glacial deposits in the Beardmore Glacier area, Transantarctic Mountains.
Hagen, E.H., et al, *Antarctic journal of the United States*, 1989, 24(5), p.67-68, 9 refs.
Faure, G., Jones, L.M.
Glacial deposits, Isotope analysis, Antarctica—Beardmore Glacier.
The glacial deposits of the Beardmore area contain unusual constituents including limestone clasts, lacustrine calcite sediment, pyrite, and wood fragments. The isotopic compositions of carbon, oxygen, sulfur, and strontium (as appropriate) of

these samples provide information about their origins. Analytical results are shown in a table and interpreted in terms of isotope reference standards PDB (C-13), SMOW (0-18), and TCD (S-34).

45-1156
Cooperative climatological-glaciological program in the Antarctic Peninsula.
Thompson, L.G., et al, *Antarctic journal of the United States*, 1989, 24(5), p.69-70, 11 refs.
Mulvaney, R., Peel, D.A.
Climatic changes, Ice cores, Research projects, Antarctica—Antarctic Peninsula.
A cooperative glaciological-climatological ice-core drilling program among the British Antarctic Survey, Ohio State University, and the University of Washington was initiated during the 1988-1989 antarctic field season. The program will endeavor to establish from ice cores a 1,000- to 2,000-year paleoclimatic history for the southern Antarctic Peninsula region. One of the principal scientific objectives of the investigation is to determine the nature of the physical link between annually resolvable records from other ice cores in the Peninsula: Dolleman I. and Gomez Nunatak, James Ross I., and Siple Station in Antarctica, as well as more distant sites like the Quelccaya Ice Cap (14S). A more global synthesis of climatic variations over the last 2,000 years will increase the understanding of the mechanisms controlling the more frequent fluctuations within the global climate system, and help assess the degree to which the paleoclimatic records extracted from polar ice cores relate to climatic events in low latitudes.

45-1157
Initiation of strain measurements on Dyer Plateau, Antarctic Peninsula.
Raymond, C.F., et al, *Antarctic journal of the United States*, 1989, 24(5), p.71.
Weertman, B.R.
Ice sheets, Ice creep, Antarctica—Dyer Plateau.
To determine the present flow regime in this vicinity of the Dyer Plateau, an accumulation and strain net of 70 markers was deployed in 5 longitudinal and 7 transverse lines, providing coverage in a band roughly 5 km wide and 25 km long extending 15 km west of the divide and 10 km east of it. The spacing of markers was graded with a high density of 0.5 km spacing in an approximately 3 sq km centered on the divide. This local high-density array was surveyed by electromagnetic distance ranging and angle measurement by theodolite. The topography determined by the survey shows that the divide in this locale slopes gently northward and is underlain by rugged subglacial topography with ice depths varying from 300 m to more than 1,000 m.

45-1158
Continued analysis of field data of the Siple Coast, West Antarctica.
Bindschadler, R.A., et al, *Antarctic journal of the United States*, 1989, 24(5), p.72-73, 8 refs.
Stephenson, S.N., Vornberger, P.L., Roberts, E.P.
Ice sheets, Ice creep, Ice mechanics, Antarctica—Siple Coast.
The goals of the Siple Coast Project are to determine the mass balance of that portion of the west antarctic ice sheet that drains into the Ross Ice Shelf, to identify the physical processes controlling its ice flow, and to predict its future using sophisticated numerical models. Twenty-two sites were visited in the catchment areas of Ice Streams D and E to provide data for calculating the present net mass balance. Analysis of the temperature profiles shows that Crary Ice Rise is much younger than Holocene age. Reoccupation of a marker on a raft at the side of the ice rise confirmed that the raft has separated from the ice rise. Analysis of other data collected in previous years from around the ice rise implies that the ice rise is migrating upstream. At the mouth of ice stream C, remeasurements of stake positions and strain figures confirm that the ice is almost stagnant with velocities of only a few meters per year. Analysis of a set of 10 thematic mapper images indicates a number of interesting features which include a distributed system of thin ice streams that feed into the main ice stream, the intermittent nature of streaming flow in the upper regions of ice streams, the narrowness of the crevassed margins of ice streams D and E (in contrast to the broad northern margin of ice stream B), and the ability to see ancient flow features on ice stream C even though this ice stream appears to have stopped some 200 years ago.

45-1159
Ice-stream basal modeling: progress report.
Alley, R.B., *Antarctic journal of the United States*, 1989, 24(5), p.74, 13 refs.
Ice sheets, Basal sliding, Models.
One of the main difficulties in predicting future behavior of the west antarctic ice sheet is lack of an accepted bed model for the fast-moving ice streams that drain it. In cooperation with the ongoing field studies of the Siple Coast Project, development of a model for ice-stream motion through deformation of subglacial till continues. ("Deforming bed" refers to the bedrock underneath the ice sheet.) This hypothesis grows out of the seismic observation of a water-saturated, unconsolidated layer with high water pressure and high porosity beneath ice stream B, West Antarctica, and the strong probability that pervasive deformation in this layer controls ice-stream motion. The seven basic points of the model are stated.

45-1160
Geophysical studies at and around Upstream C camp, Siple Coast, 1988-1989.
Bentley, C.R., et al, *Antarctic journal of the United States*, 1989, 24(5), p.75-77, 4 refs.
Anandakrishnan, S., Atre, S., Retzlaff, R.
Ice sheets, Seismic surveys, Antarctica—Siple Coast.
Experiments were designed to investigate the cause and manner of the stagnation of ice stream C, which is inactive. The ice stream once was heavily crevassed at the surface, but now crevasses are buried by 30 m or so, which allowed ground-based seismic and radar sounding, not only on the ice stream but also across the (buried) marginal shear zones ("paleomargins") to the "ridges" on each side. Airborne radar surveys were also conducted by Twin Otter over the upstream portions of ice streams B and C and ridges AB and BC. High-resolution profiling, using 150-gram charges, was carried out along nine line segments on ice stream C and ridge BC to search for subglacial sedimentary layers similar to those beneath ice stream B, and to determine the properties of such layers, if they exist. Wide-angle shooting with charges of 450 grams was carried out to determine the wave velocities in and below the ice. Additional profiles were made with 2.3 kg charges to study the deeper sedimentary layering beneath the ice. All shots were fired in holes about 15 m deep. Additional data were gathered through passive seismic monitoring, a crustal refraction experiment, airborne radar, ground-based 50 MHz radar, and short-pulsed radar.

45-1161
Fundamentals of phase change: freezing, melting, and sublimation.
Bayazitoglu, Y., ed. New York, American Society of Mechanical Engineers, 1990, 81p., Refs. passim. Papers presented at the Winter Annual Meeting of the American Society of Mechanical Engineers, Dallas, TX, Nov. 25-30, 1990. HTD (Heat Transfer Division), Vol.143. For selected papers see 45-1162 through 45-1166.
Kroeger, P.G., ed.
Heat transfer, Heat transfer coefficient, Phase transformations, Ice physics, Ice water interface, Ice melting, Ice formation, Analysis (mathematics), Mathematical models, Salinity, Thermocouples, Laminar flow, Ice temperature.

45-1162
Heat transfer analysis for ice objects melting in air.
Janna, W.S., et al, Fundamentals of phase change: freezing, melting, and sublimation. Edited by Y. Bayazitoglu and P.G. Kroeger, New York, American Society of Mechanical Engineers, 1990, p.1-8, 10 refs.
Jakubowski, G.S.
Heat transfer, Phase transformations, Ice models, Ice melting, Ice physics, Analysis (mathematics).

45-1163
Method for predicting freezing in forced flow.
Albert, M.R., et al, MP 2793, Fundamentals of phase change: freezing, melting, and sublimation. Edited by Y. Bayazitoglu and P.G. Kroeger, New York, American Society of Mechanical Engineers, 1990, p.9-14, 15 refs.
Olfe, D.B.
Ice growth, Laminar flow, Freezing, Ice physics, Ice forecasting, Phase transformations, Ice formation, Mathematical models.
A numerical method for calculating freezing in forced laminar flow with the possibility of recirculation in the flow is presented. The method is applied to problems involving smooth and step ice interfaces for flow between parallel plates.

45-1164
Melting heat transfer from a horizontal ice cylinder immersed in a quiescent saline water.
Fukusako, S., et al, *Fundamentals of phase change*: freezing, melting, and sublimation. Edited by Y. Bayazitoglu and P.G. Kroeger, New York, American Society of Mechanical Engineers, 1990, p.15-23, 17 refs.
Tago, M., Yamada, M., Kitayama, K.
Heat transfer coefficient, Ice melting, Salinity, Ice surface, Ice temperature, Ice water interface, Phase transformations, Ice physics.

45-1165
Experimental study of formation and melting of ice about horizontal tubes.
Torikoshi, K., et al, *Fundamentals of phase change*: freezing, melting, and sublimation. Edited by Y. Bayazitoglu and P.G. Kroeger, New York, American Society of Mechanical Engineers, 1990, p.57-63, 3 refs.
Nakazawa, Y., Yamashita, H.
Freezing, Ice formation, Ice melting, Phase transformations, Heat transfer coefficient, Thermocouples, Ice water interface, Water temperature.

45-1166
Forced convective heat transfer with freezing from tandem cylinders in a porous medium.
Oosthuizen, P.H., et al, Fundamentals of phase change: freezing, melting, and sublimation. Edited by Y. Bayazitoglu and P.G. Kroeger, New York, American Society of Mechanical Engineers, 1990, p.65-73, 20 refs.
Henderson, C.
Heat transfer, Porous materials, Freezing, Ice formation, Phase transformations.

45-1167
Designing electrical grounding for permafrost with inclined interface layers. (O raschete zazemlitelei v mnogoletnemerzlykh gruntakh s naklonnoi granitsei razdela sloev).
Shevtsov, IU.V., *Peredacha i raspredelenie elektroenergii v rafonakh Severa* (Transmission and distribution of electric power in northern regions). Edited by M.V. Kostenko, Apatity, Kol'skii nauchnyi tsentr AN SSSR, 1989, p.83-84, In Russian. 6 refs.
Design, Electrical grounding, Design criteria, Electric power, Permafrost beneath structures, Permafrost physics.

45-1168
Wing cracks and brittle compressive fracture.
Cannon, N.P., et al, *Acta metallurgica et materialia*, Oct. 1990, 38(10), p.1955-1962, With French and German summaries. 18 refs.
Schulson, E.M., Smith, T.R., Frost, H.J.
Ice strength, Ice cracks, Crack propagation, Brittleness, Strain tests, Cracking (fracturing), Compressive properties.

45-1169
Brittle compressive fracture of ice.
Schulson, E.M., *Acta metallurgica et materialia*, Oct. 1990, 38(10), p.1963-1976, With French and German summaries. 32 refs.
Ice strength, Cracking (fracturing), Crack propagation, Brittleness, Strain tests, Compressive properties, Ice models, Temperature effects.

45-1170
Effect of the arctic sea ice in January on the Asia-Western Pacific circulation in June.
Fang, Z., *Chinese journal of atmospheric sciences*, 1990, 14(1), p.113-119, 6 refs.
Atmospheric circulation, Climatic factors, Sea ice distribution, Ice cover effect, Statistical analysis, Seasonal variations.

45-1171
Green icebergs and remote sensing.
Lee, R.L., Jr., *Journal of the Optical Society of America A*, Oct. 1990, 7(10), p.1862-1874, 45 refs.
Icebergs, Remote sensing, Optical properties, Optical phenomena, Colored ice, Sunlight, Photometry, Spectra, Albedo, Radiation absorption.

45-1172
Raman spectroscopic study of dilute HOD in liquid H2O in the temperature range -31.5 to 160 C.
Hare, D.E., et al, *Journal of chemical physics*, Nov. 15, 1990, 93(10), p.6954-6961, 23 refs.
Sorensen, C.M.
Hydrogen bonds, Heavy water, Water structure, Molecular structure, Supercooling, Temperature effects, Thermodynamic properties, Spectroscopy.

45-1173
Model test of CCN-cloud albedo climate forcing.
Ghan, S.J., et al, *Geophysical research letters*, Apr. 1990, 17(5), p.607-610, 18 refs.
Taylor, K.E., Penner, J.E., Erickson, D.J., III
Clouds (meteorology), Condensation nuclei, Models, Climatic changes.
Cloud condensation nuclei (CCN) influence cloud albedo through their effect on the cloud droplet size distribution. A number of studies have evaluated the climatic impact of the CCN-cloud albedo feedback, but all have assumed that cloud distributions, cloud thicknesses, and cloud liquid water contents would remain constant as the climate adjusted. This assumption was tested using the Livermore version of the National Center for Atmospheric Research (NCAR) Community Climate Model (CCM1). Results indicate that there are no significant compensating changes in cloud properties that would counteract the 1.7% global albedo increase resulting from a fourfold increase in marine CCN concentration. Furthermore, when ocean surface temperatures are decreased 4 C in a manner broadly consistent with the enhanced cloud albedos, an increase in cloud fraction of 3.5% and a reduction in cloud altitude are predicted, leading to a positive feedback from clouds that would imply a climate impact roughly double that calculated from cloud droplet size distribution change alone. One of the accompanying figures is a graph of average fractional cloudiness and cloud liquid water path plotted as functions of SSTs and latitude extending from 85N to 85S. (Auth.)

45-1174
International classification for seasonal snow on the ground.
Colbeck, S.C., et al, MP 2794, International Association of Scientific Hydrology. International Commission on Snow and Ice. Working Group on Snow Classification, International Association of Scientific Hydrology, [1990], 23p.
Akitaya, E., Armstrong, R., Gubler, H., Lafeuille, J., Lied, K., McClung, D.M., Morris, E.M.
Snow cover, Snow morphology, Physical properties, Classifications, Snow crystal structure, Snow cover strength, Measurement.

45-1175
Coupled one-dimensional sea ice-ocean model applied to a semi-enclosed basin.
Omstedt, A., *Tellus*, Oct. 1990, 42A(5), p.568-582, 29 refs.
Sea ice distribution, Periodic variations, Ice water interface, Thermal regime, Drift, Mathematical models, Thermodynamics, Ice models, Heat flux, Baltic Sea.

45-1176
Ionic tracer movement through a Wyoming snowpack.
Bales, R.C., et al, *Atmospheric environment*, 1990, 24A(11), p.2749-2758, 20 refs.
Sommerfeld, R.A., Kebler, D.G.
Snow cover, Snow composition, Meltwater, Ion diffusion, Chemical analysis, Chemical properties, Snow water equivalent, Snow cover stratigraphy.

45-1177
Results of comparative model tests with a conceptual hull form and the original R-class icebreaker.
Carter, D., *Transport Canada. Report*, Nov. 1990, TP 10617E, 21p. + appends., With French summary, 4 refs.
Icebreakers, Ice breaking, Models, Mechanical tests, Ice solid interface, Performance, Hydrodynamics, Design.

45-1178
Snow survey of Great Britain 1989/90. London, Meteorological Office, Sep. 1990, 22p.
Snow surveys, Snow accumulation, Periodic variations, Meteorological data, Meteorology, Great Britain.

45-1179
Snow fencing to increase streamflow on rangelands.
Sturges, D.L., Symposium on Watershed Planning and Analysis in Action. Proceedings, New York, American Society of Civil Engineers, 1990, p.145-154, 14 refs.
Snow fences, Snowmelt, Runoff, Snow accumulation, Stream flow, Watersheds, Water supply, Design criteria.

45-1180
Svalbard radiocarbon date list 1.
Forman, S.L., et al, *University of Colorado. Institute of Arctic and Alpine Research. Occasional paper*, 1990, 47, 48p., 9 refs.
Radioactive age determination, Geochronology, Quaternary deposits, Sea level, Glacier oscillation, Marine deposits, Norway—Svalbard.

45-1181
Profiling top of buried pipe of the trans Alaska pipeline using the TSI pipe locator.
McDevitt, P.G., et al, American Petroleum Institute Pipeline Conference, Houston, TX, Apr. 26-27, 1988. *Proceedings, American Petroleum Institute*, 1988, p.279-285, 3 refs.
Cole, G.E.
Underground pipelines, Permafrost beneath structures, Frozen ground settling, Deformation, Electrical measurement, Detection, Settlement (structural), Measuring instruments, United States—Alaska.

45-1182
Snow avalanche hazards and mitigation in the United States.
Panel on Snow Avalanches, Committee on Ground Failure Hazards Mitigation Research, Division of Natural Hazard Mitigation, National Research Council, Washington, D.C., National Academy Press, 1990, 84p., Refs. p.75-84.
Avalanche forecasting, Avalanche mechanics, Safety, Countermeasures, Standards, Slope processes, Legislation, Research projects.

45-1183
Paleoenvironmental significance of foraminiferal biofacies in the glaciomarine Yakataga Formation, Middleton Island, Gulf of Alaska.
Lagoe, M.B., et al, *Journal of foraminiferal research*, July 1989, 19(3), p.194-209, 63 refs.
Eyles, C.H., Eyles, N.
Pleistocene, Marine deposits, Glacial deposits, Sea level, Geological surveys, Climatic changes, Sedimentation, Paleoclimatology, United States—Alaska.

45-1184
Friction measurements under winter runway conditions.
Yager, T.J., *Aerospace engineering*, Feb. 1990, 10(2), p.32-35.
Aircraft, Runways, Tires, Rubber ice friction, Ice cover effect, Cold weather performance, Surface properties, Measurement, Cold weather tests.

45-1185
Climatological analysis of snowfall on the Qinghai-Xizang Plateau.
Zou, J., et al, *Chinese journal of atmospheric sciences*, 1989, 13(4), p.411-422, 5 refs.
Cao, C.
Snow accumulation, Seasonal variations, Meteorological data, Meteorological factors, Climatology, Topographic effects, Long range forecasting, China—Qinghai-Xizang Plateau.

45-1186
Hydrology of a perennial snowbank in the continuous permafrost zone, Melville Island, Canada.
Lewkowicz, A.G., et al, *Geografiska annaler*, 1990, 72A(1), p.13-21, 28 refs.
Young, K.L.
Snow cover, Snowmelt, Snow hydrology, Continuous permafrost, Water balance, Surface energy, Ablation, Canada—Northwest Territories.

45-1187
Identification of annual layers in superimposed ice from Storöyjökulen in northeastern Svalbard.
Jonsson, S., et al, *Geografiska annaler*, 1990, 72A(1), p.41-54, 49 refs.
Hansson, M.
Glacier mass balance, Glacier ice, Ice dating, Ice cores, Drill core analysis, Layers, Ice structure, Stratification, Seasonal variations, Norway—Svalbard.

45-1188
Rock slope development in McMurdo Oasis, Antarctica, and implications for interpretations of glacial history.
Augustinus, P.C., et al, *Geografiska annaler*, 1990, 72A(1), p.55-62, 25 refs.
Selby, M.J.
Glaciation, Rocks, Slope processes, Glacial erosion, Geologic structures, Antarctica—Transantarctic Mountains.
The upper slopes of the Asgard and Olympus ranges of the Transantarctic Mountains have been assessed for their rock mass strength. A finite-element model of two peaks has shown that under gravitational loading they have a tendency to spread laterally as a result of internal stresses. Stress release joints and slab failures are a consequence of this loading. The characteristic slope forms are cliffs in strength equilibrium surmounting Richter denudation-slopes. It is argued that the ubiquity of such forms, and their antiquity, make an hypothesis of high-level glacial overriding unverifiable. (Auth.)

45-1189
Boulder fields of Mt. Fulufjället, west-central Sweden.
Kleman, J., et al, *Geografiska annaler*, 1990, 72A(1), p.63-78, 23 refs.
Borgström, I.
Landscape development, Landforms, Rocks, Glaciation, Periglacial processes, Pleistocene, Glacier erosion, Sweden—Mt. Fulufjället.

45-1190
Relict periglacial structures. Occurrences, age and development in different matrices on a coastal plain of southwestern Sweden.
Svensson, H., *Geografiska annaler*, 1990, 72A(1), p.79-91, 24 refs.
Pleistocene, Patterned ground, Periglacial processes, Ice wedges, Soil structure, Cryoturbation, Soil analysis, Sweden.

45-1191
Morphological development of dunes in a subarctic environment, central Kobuk Valley, northwestern Alaska.
Dijkmans, J.W.A., et al, *Geografiska annaler*, 1990, 72A(1), p.93-109, 55 refs.
Koster, E.A.
Eolian soils, Sands, Subarctic landscapes, Landscape development, Wind factors, Geomorphology, Wind direction, United States—Alaska.

45-1192
Comparison of the mass balances and flows of Rabots Glaciär and Storglaciären, Kebnekaise, northern Sweden.
Stroeven, A.P., et al, *Geografiska annaler*, 1990, 72A(1), p.113-118, 28 refs.
van de Wal, R.S.W.
Glacier mass balance, Glacier flow, Periodic variations, Velocity, Climatic changes, Sweden.

45-1193
Small glaciers as sensitive indicators of climatic fluctuations.
Grudd, H., *Geografiska annaler*, 1990, 72A(1), p.119-123, 25 refs.
Glacier mass balance, Measurement, Periodic variations, Climatic changes, Ice volume, Climatology, Sweden.

45-1194
Geocryological studies of northern Western Siberia. Collected scientific papers. [Geokriologicheskie issledovaniia na severe Zapadnoĭ Sibiri. Sbornik nauchnykh trudov].
Konstantinov, I.P., ed, Novosibirsk, Nauka, 1990, 117p., In Russian. Refs. passim. For selected papers see 45-1195 through 45-1207.
Environmental impact, Snow density, Snow cover, Landscape types, Frozen ground, Permafrost beneath structures, Bearing strength, Foundations, Stefan problem, Analysis (mathematics), Electric heating, Concrete piles, Thermal conductivity, Thermal regime, Radiation balance, Salinity, Design.

45-1195
Landscape changes due to geological-prospecting operations on the western shore of the IAmal Peninsula. [Izmeneniia landshafta pri geologo-razvedochnykh rabotakh na zapadnom poberezh'e IAmala].
Grigor'ev, N.F., et al, Geokriologicheskie issledovaniia na severe Zapadnoĭ Sibiri. Sbornik nauchnykh trudov (Geocryological studies of northern Western Siberia. Collected scientific papers). Edited by I.P. Konstantinov, Novosibirsk, Nauka, 1990, p.4-8, In Russian. 4 refs.
Baranovskiĭ, E.L.
Landscape types, Landscape development, Environmental impact.

45-1196
Formation characteristics and thermal effect of snow cover in the area of the Kureysk hydro-center structure. [Zakonomernosti formirovaniia i teplovoe vliianie snezhnogo pokrova v raione sooruzheniia Kureĭskogo gidrouzla].
Kazanskiĭ, O.A., Geokriologicheskie issledovaniia na severe Zapadnoĭ Sibiri. Sbornik nauchnykh trudov (Geocryological studies of northern Western Siberia. Collected scientific papers). Edited by I.P. Konstantinov, Novosibirsk, Nauka, 1990, p.8-17, In Russian. 8 refs.
Environmental impact, Snow cover effect, Snow thermal properties, Snow cover structure, Snow density, Snow temperature.

45-1197
Properties of snow cover in northeastern Western Siberia. [Svoĭstva snezhnogo pokrova na severo-vostoke Zapadnoĭ Sibiri].
Sergeev, B.P., Geokriologicheskie issledovaniia na severe Zapadnoĭ Sibiri. Sbornik nauchnykh trudov (Geocryological studies of northern Western Siberia. Collected scientific papers). Edited by I.P. Konstantinov, Novosibirsk, Nauka, 1990, p.18-28, In Russian. 7 refs.
Snow cover, Heat balance, Snow stratigraphy, Mass transfer, Snow temperature, Snow density.

45-1198
Distribution of surface radiation balance in northeastern Western Siberia. [Raspredelenie radiatsionnogo balansa poverkhnosti na severo-vostoke Zapadnoĭ Sibiri].
Skriabin, P.N., et al, Geokriologicheskie issledovaniia na severe Zapadnoĭ Sibiri. Sbornik nauchnykh trudov (Geocryological studies of northern Western Siberia. Collected scientific papers). Edited by I.P. Konstantinov, Novosibirsk, Nauka, 1990, p.28-33, In Russian. 13 refs.
Varlamov, S.P.
Radiation balance, Albedo, Landscape types.

45-1199
Variations in the salinity of seasonally and perennially frozen soils. [Izmeneniia zasolennosti sezonnoprotaivaishchikh i mnogoletnemerzlykh gruntov],
Anisimova, N.P., Geokriologicheskie issledovaniia na severe Zapadnoĭ Sibiri. Sbornik nauchnykh trudov (Geocryological studies of northern Western Siberia. Collected scientific papers). Edited by I.P. Konstantinov, Novosibirsk, Nauka, 1990, p.40-46, In Russian. 4 refs.
Salinity, Active layer, Seasonal variations, Soil temperature, Frozen ground temperature, Permafrost.

45-1200
Questions on the construction, design, and calculation of block ventilated foundations on permafrost. [Voprosy konstruktirovaniia, proektirovaniia i rascheta prostranstvennykh ventiliruemykh fundamentov na vechnomerzlykh gruntakh],
Goncharov, IU.M., et al, Geokriologicheskie issledovaniia na severe Zapadnoĭ Sibiri. Sbornik nauchnykh trudov (Geocryological studies of northern Western Siberia. Collected scientific papers). Edited by I.P. Konstantinov, Novosibirsk, Nauka, 1990, p.47-58, In Russian. 8 refs.
Larionov, A.A., Popovich, A.P., Berdichevskiĭ, IU.V.
Foundations, Permafrost beneath structures, Design, Ventilation, Cold weather construction, Analysis (mathematics).

45-1201
Experimental studies on the thermal interaction of cast-in-situ bored piles with frozen ground. [Eksperimental'nye issledovaniie teplovogo vzaimodeĭstviia buronabivnykh svaĭ s merzlymi gruntami],
Kamenskiĭ, R.M., Geokriologicheskie issledovaniia na severe Zapadnoĭ Sibiri. Sbornik nauchnykh trudov (Geocryological studies of northern Western Siberia. Collected scientific papers). Edited by I.P. Konstantinov, Novosibirsk, Nauka, 1990, p.65-72, In Russian. 5 refs.
Permafrost beneath structures, Bearing strength, Concrete piles, Freeze thaw cycles, Frozen ground temperature, Electric heating.

45-1202
Thermophysical characteristics of clay mortar and cement reinforcement rings for well casings in gas wells in a permafrost zone. [Teplofizicheskie svoĭstva glinistogo rastvora i tsementnogo krepleniia obsadnykh kolonn gazovykh skvazhin v zone rasprostraneniia mnogoletnemerzlykh porod],
Gavril'ev, R.I., et al, Geokriologicheskie issledovaniia na severe Zapadnoĭ Sibiri. Sbornik nauchnykh trudov (Geocryological studies of northern Western Siberia. Collected scientific papers). Edited by I.P. Konstantinov, Novosibirsk, Nauka, 1990, p.72-76, In Russian. 1 ref.
Gubanova, O.P.
Gas wells, Well casings, Thermal conductivity, Cements, Freeze thaw cycles, Analysis (mathematics).

45-1203
Controlling the frozen regime of bearing ground of structures over mines. [Upravlenie merzlotnym rezhimom gruntov v osnovanii nadshakhtnykh zdaniĭ],
Gur'ianov, I.E., Geokriologicheskie issledovaniia na severe Zapadnoĭ Sibiri. Sbornik nauchnykh trudov (Geocryological studies of northern Western Siberia. Collected scientific papers). Edited by I.P. Konstantinov, Novosibirsk, Nauka, 1990, p.77-92, In Russian. 8 refs.
Foundations, Bearing strength, Mining, Thermal regime, Design, Countermeasures, Permafrost beneath structures, Ground thawing, Analysis (mathematics).

45-1204
Hydrochemical method of controlling the crystallization of water in closed voids. [Gidrokhimicheskiĭ metod kontrolia za kristallizatsieĭ vody v zamknutykh polostiakh],
Kuz'min, G.P., et al, Geokriologicheskie issledovaniia na severe Zapadnoĭ Sibiri. Sbornik nauchnykh trudov (Geocryological studies of northern Western Siberia. Collected scientific papers). Edited by I.P. Konstantinov, Novosibirsk, Nauka, 1990, p.92-95, In Russian. 4 refs.
Davydov, V.K., IAkovlev, A.V.
Ions, Ice formation, Chemical properties, Unfrozen water content, Ice crystal growth, Permafrost, Analysis (mathematics).

45-1205
Characteristics of foundation work on permafrost. [Osobennosti raboty fundamentov v vechnomerzlykh gruntakh],
Gaĭdaenko, E.I., et al, Geokriologicheskie issledovaniia na severe Zapadnoĭ Sibiri. Sbornik nauchnykh trudov (Geocryological studies of northern Western Siberia. Collected scientific papers). Edited by I.P. Konstantinov, Novosibirsk, Nauka, 1990, p.95-104, In Russian. 11 refs.
Turbina, M.I.
Foundations, Permafrost beneath structures, Soil water, Piles, Soil mechanics.

45-1206
Algorithm for an accelerated search for a periodically stabilized regime in the solution of a Stefan problem without initial conditions. [Algoritm uskorennogo poiska periodicheski ustanovivshegosia rezhima pri reshenii zadachi Stefana bez nachal'nykh usloviĭ],
Shender, N.I., et al, Geokriologicheskie issledovaniia na severe Zapadnoĭ Sibiri. Sbornik nauchnykh trudov (Geocryological studies of northern Western Siberia. Collected scientific papers). Edited by I.P. Konstantinov, Novosibirsk, Nauka, 1990, p.105-110, In Russian. 2 refs.
Tetel'baum, A.S., Fel'dman, G.M.
Stefan problem, Analysis (mathematics), Thermal properties, Soil temperature, Frozen ground temperature.

45-1207
Modified differential method with a smoothing coefficient in solving the Stefan problem. [Modifitsirovannyĭ raznostnyĭ metod so sglazhivaniem koeffitsientov dlia resheniia zadachi Stefana],
Tetel'baum, A.S., Geokriologicheskie issledovaniia na severe Zapadnoĭ Sibiri. Sbornik nauchnykh trudov (Geocryological studies of northern Western Siberia. Collected scientific papers). Edited by I.P. Konstantinov, Novosibirsk, Nauka, 1990, p.111-118, In Russian. 8 refs.
Stefan problem, Analysis (mathematics), Freeze thaw cycles, Thermal regime, Snow cover, Heat transfer.

45-1208
Detailed test plan for preproduction qualification test (PPQT) (prototype) of shelter, maintenance, transportable (SMT).
Rhodes, D.A., *U.S. Army Test and Evaluation Command. Cold Regions Test Center.* [Report], Nov. 1990, 16p. + appends., USATECOM Proj 4-ES-975-SMT-003, 10 refs.
Helicopters, Portable shelters, Cold weather tests, Cold weather performance, Design criteria, Clothing, Winter maintenance.

45-1209
Subzero Engineering Conference proceedings.
Society of Automotive Engineers, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, 470p., P-220, Refs. passim. For selected papers see 45-1210 through 45-1254.
Motor vehicles, Engines, Diesel engines, Low temperature tests, Cold weather operation, Cold weather tests, Cold weather performance, Engine starters, Fuels, Fuel additives, Tires, Protective coatings, Computer applications, Safety, Traction, Accidents, Design, Trafficability, Viscosity.

45-1210
Method of assisting cold-starts, improving fuel economy and reducing emissions of engines at cold temperatures.
Rao, V.K., et al, Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.1-14, 19 refs.
Bardon, M.F., Gardiner, D.P.
Cold weather performance, Engine starters, Air pollution.

45-1211
Development of data capture/analysis system for the use in cold start investigation.
Mina, T.I., et al, Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.15-33, 18 refs.
Bolsover, G.W.
Data processing, Cold weather operation, Computer applications, Diesel engines, Engine starters.

45-1212
Automotive exhaust emissions at low ambient temperature.
Laurikko, J.K., Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.35-46, 10 refs.
Engines, Diesel engines, Cold weather operation, Fuels, Air pollution, Low temperature tests.

45-1213
Indoor test of ice and snow tires on iced drum—development of tester and characteristics of coated ice for test.
Shimizu, K., et al, Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.47-52, 4 refs.
Ikeya, C.
Tires, Cold weather tests, Cold weather performance, Road icing.

45-1214
Design of sub-arctic type winter tyres.
Lindstrom, L., et al, Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.53-60.
Greiner, H.
Tires, Cold weather performance, Design.

45-1215
Safe winter driving—grip as for winter, driving properties as for summer.
Craellus, K., Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.61-66.
Safety, Cold weather operation, Tires, Accidents, Roads.

45-1216
Performance of thermoplastic elastomers (TPEs) at subzero temperatures.
Brugada, R., Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.67-73.
Low temperature tests, Cold weather performance, Flexural strength, Tensile properties, Resins, Rubber, Brittleness, Cracking (fracturing), Materials.

45-1217
Corrosion protection of car bodies in Finland.
Rönnholm, M., Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.75-76.
Corrosion, Protective coatings, Motor vehicles.

45-1218
Hydraulic seals in arctic conditions.
Soudunsaari, R., et al, Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.77-84, 6 refs.
Mikkonen, S.
Sealing, Cold weather performance, Rubber, Leakage, Materials, Plastics, Low temperature tests.

45-1219
Engine testing at low temperatures.
Nylund, N.O., Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.85-92, 4 refs.
Engines, Low temperature tests, Test chambers, Test equipment.

45-1220
Tests of vehicles in the North.
Bezverkhiĭ, S.F., et al, Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.93-99.
Maramashkin, A.V.
Vehicles, Climatic factors, Cold weather tests, Static loads.

45-1221
Influences of diesel fuel properties and ambient temperature on engine operation and exhaust emissions.
Juva, A., et al, Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.101-111, 11 refs.
Zelenka, P., Tritthart, P.
Fuels, Diesel engines, Air pollution, Air temperature, Low temperature tests, Design.

45-1222
Scania battery heater for heavy trucks.
Friedel, G., Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.113-118.
Motor vehicles, Engine starters, Low temperature tests, Heating.

45-1223
Requirements and norms of SLI-batteries in the north European climate.
Loponen, M.T., et al, Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.119-122, 2 refs.
Nieminen, A.
Engine starters, Cold weather performance.

45-1224
Good diesel fuel cold properties reduce engine performance.
Mikkonen, S., et al, Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.123-132.
Juva, A.
Fuels, Diesel engines, Density (mass/volume), Viscosity, Cold weather performance.

45-1225
Field testing in cold climate—a decade of experience.
Lindwall, O., Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.133-138.
Low temperature tests, Motor vehicles.

45-1226
Data acquisition system requirements for cold weather testing.
Leier, T.E., Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.139-143, 8 refs.
Cold weather tests, Cold weather operation, Computers, Data processing, Electric power.

45-1227
Microwave snow sounding for trafficability analysis.
Ala-Ilomäki, J., et al, Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.145-150, 2 refs.
Saarilahti, M., Toikka, M., Hallikainen, M.
Dielectric properties, Trafficability, Snow density, Snow water content, Sounding, Portable equipment, Snow strength.

45-1228
Vehicle emission characteristics under cold ambient conditions.
Larson, R.E., Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.151-159, 9 refs.
Temperature effects, Cold weather operation, Air pollution, Motor vehicles, Air temperature.

45-1229
CVS-cycle and average city trip emissions in temperatures below the FTP-range.
Svensson, N.G., et al, Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.161-163.
Nilsson, S.A.
Air pollution, Cold weather operation, Motor vehicles.

45-1230
Behaviour of metal supported catalysts in subzero conditions.
Aitta, E., et al, Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.165-169.
Härkönen, M., Halme, K.
Temperature effects, Motor vehicles, Air pollution, Cold weather performance, Low temperature tests.

45-1231
Antifrost system of windshield.
Takada, H., Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.171-178, 1 ref.
Dew point, Countermeasures, Defrosting, Frost protection, Motor vehicles, Ice prevention, Windshields, Air temperature.

45-1232
Snowmobile suspension system design under university-industry collaboration.
Sankar, S., et al, Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.183-191, 13 refs.
Alanoly, J., Germain, D., Mallette, B.
Snow vehicles, Models, Design.

45-1233
Tire force generation on ice.
Hayhoe, G.F., et al, Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.199-207, 11 refs.
Shapley, C.G.
Tires, Rubber ice friction, Mathematical models.

45-1234
Studless tires use in Japan.
Horiuchi, K., Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.209-215.
Tires, Environmental impact, Rubber ice friction, Brakes (motion arresters), Safety, Traction.

45-1235
Decreasing of wearing effect of studded tires on road pavements.
Sistonen, M., Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.217-221, 8 refs.
Tires, Accidents, Safety, Ice solid interface, Pavements.

45-1236
Evolution of diesel fuel cold flow—the next frontier.
Brown, G.I., et al, Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.223-237, 4 refs.
Lehmann, E.W., Lewtas, K.
Fuels, Cold weather operation, Fuel additives, Crystals, Motor vehicles, Diesel engines.

45-1237
Present and future fuels and lubricants in cold climate operation.
Haahtela, O., et al, Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.239-250, 7 refs.
Decker, G.
Fuels, Lubricants, Cold weather operation, Fuel additives.

45-1238
Engine lubrication in cold start-up.
Kytö, M., Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.251-256, 1 ref.
Low temperature tests, Lubricants, Engines, Motor vehicles, Engine starters.

45-1239
Refinery/additive technologies and low temperature engine oil pumpability.
Rossi, A., Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.257-267, 21 refs.
Lubricants, Motor vehicles, Cold weather performance, Viscosity, Solubility, Polymers.

45-1240
Lubricant low temperature pumpability studies—oil formulation and engine hardware effects.
May, C.J., et al, Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.277-286, 17 refs.
Habeeb, J.J.
Lubricants, Cold weather performance, Motor vehicles, Engines, Cooling rate, Pressure, Viscosity.

45-1241
Daimler-Benz winter test center "Rovaniemi"—a prerequisite for experimental development of electronic wheel slip control systems for commercial vehicles.
Göhring, E., Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.287-299, 10 refs.
Motor vehicles, Cold weather operation, Cold weather tests, Safety, Vehicle wheels, Traction.

45-1242
Vehicle operation under arctic conditions.
Rosenkranz, J., Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.301-315.
Heating, Motor vehicles, Cold weather operation, Design, Engines, Engine starters, Heat loss, Heat balance.

45-1243
Safety aspects while operating in winter.
Salusjärvi, M., Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.317-320, 5 refs.
Safety, Motor vehicles, Cold weather operation, Accidents.

45-1244
Investigation of a novel aid for cold starting of diesels.
Zheng, J., et al, Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.321-331, 20 refs.
Matthews, R.D., Nichols, S.P.
Diesel engines, Engine starters, Cold weather operation, Thermocouples, Coolants.

45-1245
Garaging and cold starting of engines in field conditions.
Olsauskas, K., Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.333-335.
Engines, Cold weather operation, Heating, Motor vehicles, Engine starters, Electric heating, Air temperature.

45-1246
Cold starting the Volvo way.
Häkansson, N.O., et al, Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.337-344, 1 ref.
Kemlin, J., Nilsson, R.
Electric heating, Engine starters, Diesel engines, Cold weather operation, Motor vehicles, Air temperature.

45-1247
Saab Direct Ignition System and its cold start performance.
Jiewertz, S., et al, Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.345-353.
Klemisch, B., Anderlind, T., Gillbrand, P.S.
Engine starters, Motor vehicles, Cold weather performance.

45-1248
Traction control for commercial vehicles.
Emig, R., et al, Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.355-363, 7 refs.
Schramm, H.
Traction, Cold weather operation, Motor vehicles, Brakes (motion arresters), Snow.

45-1249
Low temperature operability of diesel vehicles.
Rickeard, D.J., et al, Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.375-382, 2 refs.
Ramsden, A.W., Thompson, N.D.
Cold weather operation, Diesel engines, Motor vehicles, Fuel additives, Dynamometers.

45-1250
Heater/defroster testing in the real world.
Leier, T.E., et al, Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.405-411, 6 refs.
Malloy, M.G., Takeda, R., Toi, M.
Motor vehicles, Low temperature tests, Defrosting, Heating, Cold weather operation, Snow.

45-1251
Effects of MTBE on gasoline engine cold weather operation.
Viljanen, J., et al, Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.413-420, 4 refs.
Kokko, J., Lundberg, M.
Cold weather operation, Engines, Fuel additives, Motor vehicles.

45-1252
Synthetic automotive lubricants for superior low-temperature operation.
Aho, E., et al, Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.421-437, 9 refs.
Harlow, A.J., Lohuis, J.R.
Cold weather operation, Lubricants, Motor vehicles, Engines, Diesel engines, Engine starters, Viscosity.

45-1253
Low temperature pumpability studies in a heavy-duty diesel engine, part II.
Machleder, W.H., et al, Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.439-453, 13 refs.
Kopko, R.J.
Diesel engines, Low temperature research, Lubricants, Cold weather performance, Motor vehicles.

45-1254
Compressibility of diesel and methanol fuels at low temperatures.
Varde, K.S., Subzero Engineering Conference proceedings, Warrendale, PA, Society of Automotive Engineers, Apr. 1989, p.455-459, 13 refs.
Fuels, Compressive properties, Temperature effects, Low temperature tests.

45-1255
Study of ice streams B and C.
Whillans, I.M., *Antarctic journal of the United States*, 1989, 24(5), p.78-79, 3 refs.
Ice sheets, Mass balance, Photogrammetry.
The ice streams draining the inland ice of West Antarctica are dramatic features. They are as long as the state of Ohio, 1,000 m thick, and 50 to 100 km wide, and they exhibit speeds reaching 2.5 m per day. A major portion of the Siple Coast Project is the mapping of ice streams B and C and the determination of their surface velocity pattern and mass balance. This involves the use of doppler satellite (TRANSIT) receivers and high-elevation aerial photography. The TRANSIT receivers are left to record for 24 hours at each station in each of 2 years. The first velocity determinations are used to describe the pattern of flow and compute mass balance. Repeated surveys of the position of the Upstream B camp show no time changes in velocity.

TRANSIT surveying can provide positions and velocities only of crevasse-free areas where airplane landings are possible. Much of ice stream B is heavily crevassed and airplane landings would be unwise and surface travel arduous and dangerous. The crevasses, however, can be turned to an advantage with the use of repeat photogrammetry.

45-1256
Low-frequency ice radar studies on ice streams B and C, West Antarctica.
Hodge, S.M., et al, *Antarctic journal of the United States*, 1989, 24(5), p.79-81, 6 refs.
Jacobel, R.W., Wright, D.L.
Ice structure, Radar echoes.
A high-speed digital data acquisition system was developed for use with ice radars, and the low-frequency, short-pulse ice radar originally developed by the U.S. Geological Survey for temperate glaciers was adapted for surface-based investigations on ice sheets. This new ice-radar system was used on ice streams B and C, West Antarctica, to study internal layering and basal conditions, on the premise that this new range of frequencies, 1-32 megahertz, should provide additional information about these phenomena and about the dynamics of the ice streams. Besides ice thickness and motion measurements and bottom topography observations, unusual folds and undulations were discovered from returns of internal layers in ice stream B.

45-1257
Short-term variations in the speed of ice stream B, Antarctica.
Harrison, W.D., et al, *Antarctic journal of the United States*, 1989, 24(5), p.81-82, 4 refs.
Echelmeyer, K.A.
Ice sheets, Rheology, Strains.
A search for variations in the speed, vertical strain rate, and seismicity of ice stream B was begun in late Nov. 1988, near Upstream B camp (83.5S 138.2W). This is part of a cooperative program to study the dynamics of this and the other rapidly moving ice streams that feed the western side of the Ross Ice Shelf. The program consists of two parts: the measurement of ice speed and surface strain rate while personnel are in the field, and the measurement of strain rate and seismicity year round by geophones and strain wires installed in several shallow boreholes near Upstream B Camp and the California Institute of Technology drill site. At the end of the field season, the strain wires were still responding to transient effects associated with their installation, and there had been little seismicity; however, about 5 weeks of velocity data had been acquired by two methods, both of which determined distance to two reference points located on relatively stagnant ice off the ice stream. In the one case an ultra-high-frequency positioning system was used for daily motion studies; in the other, an EDM was used for terrestrial surveying, which was typically done several times per day, but sometimes hourly. The latter system is the more sensitive, although its success is weather dependent.

45-1258
Borehole drilling to the bed of ice stream B, Antarctica.
Engelhardt, H., et al, *Antarctic journal of the United States*, 1989, 24(5), p.83-84, 14 refs.
Fahnestock, M., Humphrey, N., Kamb, B.
Ice sheets, Drilling.
The great ice streams flowing through and out of the west antarctic ice sheet move at speeds of hundreds of meters per year, while the ice sheet itself moves only a few tens of meters per year. The authors' goal is to understand the basic physical mechanism that controls the rapid motion, both because it is an interesting glaciological phenomenon in its own right and because it may have important consequences for worldwide climatic change. The key to the rapid motion lies, it is thought, at or near the bottom of the ice. Three different mechanisms for rapid motion have been proposed: superplasticity of the basal ice; rapid basal sliding of the ice over its bed; and rapid deformation of a layer of subglacial till. Determining which of these (if any) is the actual mechanism requires gaining access to the basal zone and making appropriate measurements there. Details of a hot water drilling method are explained along with problems experienced. Comparisons are made with arctic drilling.

45-1259
Mean annual cycle in global ocean wind stress.
Trenberth, K.E., et al, *Journal of physical oceanography*, Nov. 1990, 20(11), p.1742-1760, 40 refs.
Large, W.G., Olson, J.G.
Climatology, Wind pressure, Oceans.
The mean annual cycle in surface wind stress over the global oceans from surface wind analyses from the European Centre for Medium Range Weather Forecasts (ECMWF) for seven years (1980-86) is presented. The drag coefficient is a function of wind speed and atmospheric stability, and the density is computed for each observation. Annual and seasonal mean climatologies of wind stress, wind stress curl and Sverdrup transport and the first two annual harmonics of the wind stress are presented. The Northern and Southern Hemispheres are contrasted, as are the Pacific and Atlantic basins. The representativeness of the climatology is also assessed. The main shortcomings with the current results are in the tropics. (Auth. mod.)

45-1260
Analysis of winter low-flow rates in New Hampshire streams.
Melloh, R.A., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Aug. 1990, SR 90-26, 12p., ADA-229 512, 11 refs.
Drainage, Stream flow, Seasonal variations, Winter, Flow rate, Climatic factors, Streams, Runoff.
The timing and magnitude of winter low flows vary regionally in response to basin climate and geology. This report investigates the regionalization of low flows in the White Mountain and Upland physiographic sections of New Hampshire to establish a data set that will be used in improved analytical methods for estimating winter flows. For the summer and winter low flow periods, 3-, 7-, 14- and 30-day duration low flow events are estimated for various sizes of drainage areas (50 to 230 square miles). The likelihood of a low-flow event increases as winter proceeds in the White Mountains, but is more evenly distributed throughout the winter in the Upland. White Mountain streams have higher runoff volumes through all seasons, except winter. The average magnitudes of winter low-flow events in both physiographic sections are highly correlated with drainage area size. Mean basin elevation was of little additional help in explaining winter low-flow events within either physiographic section, though it was important in explaining summer low-flow variation in the White Mountains.

45-1261
Interaction of sea ice, snow, and glaciers with the atmosphere and ocean (Part 1).
Kotliakov, V.M., ed, *Polar geography and geology*, Jan.-Mar. 1990, 14(1), 74p., Refs. p.69-74. For Russian originals see 42-2848 and 42-2849.
Grosval'd, M.G., ed.
Snowmelt, Climatic factors, Mountain glaciers, Ice sheets, Ice shelves, Sea ice distribution, Ice deterioration, Snow cover distribution, Snow line, Solar radiation, Snow melting, Meteorological charts, Soil temperature, Land ice, Alimentation, Mass balance, Maps, Snow depth, Heat transfer, Mass transfer, Snow surveys.

45-1262
Mathematical modeling and analysis of heat pipe start-up from the frozen state.
Jang, J.H., et al, *Journal of heat transfer*, Aug. 1990, 112(3), p.586-594, 21 refs.
Faghri, A., Chang, W.S., Mahefkey, E.T.
Heat pipes, Heat transfer, Mathematical models, Phase transformations.

45-1263
Ice formation and heat transfer with water flow around isothermally cooled cylinders arranged in a line.
Hirata, T., et al, *Journal of heat transfer*, Aug. 1990, 112(3), p.707-713, 12 refs.
Matsui, H.
Ice formation, Heat transfer, Water flow, Analysis (mathematics), Ice water interface, Ice solid interface.

45-1264
Atlas of river ice in China, Beijing, Science Press, 1990, 141p., In English, Chinese, and Russian.
Zhu, S.T., ed, Liu, G.J., ed.
River ice, Ice conditions, Ice surveys, Maps, China.

45-1265
Geological history of the polar oceans: Arctic versus Antarctic.
Bleil, U., ed, Dordrecht, The Netherlands, Kluwer Academic Publishers, 1990, 823p., Proceedings of the NATO advanced research workshop held in Bremen, FRG, Oct. 10-24, 1988. For selected papers see E-43125 through E-43129, E-43132, F-43130, F-43131, J-43133 through J-43139, or 45-1266 through 45-1270.
Thiede, J., ed.
DLC QE350.6.N38 1988
Meetings, Sea ice, Ice cover, Sediments.
During the Advanced Research Workshop, papers were presented covering arctic as well as antarctic studies. A major effort was devoted to the comparison of the Cenozoic histories of the modern polar deep-sea basins of both hemispheres. This book addresses the physiography and plate tectonics of the polar deep-sea basins and their continental margins; the polar ice-covers as geological agents; contemporary depositional environments of polar oceans; the Quaternary history and paleoceanography of the northern polar deep-sea basins and of the southern ocean, and, finally, pre-Quaternary records of polar ocean history. Many of the papers contained in this book identify major unsolved scientific problems, thus offering new perspectives for future geoscientific research in the polar regions. Expeditions to the polar regions in recent years, together with progress in deep-sea drilling techniques and the new ice-breakers which are available now, or in the near future, have provided the means for renewed polar research efforts to unravel important unsolved questions related to the geological history and characteristics of the polar oceans. (Auth. mod.)

45-1266
Morphology and plate tectonics: the modern polar oceans.
Johnson, G.L., NATO Advanced Research Workshop on Geological History of the Polar Oceans: Arctic versus Antarctic, Bremen, Oct. 1988. Proceedings, edited by U. Bleil, and J. Thiede, Dordrecht, The Netherlands, Kluwer Academic Publishers, 1990, p.11-28, 44 refs.
DLC QE350.6.N38 1988
Bottom topography, Geomorphology, Tectonics
The sea bed morphologies of both the Arctic Ocean and the circumpolar antarctic seas are poorly known due to their geographic remoteness, harsh climate, and the cover of sea ice in the Arctic and extensive ice shelves in the Antarctic. This paper summarizes the present state of knowledge. The future use of aero-gravimetric and satellite altimeter sensors will help to remedy this situation. Both oceanic areas are vital to paleo- and present climate as they are the source of the deep waters of the world's oceans. (Auth.)

45-1267
Comparison of arctic and antarctic sea ice and the effects of different properties on sea ice biota.
Spindler, M., NATO Advanced Research Workshop on Geological History of the Polar Oceans: Arctic versus Antarctic, Bremen, Oct. 1988. Proceedings, edited by U. Bleil, and J. Thiede, Dordrecht, The Netherlands, Kluwer Academic Publishers, 1990, p.173-186, 47 refs.
DLC QE350.6.N38 1988
Sea ice, Ice cover thickness, Ice mechanics, Ice salinity, Microbiology.
Both polar regions are covered by extensive seasonal sea ice which is inhabited by a variety of plants and animals. The number of organisms living in the sea ice may exceed those in the water column by several orders of magnitude per unit volume. However, between the two polar regions there are fundamental differences in sea ice properties such as mean age, thickness distribution, mean salinity, development, crystal structure, and minimum and maximum sea ice expansion. These differences not only influence the space available for settlement but also the abundance, diversity, and distributional pattern of species living in the sea ice system both in the Arctic and Antarctic. Key species from the sea ice community may be used as tools in reconstructing the extent of sea ice cover in the past. (Auth.)

45-1268
Sea ice characteristics and the role of sediment inclusions in deep-sea deposition: Arctic-antarctic comparisons.
Pfirman, S., et al, NATO Advanced Research Workshop on Geological History of the Polar Oceans: Arctic versus Antarctic, Bremen, Oct. 1988. Proceedings, edited by U. Bleil, and J. Thiede, Dordrecht, The Netherlands, Kluwer Academic Publishers, 1990, p.187-211, Refs. p.206-211.
Lange, M.A., Wollenburg, I., Schlosser, P.
DLC QE350.6.N38 1988
Sea ice, Sediments, Ice rafting.
Much of arctic sea ice forms over the shallow continental shelves along the perimeter of the basin. Ice which escapes the shelf is transported several years within the Beaufort Gyre and Transpolar Drift stream, before exiting the Arctic Basin through Fram Strait. This ice, and especially that in the Siberian branch of the Transpolar Drift stream in the Eurasian Basin, may incorporate large quantities of particulate matter during formation on the shelf. Subsequent seasonal surface melting and winter freezing on the ice underside results in surface accumulation of particulate matter. Rafting of floes over and under each other results in a complex ice stratigraphy and redistribution of sediment accumulations. In contrast, antarctic sea ice has only limited sources for sediment incorporation, and most of the ice-cover melts each year. These variations in arctic and antarctic ice characteristics are illustrated by analyses of ice crystal texture, c-axis orientations, salinity, *delta*O-18 on ice cores and discussion of potential sediment input. (Auth.)

45-1269
Past changes in precipitation rate and ice thickness as derived from age-depth profiles on ice-sheets; application to Greenland and Canadian arctic ice core records.
Reeh, N., NATO Advanced Research Workshop on Geological History of the Polar Oceans: Arctic versus Antarctic, Bremen, Oct. 1988. Proceedings, edited by U. Bleil, and J. Thiede, Dordrecht, The Netherlands, Kluwer Academic Publishers, 1990, p.255-271, 34 refs.
DLC QE350.6.N38 1988
Ice sheets, Age determination, Ice cover thickness, Ice models.

45-1270
Sediment patterns in the southern Weddell Sea: Filchner Shelf and Filchner Depression.
Fütterer, D.K., et al, NATO Advanced Research Workshop on Geological History of the Polar Oceans: Arctic versus Antarctic, Bremen, Oct. 1988. Proceedings, edited by U. Bleil, and J. Thiede, Dordrecht, The Netherlands, Kluwer Academic Publishers, 1990, p.381-401, 36 refs.
Melles, M.
DLC QE350.6.N38 1988
Sea ice, Sediments, Hydrology, Bottom topography.
Sediment patterns derived from facies distribution of surface sediments and acoustic sediment characteristics were mapped in the southern Weddell Sea between 35W and the Antarctic Peninsula at 61W. Sediment sampling with box grab and gravity corer, and 3.5 kHz sub-bottom profiling, has been carried out in recent years during several expeditions by R.V. *Polarstern* in 1984-1985. Results from sub-bottom profiling of the Filchner Shelf show a thin veneer of acoustically transparent 'postglacial' sediments overlying a hard reflector that allows no acoustic penetration into the deeper layers beneath. This reflects the transition from an overcompacted diamicton deposited by a grounded ice-sheet to glaciomarine conditions of a floating ice-shelf. Sediment textures on the shelf show a wide diversity from very well-sorted pure sands in the SE near Gould Bay, sandy muds to the west and gravelly dropstone-rich muds in the Ronne Trough closer to the foot of the Antarctic Peninsula. Surface sediments of the Filchner Depression have been subdivided into five distinct sediment types which can be related to different depositional environments. Sediment facies distribution above the overcompacted diamicton supplies information about the retreat and fluctuations of the Holocene ice-shelf edge. The continental slope north of the Filchner Depression shows a gravel-paved, acoustically hard sea bottom. This together with oceanographic data indicates an area of strong bottom water flow across the slope (northward flowing Ice-Shelf Water, ISW) which leads to vigorous erosion and lag sediment formation. (Auth.)

45-1271
Thermodiffusion flow of thin intervening layers of unfrozen water in bundles of quartz fibers.
Brovka, G.P., et al, *Colloid journal of the USSR*, Sep. 1990, 52(2), p.294-297, Translated from Kolloidnĭ zhurnal. 7 refs.
Dediulia, I.V., Churaev, N.V.
Frozen ground thermodynamics, Thermal diffusion, Unfrozen water content, Moisture transfer, Mass transfer, Ground ice, Thermal analysis, Temperature gradients, Models.

45-1272
Melville Moraine: sea-level change and response of the western margin of the Foxe Ice Dome, Melville Peninsula, Northwest Territories.
Dredge, L.A., *Canadian journal of earth sciences*, Sep. 1990, 27(9), p.1215-1224, With French summary. 20 refs.
Moraines, Sea level, Variations, Glacier oscillation, Marine deposits, Radioactive age determination, Geologic processes, Canada—Northwest Territories.

45-1273
Snow/cloud discrimination with multispectral satellite measurements.
Allen, R.C., Jr., et al, *Journal of applied meteorology*, Oct. 1990, 29(10), p.994-1004, 17 refs.
Durkee, P.A., Wash, C.H.
Cloud cover, Classifications, Snow cover, Detection, Remote sensing, Reflectivity, Data processing.

45-1274
Exploratory study of ice nucleation by soot aerosols.
DeMott, P.J., *Journal of applied meteorology*, Oct. 1990, 29(10), p.1072-1079, 21 refs.
Aerosols, Organic nuclei, Ice formation, Nucleation rate, Ice nuclei, Cloud droplets, Nucleating agents, Scavenging, Cloud chambers.

45-1275
Long-term temperature monitoring program, 1987: Scotia-Fundy, Gulf of St. Lawrence, and Newfoundland.
Gregory, D.N., et al, *Canadian data report of hydrography and ocean sciences*, Aug. 1988, No.65, 491p., Microlog 90-06589, With French summary. 11 refs.
Verge, E., Dobson, D., Smith, C.
Oceanographic surveys, Water temperature, Degree days, Canada—Nova Scotia, Canada—Saint Lawrence Gulf.

45-1276
Current meter, CTD and meteorological observations on the northern Grand Banks for Apr.-Oct. 1986.
DeYoung, B., et al, *Canadian data report of hydrography and ocean sciences*, July 1988, No.63, 94p., Microlog 90-06588, With French summary.
Tang, C.L.
Oceanographic surveys, Ocean currents, Water temperature, Salinity, Marine meteorology, Canada—Newfoundland—Grand Banks.

45-1277
Oceanographic and meteorological observations from the Hibernia region of Newfoundland Grand Banks.
Petrie, B., et al, *Canadian data report of hydrography and ocean sciences*, June 1988, No.69, 270p., Microlog 90-06585, With French summary. 3 refs.
Warnell, D.
Oceanographic surveys, Ocean currents, Water temperature, Salinity, Sea level, Wind velocity, Wind direction, Canada—Newfoundland—Grand Banks.

45-1278
Long-term temperature monitoring program, 1989: Scotia-Fundy and the Gulf of St. Lawrence.
Gregory, D.N., et al, *Canadian data report of hydrography and ocean sciences*, June 1990, No.84, 175p., Microlog 90-06434, With French summary. 13 refs.
Verge, E., Langille, P.
Oceanographic surveys, Water temperature, Degree days, Canada—Nova Scotia, Canada—Saint Lawrence Gulf.

45-1279
Long-term temperature monitoring program, 1988: Scotia-Fundy and Gulf of St. Lawrence.
Gregory, D.N., et al, *Canadian data report of hydrography and ocean sciences*, Aug. 1989, No.74, 233p., Microlog 90-05162, With French summary. 12 refs.
Verge, E., Langille, P.
Oceanographic surveys, Water temperature, Degree days, Canada—Nova Scotia, Canada—Saint Lawrence Gulf.

45-1280
Hudson Bay and Ungava Bay ice-melt cycles for the period 1963-1983.
Loucks, R.H., et al, *Canadian contractor report of hydrography and ocean sciences*, Feb. 1989, No.34, 48p., Microlog 90-05160, With French summary. 4 refs.
Smith, R.E.
Ice melting, Meltwater, Runoff, Ice cover thickness, Stream flow, Canada—Hudson Bay.

45-1281
Hydrographic measurements from C.S.S. Hudson Cruise 82-002.
Hendry, R.M., *Canadian technical report of hydrography and ocean sciences*, Sep. 1989, No.118, 112p., Microlog 90-05159, With French summary. 8 refs.
Oceanographic surveys, Water temperature, Salinity, Water pressure, Water chemistry, Sea water, North Atlantic Ocean.

45-1282
Current meter, meteorological, and sea level observations for Browns Bank, Nova Scotia, Apr. 1984 to May 1985.
Lively, R.R., *Canadian technical report of hydrography and ocean sciences*, Mar. 1989, No.113, 304p., Microlog 90-05158, With French summary. 10 refs.
Oceanographic surveys, Ocean currents, Sea level, Marine meteorology, Canada—Nova Scotia.

45-1283
Physical oceanographic observations in the Cardigan Bay region of Prince Edward Island, 1982-1987.
Drinkwater, K.F., et al, *Canadian technical report of hydrography and ocean sciences*, Nov. 1988, No.110, 37p., Microlog 90-05157, With French summary. 9 refs.
Petrie, B.
Oceanographic surveys, Ocean currents, Tidal currents, Water temperature, Salinity, Canada—Prince Edward Island.

45-1284
Monthly means of temperature, salinity and sigma-t for the Gulf of St. Lawrence.
Petrie, B., *Canadian technical report of hydrography and ocean sciences*, Apr. 1990, No.126, 137p., Microlog 90-05147, With French summary. 6 refs.
Oceanographic surveys, Water temperature, Salinity, Canada—Saint Lawrence Gulf.

45-1285
Currents and temperature data from northwestern Baffin Bay, Sep. 1983-Sep. 1984.
Ross, C.K., *Canadian data report of hydrography and ocean sciences*, Feb. 1990, No.78, 227p., Microlog 90-04318, With French summary. 5 refs.
Oceanographic surveys, Ocean currents, Water temperature, Baffin Bay.

45-1286
Currents and temperature data from southwestern Baffin Bay, Oct. 1984-Oct. 1985.
Ross, C.K., *Canadian data report of hydrography and ocean sciences*, Mar. 1990, No.79, 180p., Microlog 90-04317, With French summary. 2 refs.
Oceanographic surveys, Ocean currents, Water temperature, Baffin Bay.

45-1287
Sea ice fluctuations in the western Labrador Sea (1963-1988).
Peterson, I.K., et al, *Canadian technical report of hydrography and ocean sciences*, Jan. 1990, No.123, 130p., Microlog 90-03399, With French summary. 12 refs.
Prinsenberg, S.J.
Ice surveys, Sea ice distribution, Ice edge, Drift, Ice conditions, Labrador Sea.

45-1288
Ice-based oceanographic sea-ice and meteorological data obtained over the N.E. Newfoundland Shelf, 1988-1989.
Fissel, D.B., et al, *Canadian data report of hydrography and ocean sciences*, Sep. 1989, No.75, 165p., Microlog 90-02022, With French summary. 11 refs.
Van der Baaren, A., Tang, C.L.
Oceanographic surveys, Ice surveys, Sea ice distribution, Drift, Ocean currents, Ice temperature, Ice conditions, Ice edge, Canada—Newfoundland.

45-1289
Spreading of oil spilled under ice.
Yapa, P.D., et al, *Journal of hydraulic engineering*, Dec. 1990, 116(12), p.1468-1483, 25 refs.
Chowdhury, T.
Surface waters, Oil spills, Ice cover effect, Subglacial observations, Analysis (mathematics), Simulation, Dispersions, Roughness coefficient, Water pollution.

45-1290
Low temperature operability of diesel engines.
Rickeard, D.J., et al, *Automotive engineering*, Apr. 1989, 97(4), p.33-37.
Ramsden, A.W., Thompson, N.D.
Diesel engines, Cold weather performance, Fuel additives, Flow measurement, Viscosity, Temperature effects.

45-1291
Niveo-aeolian sedimentation and resulting sedimentary structures: Søndre Strømjford area, western Greenland.
Dijkmans, J.W.A., *Permafrost and periglacial processes*, Apr.-June 1990, 1(2), p.83-96, With French summary. 23 refs.
Eolian soils, Sedimentation, Sands, Snow cover effect, Meltwater, Soil formation, Wind factors, Stratification, Greenland.

45-1292
Geomorphic impact of spring avalanches in northwest Spitsbergen (79N).
André, M.F., *Permafrost and periglacial processes*, Apr.-June 1990, 1(2), p.97-110, With French summary. 14 refs.
Avalanche mechanics, Avalanche erosion, Talus, Sediment transport, Snow cover effect, Slope processes, Lithology, Norway—Spitsbergen.

45-1293
Alpine debris flows and their sedimentary properties. A case study from the French Alps.
Nieuwenhuijzen, M.E., et al, *Permafrost and periglacial processes*, Apr.-June 1990, 1(2), p.111-128, With French summary. 37 refs.
van Steijn, H.
Periglacial processes, Mass flow, Sediment transport, Mountains, Slope processes, Grain size, Alpine landscapes, Rock streams, France—Alps.

45-1294
Karst drainage in a permafrost setting: the case of Akpatok Island, Northwest Territories, Canada.
[Drainage karstique en milieu de pergélisol: le cas de l'île d'Akpatok, T.N.O. Canada],
Lauriol, B., et al, *Permafrost and periglacial processes*, Apr.-June 1990, 1(2), p.129-144, In French with English summary. 36 refs.
Gray, J.T.
Continuous permafrost, Karst, Meltwater, Subsurface drainage, Snow cover effect, Hydrogeochemistry, Permafrost hydrology, Water table, Canada—Northwest Territories.

45-1295
Periglacial phenomena in New Zealand.
Soons, J.M., et al, *Permafrost and periglacial processes*, Apr.-June 1990, 1(2), p.145-159, With French summary. 68 refs.
Price, L.W.
Periglacial processes, Geomorphology, Frost action, Altitude, Temperature effects, Climatic factors, Mountains, Patterned ground, New Zealand.

45-1296
Development of thermokarst lakes during the Holocene at sites near Mayo, Yukon Territory.
Burn, C.R., et al, *Permafrost and periglacial processes,* Apr.-June 1990, 1(2), p.161-176, With French summary. Refs. p.173-175.
Smith, M.W.
Thermokarst lakes, Landscape development, Taliks beneath lakes, Forest fires, Climatic changes, Ground ice, Radioactive age determination, Permafrost transformation, Origin, Canada—Yukon Territory.

45-1297
Soil and rock temperatures in discontinuous permafrost: Gornergrat and Unterrothorn, Wallis, Swiss *Alps.*
King, L., *Permafrost and periglacial processes,* Apr.-June 1990, 1(2), p.177-188, With French summary. 31 refs.
Discontinuous permafrost, Permafrost distribution, Periglacial processes, Temperature measurement, Soil temperature, Weathering, Insolation, Mountains, Geomorphology, Switzerland—Alps.

45-1298
Note on biological weathering on nunataks of the Juneau Icefield, Alaska.
Hall, K., et al, *Permafrost and periglacial processes,* Apr.-June 1990, 1(2), p.189-196, With French summary. 25 refs.
Otte, W.
Nunataks, Algae, Weathering, Damage, Lithology, Surface structure, United States—Alaska.

45-1299
Fourth International Conference on Atmospheric *Icing of Structures.*
International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, 414p., Refs. passim. For individual papers see 44-415, 44-614, and 45-1300 through 45-1381.
Icing, Ice accretion, Power line icing, Aircraft icing, Snow loads, Wet snow, Ship icing, Ice growth, Ice loads.

45-1300
Atmospheric icing: a review.
Lozowski, E.P., et al, International Conference on Atmospheric *Icing of Structures, 4th, Paris, Sep.* 5-7, 1988, 1988, p.1-6, 39 refs.
Gayet, J.F.
Icing, Ice accretion, Ice heat flux, Ice growth, Ice solid interface.

45-1301
Wet snow on overhead lines: state-of-art.
Admirat, P., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.7-13, With French summary. 20 refs.
Sakamoto, Y.
Wet snow, Snow loads, Power line icing, Ice forecasting, Weather forecasting, Snowfall, Precipitation (meteorology).

45-1302
Space-time model of a major wet snow episode (Perpignan—30th-31st January 1986).
Maccagnan, M., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.14-18, With French summary. 3 refs.
Admirat, P., Gabrielli, R.
Wet snow, Snowstorms, Snow loads, Power line icing, Snowfall.

45-1303
Assessment of probabilistic climatic loadings on existing 230 kV steel transmission lines.
Haldar, A., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.19-23, 8 refs.
Mitten, P.T., Makkonen, L.
Power line icing, Ice loads, Ice forecasting, Mathematical models.

45-1304
Mapping of the risk of wet snow sticking on power lines over a period of 35 years.
Admirat, P., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.24-29, With French summary. 5 refs.
Lapeyre, J.L., De Goncourt, B., Maccagnan, M.
Wet snow, Snow loads, Power line icing, Meteorological charts.

45-1305
Probability based design approach to climatic loadings in Hungary.
Krómer, I., International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.30-33, 2 refs.
Power line icing, Ice loads, Cost analysis.

45-1306
Ice coating in Romania. Study of existing regulations regarding the intensity of ice coating.
Dragan, G., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.34-38, 7 refs.
Militaru, P.
Power line icing, Ice loads, Analysis (mathematics), Wind factors.

45-1307
Regional climato-economic study of 20 wet snow episodes over the period 1951-1987, with projection for the period 1988-2000.
Baldit, M., et al, International Conference on Atmospheric *Icing of Structures, 4th, Paris, Sep.* 5-7, 1988, 1988, p.39-43, With French summary.
Admirat, P., Lapeyre, J.L.
Power line icing, Wet snow, Snow loads, Cost analysis.

45-1308
Model for hourly snowfall.
Sage, J.D., International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.44-48, 9 refs.
Snowfall, Snow accumulation, Statistical analysis.

45-1309
Satellite images of icing clouds.
Schickel, K.P., International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.49-51, 6 refs.
Spaceborne photography, Supercooled clouds, Aircraft icing, Air temperature, Cloud physics.

45-1310
Transition of freezing precipitation types in Canadian atlantic coastal storms.
Low, T.B., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.52-56, 17 refs.
Stewart, R.E., Crawford, R.
Precipitation (meteorology), Freezing, Ice storms, Unfrozen water content, Ice accretion, Particle size distribution.

45-1311
Very short range forecast of wet snow by means of the *METEOTEL system. Experiment of winter 85-86.*
Strauss, B., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.57-60, 5 refs.
Magnan, J., Musson-Genon, L.
Weather forecasting, Wet snow, Power line icing.

45-1312
Meteorological and cloud physical observations of atmospheric *icing events on Gaustatoppen.*
Finstad, K.J., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.61-64, 3 refs.
Carstens, T., Fikke, S.M., Ervik, M.
Cloud physics, Icing, Unfrozen water content.

45-1313
Design and analysis of ice load on power lines in mountainous regions.
Murooka, M., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.65-69, 5 refs.
Ohsaki, E., Sakamoto, Y., Tadokoro, Y.
Power line icing, Ice loads.

45-1314
Freezing rain and fog events in southern Ontario: properties and effects on EHV transmission systems.
Melo, O.T., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.70-75, 15 refs.
Tam, Y.T., Farzaneh, M.
Power line icing, Rain, Supercooled fog, Ice accretion.

45-1315
On-site observations of transmission line and telecommunication tower icing as part of data acquisition programs required by new standards.
Fikke, S.M., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.76-78, 7 refs.
Ervik, M., Finstad, K.J.
Power line icing, Towers, Ice loads.

45-1316
Construction of data-base on observation of natural wet snow accretion and some considerations on it.
Sakamoto, Y., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.79-83, 3 refs.
Shimada, Y., Kawaguchi, M., Kawanishi, S.
Wet snow, Power line icing, Snow loads.

45-1317
Observation of ice accretion on power *transmission* lines.
Takagi, Y., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.84-88, 3 refs.
Okumura, T., Kitanishi, M., Sanai, M.
Power line icing, Ice accretion, Ice loads.

45-1318
Atmospheric icing with elevation on New England mountains.
Ryerson, C.C., MP 2795, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.89-93, 11 refs.
Icing, Ice accretion, Altitude, Mountains, Icing rate, Wind factors.
Variations in atmospheric icing conditions with elevation on three New England mountains were analyzed statistically. Icing was monitored along a west-facing vertical transect of 1100-m Madonna Peak in the Green Mountains, and at the summits of New Hampshire's 1917-m Mount Washington and Vermont's 1339-m Mount Mansfield. Icing rarely occurs below 800 m, and increases approximately exponentially to the summit elevation of Mount Washington. Ice accretion along slopes near the ground surface correlates with relief exposure, with even slight promontories accumulating more ice than hollows. At the summits, icing occurs about three times as often on Mount Washington as on Mount Mansfield, and mean monthly icing rates are about 50 times greater on Mount Washington.

45-1319
Basic methods and results of ice investigation for electric overhead lines design and exploitation in Czechoslovakia.
Popolanský, F., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.94-98, 5 refs.
Kružík, J.
Power line icing, Ice loads, Ice volume, Measurement.

45-1320
Analysis of ice overload on single and bundled conductors.
Flocchini, G., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.99-103, 4 refs.
Palau, C., Nicolini, P., Tavano, F.
Power line icing, Ice accretion, Ice loads, Mathematical models, Ice storms.

45-1321
Analysis of the meteorological process of ice depositions on transmission line conductors.
Csomor, M., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.104-108.
Rezsöfi, F.
Power line icing, Ice loads, Meteorological factors.

45-1322
Studies of icing and ice-snow accretion in Mt. Zao.
Yano, K., International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.109-113, 12 refs.
Icing, Ice accretion, Snow loads, Trees (plants).

45-1323
Density of natural ice accretions.
Jones, K.F., MP 2796, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.114-118, 12 refs.
Icing, Ice accretion, Ice density, Meteorological factors, Analysis (mathematics), Ice forecasting.
*The particular meteorological conditions under which atmo*spheric icing occurs determine the density of the accreted ice. Density information is required to calculate the accreted ice load on an object. A density formula developed by Macklin (1962) from artificially iced samples is often used to calculate rime ice density as a function of R (effective droplet diameter multiplied by droplet impact speed divided by icing surface temperature). In this study icing data collected in natural conditions at the summit of Mt. Washington in New Hamsphire was used to test Macklin's relationship. The Mt Washington Observatory has been making icing measurements using rotating multicylinders since 1969. Meteorological and icing data from these observations were used along with accretion weight and volume data from each of the six cylinders in the multicylinder set to relate ice accretion density to Macklin's R parameter. A least-squares fit for density as a function of R was obtained that indicates a different relationship from that obtained by Macklin. A multiple regression analysis was performed to relate the ice accretion density directly to air temperature, wind speed, cloud liquid water content, cloud median volume droplet diameter, and cylinder diameter.

45-1324
Freezing rain in Quebec: field observations compared to model estimations.
Felin, B., *International Conference on Atmospheric* Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.119-123, 11 refs.
Rain, Power line icing, Ice accretion, Mathematical models, Ice loads.

45-1325
Icing rate measurements made for different cable configurations on an icing test line at Mt. Valin.
Druez, J., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.125-128, 9 refs.
McComber, P., Felin, B.
Power line icing, Icing rate, Ice accretion, Mathematical models, Cables (ropes).

45-1326
Calibration of a snow accumulation based on actual cases in Japan and France.
Admirat, P., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.129-133, With French summary. 4 refs.
Sakamoto, Y., De Goncourt, B.
Snow accumulation, Power line icing, Snow loads, Mathematical models.

45-1327
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Aircraft icing, Ice accretion, Glaze, Wind tunnels.

45-1328
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Turnock, S.R.
Glaze, Ice accretion, Surface roughness, Mathematical models, Microstructure, Ice water interface, Water films.

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Icing, Ice accretion, Heat transfer coefficient, Ice air interface, Convection.

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Ice adhesion, Ice strength, Artificial ice, Ice removal, Aircraft icing.

45-1333
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Power line icing, Ice loads, Wind tunnels.

45-1334
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45-1335
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45-1336
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Aircraft icing, Wind tunnels, Research projects, France.

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45-1338
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Isaka, H., Guffond, D.
Aircraft icing, Fluid flow, Mathematical models.

45-1339
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Ship icing, Ice accretion, Ice forecasting, Mathematical models, Ice growth, Precipitation (meteorology), Supercooled fog, Ice loads.

45-1340
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Offshore structures, Ice accretion, Icing, Computer programs, Mathematical models.

45-1341
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Power line icing, Ice accretion, Mathematical models, Air flow, Ice loads, Fluid flow.

45-1342
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Skelton, P.L.I.
Power line icing, Ice accretion, Mathematical models, Ice loads, Snow loads, Fluid dynamics.

45-1343
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Power line icing, Ice accretion, Mathematical models, Ice growth, Ice air interface.

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45-1345
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45-1347
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Icing, Ice accretion, Drops (liquids).

45-1348
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45-1349
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Aircraft icing, Ice strength, Tensile properties, Wind tunnels.

45-1350
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Icing, Ice crystal growth.

45-1351
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Du, N.
Icing, Drops (liquids), Particle size distribution, Measurement, Microscope slides, Wind tunnels.

45-1352
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Royer, H.
Cloud droplets, Particle size distribution, Probes, Measurement, Holography.

45-1353
Ice accretion (growth, mass, shape, thickness, density) on a 12.5 mm rod in dependence on cloud physical parameters for different types of clouds.
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Aircraft icing, Ice accretion, Cloud physics, Clouds (meteorology).

45-1354
Snow accretion in Catalonia: a climatological study.
Barò, M.D., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.277-281, 9 refs.
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Snow accumulation, Snowstorms, Power line icing.

45-1355
Automatic computer controlled weather actuated camera system for the investigation of snow accretion on overhead lines.
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Power line icing, Snow loads, Monitors, Computer applications, Meteorological instruments, Photographic techniques.

45-1356
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Panel, J.M., Lafeuille, J.
Snow water content, Snow samplers, Dielectric properties, Wet snow.

45-1357
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Sugawara, N., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.291-295, 7 refs.
Hokari, K.
Power line icing, Electrical insulation.

45-1358
Effects of ice coating on the dielectric strength of high-voltage insulators.
Kannus, K., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.296-300, 8 refs.
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Power line icing, Electrical insulation.

45-1359
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Farzaneh, M., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.301-304, 10 refs.
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Power line icing, Electrical insulation.

45-1360
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Milanovic, D., Plazinic, S.
Power line icing, Electrical insulation.

45-1361
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Teisseyre, Y., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.310-313, 11 refs.
Farzaneh, M.
Power line icing, Ice accretion, Ice electrical properties.

45-1362
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Pon, C.J.
Power line icing, Wind pressure, Damping, Vibration.

45-1363
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Pohlman, J.C.
Power line icing, Wind pressure, Vibration.

45-1364
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Lapeyre, J.L.
Power line icing, Snow loads, Countermeasures, Tensile properties, Mathematical models.

45-1365
Management of devastating ice storms.
Hesse, K.H., International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.330-334.
Power line icing, Ice storms.

45-1366
Crossing of HV and MV electric lines in areas with icing risks.
Savary, P., International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.335-337.
Power line icing, Safety.

45-1367
Studies on atmospheric icing in Finland.
Lehtonen, P., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.338-343, 13 refs.
Laiho, J., Makkonen, L., Riisio, P., Miettinen, H.
Icing, Meteorological factors, Ice loads, Regional planning.

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Icing, Ice loads.

45-1369
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Vieille, J.
Power line icing, Cold weather operation, Regional planning.

45-1370
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Su, F.H., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.354-357, 3 refs.
Hu, S.X.
Power line icing, Altitude, Countermeasures, Regional planning.

45-1371
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45-1372
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Saotome, H., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.363-366.
Yoshioka, M., Okada, K.
Power line icing, Snow loads, Countermeasures.

45-1373
Influence of Joule effect and of climatic conditions on liquid water content of snow accreted on conductors.
Admirat, P., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.367-371, With French summary, 5 refs.
Maccagnan, M., De Goncourt, B.
Power line icing, Snow loads, Snow water content, Mathematical models, Meteorological factors, Electrical resistivity.

45-1374
Research to develop conductor deicing compounds.
Baum, B., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.372-375, 2 refs.
Thoma, L., Kendrew, T.
Power line icing, Chemical ice prevention, Protective coatings.

45-1375
Countermeasures to both the wet snow accretion and the galloping damages on the transmission lines.
Yamaoka, M., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.376-380, 10 refs.
Fujita, K., Wakahama, G.
Power line icing, Snow loads, Wet snow, Wind pressure, Vibration, Damping, Analysis (mathematics).

45-1376
Electro-Impulse De-Icing (EIDI) of transmission line towers.
Ross, R., International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.381-385, 18 refs.
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45-1377
De-icing of microwave dishes and power lines by electromagnetic impulse.
Zumwalt, G.W., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.386-389, 9 refs.
Egbert, R.I.
Power line icing, Ice removal, Electric heating, Artificial melting.

45-1378
Computer assisted aircraft icing forecast.
Fuchs, W., International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.390-393, 32 refs.
Aircraft icing, Ice forecasting, Computer applications.

45-1379
Detecting and predicting icing conditions on road, bridge, and runway surfaces.
Kelley, J.R., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.394-398, 6 refs.
Trask, D.C., Hunt, O.M.
Road icing, Ice forecasting, Ice detection, Road maintenance.

45-1380
Use of a ship/icing model to estimate the effect of the direct spray flux on the icing rate.
Zakrzewski, W.P., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.399-404, 16 refs.
Lozowski, E.P., Blackmore, R.Z.
Ship icing, Sea spray, Icing rate, Mathematical models.

45-1381
Ballistic accretion on a point seed.
Rambaldi, S., et al, International Conference on Atmospheric Icing of Structures, 4th, Paris, Sep. 5-7, 1988, 1988, p.411-414, 2 refs.
Porcú, F., Prodi, F.
Ice accretion, Mathematical models, Statistical analysis, Ice crystal adhesion, Ice crystal collision.

45-1382
Use of polarization to characterize precipitation and discriminate large hail.
Balakrishnan, N., et al, *Journal of the atmospheric sciences*, July 1, 1990, 47(13), p.1525-1540, 57 refs.
Zrnić, D.S.
Precipitation (meteorology), Hailstones, Detection, Radar echoes, Reflectivity, Physical properties.

45-1383
Precipitation production in a large Montana hailstorm: airflow and particle growth trajectories.
Miller, L.J., et al, *Journal of the atmospheric sciences*, July 1, 1990, 47(13), p.1619-1646, 65 refs.
Tuttle, J.D., Foote, G.B.
Precipitation (meteorology), Hailstone growth, Storms, Snow pellets, Radar echoes, Atmospheric circulation, Hail clouds.

45-1384
Lidar observations of the horizontal orientation of ice crystals in cirrus clouds.
Thomas, L., et al, *Tellus*, Apr. 1990, 42B(2), p.211-216, 24 refs.
Cartwright, J.C., Wareing, D.P.
Lidar, Clouds (meteorology), Ice crystals, Specular reflection, Backscattering, Orientation, Cloud height indicators, Temperature effects.

45-1385
Synthetic products as basic components of low-pour motor oils.
Tsvetkov, O.N., et al, *Chemistry and technology of fuels and oils*, Nov. 1990, 26(3-4), p.189-192, Translated from Khimiia i tekhnologiia topliv i masel, Apr 1990, 10 refs.
Paron'kin, V.P., Shkol'nikov, V.M., Merzlikin, F.N.
Lubricants, Admixtures, Viscosity, Temperature effects, Chemical analysis, Cold weather performance.

45-1386
Predictions and studies with a one-dimensional ice-ocean model.
Riedlinger, S.H., et al. *Journal of physical oceanography*, Oct. 1990, 20(10), p.1545-1562, 20 refs.
Warn-Varnas, A.
Sea ice distribution, Ice water interface, Ice models, Ice edge, Heat flux, Drift, Water temperature, Snow cover effect, Climatology.

45-1387
Methods of evaluating the hydrological role of snow management.
Shutov, V.A., *Water resources*, Nov. 1990, 17(1), p.15-23, Translated from Vodnye resursy, Jan.-Feb. 1990. 16 refs.
Snow retention, Meltwater, Seepage, Soil water, Water balance, Snow hydrology, Water reserves, Agriculture.

45-1388
Photoheterotrophy and dark heterotrophy in ice-covered Lake St. Clair.
Wallen, D.G., *Journal of Great Lakes research*, 1990, 16(3), p.339-345, 46 refs.
Plankton, Lakes, Ice cover effect, Photosynthesis, Subglacial observations, Primary productivity, Light effects, Ecology.

45-1389
Boulder-paved river channels: a case study of a fluvioperiglacial landform.
Davies, D.A., et al. *Zeitschrift für Geomorphologie*, June 1990, 34(2), p.213-231, With German and French summaries. 48 refs.
Berrisford, M.S., Matthews, J.A.
Periglacial processes, River flow, Channels (waterways), Rocks, Water erosion, Ice erosion, Solifluction, Orientation, Landforms.

45-1390
Thermal stresses induced by water solidification in a cylindrical tube.
Lin, S., et al. *Journal of heat transfer*, Nov. 1990, 112(4), p.1079-1082, 7 refs.
Gao, D.Y., Yu, X.C.
Pipes (tubes), Ice formation, Thermal stresses, Ice strength, Mathematical models, Heat transfer, Ice water interface.

45-1391
Radar depth sounding near Upstream B camp—December 1988.
Moore, R.K., et al. *Antarctic journal of the United States*, 1989, 24(5), p.85-86, 2 refs.
Davis, C.H., Xin, W., Dean, R.H.
Ice sheets, Radar echoes, Recording instruments.
During the 1988-1989 austral summer a University of Kansas team used the Coherent Antarctic Radar Depth Sounder (CARDS) for a survey at the Upstream B area as part of the *Siple Coast Project*. CARDS is a 150-megahertz pulse radar using pulse compression and coherent integration to achieve fine resolution and high sensitivity. Its range resolution is 6 m. With a peak power of only 20 watts, it achieves an equivalent peak power of 900 kilowatts by coherent integration. It may be operated from an airplane or a tracked vehicle. Sample records of ice sounding echoes are included.

45-1392
Seismic reflection and refraction experiment on the Ross Ice Shelf, Antarctica.
Ten Brink, U., et al. *Antarctic journal of the United States*, 1989, 24(5), p.87-88, 3 refs.
Stern, T., Beaudoin, B.
Ice shelves, Seismic reflection, Seismic refraction, Antarctica—Ross Ice Shelf.
During austral summer 1988-1989 a joint multichannel seismic experiment was carried out to determine the thickness and configuration of the sediment and crustal layers in the vicinity of Ross Island, Antarctica. The objectives of this experiment were twofold: to study lithospheric flexure associated with the emplacement of the large, geologically young (less than 5 million years) volcanic load of Ross Island on the thinned and extended continental lithosphere of the Ross embayment, and to investigate field and processing parameters necessary for seismic reflection work on a thick (200-350 m) high-velocity ice overlying 600- to 800-m-deep water. In this article, the second objective is discussed. Specific aspects of the discussion include profile lengths, channel size, seismic array lengths, string location and orientation, shot depth, charge size, and success assessment *vis à vis* other surveys in similar circumstances.

45-1393
Soluble and insoluble impurities in snow samples from Ross Island, Antarctica.
Palais, J.M., et al. *Antarctic journal of the United States*, 1989, 24(5), p.89-91, 3 refs.
Chuan, R., Spencer, M.J.
Snow impurities, Firn, Aerosols, Antarctica—Erebus, Mount.
In this paper, preliminary results are reported of snow-pit and *firn-core* studies which examine the types of soluble and insoluble particles found in snow samples collected around Mount Erebus, the active volcano on Ross Island. This work is part of a larger study in which aerosol measurements aboard an LC-130 Hercules airplane and on the ground are made to determine whether Mount Erebus has an effect on the chemistry of the antarctic troposphere and on regional ice chemistry. The aerosol measurements are made with a quartz-crystal microbalance, multi-stage cascade impactor to characterize the typical aerosol particles found in the volcanic plume of Mount Erebus, both on the ground at the crater rim and in the air, and in the ambient troposphere. Several aerosol measurements have also been made on the ground but away from the direct effects of the volcano.

45-1394
Record of solar proton events in a firn core from Windless Bight.
Zeller, E.J., et al. *Antarctic journal of the United States*, 1989, 24(5), p.92-94, 10 refs.
Dreschhoff, G.A.M., Laird, C.M.
Firn, Snow impurities, Chemical composition, Solar activity, Antarctica—Windless Bight.
During the 1988-1989 field season, the high-resolution nitrate analysis of a snow sequence from Windless Bight on the Ross Ice Shelf was undertaken. A firn core was drilled by hand to a depth of 21.7 m. All analytical operations were performed in a portable field laboratory at Williams Field located 7 km from the drill site in Windless Bight. Sampling was accomplished at the drill site. Cores and samples were handled only with cleaned stainless steel implements. In all cases, cores were trimmed to remove any possible contamination from sides or ends. After trimming, 1.5-cm-thick samples were cut sequentially from the core, and each sample was immediately placed in a cleaned, numbered glass vial and sealed with a polyethylene cap. All samples were transported from the drill site to the laboratory on the day that they were collected. They were kept frozen until approximately 1 hour before analysis for nitrate by ultraviolet spectrophotometry. Analyses were always completed within 24 hours of sampling with an analytical precision of within 2 percent for a mean concentration of 16.28 mg/l. The results of the study are shown in figures and discussed.

45-1395
104-meter oxygen-isotope record at J-9, Ross Ice Shelf, Antarctica.
Grootes, P.M., et al. *Antarctic journal of the United States*, 1989, 24(5), p.95-96, 8 refs.
Stuiver, M.
Ice cores, Oxygen isotopes, Isotope analysis, Antarctica—Ross Ice Shelf.
A complete oxygen-isotope profile through the Ross Ice Shelf, Antarctica, Station J-9, 82.4S 168.6W, elevation 60 m, covers at least the last 30,000 years. This profile was obtained from a core drilled in 1978-1979. Reported here is the oxygen-isotope profile of a 104 m core drilled in 1976 about 100 m away from the 1978 core. Comparison of the oxygen-isotope records of the two cores reveals the spatial variability in the core records. This information is needed for a proper interpretation of the paleoenvironmental information in the long record of the 1978 core. The results are expressed as *delta*O-18, the relative difference between the O-18/O-16 ratio of the sample and that of Standard Mean Ocean Water (V-SMOW), given in parts per thousand (per mill).

45-1396
Velocities of antarctic outlet glaciers determined from sequential Landsat images.
MacDonald, T.R., et al. *Antarctic journal of the United States*, 1989, 24(5), p.105-106, 3 refs.
Ferrigno, J.G., Williams, R.S., Jr., Lucchitta, B.K.
Glacier flow, Antarctica—East Antarctica, Antarctica—West Antarctica.
By use of a modified measurement technique and a computer program developed at the U.S.G.S. in Flagstaff, AZ, the average velocity of 14 outlet glaciers distributed around the coast of Antarctica was successfully measured on sequential (time-lapse) Landsat multispectral scanner images. Fourteen antarctic outlet glaciers were measured: six in West Antarctica, three that discharge through the Transantarctic Mountains, and five in East Antarctica. Average velocities ranged from a low of 0.1 km per year for an unnamed outlet glacier in Marie Byrd Land, to a high of 2.2 km per year for the Pine Island Glacier, also in Marie Byrd Land, which confirms measurements made earlier.

45-1397
Antarctic glacier velocities from Landsat images.
Lucchitta, B.K., et al. *Antarctic journal of the United States*, 1989, 24(5), p.106-107, 1 ref.
Ferguson, H.M., Schafer, F.J., Ferrigno, J.G., Williams, R.S., Jr.
Glacier flow, Photogrammetric surveys, Antarctica—Banzare Coast.
A study was undertaken to determine ice velocities on outlet glaciers around the periphery of Antarctica, using pairs of existing Landsat images, each pair covering the same area of coastline. On sequential images, at least two fixed points along the coastline are located and cracks, crevasses, or other features in the floating part of outlet glaciers are identified; these features move with the ice and retain their shape for many years. For positive transparencies, the features are punch registered in a point-transfer device commonly used for the registration of points on stereoimages; a coordinate system is established, and the translational movement of the points is calculated from the coordinates. For the paper prints, triangulation is used between fixed and moving points; the distances between these points are measured, and a computer program calculates the translations. Measurement on positive transparencies shows that velocities of the DeHaven Glacier ranged from 540 m per year near the grounding line to 870 m per year near the breakup of the glacier 8 km from the grounding line. On the Holmes Glacier, the velocities ranged from 890 m per year at 9 km from the grounding line to 1,520 m per year near the breakup of the glacier 35 km from the grounding line.

45-1398
Arctic research in the United States, Vol.4.
U.S. Interagency Arctic Research Policy Committee, MP 2797, Washington, D.C., Fall 1990, 106p.
Brown, J., ed, Bowen, S., ed, Cate, D., ed.
International cooperation, Research projects, Meetings, Expeditions, Organizations, Polar regions.

45-1399
In-House Laboratory Independent Research Program—FY88.
Diemand, D., ed. *U.S. Army Cold Regions Research and Engineering Laboratory*, Oct. 1990, SR 90-34, 18p. ADA-229 665.
Moritz, M., ed.
Research projects, Ice, Snow, Frozen ground.
CRREL's In-House Laboratory Independent Research (ILIR) Program provides a means for innovative high-risk basic research. This report briefly describes the 17 ILIR research projects undertaken in FY88. Work in this program addressed various problems concerning the physical properties of ice, snow and frozen ground; remote sensing of lake and river ice; water content of frozen or partially frozen materials; and physical/mathematical models for experimental or predictive use in ice research.

45-1400
Freshwater wetlands and wildlife.
Sharitz, R.R., ed, Washington, D.C., U.S. Department of Energy, 1989, 1265p., CONF-8603101, Proceedings of a symposium held at Charleston, SC, Mar. 24-27, 1986. Refs. passim. For selected papers see 45-1401 through 45-1405.
Gibbons, J.W., ed.
DLC QH541.5.M3F737 1989
Swamps, Ecosystems, Plains, Peat, Hydrology.

45-1401
Biogeomorphology and spatial structure of northern patterned peatlands.
Madsen, B.J., Freshwater wetlands and wildlife. Edited by R.R. Sharitz and J.W. Gibbons, Washington, D.C., U.S. Department of Energy, 1989, p.235-247, CONF-8603101, 35 refs.
DLC QH541.5.M3F737 1989
Swamps, Peat, Vegetation patterns, Ecosystems, Geomorphology, Vegetation factors, Topographic features.

45-1402
Prairie wetlands: characteristics, importance to waterfowl, and status.
Krapu, G.L., et al, Freshwater wetlands and wildlife. Edited by R.R. Sharitz and J.W. Gibbons, Washington, D.C., U.S. Department of Energy, 1989, p.811-828, CONF-8603101, Refs. p.825-828.
Duebbert, H.F.
DLC QH541.5.M3F737 1989
Swamps, Ecosystems, Plains, Environmental protection, Topographic features.

45-1403
Perspectives on the status of Canadian prairie wetlands.
Millar, J.B., Freshwater wetlands and wildlife. Edited by R.R. Sharitz and J.W. Gibbons, Washington, D.C., U.S. Department of Energy, 1989, p.829-852, CONF-8603101, 60 refs.
DLC QH541.5.M3F737 1989
Swamps, Plains, Ecosystems, Climatic factors.

45-1404
Status of the national wetlands inventory in Alaska.
Hall, J.V., Freshwater wetlands and wildlife. Edited by R.R. Sharitz and J.W. Gibbons, Washington, D.C., U.S. Department of Energy, 1989, p.853-859, CONF-8603101, 9 refs.
DLC QH541.5.M3F737 1989
Swamps, Ecosystems, Mapping, Soil surveys, Topographic surveys, Environmental impact, United States—Alaska.

45-1405
Relationship of landscape position and groundwater input in northern Wisconsin kettle-hole peatlands.
Kratz, T.K., et al, Freshwater wetlands and wildlife. Edited by R.R. Sharitz and J.W. Gibbons, Washington, D.C., U.S. Department of Energy, 1989, p.1141-1151, CONF-8603101, 24 refs.
Medland, V.L.
DLC QH541.5.M3F737 1989
Swamps, Peat, Hydrology, Ground water, Topographic features, Ecosystems.

45-1406
Wetland creation and restoration: the status of the science.
Kusler, J.A., ed, Washington, D.C., Island Press, 1990, 594p., Refs. passim. For selected papers see 45-1407 through 45-1410.
Kentula, M.E., ed.
DLC QH541.5.M3W46 1990
Swamps, Land reclamation, Ecosystems, Hydrology, Regional planning.

45-1407
Restoration and creation of palustrine wetlands associated with riverine systems of the glaciated northeast.
Lowry, D.J., Wetland creation and restoration: the status of the science. Edited by J.A. Kusler and M.E. Kentula, Washington, D.C., Island Press, 1990, p.267-280, 32 refs.
DLC QH541.5.M3W46 1990
Swamps, Land reclamation, Ecosystems, Hydrology, Land development.

45-1408
Regional analysis of the creation and restoration of kettle and pothole wetlands.
Hollands, G.G., Wetland creation and restoration: the status of the science. Edited by J.A. Kusler and M.E. Kentula, Washington, D.C., Island Press, 1990, p.281-298, 40 refs.
DLC QH541.5.M3W46 1990
Swamps, Land reclamation, Hydrology, Ecosystems, Topographic features.

45-1409
Regional analysis of fringe wetlands in the Midwest: creation and restoration.
Levine, D.A., et al, Wetland creation and restoration: the status of the science. Edited by J.A. Kusler and M.E. Kentula, Washington, D.C., Island Press, 1990, p.299-325, Refs. p.316-321.
Willard, D.E.
DLC QH541.5.M3W46 1990
Swamps, Land reclamation, Hydrology, Ecosystems, Regional planning, Nutrient cycle, Revegetation.

45-1410
Creation and restoration of riparian wetlands in the agricultural Midwest.
Willard, D.E., et al, Wetland creation and restoration: the status of the science. Edited by J.A. Kusler and M.E. Kentula, Washington, D.C., Island Press, 1990, p.327-350, 38 refs.
Finn, V.M., Levine, D.A., Klarquist, J.E.
DLC QH541.5.M3W46 1990
Swamps, Land reclamation, Hydrology, Ecosystems, Regional planning.

45-1411
Glacial drainage systems along the Antarctic Peninsula and Palmer Archipelago.
Williams, C., et al, *Antarctic journal of the United States*, 1989, 24(5), p.116-117, 3 refs.
Boies, C., Domack, E.W.
Subglacial drainage, Glacier ablation, Antarctica—Antarctic Peninsula, Antarctica—Palmer Archipelago.
Parameters considered in the investigation of marine glacial processes are the size of the system, the longitudinal profile, snow-line elevation, and mass balance changes. To provide background data that help to address these concerns, base maps were constructed which delineate glacial drainage areas and flow-line character. Base maps were drawn on U.S. Defense Mapping Agency coastal charts using Landsat images taken over a number of years. Surface drainage areas were calculated using the method of weights and have methodologic errors of less than 0.1 percent. The results are tabulated and demonstrate that the glaciers along the Davis Coast are several times larger than glaciers which drain into fjords of the Danco Coast and Palmer Archipelago.

45-1412
Pleistocene periglacial eolian deposits in southwestern Alaska: sedimentary facies and depositional processes.
Lea, P.D., *Journal of sedimentary petrology*, July 1990, 60(4), p.582-591, 57 refs.
Pleistocene, Paleoclimatology, Eolian soils, Periglacial processes, Sediments, Quaternary deposits, Cryogenic soils, United States—Alaska.

45-1413
Physical and biological oceanographic interaction in the spring bloom at the Bering Sea marginal ice edge zone.
Niebauer, H.J., et al, *Journal of geophysical research*, Dec. 15, 1990, 95(C12), p.22,229-22,241, 31 refs.
Alexander, V., Henrichs, S.
Sea ice distribution, Ice edge, Ice melting, Biomass, Oceanographic surveys, Plankton, Upwelling, Ice water interface, Bering Sea.

45-1414
Sea ice concentrations in the Canada Basin during 1988: comparisons with other years and evidence of multiple forcing mechanisms.
Serreze, M.C., et al, *Journal of geophysical research*, Dec. 15, 1990, 95(C12), p.22,253-22,267, 49 refs.
Maslanik, J.A., Preller, R.H., Barry, R.G.
Sea ice distribution, Pack ice, Ice deterioration, Drift, Climatic factors, Ice surveys, Ice water interface, Arctic Ocean.

45-1415
Satellite microwave sea-ice observations and oceanic processes on the antarctic continental shelf.
Jacobs, S.S., et al, *Antarctic journal of the United States*, 1989, 24(5), p.135-136, 3 refs.
Comiso, J.C.
Sea ice distribution, Air temperature, Polynyas, Water temperature.
This project progress review cites several dominant conditions developed from satellite surveillance during the period 1979-1986: a persistently lower ice cover over the continental shelf than above the adjacent deep ocean; identification of two new polynyas near the continental break; and the stability of winter sea ice concentration on the shelf, averaging 86%, and showing little sensitivity to present day atmospheric variability. Some of the reasons for these occurrences are discussed, along with some necessary precautions in the interpretation of brightness temperatures in the satellite observations.

45-1416
Winter sea-ice cover and ocean processes.
Gordon, A.L., et al, *Antarctic journal of the United States*, 1989, 24(5), p.140-142, 4 refs.
Huber, B.A.
Ice cover thickness, Sea water, Salinity.
This report presents a summary of the conceptual view regarding the relationship of the southern ocean sea-ice cover to oceanic processes that the authors have developed since the winter and spring field programs of the Somov, 1982 and Polarstern, 1987. Discussion with colleagues interested in mixed-layer modeling have benefited this development. Within the Weddell Gyre, there is a delicate balance between the thin veneer of sea ice and entrainment of deep water, with its relative warmth and saltiness, into the winter mixed layer. The interrelationships of these characteristics and the processes they engender are discussed.

45-1417
Currents and water temperatures observed in Green Bay, Lake Michigan. Part I: Winter 1988-1989. Part II: Summer 1989.
Gottlieb, E.S., et al, *U.S. National Oceanic and Atmospheric Administration. NOAA Technical memorandum*, Nov. 1990, ERL GLERL-73, 90p., 14 refs.
Saylor, J.H., Miller, G.S.
Water flow, Water temperature, Lake water, Lake ice, Ice conditions, Water pollution, United States—Michigan, Lake.

45-1418
Minimum altitudes for former periglacial landforms adjacent to longitude 106W in Colorado and New Mexico, U.S.A., between latitudes 33N and 40N.
Marker, M.E., *Arctic and alpine research*, Nov. 1990, 22(4), p.366-374, 29 refs.
Periglacial processes, Landscape development, Landforms, Glaciation, Altitude, Distribution, Solifluction, United States—Colorado.

45-1419
Thermophilic bacteria among arctic, subarctic, and alpine habitats.
Boyd, W.L., et al, *Arctic and alpine research*, Nov. 1990, 22(4), p.401-411, 25 refs.
Onn, D.R., Boyd, J.W.
Soil microbiology, Bacteria, Growth, Sampling, Temperature effects, Soil surveys, Biomass, Viability.

45-1420
Effects of beaver dams on subarctic wetland hydrology.
Woo, M.K., et al, *Arctic*, Sep. 1990, 43(3), p.223-230, With French summary. 18 refs.
Waddington, J.M.
Swamps, Subarctic landscapes, Stream flow, Surface drainage, Water storage, Animals, Hydrology, Water balance.

45-1421
Winter short-pulse radar studies on the Tanana River, Alaska.
Delaney, A.J., et al, *Arctic*, Sep. 1990, 43(3), MP 2802, p.244-250, With French summary. 24 refs.
Arcone, S.A., Chacho, E.F., Jr.
River ice, Subsurface investigations, Ground water, Radar echoes, Aerial surveys, Water supply, Subglacial observations, Frost penetration, Dielectric properties, Water table, United States—Alaska.

45-1422
Void formation in unidirectional solidification.
Tagavi, K., et al, *Experimental heat transfer*, Sep.-Oct. 1990, 3(3), p.239-255, 16 refs.
Chow, L.C., Solaiappan, O.
Solutions, Freezing, Phase transformations, Vapor diffusion, Bubbles, Gravity.

45-1423
AMERIEZ 1988: Mid-winter physical oceanographic observations in the Scotia Sea.
Muench, R.D., et al, *Antarctic journal of the United States*, 1989, 24(5), p.148-150, 3 refs.
Gunn, J.T., Husby, D.M.
Sea ice, Oceanographic surveys, Polar regions, Scotia Sea, Antarctica—Weddell Sea.
As part of the Antarctic Marine Ecosystem Research at the Ice-Edge Zone (AMERIEZ) program, water-column temperature, salinity and surface Lagrangian water-movement measurements were obtained in the Scotia Sea during austral winter 1988. The study was carried out from the R/V *Polar Duke* during two separate cruise legs from June through Aug. The first leg focussed upon processes within the multi-year pack, while the second leg focussed upon water-column processes seaward of the marginal ice zone. The Scotia Front was identifiable in winter 1988 as a region of strong temperature gradients, at depths of 300-500 m, between the water of the Weddell-Scotia Confluence Zone and warmer Pacific Deep Water. Data showed salinity (hence, density) stratification within the confluence to be similar to that farther north and south, suggesting that deep winter convection is not a significant regional process. In addition to the Weddell-Scotia frontal system, whose presence and structure are controlled by regional oceanographic conditions, a small number of localized upper layer fronts and lenses were associated with the marginal ice zone.

45-1424
Cryoplanation terraces, northern Yukon.
Lauriol, B., *Canadian geographer*, 1990, 34(4), p.347-351, 15 refs.
Landforms, Tundra, Periglacial processes, Cryogenic structures, Frost shattering, Canada—Yukon Territory.

45-1425
Role of the oceans in climatic variability and climatic change.
Mysak, L.A., et al, *Canadian geographer*, 1990, 34(4), p.352-369, Refs. p.367-369.
Lin, C.A.
Air water interactions, Climatic changes, Air temperature, Carbon dioxide, Sea ice distribution, Climatic factors, Periodic variations, Climatology.

45-1426
Temperature regime of oil and gas pipelines laid jointly in frozen ground.
Danielian, IU.S., et al, *Power engineering*, 1988, 26(1), p.91-96, 4 refs. For Russian original see 43-4506.
Yanitskiĭ, P.A.
Underground pipelines, Fluid flow, Thermal regime, Frozen ground thermodynamics, Design, Pipe flow.

45-1427
Modelling of particle distribution in the melting layer.
De Wolf, D.A., et al, *IEE proceedings. Microwaves, antennas and propagation*, Dec. 1990, 137H(6), p.389-395, 7 refs.
Russchenberg, H.W.J., Ligthart, L.P.
Precipitation (meteorology), Radar echoes, Wave propagation, Snow crystal structure, Particle size distribution, Ice melting, Analysis (mathematics), Dielectric properties, Scattering.

45-1428
Arctic ozone crater in 1989.
Evans, W.F.J., et al, *Canadian journal of physics*, Oct. 1990, 68(10), p.1113-1121, With French summary. 17 refs.
Walker, A.E., Bunn, F.E.
Atmospheric composition, Polar atmospheres, Atmospheric circulation, Gases, Ozone, Periodic variations, Air pollution.

45-1429
On the systematic variation in surface aerosol concentration at the South Pole.
Samson, J.A., et al, *Atmospheric research*, 1990, Vol.25, MP 2810, p.385-396, 34 refs.
Barnard, S.C., Obremski, J.S., Riley, D.C., Black, J.J., Hogan, A.W.
Meteorology, Meteorological instruments, Meteorological charts.
Aerosol observations have been made at the Amundsen-Scott Station on a disciplined schedule since Jan. 1974. Analysis of the data shows a repeatable annual cycle in surface aerosol concentration characterized by a twenty-fold increase during the spring months as lower-latitude air is advected onto the Polar Plateau. During the nine-year period 1977-1985, the mean values of the aerosol concentrations for the spring months, as well as for the entire calendar year, decreased. The

diminution of surface aerosol at the South Pole appears to be statistically significant.

45-1430

Integrating radar-rainfall data into the hydrologic modeling process.

Engdahl, T.L., et al, MP 2803, Conference on Operational Precipitation Estimation and Prediction, Anaheim, CA, Feb. 7-8, 1990, Boston, MA, American Meteorological Society, 1990, p.69-73, 14 refs.

McKim, H.L.

Rain, Precipitation (meteorology), Hydrologic cycle, Computerized simulation, Radar.

45-1431

Liquid chromatographic separation of 2,4,6-trinitrotoluene and its principal reduction products.

Walsh, M.E., et al, *Analytica chimica acta*, 1990, Vol.231, MP 2804, p.313-315, 10 refs.

Jenkins, T.F.

Explosives, Military research.

A liquid chromatographic method is described for the baseline separation of 2,4,6-trinitrotoluene (TNT) and its main reduction products. Two analytical columns (LC-18 and LC-CN) are connected in series and eluted isocratically at 1.5 ml/min with water-methanol-tetrahydrofuran (60.5+25+14.5). The capacity factors (k') are 1.4, 1.6, 5.1, 6.4 and 7.0 for 2,6-diamino-4-nitrotoluene, 2,4-diamino-6-nitrotoluene, TNT, 4-amino-2,6-dinitrotoluene and 2-amino-4,6-dinitrotoluene, respectively.

45-1432

Microcomputer simulation of phase change heat transfer.

Farag, I.H., et al, *International journal of heat and technology*, 1990, 8(1-2), MP 2805, p.43-65, 22 refs.

Buzzell, G.M., Phetteplace, G.

Heat transfer, Phase transformations, Computerized simulation, Latent heat, Cooling systems, Underground pipelines, Melting, Freezing.

The development of a microcomputer-based finite element program with the ability to simulate phase change (melting and freezing) is outlined. A closed form Galerkin finite element method derived from a delta function formulation of the latent heat discontinuity in the heat capacity versus temperature function is used within phase change elements of the solution domain. Storage reduction data structures are implemented and compared on the basis of overall program execution time. Analytical solutions for melting and freezing are used to verify program accuracy and to explore other simulation parameters such as time step size, mesh density and start-up technique. Several "life like" phase change simulations are compared to the results obtained from other numerical models.

45-1433

Cold tolerance of plants used for cold-regions revegetation.

Reid, W.H., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Oct. 1990, SR 90-37, 15p., ADA-229 864, Refs. p.9-15.

Palazzo, A.J.

Revegetation, Plants (botany), Cold tolerance.

Only a fraction of the world's plant species can tolerate freezing, and all exhibit various forms of damage after exposure to extreme cold. Some species, on exposure to low, nonfreezing temperatures, exhibit enhanced tolerance through a genetically determined process called cold hardening. Cold tolerance is attributed partly to the accumulation of soluble carbohydrates, soluble proteins and lipids in cells, and to the proliferation of intracellular membranes. There are several methods of testing for cold tolerance. Plant nutritional status may increase or decrease cold tolerance. Several chemicals, among them a fungicide, have been found to reduce cold tolerance. Water stress improves cold tolerance. Research is needed in several areas to improve the success and lower the cost of revegetation projects. The genetics of cold tolerance is poorly understood. Research on cold tolerance with combined stresses is needed. Simulation analysis of plant growth in cold climates is important if carbon balance is to be understood. Applied research is needed in several areas: appropriate statistical descriptions of climate, remote sensing for terrain evaluation, analysis to determine plant and soil temperatures in relation to air temperature; and complex revegetation strategies involving plant succession on disturbed lands. Cold-regions soil microbiology, important in plant success, is poorly known. A clearing house for information on plant cold tolerance and cold-regions revegetation would reap great reward for efficient reclamation.

45-1434

Evidence of individual solar proton events in antarctic snow.

Dreschhoff, G.A.M., et al, *Solar physics*, June 1990, 127(2), p.333-346, 48 refs.

Zeller, E.J.

Snow composition, Solar activity, Firn stratification.

The nitrate concentration in a firn core was measured in Antarctica by ultraviolet spectrophotometry under tightly controlled experimental procedures. Based on uninterrupted, high-resolution sampling, variations in nitrate concentration were found to average about 53% (one standard deviation) of the mean concentration for the entire core. Short pulses of high nitrate concentration were found to show a variance of up to 11 standard deviations above the mean. At the series mean, the precision of analysis is better than 2%. The firn core was drilled by hand to a depth of 21.7 m corresponding to 62 years and including more than 5 solar cycles. The time series that resulted from a total of 1393 individual analyses shows a statistically significant modulation of the background signal that is clearly tracable to solar activity. Several anomalously large concentration peaks were observed that have been dated and found to correlate with the major solar proton events of Aug. 1972, July 1946, and the white-light flare of July 1928. (Auth. mod.)

45-1435

Elemental tracers of volcanic emissions in antarctic aerosol and snow samples.

Palais, J.M., et al, *Antarctic journal of the United States*, 1989, 24(5), p.217-218, 2 refs.

Mosher, B.W.

Snow impurities, Aerosols, Chemical analysis, Antarctica—Erebus, Mount.

An attempt is described to establish whether a trace elemental signature characteristic of Mount Erebus can be identified to help determine whether the volcano is an important source of trace elements and other impurities of the antarctic atmosphere. Comparison of the elemental ratios in Erebus plume samples and snow samples collected near the volcano allows one to determine whether snow samples provide good surrogates for aerosol measurements. It is suggested that the addition of approximately 0.25 g of starch contained in 10-15 ml of deionized water results in complete trace-metal recovery, while blank levels for most trace metals remain low when compared with levels reported in antarctic snow.

45-1436

Satellite observations of katabatic winds blowing from Marie Byrd Land onto the Ross Ice Shelf.

Bromwich, D.H., *Antarctic journal of the United States*, 1989, 24(5), p.218-221, 9 refs.

Wind velocity, Air flow, Wind direction, Antarctica—Marie Byrd Land, Antarctica—Ross Ice Shelf.

This pilot study suggests that marked drainage airflow may be resolved on winter thermal infrared satellite images of the Siple Coast area around 25% of the time. Usually, katabatic wind signatures are aligned parallel to the surface-wind directions recorded at adjacent automatic weather stations. The wind speeds associated with the signatures evaluated here are less than those studied earlier. About 10% of the time, katabatic airflows cross the Siple Coast propagate northward along the Transantarctic Mountains and appear to reach the northwestern edge of the Ross Ice Shelf. In the case presented here, this apparent 1,000 km propagation across flat terrain was associated with a cloud-free, quasi-stationary cyclone over the central Ross Ice Shelf, and may primarily consist of combined katabatic airstreams from Marie Byrd Land and Byrd Glacier.

45-1437

Observational and modeling studies of the katabatic winds at Terra Nova Bay.

Parish, T.R., et al, *Antarctic journal of the United States*, 1989, 24(5), p.221-223, 11 refs.

Bromwich, D.H.

Wind velocity, Air flow, Models, Antarctica—Terra Nova Bay.

Currently underway is a comprehensive study of the katabatic wind regime near Terra Nova Bay. This site was selected because previous studies have shown the area to be prone to intense katabatic winds for nearly the entire winter. Significant channeling of the cold air in the interior of the continent acts to make the Terra Nova Bay region one of the windiest in all of Antarctica. Automatic weather stations have been deployed at Inexpressible I., some 30 km downwind from the mouth of the Reeves Glacier, since 1984. More recently, an array of five additional automatic weather stations has been deployed to sample the spatial variation of the katabatic wind. In addition, four automatic weather stations have been set up in support of ongoing, cooperative meteorological studies of the Italian Antarctic Expedition. As part of the study, numerical simulations of the Terra Nova Bay katabatic wind regime have been conducted. The model used is a six-level, bulk-layer version of an earlier three-dimensional, hydrostatic, primitive equation model. A case study focuses on Terra Nova Bay to provide a comparison between the model simulations and the records from the AWS.

45-1438

Strong katabatic wind event at Terra Nova Bay.

Bromwich, D.H., et al, *Antarctic journal of the United States*, 1989, 24(5), p.223-225, 6 refs.

Parish, T.R.

Air flow, Wind velocity, Ice sheets, Topographic effects, Antarctica—Terra Nova Bay.

The selected event started around the middle of Mar. 14 and ended on Mar. 22, 1988. The 9-day average wind speed at Inexpressible I. was 16.9 m/s and the strongest speed was 36 m/s; these 3-m-height values are close to the typical Mar. conditions reported in 1989 of 18.2 and 34 m/s, respectively. The wind-speed record displays major maxima and minima at intervals of about 1.5 days. The wind speeds measured by AWS 09 at the head of Reeves Glacier follow the general trend of the Inexpressible I. values. Notable differences do occur, as for example during the first half of Mar. 18 when the variations are anticorrelated. The results from this examination can be summarized as follows. The change from the strongest to the lightest winds at Inexpressible I. was associated with coherent variations of wind, temperature, and pressure throughout the area. Several of these changes can be rationalized in terms of the coupling between the interior confluence zone and the coastal katabatic winds.

45-1439

Katabatic winds in Adélie Land, East Antarctica.

Wendler, G., *Antarctic journal of the United States*, 1989, 24(5), p.226-228, 8 refs.

Air flow, Ice sheets, Weather stations, Antarctica—East Antarctica.

The focus of this report is on the relationship between wind speed and terrain slope angle between Dumont d'Urville and Dome C. The station at the highest altitude, Dome C, has the lightest average wind speed, while a station at less than half the altitude reported the highest speed. The strong influence of the gravitational force on wind speed also extended to annual variations at the slope stations, where winter speeds were about 30% higher than summer speeds. Other details coming from this analysis include the powerful wind directional constancy for all of the winter and the nights in summer; and a temperature gradient in the area of about 2.5 deg C/100 km.

45-1440

Antarctic automatic weather stations: austral summer 1988-1989.

Stearns, C.R., et al, *Antarctic journal of the United States*, 1989, 24(5), p.242-243, 2 refs.

Weidner, G.A.

Weather stations, Cold weather operation, Maintenance.

The United States Antarctic Program (USAP) automatic weather station project places automatic weather station units in remote areas of Antarctica in support of meteorological research. The USAP automatic weather station units support the following studies: barrier wind flow along the Antarctic Peninsula and the Transantarctic Mountains; katabatic wind flow down the slope to the Adélie Coast, Reeves Glacier, Byrd Glacier, and Beardmore Glacier; mesoscale circulation and the sensible and latent heat fluxes on the Ross Ice Shelf; and climatology of Byrd, Siple, and Dome C stations. A table gives the automatic weather station unit location, identification number, latitude, longitude, elevation, and the start date for the 27 automatic weather station units in operation during 1989. Three units have been abandoned since 1980. A brief account of the field season mainly involves visiting AWS sites, checking the operation of the systems, and making any needed repairs.

45-1441

Simple model for air/snow fractionation of aerosol components over the Antarctic Peninsula.

Dick, A.L., *Journal of atmospheric chemistry*, July/Aug. 1990, 11(1-2), p.179-196, 21 refs.

Snow crystals, Polar atmospheres, Aerosols, Chemical analysis, Models, Antarctica—Antarctic Peninsula.

A model has been set up to investigate the wet and dry aerosol removal processes which occur in clean air over the Antarctic Peninsula. Input for the model was obtained from bulk chemical analysis and scanning electron microscopy of aerosol and snow samples collected simultaneously at remote sites around the Peninsula. The model predicts that sulphate and sea-salt aerosol will be removed mainly in-cloud by riming of falling snow and ice crystals. Crustal aerosol is principally removed by acting as nuclei for these crystals and by impaction on falling snow. For the largest locally-generated aerosol, dry deposition is indicated as the major removal process. These findings suggest a possible mechanism for the observed air/snow fractionation. (Auth.)

45-1442

Quaternary glaciations in the southern ocean and Antarctic Peninsula area.

Clapperton, C.M., *Quaternary science reviews*, 1990, 9(2/3), p.229-252, Refs. p.251-252.

Glacier oscillation, Paleoclimatology, Glaciation, Antarctica—West Antarctica.

There are three main difficulties in constructing detailed time series for Late Quaternary glacier fluctuations in the southern ocean-subantarctic region: sea level control on ice extent, differential tectonics, and lack of material for radiometric dating. South of 60S, the glacial Equilibrium Line Altitude is low enough for glaciers to expand without a decrease in temperature, if sea level falls. Tectonic uplift during the Quaternary may explain why the Falkland Is. did not develop most of their glacial and nivoglacial features until the last glaciation. The South Shetland Is. have a unique assemblage of raised marine features in the subantarctic. Some radiometric dates obtained, together with relative weathering criteria and drift distribution, suggest that glaciers in the southern ocean and subantarctic region have fluctuated synchronously with glaciers elsewhere in the Southern Hemisphere during the last 100 ka. The last glaciation maximum culminated after 26 ka BP, and glacier advances are inferred for the late-glacial intervals (15-14 ka and 12-10 ka BP) and the Neoglacial interval (last 5 ka). (Auth. mod.)

45-1443

Late Cenozoic glacial history of the Ross Embayment, Antarctica.

Clapperton, C.M., et al, *Quaternary science reviews*, 1990, 9(2/3), p.253-272, Refs. p.271-272.

Sugden, D.E.

Glaciation, Glacier oscillation, Ice cover thickness, Paleoclimatology, Antarctica—Ross Ice Shelf.

For the Late Quaternary, reconstructed ice surface profiles, based on detailed mapping and dating of drift sheets, show that large outlet glaciers from East Antarctica's polar plateau became about 1000 m thicker during glaciation maxima, while the plateau ice barely thickened at all. This is attributed to extensive northward migration of the ice grounding line in the

Ross Embayment as global sea level fell. Dates obtained from the drift sheets confirm that glaciers in the Ross Embayment area reached maximal limits at 190-160 ka BP and at 23-14 ka BP. Recession from the last glaciation maximum was underway by 13 ka BP and was complete by ca. 6 ka BP. Alpine glaciers terminating in the Dry Valleys fluctuate asynchronously with the Ross Embayment glaciers; they retreat during glacial maxima when they become starved of accumulation, and readvance during warmer intervals. Because of their dependence on grounding line position, glacier fluctuations in much of Antarctica are primarily led by sea level changes controlled by ice sheets in the Northern Hemisphere. (Auth. mod.)

45-1444

Quaternary glaciations in the Southern Hemisphere: an overview.

Clapperton, C.M., *Quaternary science reviews*, 1990, 9(2/3), p.299-304, 28 refs.

Paleoclimatology, Glaciation, Antarctica—Transantarctic Mountains.

Large glacier systems in Antarctica have existed at least since the Early Miocene. There is evidence of glaciation during Oxygen Isotope Stages 10.8 and 6 in several parts of the Southern Hemisphere, but the only well dated advance of the Middle Quaternary is that of Stage 6 in the Transantarctic Mountains. During the last glaciation, montane glaciers in parts of the *Southern Hemisphere were as large during Isotope Stage 4 as* during Isotope Stage 2. (Auth. mod.)

45-1445

Influence of ice segregation and solutes on soil structural stability.

Perfect, E., et al, Canadian journal of soil science, Nov. 1990, 70(4), p.571-581, With French summary. 38 refs.

Van Loon, W.K.P., Kay, B.D., Groenevelt, P.H.

Soil water, Soil freezing, Soil structure, Frost action, *Frost penetration, Chemical composition, Solutions.*

45-1446

Ice core drilling.

International Workshop on Ice Drilling Technology, 3rd, Grenoble, France, Oct. 10-14, 1988, Grenoble, France. Centre National de la Recherche Scientifique. Laboratoire de Glaciologie et Géophysique de l'Environnement, 1989, 205p., Refs. passim. For individual papers see 45-1447 through 45-1472 or F-43257 through F-43268.

Rado, C., ed, Beaudoing, D., ed.

Ice coring drills, Thermal drills, Drilling, Ice cores, Ice drills, Boreholes, Coring.

This is a collection of papers presented at the 3rd International Workshop on Ice Drilling Technology, held on Oct. 10-14, 1988 in Grenoble, France. Twelve of the papers presented are pertinent to Antarctica, and discuss ice core drilling (electromechanical, thermal, hot water) and ice core processing and quality.

45-1447

German intermediate ice core drilling since 1981: technique and experience.

Bässler, K.H., et al, International Workshop on Ice Drilling Technology, 3rd, Grenoble, France, Oct. 10-14, 1988. Proceedings. Ice core drilling. Edited by C. Rado and D. Beaudoing, Grenoble, France. Centre National de la Recherche Scientifique. Laboratoire de Glaciologie et Géophysique de l'Environnement, 1989, p.3-5, 4 refs.

Kohnen, H.

Ice coring drills, Drilling, Coring, Ice cores.

The development of a Rufli type drill system for electromechanical ice coring, its use at several locations in the Antarctic, and future modifications based on experience during field work are outlined. A short video record, taken during the German Antarctic Expedition in 1987 in the Ritscher Upland and the Ekström ice shelf, gives an impression of the drill procedure and occurring problems. (Auth.)

45-1448

Refinements of the UCPH shallow drill.

Gundestrup, N.S., et al, International Workshop on Ice Drilling Technology, 3rd, Grenoble, France, Oct. 10-14, 1988. Proceedings. Ice core drilling. Edited by C. Rado and D. Beaudoing, Grenoble, France. Centre National de la Recherche Scientifique. Laboratoire de Glaciologie et Géophysique de l'Environnement, 1989, p.6-13, 8 refs.

Hansen, S.B., Johnsen, S.J.

Ice coring drills, Drilling, Coring, Augers, Ice cores.

45-1449

Performance of the UCPH shallow and hand augers.

Clausen, H.B., et al, International Workshop on Ice Drilling Technology, 3rd, Grenoble, France, Oct. 10-14, 1988. Proceedings. Ice core drilling. Edited by C. Rado and D. Beaudoing, Grenoble, France. Centre National de la Recherche Scientifique. Laboratoire de Glaciologie et Géophysique de l'Environnement, 1989, p.14-20, 8 refs.

Gundestrup, N.S., Hansen, S.B., Johnsen, S.J.

Ice coring drills, Drilling, Augers, Coring, Ice cores.

45-1450

New directions in drilling and related activities.

Koci, B.R., International Workshop on Ice Drilling Technology, 3rd, Grenoble, France, Oct. 10-14, 1988. Proceedings. Ice core drilling. Edited by C. Rado and D. Beaudoing, Grenoble, France. Centre National de la Recherche Scientifique. Laboratoire de Glaciologie et Géophysique de l'Environnement, 1989, p.21-23.

Ice coring drills, Drilling.

45-1451

Design and logistic requirements for ice coring and sample return from remote high altitude locations.

Koci, B.R., International Workshop on Ice Drilling Technology, 3rd, Grenoble, France, Oct. 10-14, 1988. Proceedings. Ice core drilling. Edited by C. Rado and D. Beaudoing, Grenoble, France. Centre National de la Recherche Scientifique. Laboratoire de Glaciologie et Géophysique de l'Environnement, 1989, p.24-27.

Ice coring drills, Ice sampling.

A description of the drilling systems, power sources applicable to high altitudes such as Antarctica, and equipment/core packaging for long rough journeys are considered. Electromechanical and thermal drilling systems are discussed, along with the use of composites, solar, wind and mechanical generation systems. (Auth. mod.)

45-1452

Design of a drill to work in a fluid filled hole.

Koci, B.R., International Workshop on Ice Drilling Technology, 3rd, Grenoble, France, Oct. 10-14, 1988. Proceedings. Ice core drilling. Edited by C. Rado and D. Beaudoing, Grenoble, France. Centre National de la Recherche Scientifique. Laboratoire de Glaciologie et Géophysique de l'Environnement, 1989, p.28-31, 2 refs.

Ice coring drills, Drilling fluids.

45-1453

Electromechanical drilling in dry holes to medium depths.

Schwander, J., et al, International Workshop on Ice Drilling Technology, 3rd, Grenoble, France, Oct. 10-14, 1988. Proceedings. Ice core drilling. Edited by C. Rado and D. Beaudoing, Grenoble, France. Centre National de la Recherche Scientifique. Laboratoire de Glaciologie et Géophysique de l'Environnement, 1989, p.32-37, 5 refs.

Rufli, H.

Ice coring drills, Drilling, Coring, Ice cores.

In reviewing factors limiting the depth for the production of good quality ice cores, the bore-hole closure is discussed from results based on measured first year strain rates of two holes, one at Byrd Station. The latest version of a mechanical drill system which has been modified to produce better cores from greater depths is presented.

45-1454

Ice drilling instrumentation.

Hancock, W.H., et al, International Workshop on Ice Drilling Technology, 3rd, Grenoble, France, Oct. 10-14, 1988. Proceedings. Ice core drilling. Edited by C. Rado and D. Beaudoing, Grenoble, France. Centre National de la Recherche Scientifique. Laboratoire de Glaciologie et Géophysique de l'Environnement, 1989, p.38-50, 11 refs.

Koci, B.R.

Ice coring drills, Borehole instruments, Drilling, Coring, Electronic equipment, Monitors.

Two types of instrument packages for monitoring the ice drilling process have been designed. Both are mounted in the drill and return information to the surface during drilling. One was used on a hot water drill during the Nov.-Dec. 1987 summer season in Antarctica. It was powered and controlled from the surface with the data conversion being done using a commercial board in a Compaq computer. The designs and types of data collected are discussed. (Auth. mod.)

45-1455

Hole liquids.

Gundestrup, N.S., International Workshop on Ice Drilling Technology, 3rd, Grenoble, France, Oct. 10-14, 1988. Proceedings. Ice core drilling. Edited by C. Rado and D. Beaudoing, Grenoble, France. Centre National de la Recherche Scientifique. Laboratoire de Glaciologie et Géophysique de l'Environnement, 1989, p.51-53, 7 refs.

Drilling fluids, Ice coring drills.

In deep drilling, the hole must be filled with a liquid in order to prevent hole closure from the surrounding ice. The maximum depth received in a dry hole is 906 m at Dome C using a thermal drill in ice. Mechanical drills have a more limited depth capability in a dry hole than a thermal drill due to the lack of clearance at the drill head. Nevertheless, it was possible to core 360 m at South Pole (-55 C) and 325 m at Renland in East Greenland (-18 C). In deeper drillings, the hole has to be filled with a liquid. (Auth. mod.)

45-1456

Electromechanical ice core drilling systems: a discussion.

Kuivinen, K.C., et al, International Workshop on Ice Drilling Technology, 3rd, Grenoble, France, Oct. 10-14, 1988. Proceedings. Ice core drilling. Edited by C. Rado and D. Beaudoing, Grenoble, France. Centre National de la Recherche Scientifique. Laboratoire de Glaciologie et Géophysique de l'Environnement, 1989, p.54-56.

Sonderup, J.M.

Ice coring drills, Drilling, Coring.

45-1457

Thermal ice core drill 4000.

Augustin, L., et al, International Workshop on Ice Drilling Technology, 3rd, Grenoble, France, Oct. 10-14, 1988. Proceedings. Ice core drilling. Edited by C. Rado and D. Beaudoing, Grenoble, France. Centre National de la Recherche Scientifique. Laboratoire de Glaciologie et Géophysique de l'Environnement, 1989, p.59-65, 1 ref.

Donnou, D., Rado, C., Manouvrier, A., Girard, C., Ricou, G.

Ice coring drills, Thermal drills, Antarctica—Dome C.

The "Laboratoire de Glaciologie et Géophysique de l'Environnement" has developed since 1968 a thermal drill system, which reached 905 m in depth during the summer season 1977-78 at Dome C. In order to reach deeper layers, the system had to be modified for working in a fluid filled hole.

45-1458

Setting up a deep ice core drilling facility and preliminary tests: Terre Adelie-Antarctica.

Donnou, D., et al, International Workshop on Ice Drilling Technology, 3rd, Grenoble, France, Oct. 10-14, 1988. Proceedings. Ice core drilling. Edited by C. Rado and D. Beaudoing, Grenoble, France. Centre National de la Recherche Scientifique. Laboratoire de Glaciologie et Géophysique de l'Environnement, 1989, p.66-69.

Augustin, L., Manouvrier, A., Perrin, J. Girard, C., Ricou, G.

Ice coring drills, Thermal drills, Drilling, Antarctica—Adélie Coast.

The goal of the summer 1987-88 field operations was to test the thermal drill equipment designed to work in a fluid filled hole on the Adélie Coast. The drilling equipment, designed for recovery of very deep ice cores within one summer season, the hydraulic power station, and the assembly of the tower are described and illustrated.

45-1459

Deep ice core drilling equipment depth measurement and drilling process.

Perrin, J., International Workshop on Ice Drilling Technology, 3rd, Grenoble, France, Oct. 10-14, 1988. Proceedings. Ice core drilling. Edited by C. Rado and D. Beaudoing, Grenoble, France. Centre National de la Recherche Scientifique. Laboratoire de Glaciologie et Géophysique de l'Environnement, 1989, p.70-71.

Ice coring drills, Measuring instruments.

45-1460

Telemetering and remote control circuits for a 4000 m thermal drill.

Marec, G., et al, International Workshop on Ice Drilling Technology, 3rd, Grenoble, France, Oct. 10-14, 1988. Proceedings. Ice core drilling. Edited by C. Rado and D. Beaudoing, Grenoble, France. Centre National de la Recherche Scientifique. Laboratoire de Glaciologie et Géophysique de l'Environnement, 1989, p.72-85.

Maitre, M., Pinglot, J.F., Lefebvre, E.

Ice coring drills, Thermal drills, Telemetering equipment, Data transmission.

45-1461

Ice core drilling at a high accumulation area of Law Dome, Antarctica, 1987.

Etheridge, D.M., et al, International Workshop on Ice Drilling Technology, 3rd, Grenoble, France, Oct. 10-14, 1988. Proceedings. Ice core drilling. Edited by C. Rado and D. Beaudoing, Grenoble, France. Centre National de la Recherche Scientifique. Laboratoire de Glaciologie et Géophysique de l'Environnement, 1989, p.86-96, 8 refs.

Wookey, C.W.

Ice coring drills, Thermal drills, Ice cores, Drilling, Coring, Antarctica—Law Dome.

A 234 m deep 195 mm diameter ice core was drilled at DE08, 16 km east of the Law Dome summit in 1987. The details of the thermal drill facility are described. The ice core and borehole were measured and sampled on-site for all principal parameters and showed that the core reached back to about 1810 AD. The snow accumulation rate at the drill site is about 1200 kg/sq m/a and surface melting is very infrequent. The suitability of the core for gas composition studies and other analyses is discussed. (Auth.)

45-1462
Antifreeze-thermodrilling of cores in arctic sheet glaciers.
Zagorodnov, V.S., International Workshop on Ice Drilling Technology, 3rd, Grenoble, France, Oct. 10-14, 1988. Proceedings. Ice core drilling. Edited by C. Rado and D. Beaudoing, Grenoble, France. Centre National de la Recherche Scientifique. Laboratoire de Glaciologie et Géophysique de l'Environnement, 1989, p.97-109, 7 refs.
Ice coring drills, Thermal drills, Glacier ice, Ice cores, Drilling, Coring.

45-1463
Drilling with ethanol-based antifreeze in Antarctica.
Morev, V.A., et al, International Workshop on Ice Drilling Technology, 3rd, Grenoble, France, Oct. 10-14, 1988. Proceedings. Ice core drilling. Edited by C. Rado and D. Beaudoing, Grenoble, France. Centre National de la Recherche Scientifique. Laboratoire de Glaciologie et Géophysique de l'Environnement, 1989, p.110-113.
Manevskiĭ, L.N., IAkovlev, V.M., Zagorodnov, V.S.
Ice coring drills, Thermal drills, Antifreezes.
An account is given of antifreeze-thermal drilling in Antarctica. Tabulated data on the boreholes drilled with antifreeze-thermal technology, showing year and site of the drilling, type of ice or firn, borehole temperature and other characteristics, are presented.

45-1464
Evaluation of hot water drills.
Bässler, K.H., et al, International Workshop on Ice Drilling Technology, 3rd, Grenoble, France, Oct. 10-14, 1988. Proceedings. Ice core drilling. Edited by C. Rado and D. Beaudoing, Grenoble, France. Centre National de la Recherche Scientifique. Laboratoire de Glaciologie et Géophysique de l'Environnement, 1989, p.116-122, 8 refs.
Miller, H.
Ice coring drills, Thermal drills, Hydrothermal processes, Analysis (mathematics).

45-1465
Light-weight hot water drill for large depth: experiences with drilling on Jakobshavns Glacier, Greenland.
Iken, A., et al, International Workshop on Ice Drilling Technology, 3rd, Grenoble, France, Oct. 10-14, 1988. Proceedings. Ice core drilling. Edited by C. Rado and D. Beaudoing, Grenoble, France. Centre National de la Recherche Scientifique. Laboratoire de Glaciologie et Géophysique de l'Environnement, 1989, p.123-136, 22 refs.
Echelmeyer, K.A., Harrison, W.
Ice drills, Thermal drills, Glacier surveys, Glacier ice, Boreholes, Analysis (mathematics), Drilling, Hydrothermal processes.

45-1466
Deep hot water drill system with potential for bottom sampling.
Koci, B.R., International Workshop on Ice Drilling Technology, 3rd, Grenoble, France, Oct. 10-14, 1988. Proceedings. Ice core drilling. Edited by C. Rado and D. Beaudoing, Grenoble, France. Centre National de la Recherche Scientifique. Laboratoire de Glaciologie et Géophysique de l'Environnement, 1989, p.137-139, 2 refs.
Ice drills, Thermal drills, Subglacial observations, Bottom sediment, Antarctica—Ross Ice Shelf.
During the 1987-88 antarctic season, a hot water drilling system capable of drilling up to 3,000 m was tested. By insulating a one inch diameter hose, the heat loss is reduced so water temperature at the nozzle falls off by 2 C/100 m of water depth. In addition, wires incorporated in the jacket allow measurement while drilling to assure hole straightness and large enough diameter to permit instrument raising and lowering. Heat input for this system is 0.5 W. Some ideas are presented on drilling subglacial material. Saturated till sampling requires a tool used by the well drilling industry for sampling material below the water table, while rock sampling and coring of frozen till utilize mining technology. The use of additives to enhance drilling rates is also discussed. (Auth.)

45-1467
Danish contribution to the family of hot-water glacier drills.
Olesen, O.B., International Workshop on Ice Drilling Technology, 3rd, Grenoble, France, Oct. 10-14, 1988. Proceedings. Ice core drilling. Edited by C. Rado and D. Beaudoing, Grenoble, France. Centre National de la Recherche Scientifique. Laboratoire de Glaciologie et Géophysique de l'Environnement, 1989, p.140-148, 3 refs.
Ice drills, Thermal drills, Subglacial observations.

45-1468
New methods in ice core processing.
Stauffer, B., et al, International Workshop on Ice Drilling Technology, 3rd, Grenoble, France, Oct. 10-14, 1988. Proceedings. Ice core drilling. Edited by C. Rado and D. Beaudoing, Grenoble, France. Centre National de la Recherche Scientifique. Laboratoire de Glaciologie et Géophysique de l'Environnement, 1989, p.151-157, 2 refs.
Burkhalter, J., Sigg, A.
Ice cores, Drill core analysis, Core samplers, Antarctica—Amundsen-Scott Station.
Core processing includes the inspection, registration, labelling and packing of ice cores as well as first measurements in the field. The methods of core processing applied during core drillings at Dye 3 and South Pole are presented. A modified version that will be applied in summer 1989 in Central Greenland is discussed in more detail. (Auth.)

45-1469
Investigation of ice and rock drilling by melting.
Litvinenko, V.S., International Workshop on Ice Drilling Technology, 3rd, Grenoble, France, Oct. 10-14, 1988. Proceedings. Ice core drilling. Edited by C. Rado and D. Beaudoing, Grenoble, France. Centre National de la Recherche Scientifique. Laboratoire de Glaciologie et Géophysique de l'Environnement, 1989, p.160-163, 2 refs.
Ice drills, Rock drilling, Thermal drills, Boreholes, Analysis (mathematics).

45-1470
Electrochaude: recent development in borehole drilling.
Rado, C., et al, International Workshop on Ice Drilling Technology, 3rd, Grenoble, France, Oct. 10-14, 1988. Proceedings. Ice core drilling. Edited by C. Rado and D. Beaudoing, Grenoble, France. Centre National de la Recherche Scientifique. Laboratoire de Glaciologie et Géophysique de l'Environnement, 1989, p.164-168, 3 refs.
Girard, C., Perrin, J.
Thermal drills, Ice drills, Drilling, Boreholes.

45-1471
Electronic instrumentation used in borehole surveying.
Kelty, J.R., et al, International Workshop on Ice Drilling Technology, 3rd, Grenoble, France, Oct. 10-14, 1988. Proceedings. Ice core drilling. Edited by C. Rado and D. Beaudoing, Grenoble, France. Centre National de la Recherche Scientifique. Laboratoire de Glaciologie et Géophysique de l'Environnement, 1989, p.171-179, 15 refs.
Hansen, B.L.
Borehole instruments, Ice sampling, Data transmission, Data processing, Electronic equipment.

45-1472
Assessing the quality of thermally drilled deep antarctic ice cores for trace elements analysis.
Boutron, C.F., et al, International Workshop on Ice Drilling Technology, 3rd, Grenoble, France, Oct. 10-14, 1988. Proceedings. Ice core drilling. Edited by C. Rado and D. Beaudoing, Grenoble, France. Centre National de la Recherche Scientifique. Laboratoire de Glaciologie et Géophysique de l'Environnement, 1989, p.182-197, 19 refs.
Patterson, C.C., Barkov, N.I.
Ice cores, Drill core analysis, Impurities, Ice composition, Antarctica—Dome C, Antarctica—Vostok Station.
Concentrations of Pb, Zn, Na, Mg, K, Ca, Fe and Al have been measured in successive veneers of ice, mechanically chiselled progressing from the outside to the very center of various sections of the Dome C and Vostok deep ice cores. Mean elemental contamination present in the outside layer of the cores was found to range from 0.3 ng/g (Al) up to 20 ng/g (Na) for the Dome C core, and from 5 ng/g (Al) up to 290 ng/g (Zn) for the Vostok core. Contrasting outside-inside curves were observed for the various elements. Plateaus of concentrations were obtained in the inner parts of the core sections in all cases for Na and Mg, and in most cases for K, Ca, Fe and Al. For Pb and Zn, on the other hand, plateaus were observed only for part of the sections. (Auth. mod.)

45-1473
General geocryology. [Obshchaia geokriologiia]
Ershov, E.D., Moscow, Nedra, 1990, 558p., In Russian. 21 refs.
Geocryology, Ground thawing, Geologic processes, Engineering geology, Frozen rocks, Ground water, Freeze thaw cycles, Environmental protection, Moisture transfer, Frozen rock strength, Permafrost beneath structures, Frozen rock temperature, Cold weather construction, Sediments, Taliks, Frost heave, Design criteria, Thermokarst.

45-1474
Tundra lakes and streams as gas conduits to the atmosphere: implications for tundra carbon budgets.
Kling, G.W., et al, *Science*, Jan. 18, 1991, 251(4991), p.298-301, Numerous refs.
Kipphut, G.W., Miller, M.C.
Tundra, Lakes, Streams, Carbon dioxide, Climatic changes, United States—Alaska—North Slope.

45-1475
Geological prospecting of rocks for deep-freezing shafts. [Geologische Erkundung des Gebirges für tiefe Gefrierschächte]
Lamparski, H., *Zeitschrift für angewandte Geologie*, Oct. 1988, 34(10), p.307-308, In German.
DLC QE1.Z39
Mountains, Frozen rocks.

45-1476
Technical problems in deep-freeze planning and the deep-freezing process. [Technische Probleme bei der Planung eines tiefen Gefrierverfahrens und der Gefrierprozess]
Szendzielorz, H., *Zeitschrift für angewandte Geologie*, Oct. 1988, 34(10), p.308-310, In German.
DLC QE1.Z39
Soil freezing, Frozen rocks.

45-1477
Modelling temperature distribution in water-bearing formations, especially by freezing. [Modellierung der Temperaturverteilung in Wasserführenden Formationen, speziell beim Gefrierverfahren]
Marcak, H., et al, *Zeitschrift für angewandte Geologie*, Oct. 1988, 34(10), p.310-313, In German with English and Russian summaries. 2 refs.
Siemek, J.
DLC QE1.Z39
Soil temperature, Temperature distribution, Soil freezing, Mathematical models.

45-1478
Oil spill response guide.
Robert J. Meyers & Associates, *Pollution technology review*, 1989, No.174, 314p., 79 refs.
Research Planning Institute, Inc.
DLC TD427.P4 O3877
Oil spills, Ocean environments, Oil recovery, Countermeasures, Environmental impact, Logistics, Equipment, Offshore drilling, Ice cover effec*, Beaufort Sea.

45-1479
Heavy trucks, climate and pavement damage.
Organisation for Economic Co-operation and Development Scientific Expert Group, Paris, France, Organisation for Economic Co-operation and Development, 1988, 175p., 101 refs.
Pavements, Motor vehicles, Damage, Loading, Climatic factors, Cold weather performance, Surface properties, Frost action, Mechanical properties, Design.

45-1480
Hydrogeochemistry of snow and snowmelt in catchment hydrology.
Jones, H.G., et al, Process Studies in Hillslope Hydrology. Edited by M.G. Anderson and T.P. Burt, Chichester, England, John Wiley & Sons Ltd., 1990, p.255-297, Refs. p.289-297.
Stein, J.
DLC GB665.P68
Snowmelt, Runoff, Hydrogeochemistry, Water retention, Snow composition, Snow cover effect, Watersheds, Hydrologic cycle, Snow impurities, Meltwater, Seasonal variations.

45-1481
Geography of surface runoff: some lessons for research.
Church, M., et al, Process Studies in Hillslope Hydrology. Edited by M.G. Anderson and T.P. Burt, Chichester, England, John Wiley & Sons Ltd., 1990, p.299-325, Refs. p.323-325.
Woo, M.K.
DLC GB665.P68
Runoff, Snowmelt, Precipitation (meteorology), Slope processes, Water balance, Surface waters, Climatic factors, Hydrology.

45-1482
Environmental isotope studies of storm and snowmelt runoff generation.
Sklash, M.G., Process Studies in Hillslope Hydrology. Edited by M.G. Anderson and T.P. Burt, Chichester, England, John Wiley & Sons Ltd., 1990, p.401-435, Refs. p.432-435.
DLC GB665.P68
Runoff, Precipitation (meteorology), Snowmelt, Isotope analysis, Hydrogeochemistry, Stream flow, Subsurface drainage, Chemical analysis, Ground water

45-1483
Electro-physical and physical-mechanical properties of ice. [Elektrofizicheskie i fiziko-mekhanicheskie svoĭstva l'da],
Bogorodskiĭ, V.V., ed. Leningrad, Gidrometeoizdat, 1989, 256p., In Russian. Refs. pass. im. For individual papers see 45-1484 through 45-1509 or F-43272 through F-43277.
Gavrilo, V.P., ed.
Ice physics, Ice mechanics, Sea ice, Ice electrical properties, Ice temperature, Ice cover, Ice cover thickness, Ice salinity, Ice surveys, Remote sensing, Snow physics, Wave propagation, Frazil ice.
This work discusses results of theoretical, laboratory, and field studies on a range of physical characteristics of snow, sea ice, and glacial covers in arctic and antarctic regions. Electrophysical parameters and the electrical structure of sea ice in the UHF range as well as the results of studies of the velocity of radio wave propagation in glaciers are discussed. A series of articles is devoted to radio waves of snow and ice covers, and questions on the interpretation of remote ice sensing. Data from results of physical modeling of frazil ice formation and space-oriented crystal structures of ice cover are presented. Questions on ice mechanics relating to ice breakup are also examined. (Auth. mod.)

45-1484
Applying r-f methods to oceanographic and glacial studies. [Primenenie *radiofizicheskikh metodov v okeanograficheskikh i ledovykh issledovaniiakh*],
Gavrilo, V.P., Elektrofizicheskie i fiziko-mekhanicheskie svoĭstva l'da (Electro-physical and physical-mechanical properties of ice). Edited by V.V. Bogorodskiĭ and V.P. Gavrilo, Leningrad, Gidrometeoizdat, 1989, p.7-22, In Russian. 38 refs.
Oceanography, Oceanographic surveys, Ice surveys, Radio echo soundings, Remote sensing, Sea ice, Ice electrical properties, Ice physics.

45-1485
Electrical parameters of surface layers of shelf and continental glaciers in the UHF range. [Elektricheskie parametry poverkhnostnykh sloev shel'fovogo i materikovogo lednikov v SVCh diapazone],
Bogorodskiĭ, V.V., et al, Elektrofizicheskie i fiziko-mekhanicheskie svoĭstva l'da (Electro-physical and physical-mechanical properties of ice). Edited by V.V. Bogorodskiĭ and V.P. Gavrilo, Leningrad, Gidrometeoizdat, 1989, p.23-31, In Russian. 6 refs.
Pasynkov, V.V., Khokhlov, G.P.
Glaciers, Ice surface, Ice electrical properties, Glacier ice, Glacier surfaces.
Results of experimental investigations of the electrical parameters of glacier ice in the area of Novolazarevskaya Station are presented. *Distributions of electrical parameters* were obtained for 3 areas of ice formation, differentiated by the structure and physical characteristics of the surface layers of the glacier mass. *The results obtained allow a better understanding* of the nature of thermal radio wave emissions of antarctic glaciers and make it possible to evaluate remote r-f methods of studying ice covers. (Auth. mod.)

45-1486
***Electro-physical* characteristics of hummocks.** [Elektrofizicheskie kharakteristiki torosov],
Pasynkov, V.V., et al, Elektrofizicheskie i fiziko-mekhanicheskie svoĭstva l'da (Electro-physical and physical-mechanical properties of ice). Edited by V.V. Bogorodskiĭ and V.P. Gavrilo, Leningrad, Gidrometeoizdat, 1989, p.32-35, In Russian. 2 refs.
Khokhlov, G.P.
Hummocks, Ice electrical properties, Ice physics.

45-1487
Specific *attenuation in the* UHF range of sea ice in various regions. [Ob udel'nom oslablenii morskogo l'da v raznykh regionov v SVCh diapazone],
Pasynkov, V.V., et al, Elektrofizicheskie i fiziko-mekhanicheskie svoĭstva l'da (Electro-physical and physical-mechanical properties of ice). Edited by V.V. Bogorodskiĭ and V.P. Gavrilo, Leningrad, Gidrometeoizdat, 1989, p.36-45, In Russian. 11 refs.
Khokhlov, G.P.
Attenuation, Sea ice, Ice salinity, Ice density, Radio waves, Ice surface, Ice electrical properties, Ice physics.

45-1488
Method of measuring electrical characteristics of dielectric materials with the aid of a quadruple-lead measuring line. [Metod izmereniia *elektricheskikh kharakteristik dielektricheskikh materialov s pomoshch'iu chetyrekhprovodnoi izmeritel'noi linii*],
Trepov, G.V., Elektrofizicheskie i fiziko-mekhanicheskie svoĭstva l'da (Electro-physical and physical-mechanical properties of ice). Edited by V.V. Bogorodskiĭ and V.P. Gavrilo, Leningrad, Gidrometeoizdat, 1989, p.46-52, In Russian. 6 refs.
Measuring instruments, Design, Electrical properties, Sea ice, Ice electrical properties, Analysis (mathematics).

45-1489
Attenuation of 3-cm band radar signals by snow cover in the Antarctic. [Oslablenie radiolokatsionnykh signalov trekhsantimetrovogo diapazona v snezhnom pokrove Antarktidy],
Trepov, G.V., Elektrofizicheskie i fiziko-mekhanicheskie svoĭstva l'da (Electro-physical and physical-mechanical properties of ice). Edited by V.V. Bogorodskiĭ and V.P. Gavrilo, Leningrad, Gidrometeoizdat, 1989, p.53-58, In Russian. 2 refs.
Snow crust, Attenuation, Snow cover, Snow electrical properties, Radar echoes, Snow physics, Snow depth, Snow permeability, Firn, Mathematical models.
Experimental results from radar sounding of snow cover in Antarctica show that the maximum depth of penetration of the snow mass by radio waves is determined primarily by the number of permeable ice crust-boundaries of annual snow layers. The attenuation value of the signal during the penetration of one ice crust in the snow was obtained. (Auth. mod.)

45-1490
Measuring the velocity of electromagnetic wave propagation in a glacier on Dome B in Antarctica. [Izmerenie skorosti rasprostraneniia elektromagnitynkh voln v lednike na kupole "B" v Antarktide],
Sheremet'ev, A.N., Elektrofizicheskie i fiziko-mekhanicheskie svoĭstva l'da (Electro-physical and physical-mechanical properties of ice). Edited by V.V. Bogorodskiĭ and V.P. Gavrilo, Leningrad, Gidrometeoizdat, 1989, p.59-64, In Russian. 1 ref.
Ice physics, Ice electrical properties, Velocity measurement, Glacier ice, Electromagnetic properties, Wave propagation.
The author analyzes measurements of the velocity of electromagnetic wave propagation in ice (obtained by oblique sounding) on a glacier over 3500 m thick, located on the surface of a subglacial lake. (Auth. mod.)

45-1491
Radar measurements of the thickness and movement velocity of ice cover in the area of Dome B. [Radiolokatsionnye *izmereniia tolshchiny i skorosti dvizheniia lednikovogo pokrova v raione kupola "B"*],
Sheremet'ev, A.N., Elektrofizicheskie i fiziko-mekhanicheskie svoĭstva l'da (Electro-physical and physical-mechanical properties of ice). Edited by V.V. Bogorodskiĭ and V.P. Gavrilo, Leningrad, Gidrometeoizdat, 1989, p.65-71, In Russian. 1 ref.
Ice cover thickness, Velocity measurement, Radar echoes, Ice surface, Glacier ice, Glacier oscillation.
The author analyzes measurements of the thickness and movement velocity of ice cover in the region of Dome B in the central part of Antarctica, obtained during the 28th and 29th Soviet Antarctic Expeditions. From the measurements it was possible to determine the center of the flow of the ice, where the velocity of the glacier is minimal and amounts to about 0.1 m year. (Auth. mod.)

45-1492
Probability distribution of the radiation temperature of the surface of snow and ice cover of different ages. [Veroiatnostnoe raspredelenie radiatsionnoĭ temperatury *poverkhnosti snezhno-ledianogo pokrova raznogo vozrasta*],
Darovskikh, A.N., et al, Elektrofizicheskie i fiziko-mekhanicheskie svoĭstva l'da (Electro-physical and physical-mechanical properties of ice). Edited by V.V. Bogorodskiĭ and V.P. Gavrilo, Leningrad, Gidrometeoizdat, 1989, p.72-77, In Russian. 3 refs.
Martynova, E.A., Spitsyn, V.A.
Ice cover, Ice physics, Surface temperature, Sea ice, Snow physics, Snow surface temperature, Ice surface, Ice temperature, Snow cover, Analysis (mathematics), Snow depth, Wind velocity.

45-1493
Investigations of Okhotsk Sea ice cover with the aid of an airborne scanning UHF radiometer. [Issledovanie *ledianogo pokrova Okhotskogo moria s pomoshch'iu samoletnogo skaniruiushchego SVCh-radiometra*],
Aleksandrov, V.IU., et al, Elektrofizicheskie i fiziko-mekhanicheskie svoĭstva l'da (Electro-physical and physical-mechanical properties of ice). Edited by V.V. Bogorodskiĭ and V.P. Gavrilo, Leningrad, Gidrometeoizdat, 1989, p.78-87, In Russian. 8 refs.
Melent'ev, V.V.
Sea ice, Microwaves, Ice cover, Airborne equipment, Analysis (mathematics).

45-1494
***Questions on interpreting* data from infrared-ice reconnaissance.** [Nekotorye voprosy interpretatsii dannykh IK-ledovoĭ razvedki],
Tarashkevich, V.N., et al, Elektrofizicheskie i fiziko-mekhanicheskie svoĭstva l'da (Electro-physical and physical-mechanical properties of ice). Edited by V.V. Bogorodskiĭ and V.P. Gavrilo, Leningrad, Gidrometeoizdat, 1989, p.88-91, In Russian. 3 refs.
Chebotareva, V.A.
Ice cover, Ice temperature, Ice surface, Surface temperature, Surface waters, Remote sensing, Infrared reconnaissance, Ice surveys.

45-1495
Simple method of measuring the thickness of ice in fresh-water reservoirs. [Prostoĭ metod izmereniia tolshchiny l'da presnovodnykh vodoemov],
Pasynkov, V.V., et al, Elektrofizicheskie i fiziko-mekhanicheskie svoĭstva l'da (Electro-physical and physical-mechanical properties of ice). Edited by V.V. Bogorodskiĭ and V.P. Gavrilo, Leningrad, Gidrometeoizdat, 1989, p.92-98, In Russian. 2 refs.
Khokhlov, G.P.
Reservoirs, Ice cover thickness, Measurement, Measuring instruments, Analysis (mathematics).

45-1496
Cepstrum analysis of signals reflected from sea ice based on a linear forecasting method. [Kepstral'nyĭ analiz signalov, otrazhennykh ot morskikh l'dov na osnove metoda lineĭnogo predskazaniia],
Oganesian, A.G., et al, Elektrofizicheskie i fiziko-mekhanicheskie svoĭstva l'da (Electro-physical and physical-mechanical properties of ice). Edited by V.V. Bogorodskiĭ and V.P. Gavrilo, Leningrad, Gidrometeoizdat, 1989, p.99-105, In Russian. 9 refs.
Chaĭkovskiĭ, I.B.
Radar echoes, Sea ice, Forecasting, Analysis (mathematics), Reflection, Ice physics.

45-1497
Effective areas of radiation of pressure ridges in fast ice in the 9.4 GHz frequency range at small grazing angles. [Effektivyne ploshchadi rasseianiia (EPR) torosov pripaĭnogo l'da v diapazone 9,4 GGts pri malykh uglakh skol'zheniia],
Kuznetsov, N.M., et al, Elektrofizicheskie i fiziko-mekhanicheskie svoĭstva l'da (Electro-physical and physical-mechanical properties of ice). Edited by V.V. Bogorodskiĭ and V.P. Gavrilo, Leningrad, Gidrometeoizdat, 1989, p.106-108, In Russian. 3 refs.
Trepov, G.V.
Fast ice, Sea ice, Pressure ridges, Antennas, Ice physics, Radiation.

45-1498
Characteristics of the distribution of the volume of air and brine pockets *in sea* ice. [*Nekotorye* osobennosti raspredeleniia ob"ema por s vozdukhom i rassolom v morskikh l'dakh],
Nazintsev, IU.L., et al, Elektrofizicheskie i fiziko-mekhanicheskie svoĭstva l'da (Electro-physical and physical-mechanical properties of ice). Edited by V.V. Bogorodskiĭ and V.P. Gavrilo, Leningrad, Gidrometeoizdat, 1989, p.109-123, In Russian. 19 refs.
Tyshko, K.P.
Brines, Ice salinity, Sea ice, Ice physics, Ice temperature, Ice density, Seasonal variations, Ice mechanics, Ice cover, Ice formation.
The authors present the results of their calculations of the relative volume of air and brine pockets found in different layers of ice cover. The calculations made were based on data obtained from investigations of sea ice in the Arctic and Antarctica. Statistical analysis of the distribution of the volume of pockets in ice of different ages and conditions is included. (Auth. mod.)

45-1499
Contact supercooling of water layers and bottom ice formations in the sea. [Kontaktnoe pereokhlazhdenie sloev vody i vnutrivodnoe ledoobrazovanie v more],
Cherepanov, N.V., et al, Elektrofizicheskie i fiziko-mekhanicheskie svoĭstva l'da (Electro-physical and physical-mechanical properties of ice). Edited by V.V. Bogorodskiĭ and V.P. Gavrilo, Leningrad, Gidrometeoizdat, 1989, p.124-134, In Russian. 12 refs.
Nazintsev, IU.L., Tyshko, K.P.
Sea ice, Bottom ice, Supercooling, Heat transfer, Ice formation, Water temperature, Salinity, Analysis (mathematics).

45-1500
Passive and active bottom ice formation. [O "passivnom" i "aktivnom" vnutrivodnom ledoobrazovanii],
Tyshko, K.P., et al, Elektrofizicheskie i fiziko-mekhanicheskie svoĭstva l'da (Electro-physical and physical-mechanical properties of ice). Edited by V.V. Bogorodskiĭ and V.P. Gavrilo, Leningrad, Gidrometeoizdat, 1989, p.135-143, In Russian. 6 refs.
Nazintsev, IU.L.
Bottom ice, Supercooling, Sea ice, Ice formation, Water temperature, Analysis (mathematics).

45-1501
Laboratory studies of oriented growth of ice crystals in moving water streams. [Laboratornye issledovaniia orientirovannogo rosta kristallov l'da v dvizhushchemsia vodnom potoke],
Cherepanov, N.V., et al, Elektrofizicheskie i fiziko-mekhanicheskie svoĭstva l'da (Electro-physical and physical-mechanical properties of ice). Edited by V.V. Bogorodskiĭ and V.P. Gavrilo, Leningrad, Gidrometeoizdat, 1989, p.144-153, In Russian. 9 refs.
Strakhov, M.V.
Sea ice, Ice crystal structure, Ice physics, Ice crystal growth, Sea ice distribution.
Questions related to the occurrence of space-ordering in the crystal structure of sea ice and its distribution in arctic and antarctic sea ice are examined, and the causes of such ordering are discussed. From the analysis of the obtained results, some regularities in the formation of ice with ordering in the C-axis orientation of the crystals, depending on the flow regime, were revealed. (Auth. mod.)

45-1502
Study on space-oriented crystal structures of arctic sea ice. [Issledovanie prostranstvenno-orientirovannykh kristallicheskikh struktur arkticheskogo morskogo l'da],
Strakhov, M.V., Elektrofizicheskie i fiziko-mekhanicheskie svoĭstva l'da (Electro-physical and physical-mechanical properties of ice). Edited by V.V. Bogorodskiĭ and V.P. Gavrilo, Leningrad, Gidrometeoizdat, 1989, p.154-166, In Russian. 6 refs.
Sea ice, Ice crystal structure, Ice physics.

45-1503
Structure and physical properties of ice, formed by accelerated freezing with the aid of liquid nitrogen. [Struktura i fizicheskie svoĭstva l'da, sformirovannogo uskorennym namorazhivaniem s pomoshch'iu zhidkogo azota],
Tyshko, K.P., Elektrofizicheskie i fiziko-mekhanicheskie svoĭstva l'da (Electro-physical and physical-mechanical properties of ice). Edited by V.V. Bogorodskiĭ and V.P. Gavrilo, Leningrad, Gidrometeoizdat, 1989, p.167-173, In Russian. 5 refs.
Ice physics, Ice structure, Artificial freezing, Ice strength, Ice temperature.

45-1504
Creep and strength of ice cover subjected to loads and dies. [Polzuchest' i prochnost' ledianogo pokrova pri vozdeĭstvii na nego nagruzok i shtampov],
Aleksandrov, V.M., et al, Elektrofizicheskie i fiziko-mekhanicheskie svoĭstva l'da (Electro-physical and physical-mechanical properties of ice). Edited by V.V. Bogorodskiĭ and V.P. Gavrilo, Leningrad, Gidrometeoizdat, 1989, p.174-187, In Russian. 7 refs.
Arutiunian, N.Kh., Shmatkova, A.A.
Ice cover strength, Ice creep, Analysis (mathematics), Ice deformation, Ice mechanics.

45-1505
Long waves in an ice cover-fluid system, under ice compression. [O dlinnykh volnakh v sisteme ledianoĭ pokrov-zhidkost' pri nalichii ledovogo szhatiia],
Gol'dshteĭn, R.V., et al, Elektrofizicheskie i fiziko-mekhanicheskie svoĭstva l'da (Electro-physical and physical-mechanical properties of ice). Edited by V.V. Bogorodskiĭ and V.P. Gavrilo, Leningrad, Gidrometeoizdat, 1989, p.188-205, In Russian. 15 refs.
Marchenko, A.V.
Compressive properties, Ocean waves, Ice cover effect, Analysis (mathematics), Subglacial observations, Ice cracks, Ice mechanics.

45-1506
Deformation and breakup of ice by the water stream from an icebreaker propeller. [Deformirovanie i razrushenie l'da vodnym potokom ot vinta ledokola],
Gavrilo, V.P., et al, Elektrofizicheskie i fiziko-mekhanicheskie svoĭstva l'da (Electro-physical and physical-mechanical properties of ice). Edited by V.V. Bogorodskiĭ and V.P. Gavrilo, Leningrad, Gidrometeoizdat, 1989, p.206-213, In Russian. 7 refs.
Nikitin, V.A., Smirnov, V.N.
Ice deformation, Ice water interface, Propellers, Ice mechanics, Ice breakup, Icebreakers, Analysis (mathematics), Ice thickness.

45-1507
Physical conditions of the melting of ice cover in the shallow arctic shelf. [Fizicheskie usloviia taiianiia ledianogo pokrova melkovodnogo arkticheskogo shel'fa],
Sukhorukov, K.K., Elektrofizicheskie i fiziko-mekhanicheskie svoĭstva l'da (Electro-physical and physical-mechanical properties of ice). Edited by V.V. Bogorodskiĭ and V.P. Gavrilo, Leningrad, Gidrometeoizdat, 1989, p.214-222, In Russian. 3 refs.
Ice physics, Ice cover, Ice melting.

45-1508
Dynamic interaction of ice floes with flexible vertical supports in the sea. [Dinamicheskoe vzaimodeĭstvie ledianykh poleĭ s gibkimi vertikal'nymi oporami v more],
Vershinin, S.A., et al, Elektrofizicheskie i fiziko-mekhanicheskie svoĭstva l'da (Electro-physical and physical-mechanical properties of ice). Edited by V.V. Bogorodskiĭ and V.P. Gavrilo, Leningrad, Gidrometeoizdat, 1989, p.223-237, In Russian. 11 refs.
Iliadi, A.A.
Ice floes, Vibration, Ice solid interface, Ice mechanics.

45-1509
Ice deformation by a ship-raising pontoon. [Deformirovanie l'da sudopod"emnym pontonom],
Gavrilo, V.P., et al, Elektrofizicheskie i fiziko-mekhanicheskie svoĭstva l'da (Electro-physical and physical-mechanical properties of ice). Edited by V.V. Bogorodskiĭ and V.P. Gavrilo, Leningrad, Gidrometeoizdat, 1989, p.238-243, In Russian. 6 refs.
Nikitin, V.A., Smirnov, V.N., Shushlebin, A.I.
Ice deformation, Ice solid interface, Ice mechanics, Ice strength, Analysis (mathematics).

45-1510
Wheels and tracks in snow: validation study of the CRREL shallow snow mobility model.
Blaisdell, G.L., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, Nov. 1990, CR 90-09, 72p., ADA-230 102, 10 refs.
Richmond, P.W., Shoop, S.A., Green, C.E., Alger, R.G.
Snow, Snow strength, Vehicles, Traction, Computerized simulation, Models, Snow vehicles, Tracked vehicles, Tanks (combat vehicles), Military equipment, Motor vehicles.
In 1986, a mobility model was developed for predicting the traction and motion resistance of both wheeled and tracked vehicles on shallow snow, and a winter field season was dedicated to gathering mobility data for a diverse family of vehicles (including four on wheels and three tracked) to validate the model. The original version of the model, SSM1.0, used the Mohr-Coulomb shear failure equation from soil mechanics to predict gross traction. This required input of the snow strength parameters *c* and *phi*. Motion resistance is predicted by calculating the amount of work done by the tire in compacting snow and only requires snow depth and density values as input snow properties. Some effort was expended in determining an easy and reliable method of obtaining snow strength parameters. The model was originally designed to use an initial snow density-snow strength relationship established from past instrumented vehicle test results. Historically, shear annulus apparati have been used to obtain Mohr-Coulomb strength parameters. A comparison of snow strength obtained via these three methods (shear annulus, instrumented vehicle, calculated from initial density using the relationship in SSM1.0) for individual snow covers showed no agreement. SSM1.0 assumed that snow strength parameters for mobility prediction were a function of initial snow density; however, traction is developed in the compacted snow under the driving element, whose strength properties bore little relation to those of the initial snow. It appears that the shear strength of the compacted snow is essentially a constant for all of the vehicles and snow covers tested here.

45-1511
Laboratory and field tests of a wire mesh frazil collector.
Foltyn, E.P., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Oct. 1990, SR 90-35, 10p., ADA-230 181, 9 refs.
Frazil ice, River ice, Ice control, Design, Flooding.
Frazil ice jams on rivers cause problems that range from slowing commercial river traffic to widespread flooding. Through the years, one of the accepted techniques of controlling frazil ice jams has been to retain the frazil ice in a location where it will not harm the environment, using dams or weirs. In the interest of developing an inexpensive ice control structure, a series of laboratory and field tests were conducted using different wire mesh structures as a dam to determine which type of wire mesh best retains ice and what the optimum orientation of that mesh should be. A material such as chain link fence fabric would collect and retain the ice, but proper bed preparation must be done to prevent bed scour. Further study is required to determine the optimum mesh size

45-1512
Climate measurements by the EOS Geoscience Laser Ranging System.
Spinhirne, J.D., et al, Symposium on Global Change Studies, 2nd, New Orleans, LA, Jan. 14-18, 1991, Boston, MA, American Meteorological Society, 1991, p.17-22, 4 refs.
Zwally, H.J., Thomas, R.H., Bentley, C.R., Schutz, R.E., Shipley, S.T.
Lasers, Climatology, Measuring instruments, Remote sensing, Clouds (meteorology), Aerosols, Ice cover, Glaciology, Sea ice, Land ice, Ice sheets, Snow accumulation.

45-1513
2-13 micron spectrum of cirrus clouds.
Lynch, D.K., et al, Symposium on Global Change Studies, 2nd, New Orleans, LA, Jan. 14-18, 1991, Boston, MA, American Meteorological Society, 1991, p.126-129, 9 refs.
Hackwell, J.A., Russell, R.W.
Spectroscopy, Cloud physics, Spectra, Ice crystal size.

45-1514
Seasonal variation of some constituents of antarctic tropospheric air.
Hogan, A.W., et al, *Geophysical research letters*, Dec. 1990, 17(12), MP 2806, p.2365-2368, 22 refs.
Egan, W.G., Samson, J.A., Barnard, S.C., Riley, D.M., Murphey, B.B.
Meteorology, Air masses, Seasonal variations, Atmospheric composition, Aerosols, Carbon dioxide, Water vapor.
The interior of Antarctica is dominated by the continental Antarctic [cA] air mass, which resides entirely on the antarctic ice, and only receives heat, moisture and particles by exchange with surrounding air masses. The concentrations of carbon dioxide, total aerosol, and soot aerosol do not vary coincidentally in this air mass during antarctic spring. A hypothesis describing the modification of these properties within the cA air mass through exchange with the surrounding air masses and variation of the source strength of arine aerosol in maritime polar air masses is proposed. (Auth.)

45-1515
Method for determining the uniaxial compressive strength of sea ice as applied to the calculation of an ice load. [Metodika opredeleniia predela prochnosti morskogo l'da na odnoosnoe szhatie primenitel'no k raschetu ledovoĭ nagruzki],
Zanegin, V.G., Gidrotekhnicheskie sooruzheniia. Mezhvuzovskiĭ sbornik nauchnykh trudov (Hydraulic structures. Interuniversity collected scientific works). Edited by N.G. Khrapatyĭ, Vladivostok, Dal'nevostochnyĭ gosudarstvennyĭ universitet, 1988, p.48-54, In Russian. 4 refs.
Compressive properties, Sea ice, Ice loads, Analysis (mathematics).

45-1516
Some results of field observations of icing on marine hydraulic structures in the coastal area of the Far East. [Nekotorye rezul'taty naturnykh nabliudeniĭ za obledeneniem morskikh gidrotekhnicheskikh sooruzheniĭ na poberezh'e Dal'nego Vostoka],
Demin, IU.A., Gidrotekhnicheskie sooruzheniia. Mezhvuzovskiĭ sbornik nauchnykh trudov (Hydraulic structures. Interuniversity collected scientific works). Edited by N.G. Khrapatyĭ, Vladivostok, Dal'nevostochnyĭ gosudarstvennyĭ universitet, 1988, p.54-61, In Russian. 5 refs.
Icing, Hydraulic structures, Piers, Moorings.

45-1517
Determining the bending moments acting on a system of vertical circular cylinders from the ice floe side. [Opredelenie izgibaiushchikh momentov, deistvuiushchikh na sistemu vertikal'nykh krugovykh tsilindrov so storony ledianogo polia],
Matskevich, D.G., et al, Gidrotekhnicheskie sooruzheniia. Mezhvuzovskiĭ sbornik nauchnykh trudov (Hydraulic structures. Interuniversity collected scientific works). Edited by N.G. Khrapatyĭ, Vladivostok, Dal'nevostochnyĭ gosudarstvennyĭ universitet, 1988, p.140-146, In Russian. 5 refs.
Shkhinek, K.N.
Supports, Ice solid interface, Ice floes, Water level, Ice adhesion, Hydraulic structures, Ice loads, Analysis (mathematics), Ice cover thickness.

45-1518
Geophysical aspects of ice core drilling in Antarctica.
Moore, J.C., Cambridge, England, British Antarctic Survey, 1988, 168p. + append., Ph.D. thesis. Refs. p.156-168.
Ice sheets, Ice cores, Drill core analysis, Dielectric properties, Electrical measurement, Stratigraphy, Ice composition, Geophysical surveys, Ice temperature, Ice electrical properties, Glacier flow, Computer programs, Antarctica- Dolleman Island.

Using geophysical techniques and ice core analyses, a comprehensive study has been made of the ice sheet of Dolleman I., an ice rise on the east coast of the Antarctic Peninsula. A new technique for the rapid dielectric profiling of ice cores has been developed which is about fifty times quicker than earlier methods of similar accuracy. The technique makes continuous profiling of ice cores a practical procedure. The interpretation of the dielectric results clearly shows that dielectric parameters provide a comparable stratigraphy to that obtained by conventional chemical techniques. A statistical analysis of the dielectric and chemical measurements for a 45 m length of ice core shows that the high frequency conductivity is determined both by neutral salt and by acid concentrations. Two separate processes determine the high frequency conductivity: acids (probably in liquid form at three grain boundaries) determine the d.c. conductivity, whilst salts (probably dispersed throughout the ice fabric) determine the dielectric conductivity. The salt conduction mechanism is probably due to Bjerrum L defects alone. These results are the first ever to allow a comprehensive comparison of dielectric and chemical data from natural ice. The high frequency conductivity profile from the 133 m long Dolleman core has been used to generate synthetic 'radargrams'. These show features that correspond to the internal reflections often seen when radar sounding polar ice sheets. In parallel with the dielectric study, a resistivity survey of the drifting area was completed, the borehole temperature profiled and an ice flow stake scheme surveyed. The results of these surveys indicate that strain rates are changing rapidly, and the temperature at the base of the ice rise is close to 0 C. The causes of these results are discussed, and the most likely explanation found to be a change in the bed condition from sliding to non-sliding motion. (Auth. mod.)

45-1519
Heavy snowfall within a mesoscale convergence zone.
Sanderson, R.M., et al, *Meteorological magazine*, Mar. 1990, 119(1412), p.41-52, 1 ref.
Golding, B.W., Bader, M.J.
Snowfall, Weather forecasting, Meteorological data, Remote sensing, Precipitation (meteorology), Atmospheric circulation, England.

45-1520
Sensitivity experiment for the removal of arctic sea *ice with the French spectral general circulation model.*
Royer, J.F., et al, *Climate dynamics*, Nov. 1990, 5(1), p.1-17, 42 refs.
Planton, S., Déqué, M.
Sea ice, Ice cover effect, Atmospheric circulation, Heat balance, Climatic factors, Simulation, Cloud cover.

45-1521
Sensitivity of glaciation to initial snow cover, CO2, snow albedo, and oceanic roughness in the NCAR CCM.
Oglesby, R.J., *Climate dynamics*, Oct. 1990, 4(4), p.219-235, 55 refs.
Glaciation, Snow accumulation, Snow cover effect, Models, Climatic factors, Albedo, Carbon dioxide, Ablation.

45-1522
Low-temperature performance of elastomeric bearings.
Roeder, C.W., et al, *Journal of cold regions engineering*, Sep. 1990, 4(3), p.113-132, 17 refs.
Stanton, J.F., Feller, T.
Supports, Viscoelastic materials, Elastic properties, Low temperature tests, Performance, Relaxation (mechanics), Engineering, Loading.

45-1523
Numerical modeling of structure-frozen soil/ice interaction.
Puswewala, U.G.A., et al, *Journal of cold regions engineering*, Sep. 1990, 4(3), p.133-151, 32 refs.
Rajapakse, R.K.N.D.
Frozen ground strength, Creep, Soil tests, Computerized simulation, Ice solid interface, Loading, Foundations, Cold weather construction.

45-1524
Slope stability in arctic surface mines.
Sengupta, M., et al, *Journal of cold regions engineering*, Sep. 1990, 4(3), p.154-159.
Johansen, N.I., Sinha, A.K.
Mining, Slope stability, Slope protection, Ground thawing, Computerized simulation, Permafrost thermal properties, Thaw depth.

45-1525
Critical assessment of low temperature properties of multi-grade SAE 10W-30 engine oils.
Deysarkar, A.K., et al, *Lubrication engineering*, Aug. 1990, 46(8), p.502-507, 17 refs.
Clampitt, B.H.
Lubricants, Viscosity, Fluid flow, Low temperature tests, Accuracy, Performance, Chemical properties.

45-1526
Snow cover mapping of Afghanistan's mountains with space imagery.
Kravtsova, V.I., *Mapping sciences and remote sensing*, Oct.-Dec. 1990, 27(4), p.295-302, 7 refs. For Russian original see 45-1033.
Snow cover distribution, Spaceborne photography, Mapping, Seasonal variations, Mountains, Avalanche forecasting, Afghanistan.

45-1527
Permafrost response to surface temperature change and its implications for the 40,000-year surface temperature history at Prudhoe Bay, Alaska.
Harrison, W.D., *Journal of geophysical research*, Jan. 10, 1991, 96B(1), p.683-695, 15 refs.
Permafrost transformation, Surface temperature, Soil temperature, Temperature variations, Thermal regime, Subsurface investigations, Climatic changes, Permafrost depth.

45-1528
Former ice sheet based on the newly observed glacial *landforms and erratics in the central Sör Rondane* Mountains, East Antarctica.
Hirakawa, K., et al, NIPR Symposium on Antarctic Geosciences, Proceedings. No.4, Tokyo, National Institute of Polar Research, 1990, p.41-54, 6 refs.
Moriwaki, K.
Glacial deposits, Glaciation, Glacial geology, Ice sheets, Antarctica - Sör Rondane Mountains.
Reconstruction of the former ice sheet extent was revised on the basis of newly observed glacial landforms and erratics in the central Sör Rondane Mountains. Roches moutonnées on the summit of southern Lunckeryggen and erratics on the flat summit surface of west Brattnipene are in particular significant in revising the reconstruction of the former ice sheet and its longitudinal profile. Central Sör Rondane Mountains were mostly overridden by the ice sheet. Roches moutonnées and ice-smoothed mountain slopes in the summit area of southern Lunckeryggen, 1000 m or more above the present outlet glacier surface, are evidence of the northward advance of ice fall, about 10 km, where the ice was at least 400 m thicker than at present. (Auth. mod.)

45-1529
Ground temperature regimes and their relation to periglacial processes in the Sör Rondane Mountains, East Antarctica.
Matsuoka, N., et al, NIPR Symposium on Antarctic Geosciences, Proceedings. No.4, Tokyo, National Institute of Polar Research, 1990, p.55-66, 11 refs.
Moriwaki, K., Iwata, S., Hirakawa, K.
Periglacial processes, Frost heave, Freeze thaw cycles, Thaw depth, Antarctica - Sör Rondane Mountains.
Rock and soil temperatures were observed on some nunataks in the Sör Rondane Mountains during 1985-1989. Three different types of automatic recorders made it possible to collect the temperature data at 1- to 4 h intervals throughout the year. Multiple freeze-thaw events were recorded on many bedrock surfaces and in soil surface layers during the summer season. The number of freeze-thaw cycles is comparable to those in mid-latitude alpine environments where the frost action, including frost weathering, heave and creep, is regarded as the prevailing geomorphic process. Geomorphic change by the frost action, however, is believed to be insignificant in most of the Sör Rondane Mountains, because the water content of the ground is generally too low. The frost action may be effective only on the ground with a fairly high moisture content due to snow spray as well as with frequent freeze-thaw cycles. (Auth.)

45-1530
Seismic observation with local telemetry network around Syowa Station, East Antarctica (2).
Akamatsu, J., et al, NIPR Symposium on Antarctic Geosciences, Proceedings. No.4, Tokyo, National Institute of Polar Research, 1990, p.90-99, 12 refs. For part 1 see 18L-41540.
Ichikawa, N., Kaminuma, K.
Earthquakes, Icequakes, Seismic surveys, Antarctica - Lützow-Holm Bay, Antarctica - Ongul Island.
A local telemetry seismic network was established around Showa Station to study local seismicity and wave characteristics in the Lützow-Holm Bay region. More than 14,000 events were recorded during the period from June 1987 through Jan. 1989. Most of them were icequakes, though 104 teleseisms and 9 local earthquakes were identified. Local earthquakes of magnitude ranging from -1 to 3 occurred in the coastal and offshore regions of the continent. No earthquakes with M larger than 2 seemed to occur within 500 km under the continent. The locations of local earthquakes are discussed in relation to possible faults inferred from surface geology and submarine topography. Locations of icesheets of sea ice were examined to confirm the velocity model. Icesheets occurred mainly in the boundary area between the multi-year ice and the first-year ice. (Auth.)

45-1531
Chemical and isotopic characteristics of ice from an ice-wedge in Seymour Island (Isla Vcom. Marambio), Antarctic Peninsula region (1).
Kato, K., et al, NIPR Symposium on Antarctic Geosciences, Proceedings. No.4, Tokyo, National Institute of Polar Research, 1990, p.181-190, 6 refs.
Corte, A.M., Fukuda, M.
Ice wedges, Chemical analysis, Ice composition, Antarctica - Seymour Island.
Chemical analyses of ice samples from ice wedges and ice-wedge casts found in ice free areas of Seymour I. are discussed. Results show that concentrations and composition of chemicals vary significantly between the upper and lower portion of the ice body. It is concluded that this might provide useful information about the origins and formation processes of ice wedges.

45-1532
Radiative thermophysics of snow and ice. [Radiatsionnaia teplofizika snega i l'da].
Krass, M.S., et al, Leningrad, Gidrometeoizdat, 1990, 260p., In Russian with English summary and table of contents. 143 refs.
Merzlikin, V.G.
Snow physics, Light scattering, Water temperature, Mathematical models, Ice physics, Heat transfer, Snow optics, Ice optics, Thermal regime, Ice cover, Snow cover, Extraterrestrial ice, Ice sublimation, Sublimation, Lakes, Ablation, Heat balance, Mars (planet), Ice air interface, Snow air interface, Antarctica - Vanda, Lake.
The authors present a working theory of the radiative thermophysics of snow and ice. Optical and physical models for different types of snow and ice were studied. The models take into account snow and ice-atmosphere interaction by means of convective heat transfer, solar flux, and long-wavelength reradiation. A chapter is devoted to the thermophysics of antarctic lakes, especially Lake Vanda. (Auth. mod.)

45-1533
Heat transfer when drilling in permafrost. [Teploobmen pri burenii merzlykh porod].
Sedov, V.T., Leningrad, Nedra, 1990, 126p., In Russian. 79 refs.
Permafrost heat transfer, Thermal regime, Rheology, Rock drilling, Frozen rock temperature, Analysis (mathematics).

45-1534
Engineering geology of the USSR; shelves of the USSR. [Inzhenernaia geologiia SSSR; shel'fy SSSR].
Dzhanelidzhgava, K.I., ed, Moscow, Nedra, 1990, 239p., In Russian. 52 refs.
Komarov, I.S., ed, Neizvestnov, I.A.V., ed.
Glacial deposits, Engineering geology, Marine geology, Bottom sediment, Quaternary deposits, Cryogenic structures, Geologic processes, Arctic Ocean.

45-1535
Subglacial boundary-layer regelation mechanism.
Shoemaker, E.M., *Journal of glaciology*, 1990, 36(124), p.263-268, 32 refs.
Glacier ice, Regelation, Glacier beds, Boundary layer, Basal sliding, Analysis (mathematics), Ice water interface, Subglacial observations.

45-1536
Boudinage: a source of stratigraphic disturbance in glacial ice in central Greenland.
Cunningham, J., et al, *Journal of glaciology*, 1990, 36(124), p.269-272, 16 refs.
Waddington, E.D.
Glacier ice, Hydrodynamics, Ice models, Ice deformation, Ice cores, Accuracy, Stratigraphy, Shear strain, Greenland.

45-1537
Digital terrain models as a tool for glacier studies.
Rentsch, H., et al, *Journal of glaciology*, 1990, 36(124), p.273-278, 16 refs.
Welsch, W., Heipke, C., Miller, M.M.
Glacier surfaces, Models, Photogrammetry, Glacier flow, Glacier surveys, Data processing, Mapping, Topographic features, United States - Alaska.

45-1538
Ice-marginal depositional processes in a polar maritime environment, Vestfold Hills, Antarctica.
Fitzsimons, S.J., *Journal of glaciology*, 1990, 36(124), p.279-286, 37 refs.
Glacial deposits, Sediment transport, Ice edge, Moraines, Glacier ablation, Climatic factors, Antarctica - Vestfold Hills.
This study investigates the processes of ice-marginal sedimentation in Vestfold Hills. Most debris is released from the ice when basal and englacial debris bands become warped and reach the surface of the glacier, and where the debris bands are exposed by ablation of the ice surface. Once released, the debris is redistributed in the ice-marginal area by depositional processes that are controlled by the availability of water. During the short summer melt water from snow and ice saturates

the newly released debris and causes sediment flows and other mass-movement deposits. Melt-out and sublimation tills form after the layer of debris on the moraines is consolidated and melting rates decrease. When the thickness of deposits on the surface of ice-cored moraines reaches or exceeds the depth of summer thawing, the ice core no longer melts and the moraines become semi-permanent features. The sediments and land forms of the ice-marginal area closely resemble those formed by sub-polar glaciers with a complex thermal regime, and are unlike those that form at the margins of dry-based polar glaciers. Although glacier thermal regime is understood to be a major control on debris dispersal and processes of glacial sedimentation, the evidence from Vestfold Hills suggests that the primary control is the climate of the glacier terminus area. (Auth.)

45-1539

Hot-water drilling and bore-hole closure in cold ice.

Humphrey, N., et al, *Journal of glaciology*, 1990, 36(124), p.287-298, 17 refs.

Echelmeyer, K.A.

Ice sheets, Boreholes, Thermal drills, Freezing, Countermeasures, Hydraulic jets, Stefan problem, Antifreezes.

Drilling bore holes in deep, cold ice masses by hot-water methods and maintaining these holes with sufficient diameter to allow down-hole experimentation poses a major obstacle to the investigation of conditions beneath ice sheets and ice streams. Closure of the water-filled holes by refreezing is the dominant difficulty. In this paper, calculations of heat transfer from the drilling system to the ice and the subsequent time-dependent motion of the phase boundary defining the bore-hole wall are described. Results are presented with the view of optimizing the bore-hole radius at depth for a fixed drill performance and a variable rate of drilling. Calculation of melting/refreezing rates at the bore-hole wall requires the use of a one-dimensional, time-dependent numerical heat-flow model with a distorting mesh which follows the changing hole size. The delay of hole closure is discussed with a view to keeping holes open long enough to allow instruments to be lowered to the glacier bed, while realizing that drilling-system performance may be marginal because of logistical and/or expenditure constraints. The relative merits of drilling a large hole, which is very time consuming with a small drill, and the use of water-soluble antifreezes, which have a history of creating plugs of ice slush, are discussed. A method of creating a stable hole filled with antifreeze in which ice slush does not occur is described. The recent application of these theoretical ideas to the planning and implementation of successful hot-water drilling programs in Antarctica and Greenland is also presented. (Auth.)

45-1540

Correction of air-content measurements in polar ice for the effect of cut bubbles at the surface of the sample.

Martinerie, P., et al, *Journal of glaciology*, 1990, 36(124), p.299-303, 10 refs.

Lipenkov, V.IA., Raynaud, D.

Glacier ice, Bubbles, Ice sampling, Accuracy, Ice composition, Ice density, Clathrates.

45-1541

Laboratory simulations of glacial abrasion: comparison with theory.

Iverson, N.R., *Journal of glaciology*, 1990, 36(124), p.304-314, 34 refs.

Glacier ice, Glacier beds, Sliding, Abrasion, Simulation, Shear stress, Glacier friction.

45-1542

O-18 concentrations in sea ice of the Weddell Sea, Antarctica.

Lange, M.A., et al, *Journal of glaciology*, 1990, 36(124), MP 2807, p.315-323, 34 refs.

Schlosser, P., Ackley, S.F., Wadhams, P., Dieckmann, G.S.

Sea ice distribution, Snow ice, Oxygen isotopes, Ice growth, Snow cover effect, Ice composition, Ice cover thickness, Ice formation indicators, Antarctica--Weddell Sea.

Data are presented on ice texture, salinity, and *delta*O 18 obtained from identical sections of ice cores during the Winter Weddell Sea Project 1986 on RV *Polarstern* from July through Aug. 1986, in the longitude range between 5W and 7E. No uniquely definable relationship between *delta*O-18 values and ice texture in a particular section is found. However, most of the snow ice as well as some sections of frazil ice are found to have negative *delta*O-18 concentrations, due to varying degrees of admixtures of meteoric ice (snow) and sea-water during formation of snow ice. In contrast to common assumptions, these results seem to indicate that a snow cover contributes positively to sea-ice growth rather than slowing down the overall growth rate. Based on a simple model, the contributions of meteoric ice (mean of 8 +/- 3‰) and the combined meteoric ice/sea-water fraction (a minimum of 7 +/- 6‰) to the total ice thickness for the majority of the sampled floes are estimated. Although this is only a moderate contribution to the overall mass balance, in the absence of congelation growth it nevertheless enhances ice growth in general. This hypothesis is independently supported by snow- and ice-thickness data which demonstrate that the depression of the snow/ice interface below the water line (i.e. a negative freeboard) and the formation of snow ice is a common occurrence in the Weddell Sea. Therefore, it is hypothesized that the major part of the observed apparent increase in ice thickness between the inbound and outbound tracks of WWSP'86 may not be derived from "regular", thermodynamically driven congelation growth, but rather from the snow-ice component in floes of the Weddell Sea. (Auth. mod.)

45-1543

Flow laws for glacier ice: comparison of numerical predictions and field measurements.

Van der Veen, C.J., et al, *Journal of glaciology*, 1990, 36(124), p.324-339, 65 refs.

Whillans, I.M.

Glacier flow, Ice deformation, Ice creep, Boreholes, Ice mechanics, Analysis (mathematics).

45-1544

Modern pollen spectrum from Dye 3, south Greenland ice sheet.

Bourgeois, J.C., *Journal of glaciology*, 1990, 36(124), p.340-342, 8 refs.

Ice sheets, Ice composition, Pollen, Firn, Sampling, Distribution, Greenland.

45-1545

Thermal expansion coefficients for sea ice.

Johnson, J.B., et al, *Journal of glaciology*, 1990, 36(124), MP 2808, p.343-349, 26 refs.

Metzner, R.C.

Sea ice, Thermal expansion, Ice volume, Analysis (mathematics), Thermal analysis, Temperature effects, Ice thermal properties, Salinity.

Coefficients of thermal linear expansion were determined for sea ice using a Michelson interferometer. Over a temperature range of -4 to -15 C, the coefficients varied from .000045 to .000054/C for ice with a salinity of 2 ppt, and from .000033 to .000053/C for ice with a salinity of 4 ppt. Initially, warming the sea ice resulted in coefficients that were the same as those for fresh-water ice, within the limits of experimental error. Subsequent sea-ice cooling resulted in coefficients that were initially lower than those for fresh-water ice, but that asymptotically approached the coefficient values for fresh-water ice at colder temperatures. On the second warming and cooling cycle, the coefficients of thermal linear expansion exhibited hysteresis and a decrease in magnitudes. It is also shown that Pettersson's (1883) and Malmgren's (1927) measurements of the thermal volume expansion of sea ice were the result of phase transitions that caused brine expulsion, when air-free sea ice was cooled, and internal porosity increases, when sea ice was warmed. These results indicate that Pettersson's and Malmgren's measurements of the thermal volume expansion of sea ice are in error. Consequently, theoretical descriptions based on their results are incorrect. The results for the initial sea-ice warming cycle do agree with Cox's (1983) analysis.

45-1546

Recent change in ice thickness in Windless Bight, Ross Ice Shelf, Antarctica?.

Delisle, G., *Journal of glaciology*, 1990, 36(124), p.350-351, 9 refs.

Ice shelves, Floating ice, Ice cover thickness, Periodic variations, Radar echoes, Antarctica—Ross Ice Shelf.

Ice thickness data sets derived at two different periods, the first in the 1960s and the second in 1985, in Windless Bight, Ross Ice Shelf, are compared. The earlier set was based on both seismic and radar soundings, while the later included only radar soundings. While the comparison indicates that the ice shelf has thinned in the last twenty-five years, the results are equivocal due to uncertainty concerning the possibility that brine layers within the ice shelf have, by absorbing radio waves, distorted reflectivity data. This occurrence, however, is considered unlikely. Possible mechanisms suggested to account for ice thinning include bottom melting, reduction in the flow velocity of Terror Glacier, and geothermal heating from volcanic activity, which would also alter glacier velocities.

45-1547

Vapor-pressure dependence on temperature in models of snow metamorphism.

Colbeck, S.C., *Journal of glaciology*, 1990, 36(124), MP 2809, p.351-352, 14 refs.

Metamorphism (snow), Vapor pressure, Temperature effects, Mathematical models, Heat transfer.

45-1548

Extraordinary melt-water run-off near Søndre Strømfjord, West Greenland.

Russell, A.J., *Journal of glaciology*, 1990, 36(124), p.353, 4 refs.

Glacier melting, Glacial rivers, River flow, Runoff, Water retention, Greenland.

45-1549

Comments on "6000-year climate records in an ice core from the Höghetta ice dome in northern Spitsbergen".

Dowdeswell, J.A., et al, *Journal of glaciology*, 1990, 36(124), p.353-356, 17 refs. For article being commented on see 44-4167

Drewry, D.J., Simões, J.C.

Ice cores, Drill core analysis, Paleoclimatology, Ice composition, Norway--Spitsbergen.

45-1550

Estimates of shock wave attenuation in snow.

Johnson, J.B., *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, Oct. 1990, CR 90-08, 14p., ADA-230 180, 8 refs.

Attenuation, Shock waves, Snow mechanics, Snow physics, Snow compaction, Mathematical models.

A simple momentum model, assuming that snow compacts to its final density at negligible stress, is used to estimate shock wave attenuation in snow. Four shock loading situations are examined: a one-dimensional pressure impulse of finite duration and instantaneously applied pressure impulses for one-dimensional, cylindrical and spherical shock geometries. Calculations show that while a finite-duration impulse is being applied, the shock pressure in snow is determined by the impulse pressure-time profile. After the pressure impulse has been applied, the one-dimensional shock pressure decay is the same as for an instantaneously applied pressure impulse and is proportional to the inverse square of the shock propagation distance. Hence, finite-duration pressure impulses delay the onset of shock attenuation in snow. This can result in more pressure attenuation near a shock source, where the positive phase duration of the shock is short, compared to shock waves farther from a source. Cylindrical waves have a maximum decay that is proportional to the inverse of the propagation radius to the fourth power, and spherical waves have a maximum decay that is proportional to R exp-6. Amplitude decay for cylindrical and spherical shock waves can vary from (R-R(0)exp-2, when (R-R(0)<<R(0) (where R(0) is the interior radius over which a pressure impulse per unit area is applied), to their maximum decay.

45-1551

Ice-on-coil diurnal ice storage cooling system for a barracks/office/dining hall facility at Yuma Proving Ground, AZ.

Sohn, C.W., et al, *U.S. Army Corps of Engineers. Construction Engineering Research Laboratory. Technical report*, Sep. 1990, E-90/13, 49p., 11 refs.

Cler, G.L., Kedl, R.J.

Cooling systems, Ice (water storage), Electric power, Ice makers, Cost analysis, Performance, Design criteria.

45-1552

Dynamics of the Laurentide Ice Sheet in Hudson Bay, Canada.

Josenhans, H.W., et al, *Marine geology*, 1990, Vol.92, p.1-26, Refs. p.24-26.

Zevenhuizen, J.

Glacial geology, Glacial erosion, Glacier oscillation, Seismic surveys, Ocean bottom, Quaternary deposits, Ice scoring, Ice sheets, Canada—Hudson Bay.

45-1553

Self-organization in freezing soils: from microscopic ice lenses to patterned ground.

Hallet, B., *Canadian journal of physics*, 1990, Vol.68, p.842-852, With French summary. 75 refs.

Soil freezing, Soil patterns, Ice growth, Surface structure, Patterned ground, Ice lenses, Soil mechanics.

45-1554

Ice power.

Scott, D., *Popular science*, Apr. 1989, 234(4), p.154.

Vehicles, Engines, Thermal expansion, Ice pressure, Freezing, Hydraulics.

45-1555

Analysis of subscour stresses and probability of ice scour-induced damage for buried submarine pipelines. Summary report.

Comfort, G., et al, Canada. Department of Energy, Mines and Resources. Canada Oil and Gas Lands Administration, Ottawa, Canada, Mar. 1990, 30p., File No.0825-25-6-4, 6 refs.

Been, K.

Ice scoring, Marine geology, Sea ice, Offshore structures, Underground pipelines, Damage, Ocean bottom, Soil mechanics, Stresses, Statistical analysis, Petroleum industry, Performance, Ice solid interface, Computerized simulation.

45-1556

Analysis of subscour stresses and probability of ice scour-induced damage for buried submarine pipelines, Vol.1A and 1B. Database of key ice scour parameters, main report and appendices.

Comfort, G., et al, Canada. Department of Energy, Mines and Resources. Canada Oil and Gas Lands Administration, Ottawa, Canada, Feb. 1990, 106p. + 324p., File No.0825-25-6-4, 16 refs. + 13 refs.

Gilbert, C., Ferregut, C.

Sea ice, Ice scoring, Offshore structures, Underground pipelines, Damage, Statistical analysis, Ocean bottom, Marine geology, Subsurface investigations, Seismic reflection, Soil patterns, Models.

45-1557
Analysis of subscour stresses and probability of ice scour-induced damage for buried submarine pipelines, Vol.2. Deterministic model of ice-soil-pipe interaction.
Been, K., et al, Canada. Department of Energy, Mines and Resources. Canada Oil and Gas Lands Administration, Ottawa, Canada, Feb. 1990, 204p., File No.0825-25-6-4, 103 refs.
Palmer, A., Comfort, G.
Sea ice, Ice scoring, Offshore structures, Underground pipelines, Ice solid interface, Damage, Computerized simulation, Computer programs, Ice loads, Trenching, Deformation, Ocean bottom, Soil strength, Design.

45-1558
Analysis of subscour stresses and probability of ice scour-induced damage for buried submarine pipelines, Vol.3. Probabilistic modelling.
Murray, A., et al, Canada. Department of Energy, Mines and Resources. Canada Oil and Gas Lands Administration, Ottawa, Canada, Mar. 1990, 45p. + appends., File No.0825-25-6-4, 21 refs.
Ferregut, C., Ritch, R.
Sea ice, Ice scoring, Offshore structures, Underground pipelines, Damage, Computerized simulation, Trenching, Mathematical models, Computer programs, Marine geology.

45-1559
Analysis of subscour stresses and probability of ice scour-induced damage for buried submarine pipelines, Vol.4. Large scale laboratory tests of seabed scour.
Poorooshasb, F., Canada. Department of Energy, Mines and Resources. Canada Oil and Gas Lands Administration, Ottawa, Canada, Mar. 1990, 168p. File No.0825-25-6-4.
Ice scoring, Mechanical tests, Simulation, Ice models, Soil mechanics, Ice pressure, Shear properties, Ocean bottom, Icebergs, Deformation.

45-1560
Twenty-seventh Soviet Antarctic Expedition. Studies of the 1981/82 season. [Dvadtsat' sed'maia Sovetskaia antarkticheskaia ekspeditsiia. Sezonnye issledovaniia 1981/82 gg.],
Sovetskaia antarkticheskaia ekspeditsiia, *Sovetskaia antarkticheskaia ekspeditsiia. Trudy*, 1990, Vol.86, 177p., In Russian. Refs. passim. For individual papers see 45-1561 through 45-1565 or F-43345 through F-43348, F-43350, and J-43349.
Maksutov, D.D., ed.
Expeditions, Ice navigation, Polar region.
This volume contains information on observations and results of scientific efforts carried out by the 27th Soviet Antarctic Expedition in the 1981-1982 season on the antarctic continent and surrounding waters. Seasonal activities and organization of the expedition, including logistic support and contact with non-Soviet expeditions, are outlined in the first part of the book. The second part consists of 6 individual papers giving the scientific results of projects in oceanography and glaciology.

45-1561
Glaciological and geocryological investigations on Novolazarevskaya Station. [Gliatsiologicheskie i geokriologicheskie issledovaniia na stantsii Novolazarevskoĭ],
Vtiurin, B.I., *Sovetskaia antarkticheskaia ekspeditsiia. Trudy*, 1990, Vol.86, p.93-104, In Russian.
Ice surveys, Lake ice, Ice shelves, Geocryology, Antarctica—Novolazarevskaya Station, Antarctica – Schirmacher Ponds.
Field investigations carried out by SAE 27 in Schirmacher Ponds Nov. 1981 to Mar. 1982 are reviewed. Detailed discussion covers shelf ice motion and melting, continental and lacustrine ice structure, glacial deposits and evolution, dynamics of seasonal freezing and thawing of rocks, cryogenic processes and evolution, and cryogenic structure of rocks. Geocryological observations were mostly made on the ground of Novolazarevskaya Station.

45-1562
Mechanism of frazil ice formation in the Antarctic. [O mekhanizme obrazovaniia vnutrivodnogo l'da v Antarktike],
Korotkov, A.I., *Sovetskaia antarkticheskaia ekspeditsiia. Trudy*, 1990, Vol.86, p.105-116, In Russian. 29 refs.
Ice formation, Frazil ice, Water temperature, Heat transfer.
Due to problems related to studies of frazil ice formation, a classification of types of frazil ice, based on the depth of its formation, is proposed. Considering one of the possible formation and development variations of the process observed in Alasheyev Bight, the author points out that the cause of frazil ice formation is the supercooling of ocean water, and that the primary cause of water supercooling is the intense heat release of open-surface waters in the fall and winter seasons.

45-1563
Variability of natural conditions in Alasheyev Bight. [Izmenchivost' prirodnykh usloviĭ v zalive Alasheeva],
Korotkov, A.I., *Sovetskaia antarkticheskaia ekspeditsiia. Trudy*, 1990, Vol.86, p.117-133, In Russian. 19 refs.
Fast ice, Polynyas, Ice conditions, Ice formation, Ice breakup, Sea ice, Antarctica—Alasheyev Bight.
Basic elements of the sea ice regime in Alasheyev Bight, covering the period from 1962 to 1986, are summarized and tabulated data are presented. The variability and peculiarity of ice processes in the Bight are linked to the development of stationary polynyas; this development occurs in 3 stages and is related to atmospheric circulation. It is found that polynyas are an obstacle to the formation and growth of the ice cover in the studied region.

45-1564
Large-scale features of ice cover formation in the Weddell gyre region. [Krupnomashtabnye cherty formirovaniia ledianogo pokrova v oblasti krugovorota Ueddella],
Bagriantsev, N.V., *Sovetskaia antarkticheskaia ekspeditsiia. Trudy*, 1990, Vol.86, p.134-151, In Russian. 22 refs.
Sea ice distribution, Ice formation, Air water interactions, Polynyas, Antarctica—Weddell Sea.
Presented are data on the yearly cycle of ice cover formation in the Weddell gyre area during Mar. 1983-Mar. 1984, and on the ice edge position and the distribution of polynyas in the Weddell Sea during 1974-1976. Also presented are data evaluating the heat transfer necessary for the ice cover formation in the eastern portion of the Weddell gyre, an area free of ice during the months of May and June. The cause of ice cover weakening in that region is discussed, relating features of large-scale circulation of the southern ocean and the atmosphere over it.

45-1565
Structure and dynamics of the Pacific ice massif. [O strukture i dinamike Tikookeanskogo ledianogo massiva],
Krivoshein, V.K., *Sovetskaia antarkticheskaia ekspeditsiia. Trudy*, 1990, Vol.86, p.165-174, In Russian. 6 refs.
Ice surveys, Sea ice distribution, Ice edge, South Pacific Ocean, Antarctica—West Antarctica.
Data on Pacific Ocean ice cover conditions, ice edge position and sea ice distribution during Jan., Feb. and Mar. of 1981 are discussed and presented on graphs. In mid Jan., the surface area of the Pacific ice massif measured 400 thousand sq. km., surpassing the average measurements typical for that time of year. Similarly, toward the end of Feb. and beginning of Mar., the ice covered a surface of 1 million sq. km., against the average measurements of 150 thousand sq. km. in former years.

45-1566
Determining loads from adhered ice on a support column system when measuring the water level. [Opredelenie nagruzok ot primerzshego l'da na sistemu opornykh kolonn pri izmerenii urovnia vody],
Shkhinek, K.N., et al, Gidrotekhnicheskie sooruzheniia. Mezhvuzovskiĭ sbornik nauchnykh trudov (Hydraulic structures. Interuniversity collection of scientific papers). Edited by N.G. Khrapatyĭ, Vladivostok, Dal'nevostochnyĭ gosudarstvennyĭ universitet, 1987, p.76-80, In Russian. 4 refs.
Kurbanov, E.M , Matskevich, D.G.
Piles, Ice loads, Pile structures, Hydraulic structures, Ice adhesion, Ice solid interface, Water level, Measurement, Analysis (mathematics).

45-1567
Studying ice cover creep under loads distributed along a strip. [Issledovanie polzuchesti ledianogo pokrova pod deĭstviem nagruzki, raspredelennoĭ po polose],
Kreĭchman, M.M., et al, Gidrotekhnicheskie sooruzheniia. Mezhvuzovskiĭ sbornik nauchnykh trudov (Hydraulic structures. Interuniversity collection of scientific papers). Edited by N.G. Khrapatyĭ, Vladivostok, Dal'nevostochnyĭ gosudarstvennyĭ universitet, 1987, p.81-89, In Russian. 7 refs.
Goncharenko, V.M., Ptukhin, F.I.
Ice cover, Ice creep, Loads (forces), Analysis (mathematics).

45-1568
Allowing for ice conditions in designing construction associated with offshore oil and gas deposits. [Uchet ledovykh usloviĭ pri proektorivanii obustroĭstva morskikh neftegazovykh mestorozhdeniĭ],
Truskov, P.A., Gidrotekhnicheskie sooruzheniia. Mezhvuzovskiĭ sbornik nauchnykh trudov (Hydraulic structures. Interuniversity collection of scientific papers). Edited by N.G. Khrapatyĭ, Vladivostok, Dal'nevostochnyĭ gosudarstvennyĭ universitet, 1987, p.89-94, In Russian. 10 refs.
Design criteria, Offshore structures, Ice loads, Ice solid interface, Hummocks.

45-1569
Studying the equivalent cohesion of sea ice. [Issledovanie ekvivalentnogo stsepleniia morskogo l'da],
Zanegin, V.G., Gidrotekhnicheskie sooruzheniia. Mezhvuzovskiĭ sbornik nauchnykh trudov (Hydraulic structures. Interuniversity collection of scientific papers). Edited by N.G. Khrapatyĭ, Vladivostok, Dal'nevostochnyĭ gosudarstvennyĭ universitet, 1987, p.94-101, In Russian. 3 refs.
Sea ice, Cohesion, Ice physics.

45-1570
Characteristics of calculating ice-pressure resistant hydraulic structures with cyclically varying ice loads. [Osobennosti rascheta ledostoĭkikh gidrotekhnicheskikh sooruzheniĭ na tsiklicheski izmeniaiushchuiusia ledovuiu nagruzku],
Liubimov, V.S., et al, Gidrotekhnicheskie sooruzheniia. Mezhvuzovskiĭ sbornik nauchnykh trudov (Hydraulic structures. Interuniversity collection of scientific papers). Edited by N.G. Khrapatyĭ, Vladivostok, Dal'nevostochnyĭ gosudarstvennyĭ universitet, 1987, p.102-107, In Russian. 9 refs.
Khrapatyĭ, N.G.
Ice pressure, Ice loads, Hydraulic structures, Ice solid interface, Nomographs.

45-1571
Engineering geology of the USSR: Western Siberian and Turan plates. [Inzhenernaia geologiia SSSR: Zapadno-Sibirskaia i Turanskaia plity],
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Zakharov, IU.F., ed, Khasanov, A.S., ed.
Alluvium, Engineering geology, Plates, Quaternary deposits, Glacial deposits, Geocryology, Origin, Seasonal freeze thaw, Snow cover, Thaw depth, Frozen rock temperature.

45-1572
Effect of fires on frozen soils. [Vliianie pozharov na merzlotnye pochvy],
Tarabukina, V.G., et al, Novosibirsk, Nauka, 1990, 119p., In Russian. Refs. p.109-119.
Savvinov, D.D.
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45-1573
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Dmitriev, A.A., et al, Leningrad, Gidrometeoizdat, 1989, 253p., In Russian. 88 refs.
Sel'tser, P.A., Kondratiuk, S.I., Kuchin, V.A.
Polar regions, Weather forecasting, Synoptic meteorology, Atmospheric circulation.

45-1574
Water-regulating role of taiga forests. [Vodoreguliruiushchaia rol' taezhnykh lesov],
Rubtsov, M.V., et al, Moscow, Agropromizdat, 1990, 222p., In Russian. 144 refs.
Deriugin, A.A., Salmina, IU.N., Gurtsev, V.I.
Taiga, Snow cover, Water balance, Runoff, Forest soils, Freeze thaw cycles, Soil water, Soil freezing, Ground thawing, Snow water content.

45-1575
Quaternary alluvial fans in the Karakoram Mountains.
Derbyshire, E., et al, Alluvial fans: a field approach. Edited by A.H. Rachocki and M. Church, New York, John Wiley & Sons, 1990, p.27-53, 55 refs.
Owen, L.A.
Quaternary deposits, Landforms, Glacial deposits, Glaciers, Sediments, Geomorphology, Kashmir—Karakoram Mountains.

45-1576
Ice marginal ramps and alluvial fans in semiarid mountains: convergence and difference.
Kuhle, M., Alluvial fans: a field approach. Edited by A.H. Rachocki and M. Church, New York, John Wiley & Sons, 1990, p.55-68, 40 refs.
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45-1577
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Landforms, Geomorphology, Glacial deposits, Glaciers, Paleoclimatology, Japan, South Korea.

45-1578
Evolution of the alluvial fans of the Alföld.
Borsy, Z., Alluvial fans: a field approach. Edited by A.H. Rachocki and M. Church, New York, John Wiley & Sons, 1990, p.229-246, 28 refs.
Landforms, Glacial deposits, Quaternary deposits, Sediments, Hydrography, Floodplains, Pleistocene.

45-1579
Leba River alluvial fan and its palaeogeomorphological significance.
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Landforms, Geomorphology, Glacial deposits, Paleoclimatology, Sediments, Rivers, Valleys, Poland--Leba River.

45-1580
Investigations of a winter mountain storm in Utah. Part 2: Mesoscale structure, supercooled liquid water development, and precipitation processes.
Sassen, K., et al, *Journal of the atmospheric sciences*, June 1, 1990, 47(11), p.1323-1350, 21 refs.
Storms, Precipitation (meteorology), Supercooled clouds, Remote sensing, Snow pellets, Topographic effects, Radar echoes, Reflectivity.

45-1581
Moisture in membrane roofs.
Tobiasson, W., *Custom builder*, Aug. 1989, MP 2811, p.31-32, 37-38.
Roofs, Moisture, Humidity, Vapor barriers, Construction materials.

45-1582
Climatic factors in the stability of snow cover in Kazakhstan territory. [Klimaticheskie osobennosti ustoichivogo snezhnogo pokrova na territorii Kazakhstana],
Murzabekova, U.N., *Alma Ata. Kazakhskiĭ nauchno-issledovatel'skiĭ gidrometeorologicheskiĭ institut. Trudy*, 1990, Vol.106, p.88-95, In Russian. 3 refs.
Snow cover stability, Climatic factors.

45-1583
Anomalies in dates of formation and deterioration of the stable snow cover in Kazakhstan. [Ob anomal'nosti dat ustanovleniia i razrusheniia ustoĭchivogo snezhnogo pokrova v Kazakhstane],
Murzabekova, U.N., *Alma Ata. Kazakhskiĭ nauchno-issledovatel'skiĭ gidrometeorologicheskiĭ institut. Trudy*, 1990, Vol.106, p.95-99, In Russian. 8 refs.
Snow cover stability, Air temperature, Analysis (mathematics).

45-1584
Glaciers of Georgia. [Ledniki Gruzii],
Gobedzhishvili, R.G., Tbilisi, Metsnieba, 1989, 128p., In Russian. Refs. p.125-128.
Glaciers, Glacier surveys, Glaciation, River basins, Glacial rivers, Glacier oscillation, USSR--Georgia.

45-1585
Using scintillation at 2 wavelengths to measure path-averaged heat fluxes in free convection.
Andreas, E.L., *Boundary-layer meteorology*, 1991, Vol.54, MP 2812, p.167-182, 37 refs.
Scintillation, Boundary layer, Heat flux, Convection, Measurement, Analysis (mathematics).
Local free convection scaling is one of the obvious triumphs of boundary-layer similarity theory. In free convection, there is no dynamic velocity scale, the sensible and latent heat fluxes, therefore, scale directly with the temperature and humidity structure parameters. By using scintillation to measure the refractive index structure parameter at two electromagnetic (EM) wavelengths, the temperature and humidity structure parameters can be obtained and thus in effect measure path-averaged values of the sensible and latent heat fluxes. Here the author describes this so-called two-wavelength method for free convection, derives quantitative guidelines for optimizing the method, and evaluates its potential accuracy. The author shows that the two-wavelength method works best when one EM wavelength is in the visible or infrared region and the other is in the millimeter or radio region. When the Bowen ratio is between -5 and -0.1 or between 0.1 and 5, the expected accuracy of the measured fluxes is +/- 10-20%, typical of what is possible with eddy-correlation measurements. With the two-wavelength method, however, the fluxes represent spatial averages.

45-1586
Development of a simplified field method for the determination of TNT in soil.
Jenkins, T.F., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Nov. 1990, SR 90-38, 18p., ADA-230 182, 1 ref.
Explosives, Soil pollution, Ground water, Military operation.
A simple field method was developed for determining the concentration of 2,4,6 trinitrotoluene (TNT) in soil. The method involves extraction of the soil with acetone, generation of the red-colored Jackson-Meisenheimer anion by addition of potassium hydroxide and sodium sulfite, and measurement of color intensity at 540 nm using a battery-operated spectrophotometer. The method was shown to follow the Beer-Lambert law with linear calibration through an absorbance of 0.9 absorbance units, and was found to be both precise and accurate in tests with spiked soils, providing a detection limit of about 1 microgram/gram. The extraction step recovered a mean of 96% of the TNT recoverable by a more exhaustive laboratory extraction procedure. A comparison was made of concentration estimates from the field method with those from the standard RPHPLC laboratory procedure using a set of field-contaminated soils. An excellent correlation existed between the two when both 1,3,5-trinitrobenzene and TNT concentrations from the laboratory measurements were included. The method is susceptible to interference from a number of polynitroaromatic compounds including the following: 1,3,5-trinitribenzene (red), tetryl (orange), 2,6-dinitrotoluene (pinkish purple), 2,4-dinitrotoluene (blue) and 1,3-dinitrobenzene (purple). No color was observed for nitramine explosives, such as RDX or HMX, or nitrate esters such as nitroglycerine or pentaerythritol tetranitrate. The method was field tested at Umatilla Army Depot and found to provide a simple, rapid method for estimating TNT concentrations in the field. Concentration estimates from field analysis correlated well with laboratory analyses of the same samples.

45-1587
Calculating the duration of the effect of snow and constant loads when calculating the flexural strength of wooden structures. [Uchet dlitel'nosti deĭstviia snegovoĭ i postoiannoĭ nagruzok pri raschete progibov dereviannykh konstruktsiĭ],
Denesh, N.D., *Izvestiia vysshikh uchebnykh zavedeniĭ. Stroitel'stvo i arkhitektura*, July 1990, No.7, p.16-20, In Russian. 5 refs.
Loads (forces), Snow loads, Wooden structures, Flexural strength, Analysis (mathematics).

45-1588
Frozen ground areas formed in earth dams and their surroundings. [O merzlykh zonakh grunta, obrazuiushchikhsia v tele gruntovykh plotin i ikh primykaniĭ],
Belan, V.I., *Izvestiia vysshikh uchebnykh zavedeniĭ. Stroitel'stvo i arkhitektura*, Aug. 1990, No.8, p.74-79, In Russian. 3 refs.
Earth dams, Frozen ground, Thermal regime, Freeze thaw cycles.

45-1589
Climatic characteristics of the taiga in interior Alaska.
Slaughter, C.W., et al, Forest ecosystems in the Alaskan taiga: a synthesis of structure and function. (Ecological studies, 57). Edited by K. Van Cleve, F.S. Chapin III, P.W. Flanagan, L.A. Viereck, and C.T. Dyrness, New York, Springer-Verlag, 1986, p.9-21, 33 refs.
Viereck, L.A.
Taiga, Precipitation (meteorology), Climate, Soil temperature, Solar radiation, Forest ecosystems, Snow cover, Snowfall, United States--Alaska.

45-1590
Fire in taiga communities of interior Alaska.
Dyrness, C.T., et al, Forest ecosystems in the Alaskan taiga: a synthesis of structure and function. (Ecological studies, 57). Edited by K. Van Cleve, F.S. Chapin III, P.W. Flanagan, L.A. Viereck, and C.T. Dyrness, New York, Springer-Verlag, 1986, p.74-86, 21 refs.
Viereck, L.A., Van Cleve, K.
Taiga, Fires, Soil temperature, Permafrost, Forest soils, Forest ecosystems, United States--Alaska.

45-1591
Wind profiler and RASS measurements in the vicinity of lake-effect snowbands: some preliminary findings.
Penc, R.S., et al, Symposium on Meteorological Observations and Instrumentation, Seventh, New Orleans, LA, Jan. 14-18, 1991. Preprint papers, Boston, MA, American Meteorological Society, 1991, p.69-72, 5 refs.
Williams, S.R., Albrecht, B.A., Caiazza, R.
Snowstorms, Wind factors, Lake effects, Remote sensing, Weather forecasting, Synoptic meteorology, Precipitation (meteorology), Boundary layer.

45-1592
Design and operational characteristics of a heated radome for air motion measurement.
Brown, E.N., Symposium on Meteorological Observations and Instrumentation, Seventh, New Orleans, LA, Jan. 14-18, 1991. Preprint papers, Boston, MA, American Meteorological Society, 1991, p.134-139, 12 refs.
Radomes, Performance, Ice prevention, Design criteria, Airborne equipment, Electric heating.

45-1593
Airborne cryogenic frost-point hygrometer.
Spyers-Duran, P.A., Symposium on Meteorological Observations and Instrumentation, Seventh, New Orleans, LA, Jan. 14-18, 1991. Preprint papers, Boston, MA, American Meteorological Society, 1991, p.303-306, 8 refs.
Hygrometers, Freezing points, Cryogenics, Temperature control, Airborne equipment, Atmospheric composition.

45-1594
Development of a cryogenic dew/frost point hygrometer.
Buck, A.L., et al, Symposium on Meteorological Observations and Instrumentation, Seventh, New Orleans, LA, Jan. 14-18, 1991. Preprint papers, Boston, MA, American Meteorological Society, 1991, p.322-326, 7 refs.
Clark, R.
Hygrometers, Design, Cryogenics, Temperature control, Airborne equipment, Performance.

45-1595
Development of a freezing rain sensor for automated surface observing systems.
Starr, K.M., et al, Symposium on Meteorological Observations and Instrumentation, Seventh, New Orleans, LA, Jan. 14-18, 1991. Preprint papers, Boston, MA, American Meteorological Society, 1991, p.338-343, 2 refs.
Van Cauwenberghe, R.
Rain, Icing, Ice detection, Indicating instruments, Meteorological data, Precipitation (meteorology).

45-1596
Field test results on a precipitation occurrence and identification sensor.
Wiggins, W.L., et al, Symposium on Meteorological Observations and Instrumentation, Seventh, New Orleans, LA, Jan. 14-18, 1991. Preprint papers, Boston, MA, American Meteorological Society, 1991, p.348-351, 2 refs.
Sheppard, B.E.
Precipitation (meteorology), Indicating instruments, Detection, Snowfall, Radar, Data processing, Tests, Weather observations.

45-1597
Least-squares polynomial technique for discriminating between drops and graupel in 2D image records.
Czys, R.R., et al, Symposium on Meteorological Observations and Instrumentation, Seventh, New Orleans, LA, Jan. 14-18, 1991. Special sessions on laser atmospheric studies, Boston, MA, American Meteorological Society, 1991, p.J51-J55, 14 refs.
Petersen, M.S.
Raindrops, Snow pellets, Detection, Data processing, Classifications, Probes, Meteorological data.

45-1598
Retrieval of total precipitable water over high latitude regions using radiometric measurements near 90 and 183 GHz.
Wang, J.R., et al, Symposium on Meteorological Observations and Instrumentation, Seventh, New Orleans, LA, Jan. 14-18, 1991. Special sessions on laser atmospheric studies, Boston, MA, American Meteorological Society, 1991, p.J79-J84, 7 refs.
Boncyk, W.C., Dod, L.R., Sharma, A.K.
Radiometry, Aerial surveys, Water vapor, Scattering, Snow optics.

45-1599
Feature extraction from two-dimensional images using fractal analysis.
Baumgartner, D., Symposium on Meteorological Observations and Instrumentation, Seventh, New Orleans, LA, Jan. 14-18, 1991. Special sessions on laser atmospheric studies, Boston, MA, American Meteorological Society, 1991, p.J85-J87, 8 refs.
Clouds (meteorology), Ice crystal structure, Classifications, Analysis (mathematics), Probes.

45-1600
Use of mobile radiosonde systems to observe the environments of Lake Ontario winter storms.
Byrd, G.P., et al, Symposium on Meteorological Observations and Instrumentation, Seventh, New Orleans, LA, Jan. 14-18, 1991. Special sessions on laser atmospheric studies, Boston, MA, American Meteorological Society, 1991, p.J142-J145, 5 refs.
Weinbeck, R.S., Stamm, A.J., Ballentine, R.J., Chermack, E.F.
Snowstorms, Lake effects, Radio echo soundings, Weather forecasting, Precipitation (meteorology), Indicating instruments.

45-1601
Ozone and aerosol distributions measured by airborne lidar during the 1988 Arctic Boundary Layer Experiment.
Browell, E.V., et al, Symposium on Meteorological Observations and Instrumentation, Seventh, New Orleans, LA, Jan. 14-18, 1991. Special sessions on laser atmospheric studies, Boston, MA, American Meteorological Society, 1991, p.J242-J243, 2 refs.
Butler, C.F., Kooi, S.A.
Polar atmospheres, Atmospheric composition, Aerosols, Lidar, Aerial surveys.

45-1602
State standards index of the USSR, 1990. [Gosudarstvennye standarty SSSR. Ukazatel', 1990], Russia. Gosudarstvennyĭ komitet standartov, Moscow, Izdatel'stvo standartov, 1990, 4 vols., In Russian.
Standards.

45-1603
Determining estimation levels of snow cover. [Opredelenie raschetnogo urovnia snegovogo pokrova],
Kartashov, V.M., *Transportnoe stroitel'stvo*, Sep. 1990, No.9, p.4-5, In Russian.
Snow cover distribution, Snow depth, Analysis (mathematics).

45-1604
Geocryological forecasting during construction of a roadbed. [Geokriologicheskiĭ prognoz pri sooruzhenii zemlianogo polotna],
Tsernant, A.A., et al, *Transportnoe stroitel'stvo*, Sep. 1990, No.9, p.7-9, In Russian.
Bol'shakova, N.N., Lobanov, V.I.
Roadbeds, Construction, Forecasting, Geocryology.

45-1605
Ventilated passages for cooling frozen bearing ground. [Ventiliruemye kanaly dlia okhlazhdeniia vechnomerzlykh gruntov osnovaniia],
Kazarnovskiĭ, I.I., et al, *Transportnoe stroitel'stvo*, Sep. 1990, No.9, p.32-33, In Russian.
Kucheruk, A.V.
Ventilation, Foundations, Permafrost beneath structures.

45-1606
Standardizing the sustained deformation of frost-resistant concrete. [K normirovaniiu dlitel'nykh deformatsiĭ morozostoĭkogo betona],
Onina, M.M., *Transportnoe stroitel'stvo*, Sep. 1990, No.9, p.38-39, In Russian. 2 refs.
Frost resistance, Concrete freezing, Concrete admixtures.

45-1607
Estimation of sea ice type and concentration by linear unmixing of Geosat altimeter waveforms.
Chase, J.R., et al, *Journal of geophysical research*, Oct. 15, 1990, 95(C10), p.18,015-18,025, 23 refs.
Holyer, R.J.
Remote sensing, Sea ice distribution, Wave propagation, Height finding.

45-1608
Weddell-Scotia confluence in midwinter.
Muench, R.D., et al, *Journal of geophysical research*, Oct. 15, 1990, 95(C10), p.18,177-18,190, 20 refs.
Gunn, J.T., Husby, D.M.
Ocean currents, Hydrography, Sea ice.
The southern central Scotia Sea was sampled during June-Aug. 1988 with respect to temperature and salinity. Both drogued and ice-mounted drifters, tracked by Argos, were deployed in the region and yielded Lagrangian drift tracks of ice and water motion. The data substantiate past accounts of the region as dominated by eastward flow upon which a complex array of mesoscale features is superimposed. Weddell-Scotia Confluence Water was not detected, and the Scotia Front was not well defined. The region was one of intense mixing activity and primarily anticyclonic mesoscale features. Two such features, one an eddy and the other either an eddy or a meander in the Scotia Front, dominated the mesoscale field. Several smaller eddies, primarily anticyclonic and some having warm cores, were also detected. There was no evidence of deep convective mixing, and vigorous vertical mixing was limited to a 100 m-deep upper mixed layer. Vertical stability in the upper layers was enhanced by low-salinity water derived from melting ice. Temperature-salinity analyses show that winter water in the study region can be derived through isopycnal mixing between waters from the Scotia Sea and waters from the northwestern Weddell Sea. (Auth. mod.)

45-1609
Ross Ice Shelf: glaciology and geophysics.
Bentley, C.R., ed, *American Geophysical Union. Antarctic research series*, 1990, Vol.42, 126p., Refs. passim. For individual papers see F-43367 through F-43369 or 45-1610 through 45-1612.
Hayes, D.E., ed.
Ice shelves, Seismic surveys, Geophysical surveys, Antarctica—Ross Ice Shelf.
Papers 3, 4 and 5 are presented in this volume of "The Ross Ice Shelf: Glaciology and geophysics", dealing with seismic studies on the grid western half of the Ross Ice Shelf, seismic studies on the grid eastern half of the Ross Ice Shelf, and short refraction studies using an analytical curve-fitting technique, respectively.

45-1610
Seismic studies on the grid western half of the Ross Ice Shelf: RIGGS I and RIGGS II.
Robertson, J.D., et al, *American Geophysical Union. Antarctic research series*, 1990, Vol.42, Ross Ice Shelf: glaciology and geophysics, p.55-86, Refs. p.84-86.
Bentley, C.R.
Ice physics, Ice shelves, Ice cover thickness, Seismic surveys, Bottom topography, Antarctica—Ross Ice Shelf.
Airlifted geophysical surveys were carried out on the grid western half of the Ross Ice Shelf during the austral summers of 1973-1974 and 1974-1975, as part of the Ross Ice Shelf Geophysical and Glaciological Survey (RIGGS). Seismic reflection records were obtained at 76 stations, seismic long-refraction records at four stations, radar-sounding reflection records at 93 stations, and gravity measurements at 89 stations. The seismic results, supplemented by radar-sounding measurements of ice thickness, are discussed here. There is S wave velocity anisotropy in the firn that probably is caused by layered structure, but comparison between seismic and radar echo times shows no evidence of an average preferred orientation of crystallographic c axes in the body of the ice shelf. A complete listing of ice and water layer thicknesses and ocean bottom elevations is given. (Auth. mod.)

45-1611
Seismic studies on the grid eastern half of the Ross Ice Shelf: RIGGS III and RIGGS IV.
Albert, D.G., et al, *American Geophysical Union Antarctic research series*, 1990, Vol.42, MP 2813, Ross Ice Shelf: glaciology and geophysics, p.87-108, Refs. p.107-108.
Bentley, C.R.
Ice shelves, Ice cover thickness, Seismic surveys, Bottom topography, Ice physics, Seismic refraction, Antarctica—Ross Ice Shelf.
Seismic P wave refraction experiments at three locations on the Ross Ice Shelf during 1976-1977 (RIGGS III) and 1977-1978 (RIGGS IV) reveal that the velocity increases monotonically in the firn from about 500 m/s at the surface to about 3800 m/s at a depth of 60 m. Maximum P wave velocities measured at 4 locations on the ice shelf show a large range of values primarily indicative of lateral inhomogeneities, but perhaps also resulting from anisotropy. Water depths for 89 additional stations were determined using seismic reflections from the ocean floor, together with ice thicknesses measured by radar and seismic techniques. Systematic differences that appear between ice thicknesses measured by the two techniques on RIGGS IV but not on RIGGS III most likely reflect an unrecognized systematic error in measurement. (Auth. mod.)

45-1612
RIGGS III: seismic short-refraction studies using an analytical curve-fitting technique.
Kirchner, J.F., et al, *American Geophysical Union. Antarctic research series*, 1990, Vol.42, Ross Ice Shelf: glaciology and geophysics, p.109-126, Refs. p.125-126.
Bentley, C.R.
Seismic refraction, Seismic velocity, Ice shelves, Anisotropy, Antarctica—Ross Ice Shelf.
Several short-refraction profiles completed on the Ross Ice Shelf during the 1976-1977 summer season (RIGGS III) have been analyzed and interpreted. Instead of estimating slopes from the travel time curves graphically, the travel times were fit with an analytical function of a hybrid exponential and linear form by means of a nonlinear regression computer program. Differentiation of the resulting expression for the best fitting curve produces the velocity-distance function. Comparisons of P waves and S waves (both horizontally and vertically polarized) along different azimuthal directions at 3 sites indicate substantial anisotropy in at least the upper 30-40 m, and show further that transverse isotropy cannot serve as a good model for this region. Velocity gradients calculated and fit segmentally by exponential functions yielded estimates of depths to different densification horizons. (Auth. mod.)

45-1613
Reconstructed ice-flow patterns and ice limits using drift pebble lithology, outer Nachvak Fiord, northern Labrador.
Bell, T., et al, *Canadian journal of earth sciences*, Mar. 1989, 26(3), p.577-590, With French summary, 19 refs.
Rogerson, R.J., Mengel, F.
Glaciation, Glacial deposits, Glacier flow, Lithology, Soil texture, Sea level, Classifications, Canada - Labrador.

45-1614
Problem of evaluating the economic effectiveness and profitability of hail prevention operations. [K voprosu otsenki ekonomicheskoĭ effektivnosti i rentabel'nosti protivogradovykh rabot],
Danov, E.I., et al, *Meteorologiia, klimatologiia i gidrologiia*, 1989, Vol.25, p.51-55, In Russian. 7 refs.
Danova, G.M.
Economic analysis, Hail prevention, Cost analysis, Analysis (mathematics).

45-1615
SPRI participation in the Winter Weddell Gyre Study 1989.
Wadhams, P., et al, *Polar record*, Jan. 1991, 27(160), p.29-38, 17 refs.
Crane, D.R.
Ice cover thickness, Sea ice distribution, Ice surveys, International cooperation, Antarctica—Weddell Sea.
The Winter Weddell Gyre Study was conducted by an international group of scientists, including members of the Scott Polar Research Institute, from FS *Polarstern* (FRG) in Sep. and Oct. 1989, in collaboration with RV *Akademik Fedorov* (USSR). This was a multi-disciplinary experiment involving biologists, chemists, oceanographers and meteorologists. The SPRI program involved measuring ice thickness, studying the under-ice topography with an upward looking sidescan sonar, investigating the acceleration, tilt and strain of the ice, deploying Argos buoys, aerial photography, iceberg tracking, and two acoustic experiments, one to record ambient noise and the other to acoustically measure the ice thickness. (Auth. mod.)

45-1616
Quasi-steady problems in freezing soils: II. Experiment on the steady growth of an ice layer.
Takeda, K., et al, *Cold regions science and technology*, Nov. 1990, 18(3), MP 2814, p.225-247, 14 refs.
Nakano, Y.
Soil freezing, Soil tests, Ice growth, Ice lenses, Thermal conductivity, Temperature gradients, Soil water migration.
A series of freezing tests on three kinds of soil were conducted to find the steady growth condition of a segregated ice layer by using a new steady-state method in which the temperature profiles of soil specimens were controlled. It was found that the steady growth condition is determined by the absolute value of the temperature gradient of the unfrozen part of the soil *alpha u* and that of the frozen part of the soil *alpha f*, under a given hydraulic condition as follows: *alpha u* = S *alpha f*, k1 ko > S > So, *alpha f* < A, where k1 and ko are the thermal conductivity of the frozen and the unfrozen parts, respectively, and So and A constants that are the properties of a given soil. Comparing these experimental results with the results of the mathematical analysis presented in part I, it is found that the model M1 is consistent with the experimental results while the models M2 and M3 contradict them.

45-1617
Crack nucleation due to elastic anisotropy in porous ice.
Shyam Sunder, S., et al, *Cold regions science and technology*, Nov. 1990, 18(3), p.249-265, 27 refs.
Nanthikesan, S.
Ice cracks, Anisotropy, Crack propagation, Nucleation, Shear stress, Ice crystal structure, Porosity.

45-1618
On the constitutive modeling of transient creep in polycrystalline ice.
Shyam Sunder, S., et al, *Cold regions science and technology*, Nov. 1990, 18(3), p.267-294, 42 refs.
Wu, M.S.
Ice creep, Ice deformation, Ice models, Ice microstructure, Forecasting, Analysis (mathematics), Ice plasticity, Boundary value problems.

45-1619
Reversed direct-stress testing of ice: equipment and example results.
Cole, D.M., et al, *Cold regions science and technology*, Nov. 1990, 18(3), MP 2815, p.295-302, 11 refs.
Gould, L.D.
Test equipment, Mechanical tests, Ice strength, Design, Compressive properties.
This paper describes in detail a recently developed fixture for performing completely reversed (e.g., tension to compression) uniaxial stress experiments on ice. The device rigidly holds an ice specimen having bonded end caps without loading the specimen or inducing a bending moment. It is self aligning and hydraulically actuated. One of the important and unique features of the system is that it corrects for end-cap misalignment at the end cap rather that at some distance from it. The ideas underlying the design of the system are discussed. The results of a number of experiments are presented to demonstrate the capabilities of the device and to illustrate the types of mechanical property information that can be generated using this experimental technique.

45-1620
Reversed direct-stress testing of ice: initial experimental results and analysis.
Cole, D.M., *Cold regions science and technology*, Nov. 1990, 18(3), MP 2816, p.303-321, 35 refs.
Ice strength, Mechanical tests, Loading, Deformation, Ice microstructure, Internal friction, Test equipment.
This paper focusses on the analysis and discussion of the results of a series of reversed direct-stress experiments performed on freshwater ice. A companion paper (Cole and Gould, this issue) describes the apparatus developed for these experiments. The experimental technique provides a means to subject cylindrical ice specimens to fully reversed (i.e., alternating tension/-compression) uniaxial loading, thereby permitting the study of cyclic-loading effects under a uniform stress field. The topics include frequency, temperature and strain-amplitude effects on internal friction, cyclic loading-history effects on tensile strength, grain-size effects on cyclic stress-strain behavior and the Bauschinger effect. The observations are discussed in terms of the mechanisms underlying the behavior, with particular attention to dislocation processes. The observations indicate the operation of the dislocation breakaway process and the Granato-Lucke theory models the associated amplitude-dependent internal friction results extremely well.

45-1621
Ice topography over subglacial lakes.
Shoemaker, E.M., *Cold regions science and technology*, Nov. 1990, 18(3), p.323-329, 11 refs.
Glacial lakes, Subglacial observations, Glacier surfaces, Topographic features, Glacier flow, Ice models, Glacier beds, Shear stress, Subglacial drainage, Lake bursts.

45-1622
Radon measurements as indicators of permafrost distribution.
Sellmann, P.V., et al, *Cold regions science and technology*, Nov. 1990, 18(3), MP 2817, p.331-336, 9 refs.
Delaney, A.J.
Permafrost distribution, Gases, Radioactivity, Measurement, Subsurface structures, Soil composition, Vapor diffusion, Correlation.
Observations in central Alaska indicate that radon concentrations in surface soils over discontinuous permafrost seem to correspond with frozen-ground distribution. These observations were made to determine if radon measurements might provide a method for obtaining information on permafrost distribution. Radon levels from an area of silty soils varied from 14 to 348 pCi/l and averaged 51 pCi/l where the top of permafrost was within a meter of the ground surface, compared to an average of 190 pCi/l where permafrost was absent.

45-1623
Acoustic emission generated by moving loads on sea ice: preliminary results.
Langhorne, P.J., et al, *Cold regions science and technology*, Nov. 1990, 18(3), p.337-342, 26 refs.
Robinson, W.H., Squire, V.A.
Sea ice, Ice acoustics, Acoustic measurement, Sound waves, Dynamic loads, Wave propagation, Ice strength, Cracking (fracturing).

45-1624
Analyzing the mineralization of ice cover on rivers and reservoirs. [Ob otsenke mineralizatsii ledianogo pokrova rek i vodoemov],
Ergin, V.P., *Zapadno-sibirskĭi regional'nyĭ nauchno-issledovatel'skĭi gidrometeorologicheskĭi institut. Trudy*, 1990, Vol.92, p.89-100, In Russian. 21 refs.
River ice, Ice cover, Ice salinity, Ice composition, Reservoirs, Snow ice interface, Analysis (mathematics).

45-1625
Climatic conditions in the northern European basin for the last 400 years (according to observations and reconstructions). [Klimaticheskie usloviia v Severo-Evropeĭskom basseĭne za poslednie 400 let (po dannym nabliudeniĭ i rekonstruktsiĭ)],
Dement'ev, A.A., *Leningrad. Arkticheskĭi i antarkticheskĭi nauchno-issledovatel'skĭi institut. Trudy*, 1989, Vol.415, p.67-75, In Russian. 16 refs.
Climatic changes, Air temperature, Ice cover effect, Sea ice.

45-1626
Probability estimation of basic elements of the ice regime of the Barents Sea. [Veroiatnostnye otsenki osnovnykh elementov ledovogo rezhima Barentseva moria],
Zubakin, G.K., et al, *Leningrad. Arkticheskĭi i antarkticheskĭi nauchno-issledovatel'skĭi institut. Trudy*, 1989, Vol.415, p.93-102, In Russian. 9 refs.
Malorov, O.N
Drift, Sea ice, Ice cover, Ice mechanics, Ice physics, Analysis (mathematics).

45-1627
Statistical structure of the fall phases of ice phenomena on the Barents Sea. [Statisticheskaia struktura faz osennikh ledovykh iavleniĭ na Barentsevom more],
Zubakin, G.K., *Leningrad. Arkticheskĭi i antarkticheskĭi nauchno-issledovatel'skĭi institut. Trudy*, 1989, Vol.415, p.102-109, In Russian. 5 refs.
Sea ice, Seasonal variations, Ice cover, Ice formation, Statistical analysis.

45-1628
Geometrical relationships of ice formations and their distribution functions. [Geometricheskie sootnosheniia ledovykh obrazovaniĭ i funktsii ikh raspredeleniia],
Zubakin, G.K., et al, *Leningrad. Arkticheskĭi i antarkticheskĭi nauchno-issledovatel'skĭi institut. Trudy*, 1989, Vol.415, p.109-116, In Russian. 8 refs.
Khvedynich, S.V.
Ice floes, Ice cover, Sea ice, Drift, Analysis (mathematics).

45-1629
Possible errors in determining the salinity of sea ice. [Vozmozhnye oshibki pri opredelenii solenosti morskikh l'dov],
Berezin, O.N., *Leningrad. Arkticheskĭi i antarkticheskĭi nauchno-issledovatel'skĭi institut. Trudy*, 1989, Vol.415, p.154-158, In Russian. 4 refs.
Sea ice, Ice salinity, Ice cover thickness.

45-1630
Using mathematical models to investigate the interrelationship between climate and permafrost. [O primenenii matematicheskikh modeleĭ dlia issledovaniia vzaimosviazi klimat-vechnaia merzlota],
Anisimov, O.A., et al, *Meteorologiia i gidrologiia*, Oct. 1990, No.10, p.13-20, In Russian with English summary. 9 refs.
Nelson, F.E.
Mathematical models, Climate, Permafrost thermal properties, Permafrost forecasting, Permafrost distribution, Snow depth, Accuracy.

45-1631
Some problems in research and applied modelling of ice cover. [Nekotorye problemy issledovatel'skogo i prikladnogo modelirovaniia ledianogo pokrova],
Doronin, IU.P., et al, *Leningrad. Arkticheskĭi i antarkticheskĭi nauchno-issledovatel'skĭi institut. Trudy*, 1990, Vol.420, p.5-10, In Russian. 17 refs.
Frolov, I.E.
Ice cover, Ice models, Ice physics, Sea ice, Mathematical models.

45-1632
Numerical methods for ice calculations and forecasts in an automated ice-information system for the Arctic. [Chislennye metody ledovykh raschetov i prognozov v avtomatizirovannoĭ ledovo-informatsionnoĭ sisteme dlia Arktiki],
Gudkovich, Z.M., *Leningrad. Arkticheskĭi i antarkticheskĭi nauchno-issledovatel'skĭi institut. Trudy*, 1990, Vol.420, p.11-17, In Russian. 5 refs.
Ice forecasting, Ice surveys, Data processing, Computer programs.

45-1633
Quasistationary dimensionless model of arctic ice. [Kvazistatsionarnaia nul'mernaia model' arkticheskikh l'dov],
Ivanov, B.V., et al, *Leningrad. Arkticheskĭi i antarkticheskĭi nauchno-issledovatel'skĭi institut. Trudy*, 1990, Vol.420, p.18-31, In Russian. 24 refs.
Makshtas, A.P.
Ice models, Mathematical models, Ice physics, Thermodynamics, Snow ice interface, Ice cover, Ice thermal properties, Ice melting, Snow melting.

45-1634
Modelling of ice drift in the arctic basin. [Modelirovanie dreĭfa l'da v Arkticheskom basseĭne],
Kolesov, S.A., *Leningrad. Arkticheskĭi i antarkticheskĭi nauchno-issledovatel'skĭi institut. Trudy*, 1990, Vol.420, p.32-38, In Russian. 5 refs.
Drift, Ice models, Mathematical models, Sea ice, Ice cover.

45-1635
Hydrodynamic model of steady-state ice drift. [Gidrodinamicheskaia model' ustanovivshegosia dreĭfa l'da],
Ponomarev, V.I., *Leningrad. Arkticheskĭi i antarkticheskĭi nauchno-issledovatel'skĭi institut. Trudy*, 1990, Vol.420, p.39-52, In Russian. 10 refs.
Ice models, Sea ice, Drift, Mathematical models, Hydrodynamics, Ice cover.

45-1636
Modelling of fall-winter ice phenomena. [Modelirovanie osenne-zimnikh ledovykh iavleniĭ],
Petrov, V.M., et al, *Leningrad. Arkticheskĭi i antarkticheskĭi nauchno-issledovatel'skĭi institut. Trudy*, 1990, Vol.420, p.53-61, In Russian. 20 refs.
Frolov, I.E.
Ice models, Heat balance, Ice cover thickness, Mathematical models, Ice air interface, Seasonal variations, Air temperature.

45-1637
Specific aspects of modelling the evolution of ice cover on arctic seas during the melting period. [Otdelnye aspekty modelirovaniia evoliutsii ledianogo pokrova arkticheskikh morei v period taianiia],
Appel', I.L., *Leningrad. Arkticheskĭi i antarkticheskĭi nauchno-issledovatel'skĭi institut. Trudy*, 1990, Vol.420, p.62-70, In Russian. 8 refs.
Sea ice, Ice melting, Ice cover, Ice formation, Ice models, Mathematical models, Snow ice interface, Drift.

45-1638
Space-time variations in characteristics of ice cover in the area of its seasonal migration. [Prostranstvenno-vremennaia izmenchivost' kharakteristik ledianogo pokrova v zone ego sezonnoĭ migratsii],
Makshtas, A.P., et al, *Leningrad. Arkticheskĭi i antarkticheskĭi nauchno-issledovatel'skĭi institut. Trudy*, 1990, Vol.420, p.71-80, In Russian. 13 refs.
Ivanov, B.V.
Ice cover, Thermodynamics, Sea ice, Heat balance, Ice cover thickness, Seasonal variations, Air temperature, Wind velocity, Cloud cover.

45-1639
Characteristics of ice processes in seas of the northern European basin. [Osobennosti ledovykh protsessov v moriakh Severo-Evropeĭskogo basseĭna],
Zubakin, G.K., *Leningrad. Arkticheskĭi i antarkticheskĭi nauchno-issledovatel'skĭi institut. Trudy*, 1990, Vol.420, p.81-89, In Russian. 18 refs.
Sea ice, Ice cover, Ice formation, Climatic factors.

45-1640
Ice cover effects in models of sea level fluctuations and water circulation. [Effekty ledianogo pokrova v modeliakh kolebaniĭ urovnia i tsirkuliatsii vod],
Proshutinskiĭ, A.IU., *Leningrad. Arkticheskĭi i antarkticheskĭi nauchno-issledovatel'skĭi institut. Trudy*, 1990, Vol.420, p.90-104, In Russian. 17 refs.
Ice cover effect, Mathematical models, Sea ice, Ocean currents, Ice models, Sea level, Drift.

45-1641
Calculating the parameters of ice drift in the Greenland Sea. [Raschet parametrov dreĭfa l'da Grenlandskogo moria],
Zubakin, G.K., *Leningrad. Arkticheskĭi i antarkticheskĭi nauchno-issledovatel'skĭi institut. Trudy*, 1990, Vol.420, p.105-115, In Russian. 7 refs.
Drift, Sea ice, Velocity measurement, Mathematical models, Ice models.

45-1642
Role of heat transfer sources in the Barents Sea in changes to cyclone tracks. [Rol' ochagov teplootdachi v Barentsevom more v izmenenii traektoriĭ tsiklonov],
Abramov, V.A., et al, *Leningrad. Arkticheskĭi i antarkticheskĭi nauchno-issledovatel'skĭi institut. Trudy*, 1990, Vol.420, p.116-124, In Russian. 19 refs.
Frolov, I.E.
Atmospheric disturbances, Heat transfer, Ice cover effect, Turbulent flow, Air water interactions.

45-1643
Parametrization of hummocking in calculating pressure and drift in unbroken ice cover. [Parametrizatsii torosheniia pri raschetakh davleniia i dreĭfa v sploshnom ledianom pokrove],
Tsarev, V.A., *Leningrad. Arkticheskĭi i antarkticheskĭi nauchno-issledovatel'skĭi institut. Trudy*, 1990, Vol.420, p.125-129, In Russian. 2 refs.
Ice cover, Sea ice, Hummocks, Pressure ridges, Mathematical models, Drift, Ice models.

45-1644
Calculating transfer processes in models of ice cover evolution. [Uchet protsessov perenosa v modeliakh evoliutsii ledianogo pokrova],
Appel', I.L., et al, *Leningrad. Arkticheskĭi i antarkticheskĭi nauchno-issledovatel'skĭi institut. Trudy*, 1990, Vol.420, p.130-141, In Russian. 10 refs.
Speranskiĭ, D.A.
Ice formation, Ice cover, Sea ice, Ice models, Mathematical models, Phase transformations.

45-1645
PCB and PCT contamination in Winter Quarters Bay, Antarctica.
Risebrough, R.W., et al. *Marine pollution bulletin*, Nov. 1990, 21(11), p.523-529, 22 refs.
De Lappe, B.W., Younghans Haug, C.
Pollution, Bottom sediment, Chemical composition, Antarctica—Winter Quarters Bay.
Winter Quarters Bay at McMurdo Station provides docking facilities to visiting ships and is adjacent to a former dump site. Sediments are heavily contaminated with a tarry material and contain a moderately high level of chlorinated biphenyls, in the range of 100-1400 ng/g dry wt. Composition in most samples is identical to that of Aroclor 1260, with no evidence of partial degradation, indicating a dominant point source of contamination. Chlorinated terphenyls, also with a 60% chlorine composition, are present at levels in the order of 30-1200 ng/g. Outside Winter Quarters Bay, PCB levels decrease sharply, by two orders of magnitude over 1 km, and four orders of magnitude at stations 9 and 15 km distant. A substantial modification of the congener composition is evident at the distant stations, but the McMurdo PCB 'signature' nevertheless dominates over the 'global' signature characteristic of PCBs in the global atmospheric circulation. (Auth.)

45-1646
Modelling sea ice thermodynamics and dynamics in climate studies.
Hibler, W.D., III, MP 2819, NATO Advanced Study Institute on Physically-Based Modelling and Simulation of Climate and Climate Change, Part 1. Proceedings, edited by M.E. Schlesinger, Dordrecht, Kluwer Academic Publishers, 1988, p.509-563, 47 refs.
DLC QC980.N37 1986 pt.1
Sea ice, Thermodynamic properties, Ice mechanics, Ice models, Climate.
The presence of sea ice cover substantially modifies air-sea heat and momentum exchanges in the polar regions, and hence can play a major role in high-latitude climate sensitivity. Because of its mobility, the dynamics and thermodynamics of this ice cover are intrinsically related. The purely thermodynamic properties of sea ice are very dependent on the fact that it is an admixture of brine pockets and fresh water ice. This causes sea ice to have a greater equilibrium thickness than freshwater ice and to have a different seasonal cycle of thickness change. The dynamical features of sea ice are charactenzed by a highly nonlinear ice interaction that causes the ice pack to strongly resist compression while having a relatively weak resistance to dilation. The strength of the interaction is tied to the amount of thin ice which is created by the opening of leads and is removed by ice growth or pressure ridging. A plastic rheology offers a consistent means of modelling this highly nonlinear ice interaction. Results of several numerical simulations are discussed; these include the response of an antarctic sea ice model to atmospheric warming, and the behavior of a coupled ice-ocean model of the Arctic, Greenland and Norwegian seas. In the case of ice-ocean coupling it is shown that the ocean circulation is essential for realistic simulation of the ice margin in the Greenland and Norwegian seas. (Auth. mod.)

45-1647
Stars of snow.
Delly, J.G., *Microscope*, 1990, 38(2), p.223-232, 11 refs.
Snowflakes, Replicas, Laboratory techniques, Ice crystal structure.

45-1648
Measurement of ice forces on small vessels—phase 3: detailed physical calibration. Final report.
Glen, I.F., et al. *Transport Canada. Publication*, July 1990, TP 10096E, 31p. + append., With French summary. 4 refs.
Steele, M., Howard, D.
Ships, Floating ice, Ice loads, Ice pressure, Strain measuring instruments, Strain tests, Accuracy, Data processing.

45-1649
Frost heave forces on H and pipe piles embedded in Fairbanks silt.
Johnson, J.B., et al. *Alaska. Department of Transportation and Public Facilities. Report*, May 1988, FHWA-AK-RD-88-02, MP 2818, 83p., 29 refs.
Buska, J.S.
Piles, Frost heave, Permafrost beneath structures, Frozen ground mechanics, Loads (forces), Ice adhesion, Soil temperature, Shear stress, Design criteria, Strain tests, Ice solid interface.
The magnitude and variation of forces and shear stresses, caused by frost heaving in Fairbanks silt and the adfreeze effects of a surface ice layer and a gravel layer, were determined using electric strain gauges as a function of depth along the upper 2.75 m of a pipe pile, 30.5 cm I.D. x 0.95 cm wall and an H pile, 25.4 cm web x 85 kg/lineal m, for three consecutive winter seasons (1982-1985). The peak frost heaving forces on the H pile during each winter were 752, 790 and 802 kN. Peak frost heaving forces on the pipe pile of 1118 and 1115 kN were determined only for the second and third winter seasons. Maximum average shear stresses acting on the H pile were 256, 348 and 308 kPa during the three winter seasons. Maximum average shear stresses acting on the pipe pile were 627 and 972 kPa for the second and third winter seasons. Ice collars were placed around the tops of both piles during the first and third winter seasons to measure the adfreeze effects of a surface ice layer. A 0.6 m thick gravel layer replaced the soil around the tops of both piles for the second and third winter seasons to measure the adfreeze effects of a gravel backfill. The gravel layer on the H pile may have contributed about 35% of the peak forces measured. The important mechanisms that determine the magnitude of uplift heave forces are (1) soil heaving as the driving force, and (2) soil temperature, which controls the unfrozen water content, the mechanical properties of the soil and the area of influence of heaving pressures.

45-1650
Snow and avalanches in the Swiss Alps, winter 1988/89. [Schnee und Lawinen in den Schweizer Alpen, Winter 1988/89]. *Davos, Switzerland. Eidgenossisches Institut für Schnee- und Lawinenforschung. Winterberichte*, 1990, No.53, 155p., In German.
Avalanches, Snow accumulation, Air temperature, Meteorological data, Avalanche forecasting, Snow depth, Accidents, Avalanche formation, Snow temperature, Switzerland—Alps.

45-1651
Simulation of seasonal snowcover based on air temperature and precipitation.
Motoyama, H., *Journal of applied meteorology*, Nov. 1990, 29(11), p.1104-1110, 9 refs.
Snow depth, Snow compaction, Simulation, Seasonal variations, Air temperature, Precipitation (meteorology), Snow density, Mathematical models.

45-1652
Critique of the climatic record of "Water Equivalent of Snow on the Ground" in the United States.
Schmidlin, T.W., *Journal of applied meteorology*, Nov. 1990, 29(11), p.1136-1141, 27 refs.
Snow water equivalent, Periodic variations, Measurement, Accuracy, Climatology.

45-1653
Formation of ice on roads beneath bridges.
Barker, H.W., et al. *Journal of applied meteorology*, Nov. 1990, 29(11), p.1180-1184, 4 refs.
Davies, J.A.
Road icing, Bridges, Surface energy, Surface temperature, Radiation absorption, Mathematical models, Solar radiation, Safety.

45-1654
Winter fecal coliform concentrations in stream sediments.
Kidd, D.R., University of Alaska, 1989, n.p., Ph.D. thesis.
Streams, Suspended sediments, Wastes, Microbiology, Cold weather survival, Bacteria, Temperature effects, Water temperature.

45-1655
Simulation of flood waves from outburst of glacier-dammed lake.
Fernández, P.C., et al. *Journal of hydraulic engineering*, Jan. 1991, 117(1), p.42-53, 21 refs.
Fornero, L., Maza, J., Yañez, H.
Lake bursts, Glacial lakes, Ice dams, Simulation, Water flow, Flood forecasting, Mathematical models, Damage, Argentina—Mendoza River.

45-1656
Role of land ice in present and future sea-level change.
Meier, M.F., Sea-level change, Washington, D.C. National Academy Press, 1990, p.171-184, 76 refs.
DLC GC89.S413
Climatic changes, Land ice, Sea level, Glacier oscillation, Air temperature, Ice volume, Carbon dioxide, Glacier mass balance
This chapter reviews present knowledge of the response of ice sheets and glaciers to climate change and the consequent effect on sea level, for the next 100 yr. Glaciers other than the two existing ice sheets are currently wasting, and this has contributed about 0.46 mm/yr to sea-level rise since 1900. The Greenland Ice Sheet now appears close to a state of balance. The Antarctic Ice Sheet may be growing at a rate equivalent to about 0.6 mm/yr of sea-level fall; on the other hand, the rate of iceberg discharge may have been underestimated and it may be close to balance. Calculation of future changes of the Greenland Ice Sheet, the arctic ice caps, and the marginal areas in Antarctica requires study of the complex fluid mechanics, thermodynamics of subfreezing snow and firn subjected to water percolation. Determination of changes in iceberg calving is difficult because little is known about the rate-controlling processes; in addition, changes in the geometry of a glacier or ice stream cause changes in the rate of basal sliding, a process that is still imperfectly understood. A warmer climate may cause warmer ocean water to intrude under the floating ice shelves of Antarctica, causing increased basal melt and ice shelf thinning. This may reduce the back pressure on the ice streams that flow into the shelves, causing the ice streams to accelerate. This process could deplete the ice sheet, producing a sea-level rise of up to 0.3 m, or possibly more, by the year 2100. Complete disintegration of the West Antarctic Ice Sheet is not likely for many centuries or millennia. Increased accumulation on Antarctica could contribute to sea-level fall by 0.1 to 0.5 m in the next 100 years. Long-term questions include the rapid fluctuations in CO_2 and other variables observed in ice cores, the rapid deglaciation of North America at the end of the last ice age, and the possible disappearance of the West Antarctic Ice Sheet due to present-day and near-future processes. (Auth. mod.)

45-1657
Water circulation in the Barents Sea. [K voprosu o tsirkuliatsii vod Barentseva moria].
Potanin, V.A., et al. *Problemy arktiki i antarktiki*, 1989, Vol.64, p.110-117, In Russian. 3 refs.
Korotkov, S.V., Ershtadt, T.A.
Ocean currents, Models, Ice cover effect, Barents Sea.

45-1658
"Ice rivers" in arctic seas. ["Ledovye reki" arkticheskikh morei].
Benzeman, V.IU., *Leningrad. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1989, Vol.417, p.91-98, In Russian. 6 refs.
Ice mechanics, Sea ice distribution, Ice cover, Drift, Meteorological factors, Ice cover distribution, Hydrology, Flow rate.

45-1659
Using a Kalman filter for calculating ice drift parameters. [Primenenie fil'tra Kalmana dlia otsenki parametrov dreifa l'diny].
Lashov, E.S., et al. *Leningrad. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1989, Vol.417, p.99-105, In Russian. 3 refs.
Chernyshov, A.F.
Sea ice distribution, Drift, Ice floes, Analysis (mathematics), Ice mechanics.

45-1660
Relationship between the melting rate of fresh ice in sea water and the temperature and rate of the circumfluent current. [Zavisimost' skorosti taianiia presnogo l'da v morskoi vode ot temperatury i skorosti obtekaiushchego potoka].
Bannov-Baĭkov, IU.L., et al. *Leningrad. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1989, Vol.417, p.106-113, In Russian. 8 refs.
Golovin, IU.L., Totubalin, IU.IU., Cherepanov, N.V.
Ice melting, Ice physics, Water temperature, Salinity, Icebergs, Ocean currents, Analysis (mathematics).

45-1661
Calculating heat flux from the water to the atmosphere in the arctic basin. [Otsenka potokov tepla iz vody v atmosferu v Arkticheskom basseine].
Blinov, N.I., et al. *Leningrad. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1989, Vol.417, p.122-127, In Russian. 5 refs.
Artem'ev, A.O., Popkov, S.N.
Heat flux, Air water interactions, Sea ice.

45-1662
Three-dimensional structure of iceberg tracks. [Prostranstvennaia struktura sleda za aisbergom].
Pisarevskaia, L.G., et al. *Leningrad. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1989, Vol.417, p.140-144, In Russian. 6 refs.
Popov, I.K.
Icebergs, Drift, Turbulence.

45-1663
Field tests on frost heaving damage of small sized U-trough.
Suzuki, T., et al. *Japan Society of Civil Engineers. Proceedings (Doboku gakkai ronbunshu)*, June 1990, No.418, p.163-171, In Japanese with English summary. 14 refs.
Yamada, T.
Frost heave, Soil freezing, Concrete freezing, Drains.

45-1664
Scheduling fall seedings for cold-climate revegetation.
Racine, C.H., et al. *U.S. Army Cold Regions Research and Engineering Laboratory*, Oct. 1990, SR 90-36, 6p., ADA-229 742, 10 refs.
Bailey, R.N., Palazzo, A.J.
Revegetation, Grasses, Degree days, Growth.
Revegetating construction sites in the fall requires the scheduling of seeding and mulching for either permanent or dormant seedings. Dormant seedings must be late enough in the fall to prevent germination, while permanent seedings must be early enough to permit seedling establishment and avoid winterkill. A technique for determining optimum seeding dates using growing degree-day curves was developed and tested. Small outdoor plots and buried pots in Hanover, NH, were seeded with tall fescue at intervals during Oct. 1988 and 1989, respectively, and covered with either straw mulch or a Typar row cover. Soil surface temperatures, germination and growth were monitored into the following springs. Fall or spring germination of fall-sown tall fescue seeds required about 100 GDDs (growing degree days (over 5 C), while the development of a second leaf required an additional 70 GDDs. In the experimental plots without any cover, these requirements were met with Oct. 12 and Oct. 5 seedings, respectively, with a Typar cover, seeding dates could be delayed by one week. In pots the greatest spring yields were obtained under Typar at the earliest (5 Oct.) seeding date and the latest dormant seeding date (2

Nov.). Straw mulch applied during the fall had little or no effect on the number of growing degree-days remaining. However, during the following spring, it slowed soil warming and germination of dormant seedings. The appropriate fall seeding date for northern areas can be calculated using a power curve for Hanover, NH: Julian date = 360 x (GDDs required) exp-0.05.

45-1665
Three-wavelength method of measuring path-averaged turbulent heat fluxes.
Andreas, E.L., *Journal of atmospheric and oceanic technology*, Dec. 1990, 7(6), MP 2820, p.801-814, 36 refs.
Heat flux, Air temperature, Humidity, Turbulent flow, Latent heat, Analysis (mathematics), Refraction, Optical properties.
Conceptually, electro-optical measurements of the path-averaged refractive index structure parameter should yield measurements of the vertical fluxes of sensible and latent heat. With three independent measurements we can compute the meteorologically relevant temperature, humidity, and temperature-humidity structure parameters. The sensible and latent heat fluxes derive from these and a simultaneous electro-optical measurement of the path-averaged turbulent kinetic energy dissipation rate through inertial-dissipation calculations. A sensitivity analysis shows that at 0.94 micron, 10.6 microns, and 3.33 mm, the three-wavelength method would yield measurements of the temperature structure parameter accurate to + /- 20% when the Bowen ratio, the sensible heat flux divided by the latent heat flux, is in the range of 0.1 to 10. The measurement of the humidity structure parameter is potentially accurate to + /- 10% but only when the Bowen ratio is 0.01 to 0.5. Outside this range the accuracy is much worse. The measurement accuracy of the temperature-humidity structure parameter is poor. The predicted uncertainty is no better than + /- 40%. This three-wavelength combination, however, can yield the sign of the temperature-humidity structure parameter when the Bowen ratio is 0.015 to 0.5. If instead of the 10.6 micron wavelength we substitute a wavelength of 18.8 microns where laser measurements are more difficult, the Bowen ratio ranges over which we could measure both the humidity structure parameter and the sign of the temperature-humidity structure parameter expand. For the humidity structure parameter, the useful Bowen ratio range is now 0.01 to 1; and for the sign of the temperature-humidity structure parameter, it is roughly 0.02 to 2.

45-1666
Fraass breaking point test: automatic testing and an examination of asphalt quality.
Sasaki, K., et al, *Hokkaido kaihatsukyoku kaihatsu doboku kenkyujo geppo (Hokkaido Development Bureau Civil Engineering Research Institute. Monthly report)*, May 1990, No.444, p.10-17, In Japanese with English summary. 8 refs.
Shibata, T., Kawamura, K., Mizushima, T.
Pavements, Low temperature tests, Cracking (fracturing), Brittleness, Bearing strength.

45-1667
Previous knowledge bearing on hydrologic phenomena relevant to snow: review of the relevant literature. [Yuki ni kakawaru suibun gensho o atsukatta kio chiken ni tsuite: kanren ronbun no rebyu],
Nakatsugawa, M., *Hokkaido kaihatsukyoku kaihatsu doboku kenkyujo geppo (Hokkaido Development Bureau Civil Engineering Research Institute. Monthly report)*, May 1990, No.444, p.24-40, In Japanese. 69 refs.
Snow hydrology, Snowmelt, Snow water equivalent, Snow surveys, Snow cover distribution, Analysis (mathematics).

45-1668
Problems of thermodynamic processes management in an area affected by mining operations. [Problemy upravleniia termodinamicheskimi protsessami v zone vliianiia gornykh rabot],
El'chaninov, E.A., Moscow, Nauka, 1989, 236p., In Russian with English table of contents. 139 refs.
Thermodynamics, Thermal insulation, Mining, Frozen rock temperature, Permafrost heat transfer, Permafrost thermal properties, Freeze thaw cycles.

45-1669
Deterioration of polyvinylchloride-based materials in cold weather conditions. [Starenie materialov na osnove polivinilkhlorida v usloviiakh kholodnogo klimata],
Bochkarev, R.N., et al, Novosibirsk, Nauka, 1990, 119p., In Russian. 304 refs.
Filatov, I.S.
Cold weather performance, Cold weather construction, Construction materials, Damage.

45-1670
Correlation of frost depth, thaw periods and pavement deflection to spring load restrictions. Final report.
Madden, D.A., et al, *U.S. Federal Highway Administration. Maine Department of Transportation. Technical report*, June 1990, FHWA-ME-89-7, 33p., 6 refs.
Rand, D.W., Dunphy, W.J., Jr.
Frost penetration, Thaw depth, Ground thawing, Road maintenance, Trafficability, Degree days.

45-1671
Global ice forces and ship response to ice: a second season.
Minnick, P.V., et al, *U.S. Maritime Administration. Ship Structure Committee. Report*, 1990, SSC-343, 46p. + appends., 18 refs.
St. John, J.W.
Icebreakers, Ice loads, Ice pressure, Impact strength, Design criteria, Ice navigation, Ice solid interface.

45-1672
Global ice forces and ship response to ice: analysis of ice ramming forces.
Chen, Y.K., et al, *U.S. Maritime Administration. Ship Structure Committee. Report*, 1990, SSC-342, 106p. + appends., 9 refs.
Tunik, A.L., Chen, A.P.Y.
Icebreakers, Ice loads, Ice pressure, Impact strength, Design criteria, Ice navigation, Ice solid interface, Mathematical models.

45-1673
Global ice forces and ship response to ice.
Minnick, P.V., et al, *U.S. Maritime Administration. Ship Structure Committee. Report*, 1990, SSC-341, 36p. + appends., 19 refs.
St. John, J.W., Cowper, B., Edgecombe, M.
Icebreakers, Ice loads, Ice pressure, Impact strength, Design criteria, Ice navigation, Ice solid interface.

45-1674
Himalayan glaciers as a sustainable water resource.
Hasnain, S.I., *Water resources development*, June 1989, 5(2), p.106-112, 16 refs.
Glacial hydrology, Water reserves, Glacier melting, Hydrogeochemistry, Water storage, Meltwater, Ion density (concentration), India.

45-1675
Effects of immobilization conditions on the nitrification treatability of entrapped cell reactors using the PVA freezing method.
Myoga, H., et al, *Water science and technology*, 1991, 23(4-6), p.1117-1124, 4 refs.
Asano, H., Nomura, Y., Yoshida, H.
Waste treatment, Sludges, Bacteria, Freezing, Temperature effects, Microbiology.

45-1676
Finite element studies of the electro impulse de-icing systems.
Scavuzzo, R.J., et al, *Journal of aircraft*, Sep. 1990, 27(9), p.757-763, 5 refs.
Aircraft icing, Ice removal, Mechanical tests, Models, Ice deformation, Ice solid interface, Electric equipment, Vibration, Correlation.

45-1677
Ice loads and ship response to ice: consolidation report.
Daley, C., et al, *U.S. Maritime Administration. Ship Structure Committee. Report*, 1990, SSC-340, 50p. + appends., 37 refs.
St. John, J.W., Brown, R., Glen, I.F.
Icebreakers, Ice loads, Ice pressure, Impact strength, Design criteria, Ice navigation, Ice solid interface.

45-1678
Ice loads and ship response to ice: a second season.
Daley, C., et al, *U.S. Maritime Administration. Ship Structure Committee. Report*, 1990, SSC-339, 2!p. + appends., 4 refs.
St. John, J.W., Brown, R., Meyer, J., Glen, I.F.
Icebreakers, Ice loads, Ice pressure, Impact strength, Design criteria, Ice navigation, Ice solid interface.

45-1679
Shear flow of sea ice in the marginal ice zone with collision rheology.
Leppäranta, M., et al, *Geophysica*, 1990, 25(1-2), p.57-74, 16 refs.
Lensu, M., Qian-Ming, L.
Ice floes, Shear flow, Sea ice distribution, Ice edge, Drift, Analysis (mathematics), Velocity, Rheology.

45-1680
Measurements of arctic total ozone during the polar winter.
Kerr, J.B., et al, *Atmosphere-ocean*, Dec. 1990, 28(4), p.383-392, With French summary. 11 refs.
McElroy, C.T., Wardle, D.I., Dorokhov, V.
Polar atmospheres, Atmospheric composition, Photometry, Periodic variations, Air pollution.

45-1681
On the growth of marine icicles.
Chung, K.K., et al, *Atmosphere-ocean*, Dec. 1990, 28(4), p.393-408, With French summary. 9 refs.
Lozowski, E.P.
Ice growth, Dendritic ice, Sea water freezing, Ice models, Ship icing, Ice structure, Sea spray, Brines, Mathematical models.

45-1682
Participation in the WMO Solid Precipitation Measurement Intercomparison-preliminary results at the evaluation station Harzgerode.
Günther, T., *Zeitschrift für Meteorologie*, 1990, 40(3), p.224-226, 3 refs.
Precipitation (meteorology), Measurement, Precipitation gages, Accuracy, Snow accumulation, Wind factors, Meteorological data.

45-1683
Heat exchange of a bank of tubes in the transverse flow of liquid complicated by the formation of the solid phase of the heat carrier.
Semenov, V.IU., et al, *Journal of engineering physics*, Nov. 1990, 58(5), p.567-571, Translated from Inzhenerno-fizicheskiĭ zhurnal, May 1990. 6 refs.
Smorodin, A.I., Orlov, V.K.
Pipes (tubes), Ice formation, Stefan problem, Heat transfer, Heat transfer coefficient, Heat pipes, Surface temperature.

45-1684
Characteristics of simultaneous thawing and erosion of frozen sand.
Medvedskiĭ, R.I., *Journal of engineering physics*, Nov. 1990, 58(5), p.667-671, Translated from Inzhenerno-fizicheskiĭ zhurnal, May 1990. 6 refs.
Ground thawing, Ablation, Interstitial ice, Drilling, Soil texture, Mathematical models, Frozen ground thermodynamics.

45-1685
Reconstructed ice-flow patterns and ice limits using drift pebble lithology, outer Nachvak Fiord, northern Labrador: discussion and reply.
Clark, P.U., et al, *Canadian journal of earth sciences*, July 1990, 27(7), p.1002-1011, 32 refs. For article being discussed see 45-1613.
Josenhans, H.W., Bell, T., Rogerson, R.J., Mengel, F.
Lithology, Quaternary deposits, Glaciation, Glacier oscillation, Grounded ice, Sea level, Pleistocene, Canada—Labrador.

45-1686
Late Quaternary history of the southwestern Ross Sea: evidence from debris bands on the McMurdo Ice Shelf, Antarctica.
Kellogg, T.B., et al, *American Geophysical Union. Antarctic research series*, 1990, Vol.50, Contributions to antarctic research 1, edited by C.R. Bentley, p.25-56, Refs p.55-56.
Kellogg, D.E., Stuiver, M.
Ice shelves, Ice dating, Rheology, Ice cover thickness, Antarctica—McMurdo Ice Shelf.
The McMurdo Ice Shelf (MIS) preserves a detailed record of glaciologic, sedimentologic, and biotic processes during late Wisconsin and Holocene time. MIS ice deltaO-18 measurements show that the western part of the MIS is maintained by basal freezing. Uncorrected C-14 dates of shells in MIS surface debris have a bimodal distribution with all ages either more than 20,000 years B.P. or less than 7750 years B.P. Combined deltaO-18 and C-14 data demonstrate that two types of debris bands occur on the MIS: bands like those trending north from Black I. are formed by the Debenham (1919) Mechanism, of combined basal adfreezing and surface ablation, and have Holocene C-14 dates; older, remnant bands occur east of Brown Peninsula; in one place they cross the tide crack onto land. Other localities have C-14 ages more than 20,000 years B.P. and deltaO-18 values indicating ice formed from precipitation at elevations greater than 3000 m that was advected to southern McMurdo Sound. Erratic material from the Transantarctic Mountains is widespread on the MIS. These data combine to suggest that former grounded ice from East Antarctica occupied southern McMurdo Sound. (Auth. mod.)

45-1687
Saline minerals in the Lewis Cliff ice tongue, Buckley Island Quadrangle, Antarctica.
Fitzpatrick, J.J., et al, *American Geophysical Union. Antarctic research series*, 1990, Vol.50, Contributions to antarctic research 1, edited by C.R. Bentley, p.57-69, Refs. p.68-69.
Muhs, D.R., Jull, A.J.T.
Glacial deposits, Glacier tongues, Minerals, Antarctica—Lewis Cliff.
Saline minerals have been found in a moraine and as englacial deposits in the vicinity of Lewis Cliff, Buckley I Quadrangle These are the first reported occurrences of these minerals from the interior of the continent and the first reported occurrence of borax anywhere on the continent. The nahcolites are believed to have precipitated from a subglacial solution formed by the mixing of a sodium-rich, CO2-charged thermal spring water with isotopically light glacial meltwater The origin of the borax/nahcolite assemblage in the moraine is as yet unknown. (Auth. mod.)

45-1688
Arctic Ocean region.
Grantz, A., ed, Geology of North America, Vol. L, Boulder, CO, Geological Society of America, 1990, 644p. + 11 maps and charts in a separate case, Refs. passim. For selected papers see 45-1689 through 45-1695.
Johnson, G.L., ed, Sweeney, J.F., ed.
DLC QE71.G48 1986
Sea ice, Ice cover, Ocean bottom, Bottom topography, Marine geology, Tectonics, Arctic Ocean.

45-1689
Structure and dynamics of the Arctic Ocean ice cover.
Untersteiner, N., Geology of North America, Vol. L, Arctic Ocean region. Edited by A. Grantz, G.L. Johnson, and J.F. Sweeney, Boulder, CO, Geological Society of America, 1990, p.37-51, 46 refs.
DLC QE71.G48 1986
Sea ice, Ice cover, Sea water freezing, Ice air interface, Ice water interface, Drift.

45-1690
Arctic Ocean ice cover; geologic history and climatic significance.
Clark, D.L., Geology of North America, Vol. L, Arctic Ocean region. Edited by A. Grantz, G.L. Johnson, and J.F. Sweeney, Boulder, CO, Geological Society of America, 1990, p.53-62, 73 refs.
DLC QE71.G48 1986
Sea ice, Ice cover, Paleoclimatology.

45-1691
Geothermal observations in the arctic region.
Langseth, M.G., et al, Geology of North America, Vol. L, Arctic Ocean region. Edited by A. Grantz, G.L. Johnson, and J.F. Sweeney, Boulder, CO, Geological Society of America, 1990, p.133-151, 67 refs.
Lachenbruch, A.H., Marshall, B.V.
DLC QE71.G48 1986
Geothermy, Permafrost thermal properties, Underwater geothermal measurement.

45-1692
Late Mesozoic and Cenozoic paleoceanography of the northern polar oceans.
Thiede, J., et al, Geology of North America, Vol. L, Arctic Ocean region. Edited by A. Grantz, G.L. Johnson, and J.F. Sweeney, Boulder, CO, Geological Society of America, 1990, p.427-458, Refs. p.454-458.
Clark, D.L., Herman, Y.
DLC QE71.G48 1986
Paleoclimatology, Oceanography, Bottom sediment, Marine deposits, Ice rafting.

45-1693
Sedimentary basins and petroleum resource potential of the Arctic Ocean region.
Haimila, N.E., et al, Geology of North America, Vol. L, Arctic Ocean region. Edited by A. Grantz, G.L. Johnson, and J.F. Sweeney, Boulder, CO, Geological Society of America, 1990, p.503-538, 79 refs.
Kirschner, C.E., Nassichuk, W.W., Ulmichek, G., Procter, R.M.
DLC QE71.G48 1986
Petroleum industry, Natural resources, Oil wells, Exploration, Geological surveys.

45-1694
Gas hydrates of the Arctic Ocean region.
Kvenvolden, K.A., et al, Geology of North America, Vol. L, Arctic Ocean region. Edited by A. Grantz, G.L. Johnson, and J.F. Sweeney, Boulder, CO, Geological Society of America, 1990, p.539-549, 29 refs.
Grantz, A.
DLC QE71.G48 1986
Natural gas, Hydrates, Natural resources, Permafrost.

45-1695
Offshore hard minerals.
Hale, P.B., Geology of North America, Vol. L, Arctic Ocean region. Edited by A. Grantz, G.L. Johnson, and J.F. Sweeney, Boulder, CO, Geological Society of America, 1990, p.551-565, 46 refs.
DLC QE71.G48 1986
Minerals, Natural resources, Offshore drilling, Dredging, Mining, Artificial islands.

45-1696
"IMAG" apparatus: a new automatic skid-resistance tester.
Nègre, J.P., *Revue générale des routes et des aerodromes*, Dec. 1990, No.680, p.22-24, In French and English.
Skid resistance, Runways.

45-1697
Contamination of aqueous samples with formate and acetate from ambient air.
Hewitt, A.D., et al, *Atmospheric environment*, 1991, 25A(2), MP 2824, p.453-457, 11 refs.
Cragin, J.H.
Air pollution, Chemical analysis, Solutions, Vapor diffusion, Water chemistry, Meltwater, Precipitation (meteorology).
A sensitive ion chromatographic technique with detection limits of 1.9 and 6.2 micrograms/l has been developed for the determination of formate and acetate ions, respectively, in aqueous solution. Using this technique, uncovered aqueous solutions have been found to absorb the corresponding acids readily from ambient air at rates of approximately 0.02-0.1 nM sq cm/h Consequently, to prevent vapor diffusion and subsequent contamination of environmental samples with these organic acids, casual exposure to ambient air, particularly in a laboratory, should be minimized.

45-1698
One-dimensional temperature modeling techniques: review and recommendations.
Balick, L.K., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Smart Weapons Operability Enhancement Program Office. Report*, Aug. 1990, SWOE report 90-01, MP 2825, 17p., ADA-231 176, 33 refs.
Hummel, J.R., Smith, J.A., Kimes, D.S.
Infrared photography, Computerized simulation, Detection, Military research, Surface temperature.
Background surface temperature models were reviewed and evaluated for implementation in the Smart Weapons Operability Enhancement Program. As a result, current capabilities in one-dimensional modeling were determined and specific recommendations for implementation were made. Robust capabilities exist for solid materials, snow, fresh water and simple vegetation layers. Modeling of freshwater ice and sea ice are tractable at this time. Serious deficiencies exist in complex vegetation because of the mix of materials comprising the canopy and their complex geometry. Simulation of most porous solid materials seems inadequate. Recommendations for specific implementation were made in three groups: atmosphere-material energy fluxes, energy fluxes within materials (for several material types), and the initial model framework. The use of the C language version of the Terrain Surface Temperature Model is recommended to serve as an initial model framework for model development. Recommendations for research and development are made for complex vegetation types, mass transport through porous materials, the land/ocean interface, transitional conditions, and quantitative parameter estimation.

45-1699
Predicting the behavior of asphalt concrete pavements in seasonal frost areas using nondestructive techniques.
Janoo, V.C., et al, *U.S. Army Cold Regions Research and Engineering Laboratory*, Nov. 1990, CR 90-10, 56p., ADA-231 292, 16 refs.
Berg, R.L.
Concrete pavements, Frost heave, Thaw weakening, Thaw depth, Freeze thaw tests, Bituminous concretes, Laboratory techniques.
Four different pavement test sections were subjected to freeze-thaw cycling in CRREL's Frost Effects Research Facility (FERF). The test sections, each 610 cm in length, consisted of 1) 15.2 cm of asphalt concrete pavement over a clay subgrade, 2) 15.2 cm of asphalt concrete over 10.2 cm of crushed gravel over a clay subgrade, 3) 5.1 cm of asphalt concrete over 25.4 cm of crushed gravel over 12.7 cm of clean sand over a clay subgrade. Thermocouples were imbedded throughout the pavement structure and subgrade. During the thawing periods, deflection measurements were made at four locations in each test section using a Dynatest Falling Weight Deflectometer (FWD). The results of the deflection measurements are presented here. An analysis was done to quantify the subgrade strength based solely on FWD measurements. It was also shown that a relationship existed between thaw depth and FWD measurement in the subgrade.

45-1700
***Forestry equipment*—terrain interaction.**
International Society for Terrain-Vehicle Systems, North American Meeting, 3rd, Victoria, B.C., Canada, Apr. 24-27, 1989, Victoria, B.C., Forestry Canada, [1989], 291p., Refs. passim. For selected papers see 44-3759, 44-3933, 45-1701 and 45-1702.
Trafficability, Snow cover, Forestry, Vehicles, Environmental impact.

45-1701
Terrain information system for use in forestry operations.
Granberg, H.B., International Society for Terrain-Vehicle Systems, North American Meeting, 3rd, Victoria, B.C., Canada, Apr. 24-27, 1989. Proceedings, Victoria, B.C., Forestry Canada, [1989], p.113-143, 2 refs.
Snow surveys, Forestry, Trafficability, Snow cover, Computer programs.

45-1702
Effects of free water content of snow on mobility of rubber tired vehicles: a preliminary study.
Osborne, M.D., et al, International Society for Terrain-Vehicle Systems, North American Meeting, 3rd, Victoria, B.C., Canada, Apr. 24-27, 1989. Proceedings, Victoria, B.C., Forestry Canada, [1989], p.225-233.
Alger, R.G.
Trafficability, Snow cover effect, Tires, Vehicles, Snow water content, Traction.

45-1703
Rock blasting in seasonally freezing ground. Reference manual. [Vzryvnye raboty v sezonno-merzlykh gruntakh. Spravochnoe posobie],
Frash, G.B., Moscow, Nedra, 1990, 110p., In Russian. 31 refs.
Manuals, Blasting, Seasonal freeze thaw, Frozen ground mechanics, Frozen ground physics, Analysis (mathematics).

45-1704
Avacha fumarolic trace elements: distribution in snow and surface waters.
Alekseev, V.A., et al, Volcanology and seismology, 1987(Pub. Dec. 90), 11(3), p.325-336, Translated from Vulkanologiia i seismologiia. 10 refs.
Alekseeva, N.G.
Aerosols, Snow impurities, Volcanoes, Water pollution, Metals, Snow surveys.

45-1705
Mass balance and thermal regime of a crater glacier at Ushkovskii Volcano.
Murav'ev, IA.D., et al, *Volcanology and seismology*, 1987(Pub. Dec. 90), 11(3), p.411-424, Translated from Vulkanologiia i seismologiia. 8 refs.
Salamatin, A.N.
Glacier mass balance, Thermal regime, Mathematical models, Glacier heat balance, Volcanoes.

45-1706
Improving safety and control methods for the stability of main gas pipelines in the cryolithozone. [Sovershenstvovanie metodov obespecheniia i kontrolia ustoichivosti magistral'nykh gazoprovodov v kriolitozone],
Mazur, I.I., et al, *Vsesoiuznyĭ nauchno-issledovatel'skiĭ institut ekonomiki, organizatsii proizvodstva i tekhniko-ekonomicheskoĭ informatsii. Obzornaia informatsiia. Seriia: Ekonomika, organizatsiia i upravlenie proizvodstvom v gazovoĭ promyshlennosti*, 1990, 72p., In Russian. 41 refs.
Shcherbakov, S.M., Antonov-Druzhinin, V.P., Gornostaev, G.A., Shishov, V.N.
Gas pipelines, Stability, Temperature effects, Engineering geology, Permafrost bases.

45-1707
Uniqueness of soils and soil-forming processes in the Central Asian facies (taiga, steppe, desert).
Nogina, N.A., *Soviet soil science*, 1989 (Pub. 90), 22(3), p.1-11, Translated from Pochvovedenie. 14 refs.
Soil profiles, Cryogenic soils, Frozen ground, Chernozem, Soil formation.

45-1708
Soil formation on the yedomas of the Kolyma Lowland.
Mazhitova, G.G., *Soviet soil science*, 1989(Pub. 90), 22(3), p.12-23, Translated from Pochvovedenie. 22 refs.
Soil formation, Cryogenic soils, Plains.

45-1709
Autonomous taiga soil formation on the southwest coast of the Sea of Okhotsk.
Sedov, S.N., et al, *Soviet soil science*, 1989(Pub. 90), 22(3), p.24-35, Translated from Pochvovedenie. 12 refs.
Malinin, O.I., Shoba, S.A.
Soil formation, Taiga, Frozen ground chemistry, Cryogenic soils.

45-1710
Changes in global climate; a study of the effect of radiation and other factors during the present century.
Kondrat'ev, K.IA., Rotterdam, A.A. Balkema, 1985, 280p., Translation of Radiatsionnye faktory sovremennykh izmenenii global'nogo klimata, Leningrad, 1980. Russian translation series, 26. 101 refs.
Climatic changes, Snow cover, Ice cover, Albedo, Aerosols, Radiation, Solar radiation.

45-1711
One earth, one future: our changing global environment.
Silver, C.S., et al, Washington, D.C., National Academy Press, 1990, 196p., 10 refs.
DeFries, R.S.
DLC GF75.S55 1990
Climatic changes, Human factors, Air pollution, Environmental impact, Environmental protection.

45-1712
Ozone depletion, greenhouse gases, and climate change.
National Research Council. Board on Atmospheric Sciences and Climate, Washington, D.C., National Academy Press, 1989, 122p., Refs. passim. Proceedings of the Joint Symposium on Ozone Depletion, Greenhouse Gases, and Climate Change, held at the National Academy of Sciences, Mar. 23, 1988.
DLC QC881.2.S8097 1988
Climatic changes, Paleoclimatology, Atmospheric composition, Stratosphere.

45-1713
Five-year plan for U.S. scientific research in the arctic. [Piatiletnii plan nauchnykh issledovanii SSHA v Arktike],
Kossov, O.A., et al, Moscow, VNII sistemnykh issledovanii, 1989, 39p., In Russian. 9 refs. Preprint.
Smol'ianinov, N.D., IAkovlev, A.N.
Polar regions, Research projects.

45-1714
Methodological approach in evaluating the national economic effectiveness of extending navigation in the arctic. [Metodicheskie polozheniia po otsenke narodnokhoziaistvennoi ekonomicheskoi effektivnosti prodleniia navigatsii v Arktike],
Arikainen, A.I., et al, Moscow, VNII sistemnykh issledovanii, 1989, 70p., In Russian. 22 refs. Preprint.
Levit, B.IU., Livshits, V.N.
Cost analysis, Marine transportation, Ice navigation, Economic analysis, Northern Sea Route.

45-1715
Problems of military security in the Arctic. [Problemy voennoi bezopasnosti v Arktike],
Arikainen, A.I., et al, Moscow, VNII sistemnykh issledovanii, 1990, 92p., In Russian. 28 refs. Preprint.
Kossov, O.A.
Military operation, International cooperation, Polar regions.

45-1716
Experiment in composing a geobotanical map of the Noril'sk city region. [Opyt sostavleniia geobotanicheskoi indikatsionnoi karty raiona g. Noril'ska],
Moskalenko, N.G., *Geobotanicheskoe kartografirovanie*, 1972, p.54-63 + map, In Russian. 19 refs.
Tundra, Mapping, Geobotanical interpretation, Seasonal freeze thaw, Thaw depth.

45-1717
Summer temperature distribution of moss cover in cryolithozone regions (Central Yakutia). [Raspredelenie letnikh temperatur v mokhovom pokrove raionov kriolitozony (Tsentral'naia IAkutiia)],
Stashenko, A.I., *Geograficheskoe obshchestvo SSSR Izvestiia*, 1990, 122(2), p.167-170, In Russian. 7 refs.
Mosses, Temperature distribution, Thickness, Frozen ground temperature, Analysis (mathematics).

45-1718
Ice-ocean interaction on Ronne Ice Shelf, Antarctica.
Jenkins, A., et al, *Journal of geophysical research*, Jan. 15, 1991, 96(C1), p.791-813, Refs. p.812-813.
Doake, C.S.M.
Ice shelves, Ice physics, Ice water interface, Ice models, Ice surveys, Bottom topography, Polar regions, Antarctica—Ronne Ice Shelf.
Detailed glaciological studies have been completed at 28 sites lying on an approximate flow line, extending 760 km across Ronne Ice Shelf. Parameters measured at each location include ice velocity, thickness, principal strain rates, surface elevation, temperature, and accumulation rate. The data have been used in a steady state model to derive the basal mass flux and the temperature profile with depth at each site. These calculations indicate basal melting in excess of 1 m/yr over the first 100 km of the flow line downstream of the grounding line, where the ice shelf is 1200-1600 m thick. The maximum melt rates in this region occur near the inland margin and exceed 4 m/yr. Freezing then dominates up to the final 100 km before the ice front, causing accumulation of a layer of basal sea ice up to 50 m thick. This is rapidly removed as melt rates increase to over 6 m/yr at the ice front. Dense saline water, which is formed over the continental shelf during winter when the sea surface freezes, drains into the deepest parts of the sub-ice-shelf cavity. At the inland margin, where this water mass contacts the ice shelf, its temperature is 1 C above the local pressure freezing point. Melting of ice results, producing a buoyant outflow of cold, relatively fresh water, along the ice shelf base. Basal freezing occurs towards the ice front, where the ascending water becomes supercooled. This circulation has important implications for the production of Antarctic Bottom Water and for the response of the ice shelf to driving stresses, through the temperature-dependent viscosity of ice. (Auth. mod.)

45-1719
Geocryological and geological engineering problems *in the development of the Yamal Peninsula.* [Geokriologicheskie i inzhenerno-geologicheskie problemy osvoeniia IAmala],
Mel'nikov, E.S., et al, *Vsesoiuznyĭ nauchno-issledovatel'skiĭ institut ekonomiki mineral'nogo syr'ia i geologorazvedochnykh rabot. Gidrogeologiia, inzhenernaia geologiia, okhrana okruzhaiushcheĭ sredy. Obzor*, 1990, Vol.3, 53p., In Russian. 100 refs.
Kritsuk, L.N., Pavlov, A.A.
Engineering geology, Geocryology, Economic development, Environmental impact, Ground water, Ground ice, Research projects, Mapping, Forecasting, Seasonal freeze thaw, Permafrost distribution, Permafrost structure, Frozen rock strength, Frozen ground strength.

45-1720
Spectral properties of fog over the Malaspina Glacier, Alaska, in comparison to snow, ice, and clouds.
Ormsby, J.P., et al, *Photogrammetric engineering & remote sensing*, Feb. 1991, 57(2), p.179-185, 27 refs.
Hall, D.K.
Fog, Reflectivity, Spectra, Snow optics, LANDSAT, Ice optics, Cloud physics, Remote sensing, Glacier ice.

45-1721
Plying the Northern Sea Route.
Brigham, L.W., *Arctic Circle*, Jan.-Feb. 1991, p.10-11.
Route surveys, Marine transportation, International cooperation, Polar regions, Northern Sea Route.

45-1722
In North American arctic ice. Stages in development of the northwestern sea route. [Vo l'dakh Severoamerikanskoi Arktiki. Etapy razvitiia severo-Zapadnogo morskogo puti],
Arikainen, A.I., Leningrad, Gidrometeoizdat, 1989, 206p., In Russian. 39 refs.
Icebreakers, Ice navigation, Marine transportation, Military operation, History, Polar regions, Northwest Passage.

45-1723
Influence of a snow fence on young reforestation. [Influence d'une barrière à neige sur un jeune reboisement],
Mullenbach, P., et al, Colloque Dynamique des risques naturels et glaciochimie (Colloquium on the Dynamics of Natural Hazards and Glaciochemistry), Dec. 4-7, 1990, Saint Martin d'Hères, France, CEMAGREF [Centre national du machinisme agricole du génie rural des eaux et des forêts], 1990, 9p., In French
Bedecarrats, A., Brotons, J.C., Guet, C.
Snow fences, Revegetation, Forestry, Snowdrifts.

45-1724
Thermal history models for KOSI sublimation experiments.
Spohn, T., et al, *Icarus*, Oct. 1990, 87(2), p.358-371, 26 refs.
Benkhoff, J.
Extraterrestrial ice, Ice sublimation, Simulation, Vapor transfer, Thermal analysis, Thermal conductivity, Insolation.

45-1725
Springtime C-band SAR backscatter signatures of Labrador Sea marginal ice: measurements versus modeling predictions.
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Drinkwater, M.R.
Pack ice, Ice edge, Radar echoes, Backscattering, Surface roughness, Ice models, Airborne radar, Ice conditions.

45-1726
Satellite-derived reflectance of snow-covered surfaces in northern Minnesota.
Hall, D.K., et al, *Remote sensing of environment*, Aug. 1990, 33(2), p.87-96, 33 refs.
Kovalick, W.M., Chang, A.T.C.
Snow cover, Reflectivity, Solar radiation, Remote sensing, Sensor mapping, LANDSAT, Albedo, Snow cover effect.

45-1727
Effect of freezing and thawing on the microwave signatures of bare soil.
Wegmüller, U., *Remote sensing of environment*, Aug. 1990, 33(2), p.123-135, 17 refs.
Frozen ground, Microwaves, Radiometry, Freeze thaw cycles, Remote sensing, Dielectric properties, Backscattering, Surface roughness.

45-1728
Ice physics. [Fizika l'da],
Petrenko, V.F., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Jan. 1990, Vol.68, p.3-8, In Russian with English summary. 31 refs.
Ice physics, Electromagnetic properties, Ice mechanics, Ice deformation.

45-1729
Applying the principle of temperature-time analogy to the problems of ice and snow deterioration. [Primenenie printsipa temperaturno-vremennoi analogii k problemam razrusheniia l'da i snega],
Epifanov, V.P., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Jan. 1990, Vol.68, p.9-12, In Russian with English summary. 13 refs.
Snow deterioration, Thermal conductivity, Ice deterioration, Ice relaxation, Ice mechanics, Snow mechanics, Models.

45-1730
Electromagnetic emission during snow and ice deterioration. [Elektromagnitnaia emissiia pri khrupkom razrushenii snega i l'da],
Berri, B.L., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Jan. 1990, Vol.68, p.13-18, In Russian with English summary. 9 refs.
Snow deterioration, Ice deterioration, Electromagnetic properties, Brittleness, Avalanche formation, Avalanche forecasting, Glacier oscillation, Analysis (mathematics).

45-1731
Mathematical model of the properties and formation of snow cover structure. [Matematicheskaia model' formirovaniia stroeniia i svoĭstv snezhnogo pokrova],
Guseva, E.V., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Jan. 1990, Vol.68, p.18-25, In Russian with English summary. 8 refs.
Golubev, V.N.
Mathematical models, Snow cover structure, Snow cover, Snow depth, Snow compression, Snow density, Porosity.

45-1732
Problems and prospects of studies on the physical processes of snow cover. [Zadachi i perspektivy issledovanii fizicheskikh protsessov v snezhnom pokrove],
Golubev, V.N., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, Jan. 1990, Vol.68, p.26-35, In Russian with English summary. 53 refs.
Snow cover, Remote sensing, Research projects, Snow physics, Models.

45-1733
Problem of the thermal physics of snow-firn sequences. [Problema teplofiziki snezhno-firnovykh tolshch],
Bozhinskiĭ, A.N., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Jan. 1990, Vol.68, p.35-39, In Russian with English summary. 7 refs.
Krass, M.S.
Firn, Mathematical models, Mountain glaciers, Glacier mass balance, Thermal regime, Glacier ice, Ice water interface, Meltwater.

45-1734
Conditions for the occurrence of a melting ice layer in glaciers. [Ob usloviiakh sushchestvovaniia sloia taiushchego l'da v lednikakh],
Larina, T.B., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Jan. 1990, Vol.68, p.40-44, In Russian with English summary. 4 refs.
Glacier ice, Ice melting, Glacier melting, Ice temperature.

45-1735
Thermomechanics of the East Antarctic Ice Sheet. [Termomekhanika lednikovogo shchita Vostochnoĭ Antarktidy],
Grigorian, S.S., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Jan. 1990, Vol.68, p.44-51, In Russian with English summary. 18 refs.
Ignat'eva, I.IU., Shumskiĭ, P.A.
Ice sheets, Mathematical models, Time factor, Ice melting, Ice temperature, Icebergs, Ice mechanics, Ice thermal properties.
The two-dimensional, time-dependent mathematical model of the East Antarctic Ice Sheet presented in this paper is based on temperature parametrization. The parametrization describes the distribution of temperature in a glacier in relation to the surface temperature, advection of ice, dissipative heat and geothermal flux. The area of glaciation is assumed to be limited by the line of up-floating of ice under the interaction of the ice sheet with the sea, where conditions of hydrostatic equilibrium and strain stresses exist. A 46x66 point grid with 66 km spacing has been used to represent the ice-sheet surface, bedrock, accumulation rate and surface temperature. According to computations, steady state will be reached in 20,000 years. Response of the ice sheet to variations of accumulation rate and surface temperature is investigated. Insignificant changes of climatic parameters cause considerable changes of ice thickness in the center of the ice sheet. Changes in the location of the boundary and thickness of the ice sheet in the peripheral areas are also small. The volume of iceberg discharge decreases by 15 percent at a warming of 4 C of the surface temperature, and grows by 3 percent at a temperature fall of 4 C. (Auth. mod.)

45-1736
Model studies of the "atmosphere-snow-sea ice" system in an annual cycle. [Model'nye issledovaniia sistemy "atmosfera-sneg-morskoĭ led" v godovom tsikle],
Oreshko, A.P., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Jan. 1990, Vol.68, p.51-57, In Russian with English summary. 6 refs.
Chuprynin, V.I.
Mathematical models, Climatic changes, Snow air interface, Snow ice interface, Periodic variations, Temperature variations.

45-1737
Features of turbulent exchange in the periglacial layer of air. [Nekotorye osobennosti turbulentnogo obmena v prilednikovom sloe vozdukha],
Moskalenko, I.G., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Jan. 1990, Vol.68, p.57-64, In Russian with English summary. 31 refs.
Staviskiĭ, D.B.
Turbulent exchange, Periglacial processes, Spectra, Glacier surfaces.

45-1738
Interrelation of solar radiation resources and reflectivity of glaciers as a factor in the stability of glacier systems. [Vzaimosviaz' resursov solnechnoĭ energii i otrazhatel'noĭ sposobnosti lednikov kak faktor ustoĭchivosti lednikovykh sistem],
Lebedeva, I.M., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Jan. 1990, Vol.68, p.64-75, In Russian with English summary. 10 refs.
Reflectivity, Solar radiation, Albedo, Nomographs, Glacier ice, Heat balance.

45-1739
Glaciological data bank: development, operation, and prospects for future development. [Bank gliatsiologicheskikh dannykh: opyt razrabotki, ekspluatatsii i perspektivy razvitiia],
Suslov, V.F., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Jan. 1990, Vol.68, p.75-79, In Russian with English summary. 4 refs.
Tsarev, B.K., Chirkova, A.A.
Glaciers, Snow cover, Avalanches, Data processing.

45-1740
Possibility of developing a general purpose automated system for avalanche hazard forecasting and an avalanche information bank. [Vozmozhnosti razrabotki avtomatizirovannoĭ sistemy prognoza lavinnoĭ opasnosti obshchego pol'zovaniia i sbora snegolavinnoĭ informatsii],
Dushkin, V.S., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Jan. 1990, Vol.68, p.80-86, In Russian with English summary. 12 refs.
Data processing, Avalanche forecasting, Avalanches, Computer applications.

45-1741
Avalanche diagnosis as a physics problem. [Diagnoz lavin kak odna iz zadach fiziki],
Kanaev, L.A., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Jan. 1990, Vol.68, p.86-92, In Russian with English summary. 17 refs.
Fomin, A.G.
Slope stability, Avalanche modeling, Avalanche forecasting, Avalanche formation, Snow physics.

45-1742
Some regularities in the occurrence of snow cover in the Amudaria River basin. [Nekotorye zakonomernosti zaleganiia snezhnogo pokrova v basseĭne r.Amudar'i],
Kalontarov, B.I., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Jan. 1990, Vol.68, p.92-96, In Russian with English summary. 5 refs.
Kvachev, V.I., Kernosov, G.A.
Snow cover distribution, Snow density, Snow depth, Altitude, Air temperature.

45-1743
Operational evaluation of snow reserves in the forecasting of runoff from mountain rivers based on mathematical models. [Operativnaia otsenka snegozapasov v zadache prognoza stoka gornykh rek na osnove matematicheskikh modeleĭ],
Shentsis, I.D., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Jan. 1990, Vol.68, p.96-100, In Russian with English summary. 8 refs.
Runoff forecasting, Snow accumulation, River basins, Mathematical models.

45-1744
Ice and thermal conditions of small flatland reservoirs. [Ledovye i termicheskie usloviia malykh ravninnykh vodokhranilishch],
Emel'ianov, IU.N., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Jan. 1990, Vol.68, p.101-104, In Russian with English summary. 1 ref.
Shirokov, V.M.
Ice cover thickness, Rivers, Thermal regime, Water temperature.

45-1745
Constructing large ice structures. [Opyt sooruzheniia bol'shikh ledianykh ob'ektov],
Faĭko, L.I., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Jan. 1990, Vol.68, p.104-106, In Russian with English summary
Ice structure, Ice (construction material), Ice dams.

45-1746
Experimental construction of ice moorings in Antarctica using the spray-cone freezing method. [Eksperiment po sozdaniiu ledovogo prichala v Antarktide metodom fakel'nogo namorazhivaniia],
Klokov, V.D., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Jan. 1990, Vol.68, p.106-110, In Russian with English summary. 7 refs.
Poliakov, S.P.
Moorings, Ice (construction material), Ice structure, Artificial freezing.
Experimental ice moorings constructed by the method of artificial spray-cone freezing in the coastal area of Opasnaya Bay are described. A pump with a capacity of 100-185 cu m/g was used as a spraying installation. The greatest dispersion of drops and the maximum values of ice formation coefficient (up to 45%) were achieved with nozzle diameters of 35-45 mm and the wind-facing direction of the water cone. The density of artificially frozen ice varied from 500-900 kg/cu m, the strength was 0.5-1.2 MPa, and its salinity was 4-15 per mill. (Auth.)

45-1747
Characteristics of the total drift of compacted ice in a coastal zone. [Osobennosti summarnogo dreifa splochennykh l'dov v pribrezhnoĭ zone moria],
Truskov, P.A., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Jan. 1990, Vol.68, p.110-114, In Russian with English summary. 6 refs.
Beketskiĭ, S.P., Abramenko, S.E.
Drift, Ice deformation, Ice loads, Ice solid interface, Velocity, Offshore structures, Ice mechanics.

45-1748
Glaciological investigations of the Amery Ice Shelf in 1987-1989. [Gliatsiologicheskie issledovaniia na shel'fovom lednike Etmeri v 1987-1989 gg.],
Raĭkovskiĭ, IU.V., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Jan. 1990, Vol.68, p.114, In Russian.
Ice cores, Ice shelves, Ice sampling, Glacier ablation, Ice temperature, Ice formation, Ice melting, Antarctica—Amery Ice Shelf.
In 1987-1989, members of the Geography Institute (Soviet Academy of Sciences) conducted investigations of the Amery Ice Shelf, which included a study of the sedimentation regime, analysis of the snow-firn cover, temperature measurements and deep boring. Active thawing of the surface layers of the snow mass occurs from the second ten-day period in Nov. to the second ten-day period in Jan. Ten boreholes were made at depths of 10-12 m. 534 ice samples were recovered from the deepest borehole. It appears that the transformation of firn into ice takes place at a depth of 40 m. Temperature measurements were taken up to a depth of 175 m and ranged from -12.5 C at a depth of 18 m to -16.3 C at 75 m.

45-1749
Traces of continental glaciation in the area of Tiksi. [Sledy pokrovnogo oledeneniia v raĭone Tiksi],
Grosval'd, M.G., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Jan. 1990, Vol.68, p.115-116, In Russian.
Spektor, V.B.
Glaciation, Paleoclimatology.

45-1750
Recent glaciation of antarctic islands. [Sovremennoe oledenenie priantarkticheskikh ostrovov],
Vinogradov, O.N., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Jan. 1990, Vol.68, p.117-126, In Russian with English summary. 22 refs.
Psareva, T.V.
Glaciation, Ice surveys, Glacier ice, Glacier thickness.
The results of cartographic work determining the glacierization parameters of antarctic islands situated in the zone of widespread icebergs are presented. The paper contains data on the areas of islands proper and the areas of their glacierization, the glacierization extent, ice thickness, and resources in separate marine basins. The area of glaciers makes up 25,566 sq km and the total volume of ice is 5737 cu km of the water equivalent, however this area is about 5 times less than the area of the bodies of similar morphology situated within the ice shelf belt of the continent. Glacier ice is very scarce on the islands in the southern part of the Indian Ocean. The extent of glacierization on the antarctic islands appeared higher than on the polar islands of the Northern Hemisphere, situated in higher latitudes. (Auth. mod.)

45-1751
Dynamics of ice conditions in the coastal zone of Antarctica. [Dinamika ledovykh usloviĭ pribrezhnoĭ zony Antarktiki],
Korotkov, A.I., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Jan. 1990, Vol.68, p.126-133, In Russian with English summary. 11 refs.
Romanov, A.A.
Calving, Ice conditions, Polynyas, Air water interactions, Thermodynamics, Sea ice distribution.
Stationary polynyas play a very important role in the formation of the ice regime in peripheral antarctic seas. This paper deals with their classification based on the seasonal rhythms of their development, which is a complex process of thermodynamic interaction of the ocean with the atmosphere. The predominance of thermal processes over dynamic processes in the formation of polynyas is described. The dynamics of coastal glaciers are among the important agents in polynya formation. Data on their variations for the last 20 years are presented in the paper. The results are based on satellite observations of the development of 110 stationary polynyas near the coasts of Antarctica. The influence of calving of glaciers on the development of polynyas is shown. (Auth. mod.)

45-1752
Hydrothermal regime of the ice-divide area of Austfonna, Nordaustlandet. [Gidrotermicheskiĭ rezhim ledorazdel'noĭ oblasti Vostochnogo ledianogo polia, o. Severo-Vostochnaia Zemlia],
Zagorodnov, V.S., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Jan. 1990, Vol.68, p.133-141, In Russian with English summary. 13 refs.
Sin'kevich, S.A., Arkhipov, S.M.
Glacier ice, Thermal regime, Meltwater, Ice temperature, Seasonal freeze thaw, Active layer, Boreholes, Norway—Svalbard.

45-1753
Oscillations of glaciers in the interior of Tien Shan based on lichenometric data. [Kolebaniia lednikov vnutrennego Tian'-Shania po likhenometricheskim dannym],
Solomina, O.N., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Jan. 1990, Vol.68, p.142-149, In Russian with English summary. 13 refs.
Glacier oscillation, Moraines, Lichens.

45-1754
Possibilities of aerotopographic monitoring of surging glaciers (in the example of Medvezhiy Glacier, Western Pamirs). [Vozmozhnosti aerotopograficheskogo monitoringa pul'siruiushchikh lednikov (na primere lednika Medvezh'ego, zapadnyĭ Pamir)],
Osipova, G.B., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Jan. 1990, Vol.68, p.149-156, In Russian with English summary. 8 refs.
Tsvetkov, D.G., Bondareva, O.A., Morozov, V.IU.
Glacier surges, Mountain glaciers, Aerial surveys, Topographic surveys, Glacier surveys, USSR—Pamirs.

45-1755
Mechanism of self-regulation and attenuation in a glacier catastrophe in the Zailiyskiy Alatau Mountains. [Mekhanizm sderzhivaniia i zatukhaniia lednikovoĭ katastrofy v gorakh Zailiĭskogo Alatau],
Kazanskiĭ, A.B., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Jan. 1990, Vol.68, p.156-164, In Russian with English summary. 12 refs.
Fedulov, I.IA.
Glacier surges, Glacier surfaces, Glacier oscillation, Mountain glaciers, Velocity, Glacier friction, Internal friction, USSR—Zailiyskiy Alatau.

45-1756
Thermodynamics of ice creep. [K termodinamike polzuchesti l'da],
Ivanov, A.I., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Jan. 1990, Vol.68, p.165-169, In Russian with English summary. 7 refs.
Ice creep, Thermodynamics, Ice models, Mathematical models, Ice physics, Ice deformation.

45-1757
Causes of glaciation. [O prichinakh obrazovaniia pokrovnykh oledeneniĭ],
Chernosvitov, P.IU., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Jan. 1990, Vol.68, p.169-174, In Russian with English summary. 19 refs.
Origin, Paleoclimatology, Models, Glaciation, Climatic factors.

45-1758
Mapping the interrelationship between glacial-nival phenomena and human activity. [Kartografirovanie vzaimodeĭstviia nival'no-gliatsial'nykh iavleniĭ i deiatel'nosti cheloveka],
Osokin, N.I., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Jan. 1990, Vol.68, p.177-181, In Russian with English summary. 8 refs.
Gur'eva, L.A.
Human factors, Economic development, Ice conditions, Nivation, Mapping, Snow cover distribution.

45-1759
Experience in drilling boreholes filled with an ethanol-based antifreeze fluid in Antarctica. [Opyt bureniia skvazhin s zalivkoĭ antifriznoĭ zhidkost'iu na osnove etanola v Antarktike],
Morev, V.A., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Jan. 1990, Vol.68, p.181-184, In Russian with English summary. 5 refs.
Manevskiĭ, L.N., IAkovlev, V.M., Zagorodnov, V.S.
Boreholes, Antifreezes, Drilling fluids, Ice cover.
From 1975 to 1988, 9 deep boreholes were drilled in the ice cover and filled with an ethanol-based antifreeze solution. The solution has a specific weight close to that of ice, prevents ice from flowing into the boreholes, has low viscosity, and is nontoxic. It has been shown experimentally that this antifreeze solution can be used in drilling boreholes in glaciers with temperatures below -57 C. The drilling of a deep borehole on Dome B has been started. (Auth. mod.)

45-1760
Studies of polycrystalline ice creep. [Ob izuchenii polzuchesti polikristalicheskogo l'da],
Ivanov, A.I., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Jan. 1990, Vol.68, p.184-188, In Russian with English summary. 3 refs.
Ice creep, Mathematical models, Ice models, Ice physics, Ice deformation, Ice crystal structure.

45-1761
Penetrometer—a new instrument for determining physical-mechanical properties of snow. [Penetrometer—novyĭ pribor dlia opredeleniia fiziko-mekhanicheskikh svoĭstv snega],
Epifanov, V.P., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Jan. 1990, Vol.68, p.188-192, In Russian with English summary. 9 refs.
Snow mechanics, Snow physics, Snow cover stability, Penetrometers.

45-1762
Annotated list of Soviet literature on glaciology for 1987. [Annotirovannyĭ spisok sovetskoĭ literatury po gliatsiologii za 1987 god],
Kotliakov, V.M., ed, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, Jan. 1990, Vol.68, p.193-230, In Russian with English summary. 765 refs.
Chernova, L.P., ed.
Bibliographies, Glaciology.

45-1763
Nonlinear formulation of snow creep.
Olagne, X., et al, *Cold regions science and technology*, Dec. 1990, 19(1), p.1-18, 28 refs.
McClung, D.M.
Snow creep, Snow deformation, Snow loads, Structures, Mathematical models, Rheology, Design criteria, Snow mechanics.

45-1764
Numerical simulations for rare ice gouge depths.
Wang, A.T., *Cold regions science and technology*, Dec. 1990, 19(1), p.19-32, 16 refs.
Sea ice, Ice scoring, Computerized simulation, Design criteria, Forecasting, Offshore structures, Underground pipelines, Ocean bottom.

45-1765
Properties and effect of freezing rain and winter fog on outline insulators.
Farzaneh, M., et al, *Cold regions science and technology*, Dec. 1990, 19(1), p.33-46, 18 refs.
Melo, O.T.
Transmission lines, Ice accretion, Electrical resistivity, Fog, Condensation, Water films, Electrical insulation, Freezing points, Electric charge.

45-1766
Modelling of iceberg drift motions near a large offshore structure.
Isaacson, M., et al, *Cold regions science and technology*, Dec. 1990, 19(1), p.47-58, 12 refs.
McTaggart, K.A.
Icebergs, Drift, Offshore structures, Hydrodynamics, Simulation, Mathematical models, Water waves, Ocean currents, Computer applications.

45-1767
Similitude considerations for roof snow loads.
Giever, P.M., et al, *Cold regions science and technology*, Dec. 1990, 19(1), p.59-71, 20 refs.
Sack, R.L.
Snow loads, Roofs, Snow cover stability, Sliding, Simulation, Forecasting, Physical properties, Models.

45-1768
Model tests of the grounding resistance of fresh and consolidated ice rubble.
Sayed, M., et al, *Cold regions science and technology*, Dec. 1990, 19(1), p.73-82, 11 refs.
Timco, G.W., Frederking, R.M.W.
Grounded ice, Floating ice, Ice pileup, Ice mechanics, Loads (forces), Simulation, Mechanical tests, Dynamic loads, Offshore structures.

45-1769
Measurement of P-T coexistence curve for ice-water mixture.
Nordell, B., *Cold regions science and technology*, Dec. 1990, 19(1), p.83-88, 10 refs.
Ice melting, Ice pressure, Melting points, Thermal expansion, Ice water interface, Ice volume, Compressive properties.

45-1770
Modified Nadreau yield function.
Kormann, J.P., et al, *Cold regions science and technology*, Dec. 1990, 19(1), p.89-92, 2 refs.
Brown, T.G.
Ice strength, Stresses, Compressive properties, Analysis (mathematics), Phase transformations.

45-1771
Ambient concentrations, scavenging ratios, and source regions of acid related compounds and trace metals during winter in northern Michigan.
Cadle, S.H., et al, *Atmospheric environment*, 1990, 24A(12), p.2981-2989, 27 refs.
VandeKopple, R., Mulawa, P.A., Dasch, J.M.
Scavenging, Snow composition, Chemical properties, Sampling, Air pollution, Wind direction, Snow impurities.

45-1772
Surging glacial flows.
Greenberg, J.M., et al, *IMA journal of applied mathematics*, 1990, 45(3), p.195-223, 9 refs.
Shyong, W.
Glacier flow, Glacier surges, Basal sliding, Analysis (mathematics), Mathematical models, Shear stress, Water pressure.

45-1773
Mass balance of the Taku Glacier, Alaska from 1946 to 1986.
Pelto, M.S., et al, *Northwest science*, May 1990, 64(3), p.121-130, 18 refs.
Miller, M.M.
Glacier mass balance, Measurement, Glacier flow, Periodic variations, Accuracy, Climatic changes, United States—Alaska.

45-1774
Proceedings of a workshop to establish Canadian marine oil spill research and development priorities.
Ross, S.L., et al, *Environmental Studies Research Funds. Report*, Apr. 1990, No.106, 48p. + append., With French summary.
Potter, S.G.
Oil spills, Oil recovery, Water pollution, Research projects, Meetings.

45-1775
Experiment on the dynamics of powder snow avalanches in the runout zone. [Experimente zur Dynamik von Staublawinen in der Auslaufzone],
Hermann, F., *Zurich. Eidgenössische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen*, 1990, No.107, 262p., In German with French and English summaries. 32 refs.
Avalanche mechanics, Avalanche modeling.

45-1776
Colloquium on the Dynamics of Natural Hazards and Glaciochemistry, Grenoble, France, Dec. 5-7, 1990.
Colloque Dynamique des risques naturels et glaciochimie, Grenoble, France, Dec. 5-7, 1990, Saint Martin d'Hères, France, CEMAGREF [Centre national du machinisme agricole du génie rural des eaux et des forêts], [1990], Var.p., In French. Refs. passim.
For selected papers see 45-1777 through 45-1796.
Snowdrifts, Blowing snow, Avalanche mechanics, Anemometers, Ice composition, Snow composition, Avalanche modeling.

45-1777
Winter problems associated with the existence of active eolian dunes in the blueberry fields of Quebec. [Problèmes hivernaux liés à l'existence de dunes éoliennes actives dans les bleuetières du Québec],
Lemieux, G.H., et al, Colloque Dynamique des risques naturels et glaciochimie, Grenoble, France, Dec. 5-7, 1990 (Colloquium on the Dynamics of Natural Hazards and Glaciochemistry, Grenoble, France, Dec. 5-7, 1990), Saint Martin d'Hères, France, CEMAGREF [Centre national du machinisme agricole du génie rural des eaux et des forêts], [1990], p.1/2-1/11, In French. 10 refs.
Verreault, R., Perron, S.
Eolian soils, Soil stabilization, Snow fences, Soil erosion, Wind erosion, Snow retention.

45-1778
Testing of windbreak models under natural blowing snow conditions in Quebec. [Essai de maquettes brise-vent dans des conditions naturelles de poudrerie au Québec],
Verreault, R., et al, Colloque Dynamique des risques naturels et glaciochimie, Grenoble, France, Dec. 5-7, 1990 (Colloquium on the Dynamics of Natural Hazards and Glaciochemistry, Grenoble, France, Dec. 5-7, 1990), Saint Martin d'Hères, France, CEMAGREF [Centre national du machinisme agricole du génie rural des eaux et des forêts], [1990], p.1/12-1/18, In French. 3 refs.
Vachon, G., Taillandier, J.M.
Blowing snow, Windbreaks, Snow fences.

45-1779
Numerical models of wind. [Les modèles numériques de vent],
Solignac, C., Colloque Dynamique des risques naturels et glaciochimie, Grenoble, France, Dec. 5-7, 1990 (Colloquium on the Dynamics of Natural Hazards and Glaciochemistry, Grenoble, France, Dec. 5-7, 1990), Saint Martin d'Hères, France, CEMAGREF [Centre national du machinisme agricole du génie rural des eaux et des forêts], [1990], p.1/19-1/26, In French with English summary. 3 refs.
Wind (meteorology), Blowing snow, Mathematical models.

45-1780
Implementation of anemographic methods in the region of Lioran, France. [Implantation de méthodes anémographiques dans la region du Lioran (France)],
Taillandier, J.M., et al, Colloque Dynamique des risques naturels et glaciochimie, Grenoble, France, Dec. 5-7, 1990 (Colloquium on the Dynamics of Natural Hazards and Glaciochemistry, Grenoble, France, Dec. 5-7 1990), Saint Martin d'Hères, France, CEMAGREF [Centre national du machinisme agricole du génie rural des eaux et des forêts], [1990], p.1/27-1/33, In French. 2 refs.
Verreault, R., Lemieux, G.H.
Anemometers, Blowing snow.

45-1781
Aerial anemography applied to the mapping of nocturnal circulation of cold air in a blueberry field. [L'anémographie aérienne appliquée à la cartographie de la circulation nocturne d'air froid dans une bleuetière],
Verreault, R., et al, Colloque Dynamique des risques naturels et glaciochimie, Grenoble, France, Dec. 5-7, 1990 (Colloquium on the Dynamics of Natural Hazards and Glaciochemistry, Grenoble, France, Dec. 5-7, 1990), Saint Martin d'Hères, France, CEMAGREF [Centre national du machinisme agricole du génie rural des eaux et des forêts], [1990], p.1/34-1/42, In French. 8 refs.
Lemieux, G.H.
Anemometers, Wind (meteorology), Mapping, Air flow, Air temperature.

45-1782
Three-dimensional measurement of the wind velocity vector. [Mesure en trois dimensions du vecteur vitesse du vent],
Gay, M., et al, Colloque Dynamique des risques naturels et glaciochimie, Grenoble, France, Dec. 5-7, 1990 (Colloquium on the Dynamics of Natural Hazards and Glaciochemistry, Grenoble, France, Dec. 5-7, 1990), Saint Martin d'Hères, France, CEMAGREF [Centre national du machinisme agricole du génie rural des eaux et des forêts], [1990], p.1/43-1/49, In French with English summary.
Villemain, P., Journe, P.
Wind velocity, Anemometers, Acoustic measurement, Snow cover effect.

45-1783
Protection of alpine highways from snowdrifts. [Protection des routes alpines contre les congères],
Hertig, J.A., Colloque Dynamique des risques naturels et glaciochimie, Grenoble, France, Dec. 5-7, 1990 (Colloquium on the Dynamics of Natural Hazards and Glaciochemistry, Grenoble, France, Dec. 5-7, 1990), Saint Martin d'Hères, France, CEMAGREF [Centre national du machinisme agricole du génie rural des eaux et des forêts], [1990], p.1/50-1/64, In French. 4 refs.
Snowdrifts, Road maintenance, Blowing snow.

45-1784
Transport of snow by wind in mountains: field and laboratory measurements, preliminary modeling. [Transport de la neige par le vent en montagne: mesure sur site et en laboratoire, premiere modelisation],
Castelle, T., et al, Colloque Dynamique des risques naturels et glaciochimie, Grenoble, France, Dec. 5-7, 1990 (Colloquium on the Dynamics of Natural Hazards and Glaciochemistry, Grenoble, France, Dec. 5-7, 1990), Saint Martin d'Hères, France, CEMAGREF [Centre national du machinisme agricole du génie rural des eaux et des forêts], [1990], p.1/65-1/83, In French. 9 refs.
Clappier, A., Roussel, M.
Blowing snow, Wind factors, Mathematical models, Mountains.

45-1785
Study on transportability conditions of snow at a high mountain site. [Etude des conditions de transportabilité de la neige sur un site de haute montagne],
Guyomarc'h, G., et al, Colloque Dynamique des risques naturels et glaciochimie, Grenoble, France, Dec. 5-7, 1990 (Colloquium on the Dynamics of Natural Hazards and Glaciochemistry, Grenoble, France, Dec. 5-7, 1990), Saint Martin d'Hères, France, CEMAGREF [Centre national du machinisme agricole du génie rural des eaux et des forêts], [1990], p.1/84-1/92, In French.
Merindol, L.
Blowing snow, Wind factors, Mountains.

45-1786
Two-phase wind-tunnel study on snow transport by wind. [Etude en soufflerie diphasique du transport de la neige par le vent],
Naaim, F., Colloque Dynamique des risques naturels et glaciochimie, Grenoble, France, Dec. 5-7, 1990 (Colloquium on the Dynamics of Natural Hazards and Glaciochemistry, Grenoble, France, Dec. 5-7, 1990), Saint Martin d'Hères, France, CEMAGREF [Centre national du machinisme agricole du génie rural des eaux et des forêts], [1990], p.1/93-1/103, In French with English summary. 9 refs.
Blowing snow, Snowdrifts, Wind factors, Wind tunnels, Mathematical models, Snow fences.

45-1787
CLER expert system for snowdrifts. [Aide à l'expertise dans le domaine des congères, le système C.L.E.R.],
Moutte, F., Colloque Dynamique des risques naturels et glaciochimie, Grenoble, France, Dec. 5-7, 1990 (Colloquium on the Dynamics of Natural Hazards and Glaciochemistry, Grenoble, France, Dec. 5-7, 1990), Saint Martin d'Hères, France, CEMAGREF [Centre national du machinisme agricole du génie rural des eaux et des forêts], [1990], p.1/104-1/113, In French with English summary. 5 refs.
Snowdrifts, Computer applications.

45-1788
Numerical modeling of the surface hydrodynamic effects generated by an avalanche into a lake. [Modélisation numérique des effets hydrodynamiques de surface provoqués par la chute d'une avalanche dans un lac],
Naaim, M., et al, Colloque Dynamique des risques naturels et glaciochimie, Grenoble, France, Dec. 5-7, 1990 (Colloquium on the Dynamics of Natural Hazards and Glaciochemistry, Grenoble, France, Dec. 5-7, 1990), Saint Martin d'Hères, France, CEMAGREF [Centre national du machinisme agricole du génie rural des eaux et des forêts], [1990], p.2/8-2/16, In French with English summary. 5 refs.
Maciel, G.D.F.
Water waves, Avalanche mechanics, Lakes, Mathematical models, Avalanche models, Wave propagation.

45-1789
Experimental study on discontinuous gravity currents; application to powder avalanches and turbidity currents. [Etude expérimentale des courants de gravité discontinus; application aus avalanches poudreuses et aux courants de turbidite],
Beghin, P., Colloque Dynamique des risques naturels et glaciochimie, Grenoble, France, Dec. 5-7, 1990 (Colloquium on the Dynamics of Natural Hazards and Glaciochemistry, Grenoble, France, Dec. 5-7, 1990), Saint Martin d'Hères, France, CEMAGREF [Centre national du machinisme agricole du génie rural des eaux et des forêts], [1990], p.2/17-2/24, In French with English summary. 10 refs.
Avalanche mechanics, Avalanche modeling, Mathematical models, Turbulent flow.

45-1790
Dynamics of granular motion. [Considération sur la dynamique des mouvements granulaires],
Locat, J., et al, Colloque Dynamique des risques naturels et glaciochimie, Grenoble, France, Dec. 5-7, 1990 (Colloquium on the Dynamics of Natural Hazards and Glaciochemistry, Grenoble, France, Dec. 5-7, 1990), Saint Martin d'Hères, France, CEMAGREF [Centre national du machinisme agricole du génie rural des eaux et des forêts], [1990], p.2/42-2/48, In French. 10 refs.
Norem, H.
Avalanche mechanics, Landslides, Analysis (mathematics).

45-1791
ELSA, a knowledge-based system to analyze avalanche paths. [ELSA, un système à base de connaissance pour l'analyse des sites avalancheux],
Buisson, L., et al, Colloque Dynamique des risques naturels et glaciochimie, Grenoble, France, Dec. 5-7, 1990 (Colloquium on the Dynamics of Natural Hazards and Glaciochemistry, Grenoble, France, Dec. 5-7, 1990), Saint Martin d'Hères, France, CEMAGREF [Centre national du machinisme agricole du génie rural des eaux et des forêts], [1990], p.2/60-2/67, In French. 8 refs.
Charlier, C.
Avalanche forecasting, Avalanche modeling, Computer applications.

45-1792
Saint-Venant model for studying snow avalanches. [Présentation d'un modèle de St Venant pour l'étude des avalanches de neige],
Martinet, G., Colloque Dynamique des risques naturels et glaciochimie, Grenoble, France, Dec. 5-7, 1990 (Colloquium on the Dynamics of Natural Hazards and Glaciochemistry, Grenoble, France, Dec. 5-7, 1990), Saint Martin d'Hères, France, CEMAGREF [Centre national du machinisme agricole du génie rural des eaux et des forêts], [1990], p.2/68-2/75, In French with English summary. 12 refs.
Avalanche modeling, Mathematical models.

45-1793
Study on snow chemistry in Canada: research in progress and prospects. [Etude de la chimie de la neige au Canada: recherche en cours et perspectives],
Jones, H.G., Colloque Dynamique des risques naturels et glaciochimie, Grenoble, France, Dec. 5-7, 1990 (Colloquium on the Dynamics of Natural Hazards and Glaciochemistry, Grenoble, France, Dec. 5-7, 1990), Saint Martin d'Hères, France, CEMAGREF [Centre national du machinisme agricole du génie rural des eaux et des forêts], [1990], p.3/5-3/12, In French. 20 refs.
Snow composition, Snow surveys, Pollution, Snow impurities, Research projects, Canada.

45-1794
Physico-chemical and pollen composition of the Canadian arctic ice cap. [Composition physico-chimique et pollinique des calottes de glace de l'Arctique canadien],
Bourgeois, J.C., et al, Colloque Dynamique des risques naturels et glaciochimie, Grenoble, France, Dec. 5-7, 1990 (Colloquium on the Dynamics of Natural Hazards and Glaciochemistry, Grenoble, France, Dec. 5-7, 1990), Saint Martin d'Hères, France, CEMAGREF [Centre national du machinisme agricole du génie rural des eaux et des forêts], [1990], p.3/15-3/21, In French. 17 refs.
Fisher, D.A.
Ice composition, Pollen, Glacier ice, Ice surveys, Canada.

45-1795
Using the radioactive reference horizon from Chernobyl to measure snow accumulation in the Northern Hemisphere. [Utilisation du repère radioactif tchernobyl pour les mesures d'accumulation de neige dans l'hemisphere nord],
Pourchet, M., et al, Colloque Dynamique des risques naturels et glaciochimie, Grenoble, France, Dec. 5-7, 1990 (Colloquium on the Dynamics of Natural Hazards and Glaciochemistry, Grenoble, France, Dec. 5-7, 1990), Saint Martin d'Hères, France, CEMAGREF [Centre national du machinisme agricole du génie rural des eaux et des forêts], [1990], p.3/22-3/27, In French. 11 refs.
Pinglot, J.F.
Radioactive age determination, Fallout, Ice dating, Glacier alimentation, Snow accumulation, Snow stratigraphy.

45-1796
Medium depth cores. [Les carottages à moyenne profondeur],
Rado, C., Colloque Dynamique des risques naturels et glaciochimie, Grenoble, France, Dec. 5-7, 1990 (Colloquium on the Dynamics of Natural Hazards and Glaciochemistry, Grenoble, France, Dec. 5-7, 1990), Saint Martin d'Hères, France, CEMAGREF [Centre national du machinisme agricole du génie rural des eaux et des forêts], [1990], p.3/28-3/30, In French.
10 refs.
Ice coring drills.

45-1797
Passive microwave remote sensing contribution to hydrological variables.
Choudhury, B.J., *Surveys in geophysics*, Mar. 1991, 12(1-3), p.63-84, 38 refs.
Hydrology, Remote sensing, Microwaves, Soil water, Snow water equivalent, Radiometry, Brightness, Vegetation.

45-1798
3-D model for the antarctic ice sheet: a sensitivity study on the glacial-interglacial contrast.
Huybrechts, P., *Climate dynamics*, Dec. 1990, 5(2), p.79-92, 50 refs.
Ice sheets, Glacier oscillation, Climatic factors, Ice models, Ice volume, Sea level, Mathematical models, Grounded ice, Basal sliding.
In this paper, a 3-D time-dependent thermomechanical model for the entire antarctic ice sheet is presented, and is used to examine the effects of glacial-interglacial shifts in environmental boundary conditions on its geometry. The model takes into account a coupled ice shelf, grounding-line dynamics, basal sliding and isostatic bed adjustment, and considers the fully coupled velocity and temperature fields. Ice flow is calculated on a fine mesh for grounded and floating ice and a stress transition zone in between at the grounding line, where all stress components contribute in the effective stress in the flow law. There is free interaction between ice sheet and ice shelf, so that the entire geometry is internally generated. Sensitivity experiments are then performed, in which lower temperatures, reduced accumulation rates and lower global sea level stands are imposed, either singly or in combination. By comparing results of pairs of experiments, the effects of each of these changes can be determined. In agreement with glacial-geological evidence, it is found that the most pronounced changes show up in the West Antarctic ice sheet configuration. They appear to be essentially controlled by variations in eustatic sea level, whereas typical glacial-interglacial changes in temperature and ice deposition rates tend to balance one another. These findings support the hypothesis that the antarctic ice sheet basically follows glacial episodes in the Northern Hemisphere by means of sea-level teleconnections. Grounding occurs more readily in the Weddell Sea than in the Ross Sea and long time scales appear to be involved: it may take up to 40,000 years for these continental shelf areas to become completely grounded after an initial stepwise perturbation in boundary conditions. According to these reconstructions, a steady state antarctic ice sheet may contribute some 16 m to global sea level lowering at maximum glaciation. (Auth. mod.)

45-1799
Response of the antarctic ice sheet to future greenhouse warming.
Huybrechts, P., et al, *Climate dynamics*, Dec. 1990, 5(2), p.93-102, 25 refs.
Oerlemans, J.
Ice sheets, Glacier mass balance, Periodic variations, Climatic factors, Air temperature, Sea level, Ice models, Grounded ice.
This paper deals with the response of the antarctic ice sheet and presents a tentative projection of changes in global sea level for the next few hundred years, due to changes in its surface mass balance. A temperature scenario is imposed in which surface air temperature rises to 4.2 C in the year 2100 AD and is kept constant afterwards. As GCM studies seem to indicate a higher temperature increase in polar latitudes, the response to a more extreme scenario (warming doubled) has also been investigated. The mass balance model, driven by these temperature perturbations, consists of two parts: the accumulation rate is derived from present observed values and is consequently perturbed in proportion to the saturated vapor pressure at the temperature above the inversion layer. The ablation model is based on the degree-day method. It accounts for the daily temperature cycle, uses a different degree-day factor for snow and ice melting and treats refreezing of melt water in a simple way. According to this mass balance model, the amount of accumulation over the entire ice sheet is presently 2,406,000,000,000 cu m of ice, and no runoff takes place. A 1 C uniform warming is then calculated to increase the overall mass balance by an amount of 143,000,000,000 cu m of ice, corresponding to a lowering of global sea level by 0.36 mm/yr. A temperature increase of 5.3 C is needed for the increase in ablation to become more important than the increase in accumulation and the temperature would have to rise by as much as 11.4 C to produce a zero surface mass balance. Imposing the Bellagio-scenario and accumulating changes in mass balance forward in time (static response) would then lower global sea level by 9 cm by 2100 AD. In a subsequent run with a high-resolution 3-D thermomechanic model of the ice sheet, it turns out that the dynamic response of the ice sheet (as compared to the direct effect of the changes in surface mass balance) becomes significant after 100 years or so. Ice-discharge across the grounding-line increases, and eventually leads to grounding-line retreat. This is particularly evident in the extreme case scenario and is important along the Antarctic Peninsula and the overdeepened outlet glaciers along the East Antarctic coast. Grounding-line retreat in the Ross and Ronne-Filchner ice shelves, on the other hand, is small or absent. (Auth. mod.)

45-1800
Model of late Pleistocene ice sheet growth with realistic geography and simplified cryodynamics and geodynamics.
Deblonde, G., et al, *Climate dynamics*, Dec. 1990, 5(2), p.103-110, 28 refs.
Peltier, W.R.
Ice sheets, Ice models, Glacier mass balance, Periodic variations, Paleoclimatology, Pleistocene, Solar radiation, Ice volume.

45-1801
Sea-ice anomalies observed in the Greenland and Labrador Seas during 1901-1984 and their relation to an interdecadal arctic climate cycle.
Mysak, L.A., et al, *Climate dynamics*, Dec. 1990, 5(2), p.111-133, 81 refs.
Manak, D.K., Marsden, R.F.
Sea ice distribution, Periodic variations, Sea water, Salinity, Climatic changes, Statistical analysis, Hydrography, Air temperature, Greenland Sea.

45-1802
Rapid development of high ice particle concentrations in small polar maritime cumuliform clouds.
Hobbs, P.V., et al, *Journal of the atmospheric sciences*, Nov. 15, 1990, 47(22), p.2710-2722, 29 refs.
Rangno, A.L.
Clouds (meteorology), Ice crystal growth, Distribution, Sampling, Cloud physics, Microstructure, Nucleation.

45-1803
Scheme for parameterizing ice-cloud water content in general circulation models.
Heymsfield, A.J., et al, *Journal of the atmospheric sciences*, Aug. 1, 1990, 47(15), p.1865-1877, 39 refs.
Donner, L.J.
Clouds (meteorology), Ice crystal optics, Ice crystal growth, Water content, Atmospheric composition, Mathematical models, Supersaturation, Ice sublimation.

45-1804
Physics of supercooling of thin water skins covering gyrating hailstones.
List, R., *Journal of the atmospheric sciences*, Aug. 1, 1990, 47(15), p.1919-1925, 10 refs.
Hailstone growth, Ice accretion, Water films, Heat transfer, Supercooling, Spongy ice, Surface temperature, Ice water interface.

45-1805
Comments on "Physics of supercooling of thin water skins covering gyrating hailstones".
Knight, C.A., et al, *Journal of the atmospheric sciences*, Jan. 1, 1991, 48(1), p.217-220, Includes reply. 10 refs. For paper being commented on see 45-1805.
List, L.
Hailstone growth, Supercooling, Water films, Heat transfer, Spongy ice, Ice water interface.

45-1806
Wave-induced drift force in the marginal ice zone.
Masson, D., *Journal of physical oceanography*, Jan. 1991, 21(1), p.3-10, 18 refs.
Ice floes, Ice edge, Drift, Water waves, Hydrodynamics, Analysis (mathematics), Spectra, Wind factors.

45-1807
Numerical modeling of ocean circulation and ice cover over the continental shelf.
Ikeda, M., *Journal of physical oceanography*, Jan. 1991, 21(1), p.97-117, 25 refs.
Sea ice distribution, Ocean currents, Wind factors, Periodic variations, Mathematical models, Ice water interface, Bottom topography, Heat balance.

45-1808
Geomorphic processes above timberline in the Spanish Pyrenees.
Garcia-Ruiz, J.M., et al, *Mountain research and development*, Aug. 1990, 10(3), p.201-214, With French, German and Spanish summaries. 47 refs.
Alvera, B., Del Barrio, G., Puigdefabregas, J.
Mountain soils, Periglacial processes, Slope processes, Geomorphology, Quaternary deposits, Forest lines, Spain, Pyrenees.

45-1809
Turbulent transfer over snow and ice.
Morris, E.M., *Journal of hydrology*, 1989, Vol.105, p.205-223, Refs. p.221-223.
Snow air interface, Ice air interface, Turbulent exchange, Models.
This paper is a review of the literature on turbulent transfer processes over snow and ice surfaces. Current techniques for modelling these transfers for hydrological purposes are discussed. Literature cited includes studies carried out in Antarctica and the subantarctic islands. (Auth. mod.)

45-1810
1989-90 Australian Antarctic Research Program. Initial summary research activity.
Australia. Antarctic Division, Kingston, Tasmania, 1990, 152p.
Research projects, Expeditions.
Brief summaries are provided of research conducted during the 1988 winter and 1989-90 summer by ANARE in chemistry, earth sciences, logistics, environmental studies, glaciology, history, human biology and medicine, life sciences, mapping, meteorology, oceanography, physics, and political sciences. Each summary shows, with variations, title, principal investigator with affiliation, location of research site, project description, aim of research, field work carried out, difficulties encountered, significance of findings, planned dissemination of results, and collections acquired. Following the summaries are two appendices: an index by author, and names and addresses of principal investigators.

45-1811
Concrete in marine environment.
International Conference on Performance of Concrete in Marine Environment, 2nd, St. Andrews by-the-Sea, N.B., Canada, Aug. 21-26, 1988, ACI Special publication, SP 109, Detroit, American Concrete Institute, 1988, 739p., Refs. passim. For selected papers see 44-1738 through 44-1740 and 45-1812 through 45-1817.
Malhotra, V.M., ed.
Concrete durability, Freeze thaw cycles, Offshore structures, Ice loads, Concrete strength, Corrosion.

45-1812
Current status of CANMET's studies on the durability of concrete containing supplementary cementing materials in marine environment.
Malhotra, V.M., et al, International Conference on Performance of Concrete in Marine Environment, 2nd, St. Andrews by-the-Sea, N.B., Canada, Aug. 21-26, 1988. Proceedings. ACI Special publication SP-109. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1988, p.31-72, 5 refs.
Carette, G.G., Bremner, T.W.
Concrete durability, Concrete admixtures, Freeze thaw cycles, Offshore structures, Cements, Concrete strength.

45-1813
Deterioration and rehabilitation of berth faces in tidal zones at the Port of Saint John.
Gilbride, P., et al, International Conference on Performance of Concrete in Marine Environment, 2nd, St. Andrews by-the-Sea, N.B., Canada, Aug. 21-26, 1988. Proceedings. ACI Special publication SP-109. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1988, p.199-225, 9 refs.
Morgan, D.R., Bremner, T.W.
Concrete durability, Wharves, Freeze thaw cycles, Concrete strength, Maintenance.

45-1814
Steel fiber reinforced concrete jackets for repairing concrete piles.
Khanna, J., et al, International Conference on Performance of Concrete in Marine Environment, 2nd, St. Andrews by-the-Sea, N.B., Canada, Aug. 21-26, 1988. Proceedings. ACI Special publication SP-109. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1988, p.227-252.
Gilbride, P., Whitcomb, R.
Reinforced concretes, Concrete piles, Freeze thaw cycles, Concrete strength, Maintenance.

45-1815
Investigations of distress in precast concrete piles at Rodney Terminal, Saint John, New Brunswick.
Khanna, J., et al, International Conference on Performance of Concrete in Marine Environment, 2nd, St. Andrews by-the-Sea, N.B., Canada, Aug. 21-26, 1988. Proceedings. ACI Special publication SP-109. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1988, p.277-320.
Seabrook, P., Gerwick, B.C., Jr., Bickley, J.
Concrete piles, Concrete durability, Freeze thaw cycles, Precast concretes, Wharves, Concrete strength.

45-1816
Design and behavior of composite ice-resisting walls.
Adams, P.F., et al, International Conference on Performance of Concrete in Marine Environment, 2nd, St. Andrews by-the-Sea, N.B., Canada, Aug. 21-26, 1988. Proceedings. ACI Special publication SP-109. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1988, p.457-479, 21 refs. For another version see 42-3596.
Zimmerman, T.J.E., MacGregor, J.G.
Offshore structures, Concrete strength, Ice loads, Walls, Concrete slabs, Reinforced concretes, Analysis (mathematics).

45-1817
Pumping of lightweight concrete using non-presoaked lightweight aggregate.
Yonezawa, T., et al, International Conference on Performance of Concrete in Marine Environment, 2nd, St. Andrews by-the-Sea, N.B., Canada, Aug. 21-26, 1988. Proceedings. ACI Special publication SP-109. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1988, p.625-654, 3 refs.
Concrete placing, Concrete aggregates, Freeze thaw cycles, Concrete durability, Offshore structures, Lightweight concretes.

45-1818
[Proceedings].
Lewis H. Tuthill International Symposium on Concrete and Concrete Construction, Seattle, Nov. 9-13, 1987, ACI Special publication SP-104, Detroit, American Concrete Institute, 1987, 350p., Refs. passim. For selected papers see 45-1819 through 45-1822.
Halvorsen, G.T., ed.
Concrete strength, Winter concreting, Concrete curing, Concrete admixtures, Concrete placing.

45-1819
Superplasticizers, pozzolans, and granulated blast-furnace slags in concretes: a review.
Malhotra, V.M., Lewis H. Tuthill International Symposium on Concrete and Concrete Construction, Seattle, Nov. 9-13, 1987. ACI Special publication SP-104. Edited by G.T. Halvorsen, Detroit, American Concrete Institute, 1987, p.63-88, 17 refs.
Concrete admixtures, Concrete strength, Frost resistance, Water cement ratio.

45-1820
Curing of concrete.
Mather, B., Lewis H. Tuthill International Symposium on Concrete and Concrete Construction, Seattle, Nov. 9-13, 1987. ACI Special publication SP-104. Edited by G.T. Halvorsen, Detroit, American Concrete Institute, 1987, p.145-159, 16 refs.
Concrete curing, Concrete strength, Winter concreting.

45-1821
Development of high-strength concrete technology and application in Norway.
Maage, M., Lewis H. Tuthill International Symposium on Concrete and Concrete Construction, Seattle, Nov. 9-13, 1987. ACI Special publication SP-104. Edited by G.T. Halvorsen, Detroit, American Concrete Institute, 1987, p.161-183, 9 refs.
Concrete strength, Offshore structures, Freeze thaw cycles.

45-1822
Controlling concrete during hot and cold weather.
Scanlon, J.M., Lewis H. Tuthill International Symposium on Concrete and Concrete Construction, Seattle, Nov. 9-13, 1987. ACI Special publication SP-104. Edited by G.T. Halvorsen, Detroit, American Concrete Institute, 1987, p.241-259, 9 refs.
Winter concreting, Concrete strength, Concrete curing.

45-1823
Conditions and processes of the cryogenic migration of substances. Collected scientific articles. [Usloviia i protsessy kriogennoĭ migratsii veshchestva. Sbornik nauchnykh statei],
Romanov, V.P., ed, IAkutsk, Institut merzlotovedeniia SO AN SSSR, 1989, 175p., In Russian. Refs. passim.
For selected papers see 45-1824 through 45-1837.
Geocryology, Geochemistry, Cryogenic soils, Moisture transfer, Frozen rocks, Soil water migration, Mathematical models.

45-1824
Experimental investigations of moisture transfer and ice formation in freezing, water-saturated, finely dispersed soil. [Eksperimental'nye issledovaniia vlagoperenosa i l'dovydeleniia v promerzaiushchem vodonasyshchennom tonkodispersnom grunte],
Kazanskiĭ, O.A., Usloviia i protsessy kriogennoĭ migratsii veshchestva. Sbornik nauchnykh statei (Conditions and processes of the cryogenic migration of substances. Collected scientific articles). Edited by V.P. Romanov, IAkutsk, Institut merzlotovedeniia SO AN SSSR, 1989, p.3-13, In Russian. 9 refs.
Moisture transfer, Frost heave, Ice formation, Cryogenic soils.

45-1825
Algorithm for solving the Stefan problem for saline soils, freezing at subzero temperatures. [Algoritm resheniia zadachi Stefana dlia zasolennykh gruntov, promerzaiushchikh v spektre otritsatel'nykh temperatur],
Tetel'baum, A.S., Usloviia i protsessy kriogennoĭ migratsii veshchestva. Sbornik nauchnykh statei (Conditions and processes of the cryogenic migration of substances. Collected scientific articles). Edited by V.P. Romanov, IAkutsk, Institut merzlotovedeniia SO AN SSSR, 1989, p.13-24, In Russian. 3 refs.
Stefan problem, Saline soils, Unfrozen water content, Analysis (mathematics), Cryogenic soils, Phase transformations.

45-1826
Heat-moisture-salt regime of frozen ground during fall moisture-loading watering. [Teplovlagosolevoĭ rezhim merzlotnogo grunta pri osennem vlagozariadkovom polive],
Ivanov, V.A., et al, Usloviia i protsessy kriogennoĭ migratsii veshchestva. Sbornik nauchnykh statei (Conditions and processes of the cryogenic migration of substances. Collected scientific articles). Edited by V.P. Romanov, IAkutsk, Institut merzlotovedeniia SO AN SSSR, 1989, p.24-36, In Russian. 5 refs.
Frozen ground, Mathematical models, Active layer, Ground thawing, Heat transfer, Moisture transfer, Saline soils.

45-1827
Role of cryogenesis in the formation of ground water in ore deposits. [Rol' kriogeneza v formirovanii nadmerzlotnykh vod rudnykh mestorozhdeniĭ],
Makarov, V.N., Usloviia i protsessy kriogennoĭ migratsii veshchestva. Sbornik nauchnykh statei (Conditions and processes of the cryogenic migration of substances. Collected scientific articles). Edited by V.P. Romanov, IAkutsk, Institut merzlotovedeniia SO AN SSSR, 1989, p.37-55, In Russian. 15 refs.
Geocryology, Ground water, Water chemistry, Mining, Cryogenic soils.

45-1828
Chemical phenomena in the process of cryogenic erosion of andesite. [Khimicheskie iavleniia v protsesse kriogennogo vyvetrivaniia andezitov],
Gurevich, V.M., et al, Usloviia i protsessy kriogennoĭ migratsii veshchestva. Sbornik nauchnykh statei (Conditions and processes of the cryogenic migration of substances. Collected scientific articles). Edited by V.P. Romanov, IAkutsk, Institut merzlotovedeniia SO AN SSSR, 1989, p.56-67, In Russian. 8 refs.
Zobachev, V.A.
Geocryology, Freeze thaw cycles, Ions, Rock mechanics.

45-1829
Formation of the chemical composition of meltwater. [Formirovanie khimicheskogo sostava talykh vod],
Ivanov, A.V., Usloviia i protsessy kriogennoĭ migratsii veshchestva. Sbornik nauchnykh statei (Conditions and processes of the cryogenic migration of substances. Collected scientific articles). Edited by V.P. Romanov, IAkutsk, Institut merzlotovedeniia SO AN SSSR, 1989, p.67-83, In Russian. 40 refs.
Meltwater, Chemical composition, Snowmelt, Snow composition, Ice composition, Mathematical models.

45-1830
Laboratory investigations of the deterioration of ice and frozen rock monoliths by brines.
Laboratornye issledovaniia razrusheniia l'da i ledoporodnykh monolitov rassolami, Usloviia i protsessy kriogennoĭ migratsii veshchestva. Sbornik nauchnykh statei (Conditions and processes of the cryogenic migration of substances. Collected scientific articles). Edited by V.P. Romanov, IAkutsk, Institut merzlotovedeniia SO AN SSSR, 1989, p.83-95, In Russian. 6 refs.
Brines, Ice deterioration, Frozen rocks, Rock mechanics.

45-1831
Mathematical model of periodically stabilizing variations of a phase front in an experimental sample. [Matematicheskaia model' periodicheski ustanovivshchikhsia kolebaniĭ fazovogo fronta v eksperimental'nom obraztse],
Tetel'baum, A.S., et al, Usloviia i protsessy kriogennoĭ migratsii veshchestva. Sbornik nauchnykh statei (Conditions and processes of the cryogenic migration of substances. Collected scientific articles). Edited by V.P. Romanov, IAkutsk, Institut merzlotovedeniia SO AN SSSR, 1989, p.96-99, In Russian. 2 refs.
Kim-Men-Ga, L.V.
Mathematical models, Phase transformations, Stefan problem, Soil temperature, Cryogenic soils.

45-1832
Interaction of a gold chloride complex with the surface of dispersed ice. [O vzaimodeĭstvii khloridnogo kompleksa zolota (III) s poverkhnost'iu dispersnogo l'da],
Fedoseeva, V.I., et al, Usloviia i protsessy kriogennoĭ migratsii veshchestva. Sbornik nauchnykh statei (Conditions and processes of the cryogenic migration of substances. Collected scientific articles). Edited by V.P. Romanov, IAkutsk, Institut merzlotovedeniia SO AN SSSR, 1989, p.110-117, In Russian. 5 refs.
Fedoseev, N.F.
Ice surface, Adsorption, Ice mechanics.

45-1833
Characteristics of prospecting for man-induced cryopegs in the region of the lower terraces above the floodplain of the Lena River in the Yakutsk city region, using transient processes. [Osobennosti poiska tekhnogennykh kriopegov v raĭone nizkikh nadpoĭmennykh terras r. Leny v raĭone g. IAkutska metodom perekhodnykh protsessov],
Nim, IU.A., Usloviia i protsessy kriogennoĭ migratsii veshchestva. Sbornik nauchnykh statei (Conditions and processes of the cryogenic migration of substances. Collected scientific articles). Edited by V.P. Romanov, IAkutsk, Institut merzlotovedeniia SO AN SSSR, 1989, p.117-130, In Russian. 6 refs.
Geocryology, Electromagnetic prospecting, Mapping, Quaternary deposits, Taliks, Mathematical models, Brines.

45-1834
Zonality of the distribution of chemical elements in terrigenous rocks. [O zonal'nosti raspredeleniia khimicheskikh elementov v terrigennykh porodakh],
Tumanov, V.R., Usloviia i protsessy kriogennoĭ migratsii veshchestva. Sbornik nauchnykh statei (Conditions and processes of the cryogenic migration of substances. Collected scientific articles). Edited by V.P. Romanov, IAkutsk, Institut merzlotovedeniia SO AN SSSR, 1989, p.130-141, In Russian. 8 refs.
Frozen rocks, Rock properties, Chemical composition, Distribution.

45-1835
Specific characteristics of the structure of primary geochemical aureoles of kimberlites in the cryolithozone. [Spetsificheskie osobennosti struktury pervichnykh geokhimicheskikh oreolov kimberlitov v kriolitozone],
IAgnyshev, B.S., Usloviia i protsessy kriogennoĭ migratsii veshchestva. Sbornik nauchnykh statei (Conditions and processes of the cryogenic migration of substances. Collected scientific articles). Edited by V.P. Romanov, IAkutsk, Institut merzlotovedeniia SO AN SSSR, 1989, p.142-153, In Russian. 10 refs.
Lithology, Microelement content, Geochemistry, Geocryology.

45-1836
Development of the Lena River basin in the Late Cenozoic (based on analysis of the migration conditions of crust material in the cryolithozone). [K razvitiiu basseĭna reki Leny v pozdnem kaĭnozoe (na osnove analiza usloviĭ perenosa oblomochnogo materiala v kriolitozone)],
Grigor'ev, M.N., et al, Usloviia i protsessy kriogennoĭ migratsii veshchestva. Sbornik nauchnykh statei (Conditions and processes of the cryogenic migration of substances. Collected scientific articles). Edited by V.P. Romanov, IAkutsk, Institut merzlotovedeniia SO AN SSSR, 1989, p.153-161, In Russian. 11 refs.
Davidenko, N.M., Kostiukevich, V.V., Uritskiĭ, IU.F.
River basins, Geocryology.

45-1837
Formation of the isotopic-oxygen composition of structure-forming ice of the active (seasonally thawing) layer. [Formirovanie izotopno-kislorodnogo sostava teksturoobrazuiushchikh l'dov deiatel'nogo (sezonno-talogo) sloia],
Mikhalev, D.V., Usloviia i protsessy kriogennoĭ migratsii veshchestva. Sbornik nauchnykh statei (Conditions and processes of the cryogenic migration of substances. Collected scientific articles). Edited by V.P. Romanov, IAkutsk, Institut merzlotovedeniia SO AN SSSR, 1989, p.162-169, In Russian. 5 refs.
Active layer, Oxygen isotopes, Ice physics, Ice air interface, Moisture transfer, Phase transformations, Soil water migration.

45-1838
New models for the origin of Valles Marineris closed depressions.
Spencer, J.R., et al, *Journal of geophysical research*, Aug. 30, 1990, 95(B9), p.14,301-14,313, 45 refs.
Fanale, F.P.
Mars (planet), Valleys, Ground ice, Geologic processes, Geochemistry, Extraterrestrial ice, Subpermafrost ground water, Landslides.

45-1839
High-resolution topography and albedo of the south polar layered deposits on Mars.
Herkenhoff, K.E., et al, *Journal of geophysical research*, Aug. 30, 1990, 95(B9), p.14,511-14,529, 36 refs.
Murray, B.C.
Frost, Mars (planet), Topographic features, Albedo, Layers, Polar regions, Spaceborne photography, Scattering.

45-1840
Possible Martian brines: radar observations and models.
Zent, A.P., et al, *Journal of geophysical research*, Aug. 30, 1990, 95(B9), p.14,531-14,542, 52 refs.
Fanale, F.P., Roth, L.E.
Mars (planet), Radar photography, Geocryology, Subpermafrost ground water, Ground ice, Brines, Ice melting, Reflectivity, Extraterrestrial ice, Thermal regime.

45-1841
Ice haze, snow, and the Mars water cycle.
Kahn, R., *Journal of geophysical research*, Aug. 30, 1990, 95(B9), p.14,677-14,693, 39 refs.
Mars (planet), Atmospheric composition, Snow crystals, Hydrologic cycle, Haze, Water vapor, Ice crystal optics, Condensation, Clouds (meteorology).

45-1842
Spectral albedo and emissivity of CO2 in Martian polar caps: model results.
Warren, S.G., et al, *Journal of geophysical research*, Aug. 30, 1990, 95(B9), p.14,717-14,741, 64 refs.
Wiscombe, W.J., Firestone, J.F.
Mars (planet), Snow cover effect, Albedo, Thermal radiation, Carbon dioxide, Grain size, Polar regions, Extraterrestrial ice, Models, Ice optics.

45-1843
Additions and corrections to the absorption coefficients of CO2 ice: applications to the Martian south polar cap.
Calvin, W.M., *Journal of geophysical research*, Aug 30, 1990, 95(B9), p.14,743-14,750, 18 refs.
Frost, Mars (planet), Carbon dioxide, Radiation absorption, Spectra, Grain size, Polar regions, Extraterrestrial ice, Ice optics.

45-1844
Application of C-14 AMS dating to the chronology of Holocene glacier fluctuations in the High Arctic, with special reference to Leffert Glacier, Ellesmere Island, Canada.
Blake, W., Jr., *Radiocarbon*, 1989, 31(3), p.570-578, 19 refs.
Radioactive age determination, Glacier oscillation, Marine deposits, Climatic changes, Canada - Ellesmere Island.

45-1845
Recovery and dating of carbon dioxide in polar ice cores.
Wilson, A.T., et al, *Radiocarbon*, 1989, 31(3), p.579-584, 2 refs.
Donahue, D.J.
Ice cores, Radioactive age determination, Carbon dioxide, Laboratory techniques, Atmospheric composition, Ice sublimation, Antarctica - Beardmore Glacier.
A new method is described for recovering trapped CO2 from polar ice cores. The ice is sublimed under vacuum, and H2O vapor and CO2 are collected at appropriate cold traps. The application of this method to obtain CO2 from a specific ice core, the conversion of that CO2 to graphite, and the measurement of radiocarbon in the CO2 are described in detail. The potentialities and problems of the method are discussed. (Auth.)

45-1846
Cl-36 profile in Greenland ice from AD 1265 to 1865.
Conard, N.J., et al, *Radiocarbon*, 1989, 31(3), p.585-591, 12 refs.
Kubik, P.W., Gove, H.E., Elmore, D.
Ice cores, Radioactive age determination, Ice sampling, Ice dating, Correlation, Solar activity, Greenland.

45-1847
Occurrence of zinc in antarctic ancient ice and recent snow.
Boutron, C.F., et al, *Earth and planetary science letters*, Dec. 1990, 101(2/4), p.248-259, 30 refs.
Patterson, C.C., Barkov, N.I.
Ice cores, Ice composition, Snow composition, Chemical properties, Minerals.
Concentrations of zinc (Zn) have been measured in various sections of the Dome C and Vostok deep antarctic ice cores, whose ages range from 3850 to 155,000 years BP, and in several large surface antarctic snow blocks collected in Adélie Land and at the geographic South Pole. All the samples were mechanically decontaminated, and detailed outside-inside variation profiles were drawn for most of them, allowing us to clearly establish the accuracy of the data obtained from the analysis of the most central parts of each individual core section or snow block. Natural Zn concentrations have strongly varied in antarctic ice during the past 155,000 years, the highest values (up to about 100 pg Zn/g) being observed during the Last Glacial Maximum and possibly during the end of the next-to-last ice age. Windblown dust from crustal rock and soil appears to be the main natural source of Zn during the glacial periods, especially the Last Glacial Maximum. Zn concentrations in present-day antarctic snow from central East Antarctica, about 5 pg Zn/g, are comparable with those in Holocene ice several thousand years old, which is evidence that the antarctic tropospheric cell is still little affected by anthropogenic Zn. (Auth.)

45-1848
Kinematics and dynamics of heavy snowfall bands over European territory. [Kinematika i dinamika zon sil'nykh snegopadov nad territoriei Evropy],
Gromova, G.G., et al, Leningrad. Gidrometeorologicheskiĭ nauchno-issledovatel'skiĭ tsentr SSSR. Trudy, 1989, Vol.299, p.3-12, In Russian. 8 refs.
Petrichenko, I.A., Galakhova, T.A.
Snowfall, Weather forecasting, Synoptic meteorology.

45-1849
Characteristics of heavy and very heavy precipitation during the winter in Moscow and the Moscow district. [Kharakteristiki sil'nykh i ochen' sil'nykh osadkov v zimniĭ period goda v Moskve i Moskovskoĭ oblasti],
Lapcheva, V.F., *Leningrad. Gidrometeorologicheskiĭ nauchno-issledovatel'skiĭ tsentr SSSR. Trudy*. 1989, Vol.299, p.122-132, In Russian. 4 refs.
Precipitation (meteorology), Snowfall.

45-1850
Results of testing the method of forecasting the amount of winter precipitation using data from meteorological satellites and radar. [Rezul'taty ispytaniia metoda prognoza kolichestva zimnikh osadkov s ispol'zovaniem dannykh nabliudeniĭ ISZ i MRL],
Litvin, N.N., *Leningrad. Gidrometeorologicheskiĭ nauchno-issledovatel'skiĭ tsentr SSSR. Trudy*, 1989, Vol.299, p.132-138, In Russian. 5 refs.
Weather forecasting, Precipitation (meteorology), Hoarfrost.

45-1851
Characteristics of the formation conditions of airmass and frontal ice-hoarfrost deposits in the Central Volga River region. [Osobennosti uslovīĭ obrazovaniia vnutrimassovykh i frontal'nykh gololedno-izmorozevykh otlozheniĭ v Srednem Povolzh'e],
Maksimovich, S.N., *Leningrad. Gidrometeorologicheskiĭ nauchno-issledovatel'skiĭ tsentr SSSR. Trudy*, 1989, Vol.299, p.138-143, In Russian. 5 refs.
Ice formation, Hoarfrost, Air masses, Glaze, Synoptic meteorology, Meteorological factors.

45-1852
Characteristics of the formation of light frost in the territory of the Turkmen SSR. [Osobennosti vozniknoveniia zamorozkov na territorii Turkmenskoĭ SSR],
Tumasova, V.V., *Leningrad. Gidrometeorologicheskiĭ nauchno-issledovatel'skiĭ tsentr SSSR. Trudy*, 1989, Vol.299, p.143-151, In Russian. 5 refs.
Frost, Ice formation, Synoptic meteorology, Meteorological factors.

45-1853
Prospects for future climate: a special US/USSR report on climate and climate change.
MacCracken, M.C., ed, Chelsea, MI, Lewis Publishers, 1990, 270p., Refs. p.235-267. Prepared under the auspices of the US/USSR Agreement on Protection of the Environment, 1972.
Budyko, M.I., ed, Hecht, A.D., ed, Izrael', IU.A., ed.
Climatic changes, Paleoclimatology, Atmospheric composition, Atmospheric circulation, Climatic factors, Human factors.

45-1854
Drilling in the permafrost.
Kudriashov, B.B., et al, New Delhi, Amerind Publishing Co., 1990, 318p., 49 refs. For Russian original see 38-1953.
IAkovlev, A.M.
Artificial freezing, Cements, Concrete admixtures, Concrete freezing, Drilling, Drilling fluids, Mining, Permafrost physics, Permafrost thermal properties, Petroleum industry, Thermal drills, Well casings, Well logging, Heat transfer, Mass transfer, Ice sheets.
This book presents a brief description of the natural conditions of permafrost regions, properties of the permafrost and the processes occurring in it, fundamentals of the heat transfer processes during drilling, and the service temperature conditions of the tool. Methods and devices for cooling the flushing media, principles of quality control of flushing agents and the technology and commercial viability of their use during drilling in the permafrost have been considered. *The main emphasis is on the* drilling technology which uses a variety of flushing agents. The text also includes a description of the technology of utilizing grouting solutions, the theory and practice of drilling with simultaneous freezing of weakly cohesive, moist ground as well as drilling holes in the ice-sheets of the circumpolar regions. The final chapter describes the applications of much of this technology by various Soviet Antarctic Expeditions. This book is intended for engineers and technical personnel engaged in drilling for exploratory geological works. (Auth. mod.)

45-1855
Review of pedogenic zonation in well-drained soils of the southern circumpolar region.
Bockheim, J.G., et al, Quaternary research, July 1990, 34(1), p.47-66, 60 refs.
Ugolini, F.C.
Cryogenic soils, Desert soils, Soil classification, Permafrost.
The concept of zonality is used to link well-drained mineral soils and processes along a bioclimatic gradient extending from ca. 48 to 87S, including southernmost Chile, the subantarctic islands, and maritime and continental Antarctica. The following environmental factors decline along this gradient: mean annual temperature and precipitation and the type and number of plant species. Six pedological zones (along with representative soils) are identified along the gradient: (1) Subantarctic Forest Zone (Podzol?), (2) Subantarctic Low Tundra zone, (3) Subantarctic High Tundra Zone (Subantarctic Brown soil, without permafrost), (4) Antarctic Sub-Polar Desert Zone (Subantarctic Brown soil, with permafrost), (5) Antarctic Polar Desert Zone (Red Ahumisol), and (6) Cold Desert Zone (Ahumisol). Zonal mineral soils in the Subantarctic Forest and Low Tundra Zones are rare, because large amounts of precipitation (over 2500 mm) and cool summers have led to thick accumulations of peat. Whereas the processes of rubification, melanization, and peat accumulation decline in relative magnitude southward, the processes of salinization and desert pavement formation increase in relative importance along this bioclimatic gradient. Carbonation and pervection (silt and clay migration) are maximized in the Subantarctic Tundra and Antarctic Polar Desert Zones. Because of the limited amount of land between 40 and 65S and the presence of the Antarctic Convergence, comparable pedogenic zones occur at lower latitudes in the Southern than in the Northern Circumpolar Region. (Auth.)

45-1856
Strength of cryogenic engineering alloys under electromagnetic loads. [Prochnost' splavov kriogennoĭ tekhniki pri elektromagnitnykh vozdeĭstviiakh],
Strizhalo, V.A., et al, Kiev, Naukova dumka, 1990, 154p., In Russian. 151 refs.
Novogrudskiĭ, L.S., Vorob'ev, E.V.
Cryogenics, Metals, Deformation, Low temperature tests, Tensile properties, Steels.

45-1857
Using ultrasound to measure water flow when wind and ice actions affect the distribution of the flow rate. [Izmerenie raskhoda vody ul'trazvukovym metodom pri vozdeĭstvii vetra i l'da na raspredelenie skorosti potoka],
Zatyl'nikov, A.I., *Leningrad. Gosudarstvennyĭ gidrologicheskiĭ institut. Trudy*, 1988, Vol.325, p.13-19, In Russian. 6 refs.
Flow rate, Water flow, Wind factors, Ice cover effect, Measurement, Ultrasonic tests.

45-1858
Electromagnetic emission from dynamic processes in ice. [Ob elektromagnitnom izuchenii pri dinamicheskikh protsessakh vo l'du],
Bogorodskiĭ, V.V., et al. *Akademiia nauk SSSR. Doklady*, 1990, 314(6), p.1357-1360, In Russian. 8 refs.
Gusev, A.V., Nikitin, V.A., IArtsev, M.B.
Ice physics, Electromagnetic properties, Ice electrical properties, Analysis (mathematics).

45-1859
Causes of the aseismicity of Antarctica. [Prichina aseĭsmichnosti Antarktidy],
Sadovskiĭ, M.A., et al. *Akademiia nauk SSSR. Doklady*, 1990, 314(6), p.1369-1374, In Russian. 12 refs.
Avsiuk, IU.N.
Seismology, Ice cover effect, Earthquakes, Antarctica.
Epicenters of earthquakes with a magnitude greater than 5 are not found in Antarctica. The sole distinction of Antarctica lies in the fact that the entire continent is covered with a plastic material – ice. In this work the authors attempt to explain the aseismicity of Antarctica from the standpoint of a model of the dynamically stressed geophysical environment, which seems to be capable of explaining the normal and "pathological" development of regional seismic activity. (Auth. mod.)

45-1860
Presence of glacial deposits in the central basin of the Barents Sea. [O prisutstvii lednikovykh otlozhenii v tsentral'noĭ vpadine Barentseva moria],
Gataullin, V.N., et al. *Akademiia nauk SSSR. Doklady*, 1990, 314(6), p.1463-1467, In Russian. 13 refs.
Poliak, L.V.
Stratigraphy, Glacial deposits, Marine geology, Barents Sea.

45-1861
Push and tidal deformation of drifting ice. [Podvizhki i prilivnye deformatsii dreĭfuiushchego l'da],
Legen'kov, A.P., Leningrad, Gidrometeoizdat, 1988, 104p., In Russian. 69 refs.
Ice push, Drift, Ice deformation, Tidal currents, Ice mechanics, Sea ice.

45-1862
Record of the atmospheric methane sink from formaldehyde in polar ice cores.
Staffelbach, T., et al. *Nature*, Feb. 14, 1991, 349(6310), p.603-605, 21 refs.
Neftel, A., Stauffer, B., Jacob, D.
Ice cores, Ice composition, Atmospheric composition, Antarctica. Siple Station, Antarctica. Byrd Station.
Measurements of methane from ice cores show that the atmospheric concentration of methane has more than doubled since industrialization, and was only half of the pre-industrial value during the last ice age. Natural sources of atmospheric methane are mainly biogenic, with the main sink for methane being its reaction with OH radicals. This reaction initiates a chain of reactions involving other trace gases and radicals, one of which is formaldehyde. In the remote troposphere, oxidation of methane followed by other reactions is the main source for formaldehyde. By reconstructing records of atmospheric methane and formaldehyde from ice cores, one may examine changes in sources of methane and in the oxidation capacity of the atmosphere.

45-1863
Satellite radar altimetry of ice sheets and ice shelves.
Rapley, C.G., et al, British Antarctic Survey Antarctic Special Topic Award Scheme Symposium, Nov. 9-10, 1988. *Proceedings*. University research in Antarctica, edited by R.B. Heywood, Cambridge, British Antarctic Survey, 1989, p.43-50, 30 refs.
Cudlip, W., Partington, K.C., McIntyre, N.F., Ridley, J.K.
Ice sheets, Ice shelves, Radar photography, Radar tracking, Airborne radar, Polar regions.
The antarctic and Greenland ice sheets are key elements of the global climate system. Repeated accurate measurements of their surface topography not only provide a fundamental means of investigating their dynamics, but permit the study of possible climate-related changes in their mass balance. Satellite-based radar altimetry is the only practical means of obtaining such data. Here the development of the altimetric measurements of ice sheet and ice shelf topography are reviewed, and new results obtained using data from the Seasat and Geosat instruments are described. These include a comparison of height measurements over a test area in Wilkes Land, which imply an average increase in height of 0.8 m over a 7-year period. The UK is well placed to benefit from the launch of ESA's ERS-1 altimeter in 1990. This will provide coverage to +/- 82 deg for the first time. (Auth.)

45-1864
Report of the International Ice Patrol in the North Atlantic.
U.S. Coast Guard. *U.S. Coast Guard Bulletin*, 1988, No 74, 118p., CG-188-43, 31 refs.
Sea ice distribution, Ice reporting, Ice conditions, Ice detection, Icebergs, Drift stations, Ice navigation, Aerial surveys.

45-1865
Paleogeographical regularities of glacial lithogenesis. [Paleogeograficheskie zakonomernosti lednikovogo litogeneza],
Sudakova, N.G., Moscow, Universitet, 1990, 158p., In Russian with English table of contents. Refs. p.150-156.
Lithology, Glacial deposits, Pleistocene, Moraines, Correlation, Paleoclimatology.

45-1866
Cost estimation in construction; for northern regions. Handbook. [Sostavlenie smet v stroitel'stve; dlia severnykh raionov. Spravochnik],
Liberman, I.A., Leningrad, Strolizdat, 1990, 224p., In Russian.
Cost analysis, Cold weather construction, Manuals, Permafrost, Frozen ground.

45-1867
Remote sensor observations during WISP90: the use of microwave radiometers, RASS, and ceilometers for detection of aircraft icing conditions.
Stankov, B.B., et al. *U.S. National Oceanic and Atmospheric Administration. Technical memorandum*, Nov. 1990, ERL WPL-187, 77p., 17 refs.
Westwater, E.R., Snider, J.B., Weber, R.L.
Aircraft icing, Ice detection, Ice forecasting, Remote sensing, Radiometry, Ice storms, Clouds (meteorology).

45-1868
Thirteenth Canadian Geotechnical Colloquium: ice design criteria for wide arctic structures.
Blanchet, D., *Canadian geotechnical journal*, Dec. 1990, 27(6), p.701-725, With French summary. Refs. p.722-725.
Offshore structures, Ice floes, Ice loads, Design criteria, Measurement, Ice solid interface, Ice mechanics, Caissons.

45-1869
Solute partitioning in freezing soils.
Konrad, J.M., et al, *Canadian geotechnical journal*, Dec. 1990, 27(6), p.726-736, With French summary. 27 refs.
McCammon, A.W.
Soil freezing, Saline soils, Frost penetration, Soil tests, Cooling rate, Moisture transfer, Salinity, Ice water interface, Subsea permafrost.

45-1870
Soil temperatures and freezing indices at depth.
McCormick, G., *Canadian geotechnical journal*, Dec. 1990, 27(6), p.749-751, With French summary. 12 refs.
Soil freezing, Frost penetration, Freezing indexes, Design criteria, Soil temperature, Underground pipelines.

45-1871
Numerical method for phase-change problems.
Kim, C.J., et al, *International journal of heat and mass transfer*, Dec. 1990, 33(12), p.2721-2734, With French, German and Russian summaries. 26 refs.
Kaviany, M.
Phase transformations, Liquid solid interfaces, Boundary value problems, Heat transfer, Analysis (mathematics), Solid phase. Freezing.

45-1872
Melting of ice in a porous medium heated from below.
Zhang, X., et al, *International journal of heat and mass transfer*, Feb. 1991, 34(2), p.389-405, With French, German and Russian summaries. 21 refs.
Nguyen, T.H., Kahawita, R.
Ice melting, Ice water interface, Convection, Heat transfer, Analysis (mathematics), Isotherms, Phase transformations.

45-1873
Constructed wetlands for wastewater treatment: municipal, industrial, and agricultural.
International Conference on Constructed Wetlands for Wastewater Treatment, 1st, Chattanooga, TN, June 13-17, 1988, Chelsea, MI, Lewis Publishers, 1989, 831p., Refs. passim. For selected papers see 45-1874 through 45-1897.
Hammer, D.A., ed
Swamps, Water treatment, Waste treatment, Mining, Decomposition, Microbiology, Sewage treatment, Plant physiology, Plant ecology, Water flow.

45-1874
Wetlands ecosystems: natural water purifiers?.
Hammer, D.A., et al, International Conference on Constructed Wetlands for Wastewater Treatment, 1st, Chattanooga, TN, June 13-17, 1988. [Proceedings]. Edited by D.A. Hammer, Chelsea, MI, Lewis Publishers, 1989, p.5-19, 17 refs.
Bastian, R.K.
Swamps, Ecosystems, Sewage treatment, Water treatment, Microbiology, Plant physiology, Decomposition.

45-1875
Hydrologic factors in wetland water treatment.
Kadlec, R.H., International Conference on Constructed Wetlands for Wastewater Treatment, 1st, Chattanooga, TN, June 13-17, 1988. [Proceedings]. Edited by D.A. Hammer, Chelsea, MI, Lewis Publishers, 1989, p.21-40, 24 refs.
Swamps, Hydrology, Water treatment, Ecosystems, Water flow, Analysis (mathematics), Evapotranspiration.

45-1876
Physical and chemical characteristics of freshwater wetland soils.
Faulkner, S.P., et al, International Conference on Constructed Wetlands for Wastewater Treatment, 1st, Chattanooga, TN, June 13-17, 1988. [Proceedings]. Edited by D.A. Hammer, Chelsea, MI, Lewis Publishers, 1989, p.41-72, 131 refs.
Richardson, C.J.
Swamps, Soil chemistry, Water treatment, Ecosystems.

45-1877
Wetland vegetation.
Guntenspergen, G.R., et al, International Conference on Constructed Wetlands for Wastewater Treatment, 1st, Chattanooga, TN, June 13-17, 1988. [Proceedings]. Edited by D.A. Hammer, Chelsea, MI, Lewis Publishers, 1989, p.73-88, 104 refs.
Stearns, F., Kadlec, J.A.
Swamps, Water treatment, Plant ecology, Plant physiology, Ecosystems, Growth.

45-1878
Wetlands microbiology: form, function, processes.
Portier, R.J., et al, International Conference on Constructed Wetlands for Wastewater Treatment, 1st, Chattanooga, TN, June 13-17, 1988. [Proceedings]. Edited by D.A. Hammer, Chelsea, MI, Lewis Publishers, 1989, p.89-105, 37 refs.
Palmer, S.J.
Swamps, Water treatment, Microbiology, Ecosystems.

45-1879
Use of wetlands for treatment of environmental problems in mining: non-coal-mining applications.
Wildeman, T.R., et al, International Conference on Constructed Wetlands for Wastewater Treatment, 1st, Chattanooga, TN, June 13-17, 1988. [Proceedings]. Edited by D.A. Hammer, Chelsea, MI, Lewis Publishers, 1989, p.221-231, 37 refs.
Laudon, L.S.
Swamps, Mining, Waste treatment, Water treatment, Geochemistry, Decomposition, Weathering.

45-1880
Constructed wetlands for wastewater treatment at Amoco Oil Company's Mandan, North Dakota refinery.
Litchfield, D.K., et al, International Conference on Constructed Wetlands for Wastewater Treatment, 1st, Chattanooga, TN, June 13-17, 1988. [Proceedings]. Edited by D.A. Hammer, Chelsea, MI, Lewis Publishers, 1989, p.233-237.
Schatz, D.D.
Swamps, Petroleum industry, Water treatment, Waste treatment.

45-1881
Performance expectations and loading rates for constructed wetlands.
Watson, J.T., et al, International Conference on Constructed Wetlands for Wastewater Treatment, 1st, Chattanooga, TN, June 13-17, 1988. [Proceedings]. Edited by D.A. Hammer, Chelsea, MI, Lewis Publishers, 1989, p.319-351, 73 refs.
Reed, S.C., Kadlec, R.H., Knight, R.L., Whitehouse, A.E.
Swamps, Water treatment, Waste treatment, Water flow, Analysis (mathematics), Hydraulics.

45-1882
Configuration and substrate design considerations for constructed wetlands wastewater treatment.
Steiner, G.R., et al, International Conference on Constructed Wetlands for Wastewater Treatment, 1st, Chattanooga, TN, June 13-17, 1988. [Proceedings]. Edited by D.A. Hammer, Chelsea, MI, Lewis Publishers, 1989, p.363-377, 18 refs.
Freeman, R.J., Jr.
Swamps, Water treatment, Soil structure, Water flow.

45-1883
Hydraulic design considerations and control structures for constructed wetlands for wastewater treatment.
Watson, J.T., et al, International Conference on Constructed Wetlands for Wastewater Treatment, 1st, Chattanooga, TN, June 13-17, 1988. [Proceedings]. Edited by D.A. Hammer, Chelsea, MI, Lewis Publishers, 1989, p.379-391, 12 refs.
Hobson, J.A.
Swamps, Water treatment, Hydraulics, Water flow, Flow control.

45-1884
Operations optimization.
Girts, M.A., et al, International Conference on Constructed Wetlands for Wastewater Treatment, 1st, Chattanooga, TN, June 13-17, 1988. [Proceedings]. Edited by D.A. Hammer, Chelsea, MI, Lewis Publishers, 1989, p.417-429, 20 refs.
Knight, R.L.
Swamps, Water treatment.

45-1885
Decomposition in wastewater wetlands.
Kadlec, R.H., International Conference on Constructed Wetlands for Wastewater Treatment, 1st, Chattanooga, TN, June 13-17, 1988. [Proceedings]. Edited by D.A. Hammer, Chelsea, MI, Lewis Publishers, 1989, p.459-468, 13 refs.
Swamps, Water treatment, Decomposition, Peat, Biomass.

45-1886
Denitrification in artificial wetlands.
Stengel, E., et al, International Conference on Constructed Wetlands for Wastewater Treatment, 1st, Chattanooga, TN, June 13-17, 1988. [Proceedings]. Edited by D.A. Hammer, Chelsea, MI, Lewis Publishers, 1989, p.484-492, 14 refs.
Schultz-Hock, R.
Swamps, Water treatment, Nutrient cycle, Plant physiology, Plant ecology, Microbiology.

45-1887
Potential importance of sulfate reduction processes in wetlands constructed to treat mine drainage.
Hedin, R.S., et al, International Conference on Constructed Wetlands for Wastewater Treatment, 1st, Chattanooga, TN, June 13-17, 1988. [Proceedings]. Edited by D.A. Hammer, Chelsea, MI, Lewis Publishers, 1989, p.508-514, 12 refs.
Hammack, R., Hyman, D.
Swamps, Water treatment, Mining, Waste treatment, Decomposition.

45-1888
Bacteriological tests from the constructed wetland of the Big Five Tunnel, Idaho Springs, Colorado.
Batal, W., et al, International Conference on Constructed Wetlands for Wastewater Treatment, 1st, Chattanooga, TN, June 13-17, 1988. [Proceedings]. Edited by D.A. Hammer, Chelsea, MI, Lewis Publishers, 1989, p.550-557, 20 refs.
Laudon, L.S., Wildeman, T.R., Mohdnoordin, N.
Swamps, Bacteria, Water treatment, Mining, Microbiology, Waste treatment.

45-1889
Root-zone system: Mannersdorf—new results.
Haberl, R., et al, International Conference on Constructed Wetlands for Wastewater Treatment, 1st, Chattanooga, TN, June 13-17, 1988. [Proceedings]. Edited by D.A. Hammer, Chelsea, MI, Lewis Publishers, 1989, p.606-621, 17 refs.
Perfler, R.
Swamps, Sewage treatment, Plant physiology, Microbiology.

45-1890
Use of artificial cattail marshes to treat sewage in northern Ontario, Canada.
Miller, G., International Conference on Constructed Wetlands for Wastewater Treatment, 1st, Chattanooga, TN, June 13-17, 1988. [Proceedings]. Edited by D.A. Hammer, Chelsea, MI, Lewis Publishers, 1989, p.636-642, 2 refs.
Swamps, Sewage treatment, Plant ecology.

45-1891
Biology and chemistry of generation, prevention and abatement of acid mine drainage.
Silver, M., International Conference on Constructed Wetlands for Wastewater Treatment, 1st, Chattanooga, TN, June 13-17, 1988. [Proceedings]. Edited by D.A. Hammer, Chelsea, MI, Lewis Publishers, 1989, p.753-760, 23 refs.
Mining, Waste treatment, Water treatment, Microbiology, Chemical properties.

45-1892
Design and construction of a research site for passive mine drainage treatment in Idaho Springs, Colorado.
Howard, E.A., et al, International Conference on Constructed Wetlands for Wastewater Treatment, 1st, Chattanooga, TN, June 13-17, 1988. [Proceedings]. Edited by D.A. Hammer, Chelsea, MI, Lewis Publishers, 1989, p.761-764, 8 refs.
Emerick, J.C., Wildeman, T.R.
Swamps, Mining, Water treatment, Waste treatment.

45-1893
Manganese and iron encrustation on green algae living in acid mine drainage.
Stevens, S.E., Jr., et al, International Conference on Constructed Wetlands for Wastewater Treatment, 1st, Chattanooga, TN, June 13-17, 1988. [Proceedings]. Edited by D.A. Hammer, Chelsea, MI, Lewis Publishers, 1989, p.765-773, 14 refs.
Dionis, K., Stark, L.R.
Swamps, Mining, Water treatment, Waste treatment, Microbiology, Algae.

45-1894
Determining feasibility of using forest products or on-site materials in the treatment of acid mine drainage in Colorado.
Howard, E.A., et al, International Conference on Constructed Wetlands for Wastewater Treatment, 1st, Chattanooga, TN, June 13-17, 1988. [Proceedings]. Edited by D.A. Hammer, Chelsea, MI, Lewis Publishers, 1989, p.774-779, 11 refs.
Hestmark, M.C., Margulies, T.D.
Swamps, Mining, Waste treatment, Water treatment, Litter, Peat.

45-1895
Use of wetlands to remove nickel and copper from mine drainage.
Eger, P., et al, International Conference on Constructed Wetlands for Wastewater Treatment, 1st, Chattanooga, TN, June 13-17, 1988. [Proceedings]. Edited by D.A. Hammer, Chelsea, MI, Lewis Publishers, 1989, p.780-787, 7 refs.
Lapakko, K.
Swamps, Mining, Waste treatment, Water treatment, Peat.

45-1896
Windsor Coal Company wetland: an overview.
Kolbash, R.L., et al, International Conference on Constructed Wetlands for Wastewater Treatment, 1st, Chattanooga, TN, June 13-17, 1988. [Proceedings]. Edited by D.A. Hammer, Chelsea, MI, Lewis Publishers, 1989, p.788-792.
Romanoski, T.L.
Swamps, Mining, Water treatment, Waste treatment.

45-1897
Wetland treatment of coal mine drainage: controlled studies of iron retention in model wetland systems.
Henrot, J., et al, International Conference on Constructed Wetlands for Wastewater Treatment, 1st, Chattanooga, TN, June 13-17, 1988. [Proceedings]. Edited by D.A. Hammer, Chelsea, MI, Lewis Publishers, 1989, p.793-800, 15 refs.
Wieder, R.K., Heston, K.P., Nardi, M.P.
Swamps, Mining, Water treatment, Waste treatment.

45-1898
Proposed construction of a crushed rock airstrip at Rothera Point, Adelaide Island, British Antarctic Territory. Final comprehensive environmental evaluation.
British Antarctic Survey, Swindon, Natural Environment Research Council, 1989, 56p.
Research projects, Cold weather construction, Ice runways, Aircraft landing areas, Antarctica, Rothera Station.
This evaluation considers a proposal to replace the existing ice skiway, situated 5 km from Rothera Station, with a crushed rock airstrip immediately adjacent to the station and the present discharging point for supply ships. The document is in two parts. The first part consists of a description of proposed activities, their alternatives, and present environmental state, the direct and second order environmental effects, and mitigation measures and monitoring. The second part consists of a Decision Document in which the impacts are evaluated in relation to the advantages of constructing, and the disadvantages of not constructing, the airstrip. The Natural Environment Research Council concludes that the scientific advantages to be gained by the construction and operation of the airstrip do justify the local and limited environmental impacts it will cause.

45-1899
Trace metal and rare earth content of black precipitation events.
Landsberger, S., et al, *Energy sources*, July-Sep. 1990, 12(3), p.363-369, 18 refs.
Davies, T.D., Tranter, M.
Precipitation (meteorology), Snow impurities, Neutron activation analysis, Chemical properties, Air pollution, Sampling, United Kingdom—Scotland.

45-1900
Best flying season.
Collins, R.L., *AOPA pilot*, Jan. 1991, 34(1), p.51-55.
Aircraft icing, Weather observations, Countermeasures.

45-1901
Northeast snowstorms.
Horne, T.A., *AOPA pilot*, Jan. 1991, 34(1), p.86-87, 1 ref.
Snowstorms, Weather forecasting, Aircraft icing.

45-1902
Dielectric observations of the transformation of single crystals of KOH-doped ice Ih to ice XI.
Oguro, M., et al, *Journal of physics and chemistry of solids*, 1991, 52(2), p.401-403, 17 refs.
Whitworth, R.W.
Doped ice, Ice crystal growth, Phase transformations, Electrical measurement, Ice electrical properties, Dielectric properties, Ice physics.

45-1903
Pressure-induced phase transitions in clathrate hydrates.
Handa, Y.P., et al, *Journal of chemical physics*, Jan. 1, 1991, 94(1), p.623-627, 20 refs.
Tse, J.S., Klug, D.D., Whalley, E.
Clathrates, Hydrates, High pressure tests, Phase transformations, Stability, Amorphous ice, Latticed structures.

45-1904
Spectra of dangling OH groups at ice cluster surfaces and within pores of amorphous ice.
Rowland, B., et al, *Journal of chemical physics*, Jan. 1, 1991, 94(1), p.812-813, 12 refs.
Devlin, J.P.
Amorphous ice, Molecular structure, Spectra, Ice physics, Hydrogen bonds, Radiation absorption.

45-1905
Decline of Pb-210 fallout on Greenland in the last century.
Nijampurkar, V.N., et al, *Current science*, Jan. 25, 1990, 59(2), p.100-102, 13 refs.
Clausen, H.B.
Fallout, Periodic variations, Ice cores, Radioactive age determination, Isotope analysis, Climatic changes, Greenland.

45-1906
Effect of volume phase changes, mass transport, sunlight penetration, and densification on the thermal regime of icy regoliths.
Fanale, F.P., et al, *Icarus*, Nov. 1990, 88(1), p.193-204, 21 refs.
Salvail, J.R., Matson, D.L., Brown, R.H.
Extraterrestrial ice, Ice cover effect, Insolation, Ice sublimation, Thermal conductivity, Mass transfer, Ice temperature, Thermal regime.

45-1907
Phenomenological description of the progression of a freezing front in a slab—application to a new heat storage material.
Guiffant, G., et al, *International communications in heat and mass transfer*, Jan.-Feb. 1991, 18(1), p.11-17, 8 refs.
Flaud, P., Royon, L.
Freezing, Phase transformations, Liquid solid interfaces, Thermal conductivity, Analysis (mathematics), Heat recovery.

45-1908
Heated effluent effects on ice-covered rivers.
Sarraf, S., *Journal of cold regions engineering*, Dec 1990, 4(4), p.161-178, 16 refs.
River ice, Ice cover effect, Ice melting, Hydrodynamics, Heat transfer, Mathematical models, River flow, Waste disposal.

45-1909
Strain gradient influence on brittle failure of ice.
Sayed, M., *Journal of cold regions engineering*, Dec 1990, 4(4), p.179-191, 17 refs.
Ice strength, Strain tests, Cracking (fracturing), Compressive properties, Brittleness, Mechanical tests.

45-1910
Behavior of laboratory-made spray ice in triaxial compression testing.
Steel, A., et al, *Journal of cold regions engineering*, Dec. 1990, 4(4), p.192-204, 16 refs.
Morin, P.J., Clark, J.I.
Ice strength, Ice (construction material), Strain tests, Compressive properties, Cold weather construction, Ice islands.

45-1911
Seasonal Sea Ice Monitoring Site (SIMS).
Barber, D., *Earth observer*, Feb. 1991, 3(2), p.8-9.
Sea ice, Research projects, Remote sensing.

45-1912
Method to reduce traffic noise by making use of a snow surface.
Hasebe, M., et al, International Tire/Road Noise Conference, Gothenburg, Sweden, Aug. 8-10, 1990. Proceedings, Vol.1, Stockholm, Swedish National Board for Technical Development, [1990], p.533-538, 5 refs.
Kaneyasu, K.
Snow acoustics, Noise (sound), Road maintenance, Sound transmission, Countermeasures.

45-1913
Preprints.
International Conference on Interactive Information and Processing Systems for Meteorology, Oceanography, and Hydrology, 7th, New Orleans, LA, Jan. 14-18, 1991, Boston, American Meteorological Society, [1991], 517p., Refs. passim. For selected papers see 45-1914 through 45-1919.
Data processing, Meteorological data, Computer applications, Remote sensing, Spaceborne photography, Computerized simulation, Weather observations, Ice forecasting.

45-1914
Road weather information systems: a strategy and guideline.
Doore, G.S., International Conference on Interactive Information and Processing Systems for Meteorology, Oceanography, and Hydrology, 7th. New Orleans, LA, Jan. 14-18, 1991. Preprints, Boston, American Meteorological Society, [1991], p.15-22.
Road icing, Data processing, Weather observations, Road maintenance, Weather forecasting.

45-1915
Reviewing meteorological data on the *DARE-II* workstation.
Smart, J.R., et al, International Conference on Interactive Information and Processing Systems for Meteorology, Oceanography, and Hydrology, 7th, New Orleans, LA, Jan. 14-18, 1991. Preprints, Boston, American Meteorological Society, [1991], p.157-163, 14 refs.
Brandage, J.M.
Meteorological data, Data processing, Computer applications, Weather forecasting, Snowstorms.

45-1916
Meeting the *climate information needs* of agribusinesses and others in the Midwest.
Kunkel, K.E., et al, International Conference on Interactive Information and Processing Systems for Meteorology, Oceanography, and Hydrology, 7th, New Orleans, LA, Jan. 14-18, 1991. Preprints, Boston, American Meteorological Society, [1991], p.265-267.
Changnon, S.A., Lonnquist, C.L.
Meteorological data, Data processing, Frost

45-1917
Animation of the normal ice cycle of the Laurentian *Great Lakes of North America*.
Assel, R.A., et al, International Conference on Interactive Information and Processing Systems for Meteorology, Oceanography, and Hydrology, 7th, New Orleans, LA, Jan. 14-18, 1991. Preprints, Boston, American Meteorological Society, [1991], p.341-345, 14 refs.
Ratkos, J.M.
Lake ice, Ice conditions, Computerized simulation, Ice cover, Great Lakes.

45-1918
Retrospective, current and future view of the United States civil operational environmental satellite program.
Koffler, R., et al, International Conference on Interactive Information and Processing Systems for Meteorology, Oceanography, and Hydrology, 7th, New Orleans, LA, Jan. 14-18, 1991. Preprints, Boston, American Meteorological Society, [1991], p.336-343, 6 refs.
Spayd, L.
Spaceborne photography, Spacecraft, Remote sensing, Research projects, Snow surveys, Ice surveys, Weather observations.

45-1919
Automated guidance for forecasting conditions conducive to aircraft icing.
Schultz, P., et al, International Conference on Interactive Information and Processing Systems for Meteorology, Oceanography, and Hydrology, 7th, New Orleans, LA, Jan. 14-18, 1991. Preprints, Boston, American Meteorological Society, [1991], p.492-496, 8 refs.
Politovich, M.K.
Aircraft icing, Ice forecasting, Computerized simulation, Data processing.

45-1920
1990-91 Australian Antarctic Research Program. Antarctic Treaty exchange information: Supplement A to particulars for Australian National Antarctic Research Expeditions.
Australia. Antarctic Division, Kingston, Tasmania, 1990, 262p., Refs. passim. For selected papers see B-43553 through B-43557 and I-43558.
Ice, Research projects, Polar regions.
Described are research projects proposed to be conducted by ANARE during the summer of 1990-91 and winter 1991, in archaeology, chemistry, earth sciences, logistics, glaciology, environmental studies, history, human biology, life sciences, mapping, meteorology, oceanography, physics, political science and psychology. Included are indexes by author and by area, an ASAC Grant scheme and a list of names and addresses of principal investigators.

45-1921
Evolution of the water regime of Phobos.
Fanale, F.P., et al, *Icarus*, Dec. 1990, 88(2), p.380-395, 15 refs.
Salvail, J.R.
Extraterrestrial ice, Ice cover, Water transport, Insolation, Ice models, Vapor transfer, Ice volume, Water reserves, Subsurface structures.

45-1922
***Coherent backscatter* and the radar characteristics of outer planet satellites.**
Hapke, B., *Icarus*, Dec. 1990, 88(2), p.407-417, 35 refs.
Extraterrestrial ice, Ice surface, Backscattering, Radar echoes, Brightness, Surface properties, Wave propagation.

45-1923
Scattering properties of natural snow and frost: comparison with icy satellite photometry.
Verbiscer, A.J., et al, *Icarus*, Dec. 1990, 88(2), p.418-428, 26 refs.
Veverka, J.
Extraterrestrial ice, Snow optics, Photometry, Scattering, Ice surface, Albedo, Backscattering, Correlation, Surface properties.

45-1924
Piezoelectric ice sensor for aviation applications.
Floyd, M.D., *Sensors*, May 1990, 7(5), p.13-24, 1 ref.
Aircraft icing, Indicating instruments, Ice detection, Performance, Design, Thermodynamic properties.

45-1925
Effect of orientation on solidification for mixed-convection flow in a rectangular channel.
Incropera, F.P., et al, *Experimental heat transfer*, Nov.-Dec. 1990, 3(4), p.377-396, 21 refs.
Campbell, J.S.
Laminar flow, Freezing, Convection, Orientation, Solid phases, Pipe flow.

45-1926
Numerical study on freezing heat transfer in water-saturated porous media.
Sasaki, A., et al, *Numerical heat transfer pt. A*, July-Aug. 1990, 18(1), p.17-32, 24 refs.
Aiba, S., Fukusako, S.
Porous materials, Saturation, Freezing, Heat transfer, Mathematical models, Phase transformations, Temperature distribution.

45-1927
Influence of iodine vapor on ice-forming activity of aerosols of various substances.
Kim, N.S., et al, *Colloid journal of the USSR*, Nov.-1990, 52(3), p.500-502, Translated from Kolloidnĭ zhurnal, May-June 1990. 7 refs.
Shilin, A.G., Shkodkin, A.V.
Aerosols, Vapor diffusion, Ice formation, Ice nuclei, Chemical analysis, Heterogeneous nucleation.

45-1928
Response of the West Antarctic Ice Sheet to CO2-induced climatic warming.
Bentley, C.R., *U.S. Department of Energy. Report*, Apr. 1982, Carbon dioxide effects research and assessment program. Environmental and societal consequences of a possible CO2-induced climate change, Vol.II, Part 1, 32p. DE82 13232.
Ice sheets, Climatic changes, Carbon dioxide, Atmospheric composition, Antarctica—West Antarctica.
The paper proposes a research plan to deal with the question of what the response of the West Antarctic Ice Sheet would be to a rise in global temperatures caused by an anthropogenic CO2 buildup in the atmosphere. The plan is designed to answer the following questions: how fast is the ice mass changing now, and why; how will the boundary conditions that affect the ice sheet respond to an atmospheric temperature change and how are those boundary conditions changing now; what will be the response of the ice sheet to changes in boundary conditions, and what can be learned by analogy with what has happened in the past.

45-1929
Carbon Dioxide Effects Research and Assessment Program. Environmental and Societal Consequences of a Possible CO2-induced Climate Change: a research agenda.
American Association for the Advancement of Science, Washington, D.C, 1980, 122p. DOE/EV/10019-01(V.1).
Climatic changes, Carbon dioxide, Sea ice, Ice sheets.
The major problem to be solved is to understand the nature of the impacts on societies of rising levels of atmospheric CO2 with the objective of avoiding or ameliorating unfavorable impacts and gaining most benefit from favorable impacts. The research program proposed herein is designed to provide the understanding needed to achieve this objective. It is based on a recognition of the distinctive characteristics of the CO2 problem. It is concluded that three kinds of research on the consequences of rising levels of atmospheric carbon dioxide and possible climatic changes are called for: assessment of risks, research to enhance beneficial effects and lessen harmful ones, where this is possible, and to slow down rates of carbon dioxide emission, and study of potential social and institutional responses to projected climatic changes. Recommended research areas of concentration in the category of the cryosphere, oceans, and marine biota are: the future of the ice sheet of West Antarctica; response of Northern Hemisphere sea ice to climatic warming; permafrost changes in Asia and North America; changes in the circulation of the upper ocean, and effects on marine biota. (Auth. mod.)

45-1930
Potential response of antarctic sea ice to climatic change induced by atmospheric CO2 increases.
Ackley, S.F., MP 2833, 1981, 17p. + 3p. refs., Contributed paper to the AAAS report to the Department of Energy on Climatic Impact of Increased CO2 Changes in the Atmosphere. 30 refs.
Sea ice, Carbon dioxide, Climatic changes
Possible mechanisms are cited by which antarctic sea ice may affect climate. While many mechanisms can be postulated, consideration must be given to the geologic record, relating to correlation between past climatic changes and sea ice action or response, and the state of knowledge about the present day formation and decay of antarctic sea ice, in order to determine, (1) if sea ice will respond to a CO2 induced climate warming and (2) how this sea ice change will affect climate. Some aspects of the antarctic sea ice are unique, readily apparent, and should be considered before such a decision is made. They include (a) the location of the antarctic sea ice on the southern boundary of the Southern Hemisphere westerly wind system, in mid-latitudes, a major repository of kinetic energy of the general circulation of the atmosphere. Ice transport from the Weddell Sea strongly affects mid-latitude temperature and presumably circulation in the S. Atlantic region at the present time. (b) The "free" boundary of the southern sea ice with the world ocean qualitatively at least, reflects a more interactive role with global scale processes than does the Arctic. (c) The role of the entire region south of the Polar Front as a "heat exchanger" where heat taken up by the ocean elsewhere is dissipated, affecting the total heat transport by the oceans and the ocean-atmosphere interaction in polar regions. (d) As part of the heat exchange process, the formation of antarctic sea ice leads to thermohaline processes producing Antarctic Bottom Water and thereby affects the meridional heat and salt transport by oceanic waters, as well as the global cycling of sea waters for nutrient and gas exchange. (Auth. mod.)

45-1931
Influence of short-term climate fluctuations on permafrost terrain.
Brown, J., et al, *U.S. Department of Energy. Report,* May 1982, MP 2823, Carbon Dioxide Effects Research and Assessment Program. Environmental and Societal Consequences of a Possible CO2-Induced Climate Change Vol.II, Part 3, 33p., DE82 017379, 50 refs.
Andrews, J.T.
Climatic changes, Permafrost thermal properties, Carbon dioxide, Geomorphology.

45-1932
Effect of large ice sheets on earthquake genesis.
Johnston, A.C., *NATO ASI series. Series C, Mathematical and physical sciences,* 1989, Vol.266, NATO Advanced Workshop on Earthquakes at North-Atlantic Passive Margins: Neotectonics and Postglacial Rebound, May 1988, p.581-599, 43 refs.
DLC QE534.2.N38 1989
Ice sheets, Earthquakes, Subglacial observations, Greenland, Antarctica.
Two continent-scale ice sheets--Antarctica and Greenland--currently exist on earth. The interiors of both continents are virtually aseismic. Is this coincidental or does a causal connection exist between the two observations? An examination of this question is the subject of this paper. It is concluded that with a few reasonable assumptions, ice sheets will indeed inhibit earthquakes by stabilizing potentially seismogenic faults in the underlying brittle crust. This same mechanism may also provide an explanation for the intense late-glacial faulting in Fennoscandia reported elsewhere in this volume. (Auth.)

45-1933
Preprint volume.
International Symposium on Winter Storms, 1st, New Orleans, LA, Jan. 14-18, 1991, Boston, American Meteorological Society, 1991, 436p., Refs. passim.
For selected papers see 45-1934 through 45-1944.
Winter, Storms, Precipitation (meteorology), Snowstorms, Ice storms, Snow accumulation, Lake effects, Weather forecasting, Sounding, Remote sensing, Fronts (meteorology), Atmospheric circulation, Meetings.

45-1934
Jet streak circulations and the Valentine's Day ice storm of 1990 in central Illinois.
Skowronski, J., International Symposium on Winter Storms, 1st, New Orleans, LA, Jan. 14-18, 1991, Boston, American Meteorological Society, 1991, p.88-89, 2 refs.
Ice storms, Fronts (meteorology), Atmospheric circulation, Precipitation (meteorology).

45-1935
Diagnosing coupled jet streak circulations for a Northern Plains snow band from the operational nested-grid model.
Hakim, G.J., et al, International Symposium on Winter Storms, 1st, New Orleans, LA, Jan. 14-18, 1991, Boston, American Meteorological Society, 1991, p.90-96, 10 refs.
Uccellini, L.W.
Snowstorms, Snow accumulation, Weather forecasting, Simulation, Atmospheric circulation, Precipitation (meteorology), Synoptic meteorology.

45-1936
Jet streaks and their relationship to heavy precipitation in Colorado Front Range winter storms.
Tollerud, E.I., et al, International Symposium on Winter Storms, 1st, New Orleans, LA, Jan. 14-18, 1991, Boston, American Meteorological Society, 1991, p.97-100, 4 refs.
Howard, K.W., Zhong, X.P.
Snowstorms, Snow accumulation, Fronts (meteorology), Atmospheric circulation, Precipitation (meteorology), Wind factors.

45-1937
Strongly temperature dependent microphysical processes and winter storms.
Stewart, R.E., et al, International Symposium on Winter Storms, 1st, New Orleans, LA, Jan. 14-18, 1991, Boston, American Meteorological Society, 1991, p.231-234, 16 refs.
Lin, C.A.
Precipitation (meteorology), Storms, Snow melting, Ice formation, Temperature effects, Atmospheric circulation.

45-1938
Aircraft icing as an applied winter storms problem.
Politovich, M.K., International Symposium on Winter Storms, 1st, New Orleans, LA, Jan. 14-18, 1991, Boston, American Meteorological Society, 1991, p.235-240, 8 refs.
Ice forecasting, Aircraft icing, Storms, Precipitation (meteorology), Supercooled clouds, Radar echoes, Aerial surveys.

45-1939
Effect of melting in a Denver snow dump.
Marwitz, J., et al, International Symposium on Winter Storms, 1st, New Orleans, LA, Jan. 14-18, 1991, Boston, American Meteorological Society, 1991, p.241-244, 1 ref.
Day, D.
Snowstorms, Fronts (meteorology), Ice melting, Meteorological factors, Atmospheric circulation, Air temperature.

45-1940
Lake-effect storms east of Lake Ontario: some preliminary findings from the LOWS field project.
Penc, R.S., et al, International Symposium on Winter Storms, 1st, New Orleans, LA, Jan. 14-18, 1991, Boston, American Meteorological Society, 1991, p.252-257, 12 refs.
Snowstorms, Lake effects, Remote sensing, Meteorological data, Precipitation (meteorology), Weather forecasting.

45-1941
Evolution of a freezing rain storm, part 1: synoptic and mesoscale conditions.
Zamora, R.J., et al, International Symposium on Winter Storms, 1st, New Orleans, LA, Jan. 14-18, 1991, Boston, American Meteorological Society, 1991, p.258-263, 2 refs.
Ice storms, Rain, Atmospheric circulation, Weather forecasting, Synoptic meteorology, Meteorological factors.

45-1942
Evolution of a freezing rain storm, part 2: remote sensor observations.
Martner, B.E., et al, International Symposium on Winter Storms, 1st, New Orleans, LA, Jan. 14-18, 1991, Boston, American Meteorological Society, 1991, p.264-269, 5 refs.
Rain, Ice storms, Remote sensing, Atmospheric circulation, Weather forecasting.

45-1943
St. Valentine's Day ice storm—an extreme freezing rain disaster.
Rauber, R.M., et al, International Symposium on Winter Storms, 1st, New Orleans, LA, Jan. 14-18, 1991, Boston, American Meteorological Society, 1991, p.272-273.
Ramamurthy, M.K.
Rain, Ice storms, Fronts (meteorology), Radar echoes, Synoptic meteorology, Weather forecasting.

45-1944
Arctic hurricane over the Bering Sea.
Businger, S., et al, International Symposium on Winter Storms, 1st, New Orleans, LA, Jan. 14-18, 1991, Boston, American Meteorological Society, 1991, p.321-324, 6 refs.
Baik, J.J.
Atmospheric disturbances, Oceans, Air water interactions, Atmospheric circulation, Atmospheric pressure, Bering Sea.

45-1945
Proceedings.
Workshop on Ice Scouring and the Design of Offshore Pipelines, Calgary, Alberta, Canada, Apr. 18-19, 1990, Canada Oil and Gas Lands Administration, 1990, 499p., Refs. passim. For selected papers see 45-1946 through 45-1964.
Sea ice, Pipe laying, Ice scoring, Offshore structures, Underground pipelines, Dama :, Design, Countermeasures, Ocean bottom, Soil structure, Trenching, Stability, Settlement (structural), Icebergs, Ground thawing, Construction, Marine geology, Meetings.

45-1946
Character and distribution of sea-ice and iceberg scours.
Lewis, C.F.M., et al, Workshop on Ice Scouring and the Design of Offshore Pipelines, Calgary, Alberta, Canada, Apr. 18-19, 1990. Proceedings, Canada Oil and Gas Lands Administration, 1990, p.57-101, Refs. p.96-101.
Blasco, S.M.
Sea ice distribution, Ice scoring, Icebergs, Offshore structures, Underground pipelines, Ocean bottom, Protection, Pressure ridges, Marine geology, Grounded ice, Beaufort Sea.

45-1947
Observed deformation structures beneath relict iceberg scours.
Woodworth-Lynas, C.M.T., Workshop on Ice Scouring and the Design of Offshore Pipelines, Calgary, Alberta, Canada, Apr. 18-19, 1990. Proceedings, Canada Oil and Gas Lands Administration, 1990, p.103-125, 11 refs.
Icebergs, Subsurface structures, Ice scoring, Pleistocene, Bottom sediment, Deformation, Subsurface investigations, Marine geology, Underground pipelines, Canada--Manitoba.

45-1948
Scour shape and sub-scour disturbance studies from the Canadian Beaufort Sea.
Gilbert, G.R., Workshop on Ice Scouring and the Design of Offshore Pipelines, Calgary, Alberta, Canada, Apr. 18-19, 1990. Proceedings, Canada Oil and Gas Lands Administration, 1990, p.127-144, 8 refs.
Sea ice, Ice scoring, Ocean bottom, Acoustic measurement, Bottom topography, Marine geology, Ice solid interface, Bottom sediment, Beaufort Sea.

45-1949
Case study analysis of the probability of ice scour-induced damage for submarine pipelines.
Comfort, G., Workshop on Ice Scouring and the Design of Offshore Pipelines, Calgary, Alberta, Canada, Apr. 18-19, 1990. Proceedings, Canada Oil and Gas Lands Administration, 1990, p.145-164, Includes discussion. 16 refs.
Sea ice, Ice scoring, Offshore structures, Underground pipelines, Damage, Marine geology, Subsurface investigations, Ice conditions, Route surveys, Computerized simulation.

45-1950
Design of marine pipelines in seabed vulnerable to ice scour.
Palmer, A., Workshop on Ice Scouring and the Design of Offshore Pipelines, Calgary, Alberta, Canada, Apr. 18-19, 1990. Proceedings, Canada Oil and Gas Lands Administration, 1990, p.167-178, 20 refs.
Sea ice, Ice scoring, Offshore structures, Underground pipelines, Ice loads, Soil mechanics, Ocean bottom, Deformation, Ice solid interface.

45-1951
Mechanisms of failure and soil deformation during scouring.
Been, K., Workshop on Ice Scouring and the Design of Offshore Pipelines, Calgary, Alberta, Canada, Apr. 18-19, 1990. Proceedings, Canada Oil and Gas Lands Administration, 1990, p.179-191, 22 refs.
Sea ice, Ice scoring, Ocean bottom, Deformation, Dislocations (materials), Underground pipelines, Offshore structures, Soil strength, Shear stress.

45-1952
On small scale ice scour modelling.
Poorooshasb, F., et al, Workshop on Ice Scouring and the Design of Offshore Pipelines, Calgary, Alberta, Canada, Apr. 18-19, 1990. Proceedings, Canada Oil and Gas Lands Administration, 1990, p.193-235, 13 refs.
Clark, J.I.
Sea ice, Ice scoring, Simulation, Models, Ocean bottom, Deformation, Mechanical tests, Soil mechanics, Underground pipelines.

45-1953
Design ice gouge depth computation through computer simulations.
Wang, A.T., Workshop on Ice Scouring and the Design of Offshore Pipelines, Calgary, Alberta, Canada, Apr. 18-19, 1990. Proceedings, Canada Oil and Gas Lands Administration, 1990, p.237-247, Includes discussion. 15 refs.
Sea ice, Ice scoring, Computerized simulation, Ocean bottom, Trenching, Ice solid interface, Offshore structures, Underground pipelines, Design criteria.

45-1954
Thaw subsidence effects on offshore pipelines and wells.
Nixon, J.F., Workshop on Ice Scouring and the Design of Offshore Pipelines, Calgary, Alberta, Canada, Apr. 18-19, 1990. Proceedings, Canada Oil and Gas Lands Administration, 1990, p.273-287, 10 refs.
Subsea permafrost, Offshore structures, Underground pipelines, Subsidence, Geothermal thawing, Pipe flow, Well casings, Permafrost thermal properties.

45-1955
Influence of the burial trench and subsurface soil conditions on the stability of the proposed offshore pipeline for Amauligak development.
Rogers, B.T., Workshop on Ice Scouring and the Design of Offshore Pipelines, Calgary, Alberta, Canada, Apr. 18-19, 1990. Proceedings, Canada Oil and Gas Lands Administration, 1990, p.303-319, Includes discussion. 10 refs.
Sea ice, Ice scoring, Offshore structures, Underground pipelines, Trenching, Ice loads, Stability, Ice solid interface.

45-1956
First arctic pipeline and later developments.
Brown, R.J., Workshop on Ice Scouring and the Design of Offshore Pipelines, Calgary, Alberta, Canada, Apr. 18-19, 1990. Proceedings, Canada Oil and Gas Lands Administration, 1990, p.323-334.
Offshore structures, Underground pipelines, Pipe laying, History, Sea ice, Construction equipment, Ice bottom surface, Subglacial observations.

45-1957
Construction strategies for arctic offshore pipelines.
McKeehan, D.S., Workshop on Ice Scouring and the Design of Offshore Pipelines, Calgary, Alberta, Canada, Apr. 18-19, 1990. Proceedings, Canada Oil and Gas Lands Administration, 1990, p.335-345.
Offshore structures, Underground pipelines, Pipe laying, Ice scoring, Cost analysis, Construction equipment, Design.

45-1958
Vessel requirements for arctic pipeline trenching and installation.
Jolles, W.H., Workshop on Ice Scouring and the Design of Offshore Pipelines, Calgary, Alberta, Canada, Apr. 18-19, 1990. Proceedings, Canada Oil and Gas Lands Administration, 1990, p.347-364, 9 refs.
Ships, Design criteria, Trenching, Pipe laying, Offshore structures, Underground pipelines, Construction equipment, Specifications.

45-1959
Application of Voker Stevin's experience to arctic offshore pipeline installation.
Volker Stevin Dredging and Services Canada Ltd, Workshop on Ice Scouring and the Design of Offshore Pipelines, Calgary, Alberta, Canada, Apr. 18-19, 1990. Proceedings, Canada Oil and Gas Lands Administration, 1990, p.365-373, Includes discussion.
Offshore structures, Pipe laying, Underground pipelines, Trenching, Environmental impact.

45-1960
Operations and maintenance of a northern pipeline.
Sangster, R.H.B., Workshop on Ice Scouring and the Design of Offshore Pipelines, Calgary, Alberta, Canada, Apr. 18-19, 1990. Proceedings, Canada Oil and Gas Lands Administration, 1990, p.377-384, 2 refs.
Underground pipelines, Crude oil, Cold weather operation, Maintenance, Design, Discontinuous permafrost, Ground thawing.

45-1961
Geotechnical monitoring for an arctic offshore pipeline.
Hanna, A.J., et al, Workshop on Ice Scouring and the Design of Offshore Pipelines, Calgary, Alberta, Canada, Apr. 18-19, 1990. Proceedings, Canada Oil and Gas Lands Administration, 1990, p.385-394, 7 refs.
Sladen, J.A.
Underground pipelines, Offshore structures, Design, Ice scoring, Ground thawing, Countermeasures, Ice conditions.

45-1962
Performance of instruments and the success of monitoring programs in the offshore environment.
DiBiagio, E., Workshop on Ice Scouring and the Design of Offshore Pipelines, Calgary, Alberta, Canada, Apr. 18-19, 1990. Proceedings, Canada Oil and Gas Lands Administration, 1990, p.395-417, 5 refs.
Offshore structures, Ocean environments, Measuring instruments, Monitors, Design, Accuracy.

45-1963
Integrity monitoring criteria and methods for ice scour problems.
Price, P.St.J., et al, Workshop on Ice Scouring and the Design of Offshore Pipelines, Calgary, Alberta, Canada, Apr. 18-19, 1990. Proceedings, Canada Oil and Gas Lands Administration, 1990, p.419-444, Refs. p.440-444.
Adams, J.R., Anderson, H.A.
Offshore structures, Underground pipelines, Ice scoring, Maintenance, Surveys, Protection, Damage.

45-1964
Examination of potential pipeline monitoring techniques.
Witney, K.C., Workshop on Ice Scouring and the Design of Offshore Pipelines, Calgary, Alberta, Canada, Apr. 18-19, 1990. Proceedings, Canada Oil and Gas Lands Administration, 1990, p.445-453, Includes discussion. 8 refs.
Sea ice, Ice scoring, Offshore structures, Underground pipelines, Damage, Surveys, Measuring instruments.

45-1965
Geographical aspects of the problems in background monitoring of natural environments in regions of the Far North of the USSR. [Geograficheskie aspekty *problemy organizatsii fonovogo monitoringa prirodnoi sredy v raĭonakh Kraĭnego Severa SSSR*],
Evseev, A.V., et al, Geograficheskoe prognozirovanie i okhrana prirody (Geographic forecasting and environmental protection). Edited by T.V. Zvonkova and N.S. Kasimov, Moscow, Universitet, 1990, p.46-58, In Russian. 64 refs.
Korzun, A.V., Krasovskaia, T.M., Solomatin, V.I.
Environmental protection, Pollution, Snow impurities, Impurities, Polar regions.

45-1966
Problems and the experience of regional ecological-geochemical analysis of landscapes. [Problemy i opyt *regional'nogo ekologo-geokhimicheskogo analiza landshaftov*],
Kasimov, N.S., et al, Geograficheskoe prognozirovanie i okhrana prirody (Geographic forecasting and environmental protection). Edited by T.V. Zvonkova and N.S. Kasimov, Moscow, Universitet, 1990, p.59-74, In Russian.
Landscape types, Ecology, Geochemistry, Snow impurities, Soil pollution.

45-1967
Ecological problems in geocryology (geocryoecology). [Ekologicheskie problemy geokriologii (geokrioekologiia)],
Popov, A.I., et al, *Geograficheskoe prognozirovanie i* okhrana prirody (Geographic forecasting and environmental protection). Edited by T.V. Zvonkova and N.S. Kasimov, Moscow, Universitet, 1990, p.145-151, In Russian.
Zhigarev, L.A., Konishchev, V.N., Solomatin, V.I.
Ecology, Geocryology.

45-1968
Workshop on Traction Mechanics on Deformable Terrain, South Lake Tahoe, CA, Oct. 9-11, 1989.
Blaisdell, G.L., ed, *U.S. Army Cold Regions Research and Engineering Laboratory*, Jan. 1990, MP 2826, 37p.
Traction, All terrain vehicles, Snow vehicles, Trafficability, Tires, Meetings.

45-1969
Initial impressions of a candidate mobile over-snow transport system.
Blaisdell, G.L., et al, *U.S. Army Cold Regions Research and Engineering Laboratory*, Apr 1990, MP 2827, 13p + appends., 5 refs.
Diemand, D., Young, B.
Snow vehicles, All terrain vehicles, Tracked vehicles, Sleds, Military transportation.

45-1970
Effect of fines in sand on friction on ice.
Blaisdell, G.L., et al, *U.S. Army Cold Regions Research and Engineering Laboratory*, Sep 1990, MP 2828, 16p + figs.
Borland, S.L.
Ice friction, Traction, Sanding, Fines, Runways.

45-1971
Snow roads and runways.
Abele, G., *U.S. Army Cold Regions Research and Engineering Laboratory*, Nov 1990, M 90-03, 100p, ADA-231 490, Refs p.88-98.
Snow roads, Runways, Snow strength, Trafficability, Snow compaction, Snow (construction material), Analysis (mathematics).
This monograph presents a complete review of all successful techniques that have been used to construct and maintain snow roads, trails and aircraft landing strips. The snow properties that must be considered prior to the construction process are identified, and the kinds of apparatus available for the measure of the properties are reviewed and assessed. A discussion of construction techniques is presented, which includes the types of snow pavements, the classification of roads by use, the classification of surface and subsurface strength, the considerations impacting on site selection, the various kinds of equipment that have been developed to construct and maintain the roads, and the additives that have been used to construct high-strength roads. The design criteria that have been established are cited.

45-1972
Ice formation in frequently transited navigation channels.
Ettema, R., et al, *U.S. Army Cold Regions Research and Engineering Laboratory*, Dec. 1990, SR 90-40, 110p., ADA-232 115, 48 refs.
Huang, H.P.
River ice, Ice navigation, Ice formation, Channels (waterways), Ice growth, Ice models, Mathematical models, Ships.
Results are reported of a study aimed at determining and documenting the effects of frequent vessel transit on ice-cover formation over navigation channels. A practical objective of this study was to evaluate the merits of scheduling vessel transits as a means of mitigating problems caused by transiting of ice-covered channels. Vessels transiting through ice covers lead to increased ice growth and transform ice to brash ice, which collects in thick accumulations that may halt traffic. The study entailed extensive laboratory experiments conducted with an ice tank and model hulls that simulated river tows and ships. It also included the formulation and use of a numerical model of ice formation. Another brief study examined the mechanics of ice accumulation beneath flat-bottomed tows. The results from the ice-tank experiments and the numerical model indicate that, except for convoys of vessels, the problems incurred by frequent transiting are not readily mitigated by a sophisticated transiting schedule. Convoying does hold promise of reducing the severity of the problem because it reduces the number of icebreaking transits. Of greater promise, however, is an approach involving mechanical methods for controlling brash-ice accumulations at perennially difficult channel locations.

45-1973
Use of central vehicle wash facilities in cold weather.
Gerdes, G.L., et al, *U.S. Army Construction Engineering Research Laboratory. Technical report*, Sep. 1990, N-90/17, 22p., 12 refs.
Benson, L.J., Bevelheimer, S.J., Smith, P.K.
Military facilities, Winter maintenance, Cold weather operation, Vehicles, Icing, Ice removal.

45-1974
Debris flows 1987 in Switzerland: modelling and fluvial sediment transport.
Rickenmann, D., *International Association of Hydrological Sciences. Publication*, 1990, No.194, Hydrology in mountainous regions. II. Artificial reservoirs; water and slopes, p.371-378, 19 refs.
Floods, Mudflows, Sediment transport, Avalanche modeling, Analysis (mathematics).

45-1975
Investigation of 1987 debris flows in the Swiss Alps: general concept and geophysical soundings.
Haeberli, W., et al, *International Association of Hydrological Sciences. Publication*, 1990, No.194, Hydrology in mountainous regions. II. Artificial reservoirs, water and slopes, p.303-310, 19 refs.
Rickenmann, D., Zimmermann, M., Roesli, U.
Floods, Mudflows, Sediment transport, Avalanche formation.

45-1976
Design of a modified Caterpillar Challenger tractor for antarctic service.
Blaisdell, G.L., et al, *U.S. Army Cold Regions Research and Engineering Laboratory*, June 1990, MP 2829, 13p + figs., 2 refs.
Kurtti, K.
Snow vehicles, Tractors, Tracked vehicles, Traverses, Sleds.
The Caterpillar Challenger tractor, modified by an extended track, is recommended as a replacement for the Caterpillar LGP D8 low-ground-pressure tractor in the National Science Foundation's antarctic vehicle fleet. The LGP D8 tractors are now over 30 years old and many of their parts have become unavailable. The Challenger tractor can be used for pulling tracked trailers or sleds with a payload up to 40 tons and at a top speed of 18 mph.

45-1977
Modeling snowmelt runoff processes in temperate and arctic environments.
Sand, K., Trondheim, University, Norwegian Institute of Technology, Oct. 1990, 176p., Ph.D. thesis. Refs. p.170-176.
Snowmelt, Snow melting, Runoff forecasting, Mathematical models, Snow hydrology, Metamorphism (Snow).

45-1978
Status of AirLand Battlefield Environment (ALBE) winter tactical decision aids.
Aitken, G.W., et al, *U.S. Army Cold Regions Research and Engineering Laboratory*, Dec. 1990, MP 2830, 14p.
Slota, J.R.
Computer programs, Military operation, Cold weather operation, Visibility, Trafficability, Route surveys, Snow roads.

45-1979
Seasonal and inter-annual variations in antarctic sea ice extent as mapped by radar altimetry.
Laxon, S., *Geophysical research letters*, Sep. 1990, 17(10), p.1553-1556, 15 refs.
Sea ice distribution, Mapping, Airborne radar, Radiometry.
Previous work has shown that inter-annual variations in total sea ice extent may provide a sensitive indicator of global climate change. Data from passive microwave instruments have allowed mapping of global sea ice extents from 1973-76 and from 1978 up to Sep. 1987. In this paper data from another microwave instrument, the Geosat radar altimeter, have been used to map the antarctic sea ice extent for the period Nov. 1986 to Jan. 1989. Comparison with total antarctic sea ice extents derived from the Scanning Multichannel Microwave Radiometer (SMMR) show excellent agreement during the freeze-up period but show significant differences during the late part of the melt period. (Auth.)

45-1980
Use of genetically altered bacteria to achieve plant frost control.
Lindow, S.E., Biotechnology of plant-microbe interactions, New York, McGraw-Hill, 1990, p.85-110, Refs. p.104-110.
Nucleation, Organic nuclei, Bacteria, Microbiology, Plant physiology, Frost protection, Frost resistance.

45-1981
Spatial interrelationships between terrain, snow distribution and vegetation patterns at an arctic foothills site in Alaska.
Evans, B.M., et al, *Holarctic ecology*, 1989, 12(3), p.270-278, 15 refs.
Walker, D.A., Benson, C.S., Nordstrand, E.A., Petersen, G.W.
Terrain identification, Topographic surveys, Snow cover distribution, Geobotanical interpretation, Vegetation patterns, Snowdrifts, Data processing.

45-1982
Antifreeze admixture developed in Japan.
Sakai, K., et al, *Concrete international*, Mar. 1991, 13(3), p.26-30, 3 refs.
Watanabe, H., Nomachi, H., Hamabe, K.
Concrete admixtures, Winter concreting, Antifreezes.

45-1983
Antifreeze admixtures for cold weather concreting.
Korhonen, C.J., et al, *Concrete international*, Mar. 1991, 13(3), MP 2831, p.38-41, 10 refs.
Cortez, E.R.
Winter concreting, Concrete admixtures, Antifreezes.

45-1984
Control of plastic shrinkage cracking in cold weather.
Senbetta, E., et al, *Concrete international*, Mar. 1991, 13(3), p.49-53, 11 refs.
Bury, M.A.
Concrete freezing, Winter concreting, Cracking (fracturing)

45-1985
Flood of August 24/25, 1987, in the Reuss Valley of Uri, Switzerland, from a hydrologic and river engineering point of view. [Das Hochwasser vom 24./25. August 1987 im Urner Reusstal aus hydrologischer und flussbaulicher Sicht].
Naef, F., et al, *Wasser, Energie, Luft = Eau, energie, air*, 1990, 82(9), p.222-227, In German with French and English summaries.
Jäggi, M.
Floods, Mudflows, Sediment transport, Rain.

45-1986
Some coolness concerning global warming.
Lindzen, R.S., *American Meteorological Society Bulletin*, Mar. 1990, 71(3), p.288-299, 37 refs.
Climatic changes, Carbon dioxide, Atmospheric physics, Atmospheric composition, Stratosphere.

45-1987
Statistical analysis of historical data at the Giulie Alps glacier terminus and their correlation with climatic data. [Analisi delle misure alle fronti dei ghiacciai delle Alpi Giulie e correlazioni con i dati climatici].
Serandrei Barbero, R., et al, *Comitato glaciologico italiano. Bollettino. Ser.3: Geografia fisica e dinamica quaternia*, 1989, 12(2), p.139-149, In Italian with English summary. 18 refs.
Rabagliati, R., Zecchetto, S.
Glacier oscillation, Statistical analysis, Correlation, Glacier tongues, Climatic factors, Air temperature, Precipitation (meteorology), Snow depth.

45-1988
Observations of debris transport and discharge on K2 Glacier, West China; implications for a depositional model of the Karakorum valley glaciers.
Drozdowski, E., *Quaestiones Geographicae*, 1989, Special issue No.2, p.31-47, 19 refs.
Glacial deposits, Sediment transport, Glacier formation, Ice models, Glacier surveys, Glacier flow.

45-1989
Presence of Trident III on the antarctic continent. [Présence du Trident III sur le continent antarctique].
Dumas, B., *Navigation*, Apr. 1986, 34(134), p.223-237, In French with English summary.
Magnetic surveys, Sea ice, Ice navigation, Antarctica—Victoria Land, Antarctica—Ross Sea.
Within the framework of the German polar scientific mission GANOVEX IV during the austral summer of 1984-1985, the CCNS/Trident III navigation system was used for an aeromagnetic survey aboard two polar Dornier 228-100s. The area chosen for the work covered a surface of 240,000 sq km over the Ross Sea and north Victoria Land. Several Trident stations, supplied by solar energy, were installed to obtain the required navigation accuracy. The success of the mission was complete, the recorded ranges were greater than 300 km, and aircraft positioning was accurate to within 20-40 m. During the mission, 48,000 km of profile data were obtained. (Auth. mod.)

45-1990
400 years isotope record of the Antarctic Peninsula climate.
Aristarain, A.J., et al, *Geophysical research letters*, Dec. 1990, 17(13), p.2369-2372, 32 refs.
Jouzel, J., Lorius, C.
Ice cores, Isotope analysis, Climate changes, Antarctica—Antarctic Peninsula.
A 400 year deuterium record has been obtained from a 154.3 m ice core drilled on Dalinger Dome, James Ross I. Based on a comparison between the isotope profile and the temperature data over the recent period, an interpretation is proposed in terms of temperature changes. The "warmest part" of this proxy record occurs around 1850 with, as a salient feature, a temperature decline of about 2 C from that time up until present conditions. This feature, at odds with the long timescale warming trend recorded for both hemispheres over the same period, likely reflects a regional characteristic related to the lack of a high latitude/low latitude link in Southern Hemisphere circulation patterns. (Auth.)

45-1991
Summertime formation of depth hoar in central Greenland.
Alley, R.B., et al, *Geophysical research letters*, Dec. 1990, 17(13), p.2393-2396, 17 refs.
Saltzman, E.S., Cuffey, K.M., Fitzpatrick, J.J.
Depth hoar, Snow temperature, Snow density, Greenland.

45-1992
June cloud cover over the Arctic Ocean.
Serreze, M.C., et al, *Geophysical research letters*, Dec. 1990, 17(13), p.2397-2400, 25 refs.
Rehder, M.C.
Cloud cover, Ice cover, Sea ice, Arctic Ocean.

45-1993
Heat transfer from Atlantic waters to sea ice in the Arctic Ocean: evidence from dissolved argon.
Moore, R.M., et al, *Geophysical research letters*, Nov. 1990, 17(12), p.2149-2152, 8 refs.
Spitzer, W.
Sea ice, Sea water, Chemical composition, Ice composition, Arctic Ocean.

45-1994
Enhanced ultraviolet transmission of antarctic sea ice during the austral spring.
Trodahl, H.J., et al, *Geophysical research letters*, Nov. 1990, 17(12), p.2177-2179, 12 refs.
Buckley, R.G.
Ultraviolet radiation, Sea ice, Water chemistry, Atmospheric composition.
In determining the effect of the recent enhanced UV levels on antarctic life it is important to know UV radiance under the vast sea ice cover surrounding the continent. This radiance is influenced by the transmission of the ice, and in this paper the first UV measurements on this turbid medium are reported. The transmission is largest in the Spring, so that life under the ice has always experienced its major UV irradiation dose in Oct. Dose enhancements by as much as an order of magnitude will have been experienced under the ozone holes of recent years. (Auth.)

45-1995
Airborne gravity measurement over sea-ice: the western Weddell Sea.
Brozena, J., et al, *Geophysical research letters*, Oct. 1990, 17(11), p.1941-1944, 11 refs.
Gravimetric prospecting, Sea ice.
An airborne gravity study of the western Weddell Sea has shown that floating pack-ice provides a useful radar altimetric reference surface for altitude and vertical acceleration corrections to airborne gravimetry. Airborne gravimetry provides an important alternative to satellite altimetry for the sea-ice covered regions of the world, since satellite altimeters are not designed or intended to provide accurate geoidal heights in areas where significant sea-ice is present within the radar footprint. Errors in radar corrected airborne gravimetry are primarily sensitive to the variations in the second derivative of the sea-ice reference surface in the frequency pass-band of interest. With the exception of imbedded icebergs, the second derivative of the pack-ice surface closely approximates that of the mean sea-level surface at wavelengths > 10-20 km. With the airborne method the percentage of ice coverage, the mixture of first and multi-year ice and the existence of leads and pressure ridges prove to be unimportant in determining gravity anomalies at scales of geophysical and geodetic interest, provided that the ice is floating and not grounded. In the Weddell study an analysis of 85 crosstrack miss-ties distributed over 25 data tracks yields an rms error of 2.2 mGals. Significant structural anomalies, including the continental shelf and offsets and lineations interpreted as fracture zones recording the early spreading directions within the Weddell Sea, are observed in the gravity map. (Auth.)

45-1996
Rebuilding an illusion.
Barr, D.W., et al, *Civil engineering*, Jan. 1991, 61(1), p.54-57.
Bogart, J.K.
Dams, Cold weather construction, Frozen lakes, Ice roads, Rock fills, Environmental protection.

45-1997
Fighting large-scale forest fires. [Bor'ba s krupnymi lesnymi pozharami].
Valendik, E.N., Novosibirsk, Nauka, 1990, 192p., In Russian. Refs. p.182-192.
Forest fires, Countermeasures, Taiga, Cold weather operation.

45-1998
Experimental frost and salt weathering of chalk. Part 2.
Jerwood, L.C., et al, *Earth surface processes and landforms*, 1990, 15(6), p.699-708, 15 refs.
Robinson, D.A., Williams, R.B.G.
Frost weathering, Freeze thaw cycles, Frozen rocks.

45-1999
Winter environment of the Ohio River valley.
Daly, S.F., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, Dec. 1990, CR 90-12, 57p., ADA-232 134, 26 refs.
Bilello, M.A., Bates, R.E.
River ice, Climatic factors, Air temperature, Water temperature, Ice conditions, United States—Ohio River.
A general survey of the winter environment of the Ohio River Valley that is relevant to river ice formation is described. Included are hydrologic, hydraulic and climatic conditions. The long-term monthly discharges steadily increase on the Ohio River throughout the winter season. Inspection of the discharges for each day shows that it has a large short-term variability during the winter, with peaks being four to six times the base flow, and generally coinciding with higher air temperatures. River water temperatures follow a yearly cycle that can be closely described by a sinusoidal curve. The river water temperatures have their minimum in Jan., and also exhibit Jan. "thaws." Ice conditions on the Ohio River are quite variable. The number of days with ice each winter has gradually and erratically decreased from 1902 to 1975. The cause of this decrease cannot be determined, but there is a direct correlation with watershed development, as indicated by watershed population. Average air temperatures show a good correlation with elevation. Other points discussed are mean minimum air temperatures, freezing-degree days and precipitation.

45-2000
Cost-effectiveness of geotextiles; review of performance in Alaskan roads. Final report.
Reckard, M., *U.S. Department of Transportation. Federal Highway Administration. Final report*, Feb. 1991, FHWA-AK-RD-90-04, 50p., 5 refs.
Thermal stresses, Roads, Pavements, Cracking (fracturing), Slope stability, Fatigue (materials), Permafrost beneath roads, Cost analysis, Active layer, Thaw consolidation.

45-2001
Ice-lobe contact sedimentary scarps in marginal zones of the major Vistulian ice-sheet positions, West-Central Poland.
Kasprzak, L., et al, *Quaestiones Geographicae*, 1989, Special issue no.2, p.69-81, 19 refs.
Kozarski, S.
Landforms, Ice cover, Paleoclimatology, Glacial geology.

45-2002
CRREL research on materials in cold environments.
Dutta, P.K., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1990, SR 90-42, 20p, ADA-232 133, 35 refs.
Low temperature tests, Materials, Cold weather performance, Tensile properties, Low temperature research.
This report is a synopsis of the developments in the materials research program at CRREL. Focusing on studies of the low-temperature behavior of materials, the report reviews these developments in three specific areas, creating a materials-property data base, researching composites and other materials and developing test facilities. Among materials, composites, being newer, have been studied in depth. Temperature and strain rate have been considered critical in influencing any material's durability; therefore, facilities were developed to provide precise control of these parameters. The program aims to meet the crucial need for designing structures and equipment using materials specifically adapted for cold regions and low-temperature applications.

45-2003
Methods of studying the thermal regime of soils in the cryolithozone. Collected scientific papers. [Metody izucheniia termicheskogo rezhima gruntov kriolitozony. Sbornik nauchnykh trudov],
Pavlov, A.V., ed, Moscow, VSEGINGEO, 1989, 128p., In Russian. Refs. passim. For individual papers see 45-2004 through 45-2017.
Thermal regime, Temperature variations, Frozen ground temperature, Soil temperature, Cryogenic soils, Geocryology, Frozen rock temperature, Mathematical models.

45-2004
Studying the thermal regime of natural complexes of tundra zones in Western Siberia. [Statsionarnoe izuchenie termicheskogo rezhima prirodnykh kompleksov tundrovoi zony zapadnoi Sibiri],
Pavlov, A.V., et al, *Metody izucheniia termicheskogo* rezhima gruntov kriolitozony. Sbornik nauchnykh trudov (Methods of studying the thermal regime of soils in the cryolithozone. Collected scientific papers). Edited by A.V. Pavlov, Moscow, VSEGINGEO, 1989, p.6-20, In Russian. 7 refs.
Dubrovin, V.A., Kotlov, S.B.
Thermal regime, Tundra, Cryogenic soils, Frozen ground temperature, Ground thawing, Geocryology.

45-2005
Methods and results of forecasting the temperature of the active layer of rocks during general development of territory in the northeastern European part of the country. [Metodika i rezul'taty prognoza temperatury deiatel'nogo sloia porod pri obshchem osvoenii *territorii severo-vostoka Evropeiskoi chasti strany*],
Slavin-Borovskii, V.B., et al, Metody izucheniia termicheskogo rezhima gruntov kriolitozony. Sbornik nauchnykh trudov (Methods of studying the thermal regime of soils in the cryolithozone. Collected scientific papers). Edited by A.V. Pavlov, Moscow, VSEGINGEO, 1989, p.20-31, In Russian. 3 refs.
Chistotinov, L.V.
Active layer, Snow cover effect, Frozen rock temperature, Frozen ground temperature, Forecasting, Mathematical models.

45-2006
Methods for stochastic modelling of temperature fields in the cryolithozone. [Metody stokhasticheskogo modelirovaniia temperaturnykh polei v kriolitozone],
Sagaldachnyi, IU.A., et al, Metody izucheniia termicheskogo rezhima gruntov kriolitozony. Sbornik nauchnykh trudov (Methods of studying the thermal regime of soils in the cryolithozone. Collected scientific papers). Edited by A.V. Pavlov, Moscow, VSEGINGEO, 1989, p.31-43, In Russian. 9 refs.
Aristova, N.B., Chubukova, A.I.
Temperature distribution, Geocryology, Mathematical models, Forecasting.

45-2007
Characteristics of restoring the temperature field, disturbed by drilling in rocks with low thermal conductivity in the Vilyuy syncline. [Osobennosti vosstanovleniia temperaturnogo polia, narushennogo bureniem, v usloviiakh nizkoteploprovodnykh porod Viliuiskoi sineklizy],
Berkovchenko, S.A., Metody izucheniia termicheskogo rezhima gruntov kriolitozony. Sbornik nauchnykh trudov (Methods of studying the thermal regime of soils in the cryolithozone. Collected scientific papers). Edited by A.V. Pavlov, Moscow, VSEGINGEO, 1989, p.43-47, In Russian.
Thermal conductivity, Rock drilling, Rock properties, Boreholes, Thermal regime, Freeze thaw cycles.

45-2008
Optimizing the observation of rock temperatures in the process of surveying cryogenic-hydrogeological operations. [Optimizatsiia nabliudenii za temperaturoi porod v protsesse s"emochnykh merzlotno-gidrogeologicheskikh rabot],
Petrova, R.G., et al, Metody izucheniia termicheskogo rezhima gruntov kriolitozony. Sbornik nauchnykh trudov (Methods of studying the thermal regime of soils in the cryolithozone. Collected scientific papers). Edited by A.V. Pavlov, Moscow, VSEGINGEO, 1989, p.47-57, In Russian. 8 refs.
Chubukova, A.L., Popova, S.I.
Frozen ground temperature, Taliks, Shafts (excavations), Temperature variations, Frozen rock temperature.

45-2009
Studying geocryological-geothermal conditions in the western group of gas-condensate fields in the Kapchagaysk megashaft. [Izuchenie *merzlotno-geotermicheskikh uslovii zapadnoi gruppy gazokondensatnykh mestorozhdenii Khapchagaiskogo megavala*],
Repin, A.G., et al, Metody izucheniia termicheskogo rezhima gruntov kriolitozony. Sbornik nauchnykh trudov (Methods of studying the thermal regime of soils in the cryolithozone. Collected scientific papers). Edited by A.V. Pavlov, Moscow, VSEGINGEO, 1989, p.58-65, In Russian. 10 refs.
Berkovchenko, S.A.
Geocryology, Geothermal prospecting, Gas production.

45-2010
Investigating the temperature regime dynamics of soils to evaluate the bearing ground stability of gas fields in the cryolithozone of Western Siberia. [Izuchenie dinamiki temperaturnogo rezhima gruntov dlia otsenki *ustoichivosti osnovanii gazovykh* promyslov v kriolitozone Zapadnoi Sibiri],
Ivlev, A.IU., Metody izucheniia termicheskogo rezhima gruntov kriolitozony. Sbornik nauchnykh trudov (Methods of studying the thermal regime of soils in the cryolithozone. Collected scientific papers) Edited by A.V. Pavlov, Moscow, VSEGINGEO, 1989, p.66-73, In Russian.
Thermal regime, Engineering geology, Soil temperature, Thaw depth, Frost penetration, Seasonal freeze thaw, Gas production.

45-2011
Two-dimensional mathematical model of ground freezing-thawing under complex boundary conditions. [Dvumernaia matematicheskaia model' promerzaniia-protaivaniia grunta pri slozhnykh granichnykh uslovuakh],
Abdushev, I.N., Metody izucheniia termicheskogo *rezhima gruntov kriolitozony*. Sbornik nauchnykh trudov (Methods of studying the thermal regime of soils in the cryolithozone. Collected scientific papers) Edited by A.V. Pavlov, Moscow, VSEGINGEO, 1989, p.73-79, In Russian. 4 refs.
Mathematical models, Soil freezing, Ground thawing.

45-2012
Modelling the thermal regime of ground in non-disturbed and disturbed natural complexes in southern Central Yakutia. [Modelirovanie temperaturnogo rezhima gruntov estestvennykh i narushennykh prirodnykh kompleksov iuga Tsentral'noi IAkutii],
Stashenko, A.I., Metody izucheniia termicheskogo *rezhima gruntov kriolitozony*. Sbornik nauchnykh trudov (Methods of studying the thermal regime of soils in the cryolithozone. Collected scientific papers) *Edited by A.V. Pavlov*, Moscow, VSEGINGEO, 1989, p.79-88, In Russian. 4 refs.
Thermal regime, Temperature variations, Thaw depth, Frozen ground temperature, Computer applications.

45-2013
Changes in the thermal regime of frost mounds in the northern taiga during economic development of the territory. [Izmenenie temperaturnogo rezhima bugrov puchenii severnoi taigi pri osvoenii territorii],
Goriainov, P.A., Metody izucheniia termicheskogo rezhima gruntov kriolitozony. Sbornik nauchnykh trudov (Methods of studying the thermal regime of soils in the cryolithozone. Collected scientific papers). Edited by A.V. Pavlov, Moscow, VSEGINGEO, 1989, p.88-95, In Russian. 2 refs.
Frost mounds, Thermal regime, Economic development, Taiga.

45-2014
Studying the temperature evolution of floodplain geosystems in northern Yakutia. [Issledovanie temperaturnoi evoliutsii poimennykh geosistem Severnoi IAkutii],
Zaikanov, V.G., Metody izucheniia termicheskogo *rezhima gruntov kriolitozony*. Sbornik nauchnykh trudov (Methods of studying the thermal regime of soils in the cryolithozone. Collected scientific papers). *Edited by A.V. Pavlov*, Moscow, VSEGINGEO, 1989, p.95-102, In Russian. 11 refs.
Floodplains, Frozen rock temperature, Geocryology, Temperature variations, Mapping.

45-2015
Research station investigation of the temperature of water masses and the surface of bottom sediments of Lake Krugloye (Central Gydan). [Statsionarnoe izuchenie temperatury vodnykh mass i poverkhnosti donnykh otlozhenii oz. Kruglogo (Tsentral'nyi Gydan)],
Kotlov, S.B., et al, Metody izucheniia termicheskogo rezhima gruntov kriolitozony. Sbornik nauchnykh trudov (Methods of studying the thermal regime of soils in the cryolithozone. Collected scientific papers). Edited by A.V. Pavlov, Moscow, VSEGINGEO, 1989, p.102-110, In Russian. 5 refs.
Goriainov, P.A., Kotlova, E.V., Pavlov, A.V.
Water temperature, Bottom sediment, Lakes, Temperature variations, Ice cover effect, Lake ice, Freezeup.

45-2016
Research station investigation of the temperature and moisture content of soils in Western Yamal. [Statsionarnoe izuchenie temperatury i vlazhnosti gruntov Zapadnogo IAmala],
Sautkin, E.V., et al, Metody izucheniia termicheskogo rezhima gruntov kriolitozony. Sbornik nauchnykh trudov (Methods of studying the thermal regime of soils in the cryolithozone. Collected scientific papers). Edited by A.V. Pavlov, Moscow, VSEGINGEO, 1989, p.111-119, In Russian. 4 refs.
Kharitonov, L.P.
Soil water, Albedo, Snow cover effect, Thaw depth, Ground thawing, Surface temperature, Seasonal freeze thaw, Frozen ground temperature, Soil temperature.

45-2017
Selecting optimal periods of observations in research station investigations of ground thermal regime in cryolithozone regions. [Vybor optimal'nykh srokov nabliudenii pri statsionarnom izuchenii temperaturnogo rezhima gruntov v ralonakh kriolitozony],
Belikhova, M.G., Metody izucheniia termicheskogo rezhima gruntov kriolitozony. Sbornik nauchnykh trudov (Methods of studying the thermal regime of soils in the cryolithozone. Collected scientific papers). Edited by A.V. Pavlov, Moscow, VSEGINGEO, 1989, p.120-122, In Russian. 2 refs.
Thermal regime, Frozen ground temperature, Computer applications.

45-2018
Twenty-sixth Soviet Antarctic Expedition. Studies of the 1980-81 season. [Dvadtsat' shestaia Sovetskaia antarkticheskaia ekspeditsiia. Sezonnye issledovaniia 1980-81 g.],
Sovetskaia antarkticheskaia ekspeditsiia, *Sovetskaia antarkticheskaia ekspeditsiia. Trudy*, 1988, Vol 83, 140p., In Russian. Refs passim. For individual papers see B-43632, J-43629 through J-43631, J-43633 and J-43634.
Serdiukov, V.I., ed, Bolnikov, V.N., ed
Expeditions, Ice navigation, Polar regions.
This volume contains information on observations and results of scientific efforts carried out by the 26th Soviet Antarctic Expedition in the 1980-1981 season on the antarctic continent and surrounding waters. Seasonal activities and organization of the expedition, shipboard research as well as geological, geophysical and glaciological observations carried out on the mainland, are outlined in the first part of this book. The second part consists of 6 individual papers giving the scientific results of projects in oceanography and marine biology.

45-2019
Ice-core record of oceanic emissions of dimethylsulphide during the last climate cycle.
Legrand, M., et al, *Nature*, Mar. 14, 1991, 350(6314), p.144-146, 19 refs.
Ice cores, Climatic changes, Sea water, Chemical composition.
The Vostok ice core in Antarctica has provided one of the longest climate records, enabling the stable-isotope, major-ion and gas composition of the atmosphere to be reconstructed over many thousands of years. Presented here are depth profiles along this core of methanesulphonate and non-seasalt sulphate (produced by the atmospheric oxidation of dimethylsulphide), which provide the first historical record of biogenic sulphur emissions from the Southern Hemisphere oceans over a complete glacial-interglacial cycle (160 kyr). Those measurements confirm and extend some previous observations made on a very limited data set from the Dome C ice core in Antarctica, which indicated increased oceanic emissions of dimethylsulphide during the later stages of the glacial period, compared with the present day. The observed glacial-interglacial variations in methanesulphonate and non-seasalt sulphate confirm that the ocean-atmosphere sulphur cycle is extremely sensitive to climate change. (Auth.)

45-2020
Anomalous temperature and oxygen gradients under the ice of a high-plains lake in Wyoming.
Rahel, F.J., *Limnology and oceanography*, May 1990, 35(3), p.751-755, 17 refs.
Frozen lakes, Ice cover effect, Water temperature, Insolation, Limnology, Bottom sediment, Oxygen.

45-2021
Behavior of a glacier-derived suspended sediment plume in a small arctic inlet.
Dowdeswell, J.A., et al, *Journal of geology*, Jan. 1991, 99(1), p.111-123, 15 refs.
Cromack, M.
Glacier melting, Meltwater, Sea water, Suspended sediments, Turbidity, Tidal currents, Sedimentation, Ocean bottom.

45-2022
Estimation of sublimation rate from ice disk on heating plate at low pressures.
Tachiwaki, T., et al, *Vacuum*, 1990, 41(7-9), p.2038-2040, 2 refs.
Muraoka, M., Sawada, K., Uyeha, H.
Ice sublimation, Heat transfer, Water vapor, Vapor diffusion, Vacuum freezing, Low temperature tests.

45-2023
Icing condition sensors for building management applications.
Jones, T.M., *Sensors*, Mar. 1990, 7(3), p.36-38.
Buildings, Electric equipment, Ice detection, Ice control, Snow melting.

45-2024
Medium scale landforms of glacial erosion in South Greenland: process and form.
Glasser, N.F., et al, *Geografiska annaler. Series A, Physical geography*, 1990, 72A(3-4), p.211-215, 27 refs.
Warren, C.R.
Glacial erosion, Landforms, Surface structure, Ice pressure, Abrasion, Basal sliding, Greenland.

45-2025
On the use of glacial striae for reconstruction of paleo-ice sheet flow patterns.
Kleman, J., *Geografiska annaler. Series A, Physical geography*, 1990, 72A(3-4), p.217-236, 55 refs.
Glacial erosion, Age determination, Glacier flow, Glacier beds, Striations, Abrasion, Glacial geology, Sweden.

45-2026
Morphology, sedimentological characteristics and origin of a fossil rock glacier on Muckish Mountain, northwest Ireland.
Wilson, P., *Geografiska annaler. Series A, Physical geography*, 1990, 72A(3-4), p.237-247, 49 refs.
Rock glaciers, Talus, Permafrost indicators, Sediment transport, Particle size distribution, Sampling, United Kingdom—Ireland.

45-2027
Ice-rich, redeposited diamicton blocks and associated structures in Quaternary outwash sediments of the Inn Valley near Innsbruck, Austria.
Krainer, K., et al, *Geografiska annaler. Series A, Physical geography*, 1990, 72A(3-4), p.249-254, 15 refs.
Poscher, G.
Glacial deposits, Outwash, Soil structure, Ice melting, Stratigraphy, Sedimentation, Quaternary deposits, Periglacial processes, Austria.

45-2028
Surge of Grande del Nevado Glacier (Mendoza, Argentina) in 1984: its evolution through satellite images.
Espizua, L.E., et al, *Geografiska annaler. Series A, Physical geography*, 1990, 72A(3-4), p.255-259, 10 refs.
Bengochea, J.D.
Glacier surges, Spaceborne photography, Photointerpretation, Periodic variations, LANDSAT, Argentina.

45-2029
Alpine proglacial fluvial sediment budget.
Warburton, J., *Geografiska annaler. Series A, Physical geography*, 1990, 72A(3-4), p.261-272, 30 refs.
Alpine landscapes, Glacier melting, Surface drainage, Sediment transport, Water erosion, Flooding, Stream flow, Switzerland.

45-2030
Generation, transport and deposition of suspended and dissolved material—examples from Swedish rivers.
Brandt, M., *Geografiska annaler. Series A, Physical geography*, 1990, 72A(3-4), p.273-283, 34 refs.
River flow, Sediment transport, Soil erosion, Runoff, Snowmelt, Suspended sediment, Hydrology.

45-2031
Late Weichselian glaciation and Holocene shore displacement on Prins Oscars Land, Nordaustlandet, Svalbard.
Österholm, H., *Geografiska annaler. Series A, Physical geography*, 1990, 72A(3-4), p.301-317, Refs. p.315-317.
Glaciation, Glacier oscillation, Glacial geology, Shoreline modification, Pleistocene, Soil analysis, Norway—Svalbard.

45-2032
Role of sublimation in particle supply for aeolian transport in cold environments.
Neuman, C.M., *Geografiska annaler. Series A, Physical geography*, 1990, 72A(3-4), p.329-335, 15 refs.
Frozen ground, Ice sublimation, Sediment transport, Eolian soils, Wind factors, Temperature effects, Low temperature tests.

45-2033
Nitrogen utilization in ice algal communities of Barrow Strait, Northwest Territories, Canada.
Harrison, W.G., et al, *Marine ecology progress series*, Nov. 1, 1990, 67(3), p.275-283, 55 refs.
Cota, G.F., Smith, R.E.H.
Sea ice, Ice edge, Algae, Nutrient cycle, Growth, Photosynthesis, Biomass, Plant ecology.

45-2034
Structure and properties of rocks in the Udokan cryolithozone. [Stroenie i svoĭstva porod kriolitozony Udokana],
Shesternev, D.M., et al, Novosibirsk, Nauka, 1990, 124p., In Russian. Refs. p.120-124.
[Adrishchenskiĭ, G.E.
Frozen rocks, Rock mechanics, Rock properties, Geocryology.

45-2035
Ice jam analysis at Idaho Falls, Snake River, Idaho.
Zufelt, J.E., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1990, SR 90-43, 18p., ADA-232 226, 4 refs.
Earickson, J.A., Cunningham, L.
Frazil ice, Ice control, Ice jams, Flooding, Hydraulics, United States—Idaho—Snake River.

45-2036
Road grip of winter tires on ice. [Vinterdäcks väggrepp på is],
Nordström, O., et al, *Sweden. Statens väg- och trafikinstitut. Rapport*, 1990, No.354, 79p. + appends., In Swedish with English summary. 22 refs.
Samuelsson, E.
Tires, Rubber ice friction, Cold weather performance.

45-2037
Ice formation in saline soils.
Konrad, J.M., *Canada. Geological survey. Open file*, Mar. 1989, No.2117, 3 vols., 15 refs.
Saline soils, Ice salinity, Ice formation, Frost heave, Ice lenses.

45-2038
1990 annual report on Alaska's mineral resources.
Schneider, J.L., ed, *U.S. Geological Survey. Circular*, 1990, No.1056, 67p., Refs. p.53-64.
Minerals, Natural resources, Environmental protection, Polar regions.

45-2039
Study of the present status of studded tires. [Undersökning av dubbdäckens aktuella status],
Samuelsson, E., *Sweden. Statens väg- och trafikinstitut. Meddelande*, 1990, No.605, 9p. + appends., In Swedish with English summary. 2 refs.
Tires, Cold weather performance.

45-2040
Field test of studded and non-studded winter tires. Subjective rating by taxi drivers. [Dubbade och odubbade vinterdäcks köregenskaper. Fältundersökning genom bedömning av taxiförare],
Samuelsson, E., *Sweden. Statens väg- och trafikinstitut. Meddelande*, 1990, No.606, 17p. + appends., In Swedish with English summary.
Tires, Cold weather performance, Rubber ice friction.

45-2041
Two-layer wind-driven coastal circulation model.
Poon, Y.K., et al, *Journal of geophysical research*, Feb. 15, 1991, 96(C2), p.2535-2548, 17 refs.
Madsen, O.S.
Ocean currents, Wind factors, Sea ice, Drift, Mathematical models, Layers.

45-2042
Top/bottom multisensor remote sensing of arctic sea ice.
Comiso, J.C., et al, *Journal of geophysical research*, Feb. 15, 1991, 96(C2), MP 2832, p.2693-2709, 26 refs.
For another version see 45-564.
Wadhams, P., Krabill, W.B., Swift, R.N., Crawford, J.P., Tucker, W.B.
Sea ice, Physical properties, Remote sensing, Measuring instruments, Performance, Correlation, Radiometry, Ice bottom surface, Radar echoes, Acoustic measurement, Lidar.
The arctic sea ice cover has been studied using near simultaneous observations by passive and active (synthetic aperture radar, SAR) microwave sensors, upward looking and sidescan sonars, a lidar profilometer, and an infrared sensor. Aircraft and submarine data over 100 km track of central arctic sea ice were registered and analyzed to evaluate the characteristics of the ice cover and the utility of each sensor in ice studies. The results of comparative and correlation analyses are as follows. The probability density functions of ice draft from sonar and elevation from lidar were found to be almost identical when isostasy is taken into account, which suggests that the basic ice thickness distribution can be derived from the surface topography measurements alone. Reasonable correlation was found between SAR backscatter and ice draft. However, surface roughness derived directly from standard deviations in the lidar elevation data was found to be poorly correlated to the SAR backscatter, which indicates that the SAR values are affected more by scattering from the ice than from the snow-covered surface. The active and passive microwave sensors are shown to generally complement each other in sensitivity to different physical properties of the sea ice. Surfaces identified as multiyear ice by the passive system have a large spread in the unaveraged SAR backscatter, indicating limitations when using a one-channel SAR for ice type identification at the highest resolution. Also, ridged ice identified by sonar and SAR data covers a large range of passive microwave emissivity, suggesting considerable variability in the age and salinity of this type of ice. Significant variations (about 0.11) in the minimum emissivity of consolidated multiyear ice are observed in different regions of the Arctic using the high-resolution (30 m) passive microwave data. This suggests that regional variations in texture and scattering characteristics of multiyear ice in the Arctic are present, likely influenced by different histories of formation of the ice in different regions.

45-2043
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Dewey, K.F.
Snow cover distribution, Periodic variations, Air temperature, Statistical analysis, Climatic changes, Spaceborne photography.

45-2044
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45-2045
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Extraterrestrial ice, Frost, Surface migration, Theories, Ice surface, Triton, Seasonal variations, Albedo.

45-2046
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Extraterrestrial ice, Frost, Surface migration, Simulation, Insolation, Triton, Atmospheric pressure.

45-2047
Zonally averaged thermal balance and stability models for nitrogen polar caps on Triton.
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Extraterrestrial ice, Frost, Surface migration, Heat balance, Models, Triton, Albedo.

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Frost lenses? Sure. But in concrete?.
Perenchio, W.F., et al, *Concrete international: design & construction*, Apr. 1990, 12(4), p.51-53, 2 refs.
Kress, V., Breitfeller, D.
Ice lenses, Concrete freezing, Surface structure, Freeze thaw cycles.

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Snowstorms, Records (extremes), Weather observations, Air temperature, Winter, United States.

45-2050
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Snowstorms, Records (extremes), Weather observations, United States—Florida.

45-2051
Final supplemental environmental impact statement: Kodiak Harbor, Alaska.
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Permafrost, Frozen ground strength, Penetration tests, Penetrometers, Soil creep, Tunnels, Engineering geology.

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Aircraft icing, Chemical ice prevention, Air flow, Fluid dynamics, Analysis (mathematics), Viscous flow, Wave propagation.

45-2054
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Marvinney, R.G., ed.
Glacial geology, Glacial deposits, Geological surveys, Marine geology, Marine deposits, Quaternary deposits, Geochronology, Stratigraphy, Sea level, United States—Maine.

45-2055
Timing and mechanisms for the deposition of the glaciomarine mud in and around the Gulf of Maine: a discussion of alternative models.
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45-2056
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Shores, Glacial geology, Sea level, Bottom topography, Isostasy, Glaciation, Terraces, Seismic surveys, United States—Maine.

45-2057
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Glacial geology, Glacial deposits, Marine geology, Marine deposits, Shores, GLacier melting, Geochronology, United States—Maine.

45-2064
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Weddle, T.K., Studies in Maine geology, Vol.6. Edited by R.D. Tucker and R.G. Marvinney, Augusta, ME, Maine Geological Survey, 1989, p.53-69, 94 refs.
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45-2066
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Glacial geology, Glacial deposits, Glacier oscillation, Geochronology, United States—Maine, United States—New Hampshire.

45-2067
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Glacial geology, Marine geology, Glacial deposits, Glacial erosion, Geochronology, United States—Maine.

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Kite, J.S., et al, Studies in Maine geology, Vol.6. Edited by R.D. Tucker and R.G. Marvinney, Augusta, ME, Maine Geological Survey, 1989, p.135-142, 28 refs.
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Glacial geology, Drainage, River basins, Lacustrine deposits, Alluvium, Paleoclimatology, Geomorphology, United States—Maine, Canada—New Brunswick.

45-2071
On the effectiveness of the production of Antarctic Bottom Water in the Weddell and Ross Seas.
St. Pierre, D.B., Monterey, Naval Postgraduate School, 1989, 124p., ADA-218 873, M.S. thesis. Refs. p.117-123.
Ice growth, Theories, Sea ice distribution, Ice breakup, Ice shelves, Tidal currents, Polar regions, Antarctica—Weddell Sea, Antarctica—Ross Sea.
The northward propagation of Antarctic Bottom Water (AABW), from its primary source in the Weddell Sea, has been documented since the early part of this century. Despite the striking similarities between the Weddell and the Ross Seas, AABW is mainly produced in the Weddell Sea. The question is posed as to why the Weddell Sea is so effective in the production of AABW as compared to the Ross Sea. Differences are determined by analyzing various physical mechanisms and forcing functions in both basins with respect to the two predominant theories of AABW formation: Foster and Carmack's shelf break process theory and Foldvik and Gammelsrod's theory of ice shelf processes. Results reveal that the strong tidal forcing at the Weddell Sea ice shelf barrier combines with the wind stress field and with the special under-ice-shelf and continental shelf bathymetries of the Weddell Sea to become the critical elements of the AABW formation process. The shelf process theory is found to account for the formation of Weddell Sea Bottom Water (WSBW), the parent constituent of AABW. (Auth mod.)

45-2072
Aqueous geochemistry of major constituents in the Alph River and tributaries in Walcott Bay, Victoria Land, Antarctica.
De Mora, S.J., et al, *Antarctic science*, Mar. 1991, 3(1), p.73-86, Refs. p.85-86.
Whitehead, R.F., Gregory, M.
Glacial rivers, Meltwater, Geochemistry, Antarctica—Walcott Bay.
Two geochemical surveys of the major constituents of the Alph River, Walcott Bay, were undertaken in summer of 1987-88. Tributaries and the runoff from various glaciers were also investigated. The Alph River has an average total dissolved solids (TDS) concentration of 63.5 mg l, approximately half that of average world river water. The chemical composition is dom-

nated by Na+ and HCO3-. Glacial melt waters have very low TDS but chemical weathering over the course of a few kilometers causes solute concentrations in the tributaries to exceed those of the Alph River. The composition of the streams is variable, but often Ca2+ is the principal cation. Enrichment factor and mass balance calculations indicate that the salts in the Alph River and its tributaries have a substantial non-marine component. Chemical weathering of calcite, mirabilite, gypsum and halite contribute solutes to the aquatic system. A "Gibbs Plot" indicates that water samples from direct glacial runoff fall outside the world water envelope. They have low solute levels but enhanced Ca2+ concentrations, resulting from the aeolian deposition and subsequent dissolution of calcitic material. (Auth.)

45-2073
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Flowers, P.A., *Journal of chemical education*, Dec. 1990, 67(12), p.1068-1069, 5 refs.
Antifreezes, Education, Density (mass/volume), Experimentation, Chemical analysis, Solutions.

45-2076
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Van Vliet-Lanoë, B.
Frost action, Ice lenses, Soil structure, Moraines, Pleistocene, Soil dating, Soil analysis, Italy.

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Harmancioğlu, N.B.
Precipitation (meteorology), Rain, Snowfall, Mathematical models, Runoff forecasting, Watersheds.

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Stein, J.
Stream flow, Meltwater, Snowmelt, Chemical properties, Environmental tests, Watersheds, Lake water, Seasonal variations, Water pollution.

45-2079
Chemical weathering in the Loch Vale Watershed, Rocky Mountain National Park, Colorado.
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Drever, J.I., Baron, J.
Watersheds, Weathering, Snowmelt, Surface drainage, Hydrogeochemistry, Chemical properties, Minerals, United States—Colorado.

45-2080
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Deriugin, A.A., *Soviet meteorology and hydrology*, 1990, No.1, p.101-105, Translated from Meteorologiia i gidrologiia, 1990, No.1. 7 refs.
Watersheds, Taiga, Snow cover, Snowmelt, Vegetation factors, Water reserves, Runoff, Forest land.

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Concrete durability, Freeze thaw tests, Concrete aggregates, Physical properties, Compressive properties.

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Extraterrestrial ice, Origin, Chemical composition, Theories, Triton, Thermodynamics.

45-2084
Microwave and physical properties of sea ice in the winter marginal ice zone.
Tucker, W.B., et al, *Journal of geophysical research*, Mar. 15, 1991, 96(C3), MP 2834, p.4573-4587, 22 refs.
Grenfell, T.C., Onstott, R.G., Perovich, D.K., Gow, A.J., Shuchman, R.A., Sutherland, L.L.
Sea ice, Ice physics, Microwaves, Ice density, Ice cover thickness, Ice salinity, Radar, Radiometry.
Surface-based active and passive microwave measurements were made in conjunction with ice property measurements for several distinct ice types in the Fram Strait during Mar. and Apr. 1987. Synthetic aperture radar imagery downlinked from an aircraft was used to select study sites. The surface-based radar scattering cross section and emissivity spectra generally support previously inferred qualitative relationships between ice types, exhibiting expected separation between young, first-year and multiyear ice. Gradient ratios, calculated for both active and passive data, appear to allow clear separation of ice types when used jointly. Surface flooding of multiyear floes, resulting from excessive loading and perhaps wave action, causes both active and passive signatures to resemble those of first-year ice. This effect could possibly cause estimates of ice type percentages in the marginal ice zone to be in error when derived from aircraft- or satellite-borne sensors.

45-2085
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Snowdrifts, Roofs, Shear stress, Wind velocity, Wind tunnels, Models.

45-2086
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45-2087
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Smiraglia, C., Zanon, G.
Glacier surveys, Glacier oscillation, Meteorological data, Mountain glaciers, Alpine glaciation, Statistical analysis, Air temperature, Precipitation (meteorology).

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Gerlach, J.A.
Concrete pavements, Frost heave, Concrete durability, Flexural strength, Cold weather construction.

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Frozen ground mechanics, Hydraulics, Models, Soil water, Water flow.

45-2090
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Corapcioglu, M.Y.
Soil freezing, Saline soils, Mathematical models, Unfrozen water content, Saturation.

45-2091
Elsevier's dictionary of glaciology in four languages; English (with definitions), Russian (with definitions), French and German.
Kotliakov, V.M., ed. Amsterdam, Elsevier, 1990, 336p., In English, Russian, French, and German.
Smoliarova, N.A., ed.
Glaciology, Dictionaries, Avalanches, Mudflows, Ice, Geocryology.

45-2092
Cold region environmental concerns.
Alter, A.J., *Critical reviews in environmental control*, 1990, 20(4), p.257-298, 233 refs.
Haze, Pollution, Waste disposal, Research projects, Environmental protection, Polar regions.

45-2093
Yukon Territory snow survey bulletin & water supply forecast: March 1, 1991.
Canada. Indian and Northern Affairs. Water Resources Division, *Yukon Territory snow survey bulletin*, Mar. 1991, 25p.
Snow surveys, Water supply, Runoff forecasting, Snow courses, Snow pillows, River basins, Drainage.

45-2094
Wheels and tracks in snow; second validation study of the CRREL shallow snow mobility model.
Richmond, P.W., et al, *U.S. Army Cold Regions Research and Engineering Laboratory*, Dec. 1990, CR 90-13, 39p., ADA-232 866, 8 refs.
Blaisdell, G.L., Green, C.E.
Tires, Snow strength, Snow vehicles, Vehicles, Computerized simulation, Models, Tracked vehicles, Traction, Military equipment, Motor vehicles.
This report presents and analyzes winter mobility data obtained during the winters of 1988 and 1989 at the Keweenaw Research Center, Houghton, MI. Traction data (1989) for the HMMWV, HEMTT, SUSV and M60 military vehicles, and the CRREL instrumented vehicle, are presented for hard-packed snow and for undisturbed snow overlaying ice. When these data are compared with an equation for undisturbed snow over soil or packed snow, slight reductions in traction are observed. Resistance data obtained in 1988 and in 1989 are evaluated based on a combined vehicle-snow parameter. An empirical equation based on this parameter and data from all the vehicles, including the CRREL instrumented vehicle using several different width tires, is developed. The resistance data and the empirical resistance equation are compared with the CRREL shallow snow mobility (SSM2.0). The SSM2.0 predicted resistance is within 50% on average. The empirically derived resistance equation is slightly worse. The report recommends further research on vehicle motion resistance in snow.

45-2095
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45-2096
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Snow mechanics, Soil mechanics, Sands, Wind factors, Eolian soils, Sediment transport, Creep, Wind velocity, Models.

45-2098
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Flanders, S.N., MP 2835, IMEKO (Internationale Messtechnische Konföderation [International Measurement Confederation]) Technical Committee. ITC series, No.9. Heat flux measurement, Budapest, Hungary, OMIKK (Orszagos Muszaki Informacios Kopont es Konyvtar [National Technical Information Center and Library])—TECHNOINFORM, 1986, p.101-120, 8 refs. Proceedings of the 2nd Workshop.
Buildings, Heat flux, Temperature measurement, Building codes, Thermal insulation.

45-2099
Detection of coarse sediment movement using radio transmitters.
Chacho, E.F., Jr., et al, *Northern engineer*, Fall 1990, 22(3), MP 2836, p.5-9, 8 refs. For another version see 44-3985.
Burrows, R.L., Emmett, W.W.
Sediment transport, River flow, Telemetering equipment, Rocks, Glacial rivers.
The use of radio transmitters to track and locate coarse sediment (39 millimeters or larger) was successfully demonstrated by tracking five individual rocks through a highly mobile, braided river system. Radio-implanted rocks traveling distances greater than 1,500 m in 8 days' time were tracked during periods of high flow and turbid water conditions. After flow receded and access to the bars and channels was possible, the rocks were again located and recovered even though burial of up to 0.3 m had occurred. A motion sensing device that detects whether a particle is in motion or at rest was also tested successfully.

45-2100
Papers on air cushion technology: icebreaking, cold weather operations, vehicles.
Hinchey, M.J., ed, *Transport Canada. Technical publication,* Sep. 1989, No.8979, 96p., With French summary. Refs. passim. For individual papers see 44-4133 through 44-4136, 45-2101 and 45-2102.
Air cushion vehicles, Ice breaking.

45-2101
Numerical simulation of over water heave motion of a two-dimensional hovercraft.
Hinchey, M.J., *Transport Canada. Technical publication,* Sep. 1989, No.8979, Papers on air cushion technology: icebreaking, cold weather operations, vehicles. Edited by M.J. Hinchey, p.25-38.
Air cushion vehicles, Mathematical models.

45-2102
Technical evaluation of the MARIC 65-tonne amphibious hovercraft model 722.
Yun, L., et al, *Transport Canada. Technical publication,* Sep. 1989, No.8979, Papers on air cushion technology: icebreaking, cold weather operations, vehicles. Edited by M.J. Hinchey, p.79-96, With French summary. 5 refs.
Gu, X., Zhu, J.Z.
Air cushion vehicles, Amphibious vehicles, China.

45-2103
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Dickinz, D., et al, Vancouver, B.C., DF Dickins Associates, Mar. 1990, Var. p., With Inuit summary. Refs. p.5/1-5/8.
Environmental protection, Oil recovery, Shores, Ice conditions, Ocean environments, Oil spills, Sea ice, *Canada—Northwest Territories—Lancaster Sound.*

45-2104
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Ketchum, R.G., et al, New York, Aperture, 1987, 112p., 36 refs.
Ketchum, C.D.
Forest ecosystems, Environmental protection, *United States—Alaska.*

45-2105
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Sea ice, Ice cover effect, Ice models, Climatic changes.
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Sea ice, Ice edge, Radiation balance, Ice models, Ice cover effect.

45-2107
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Snow cover structure, Snow impurities, Spectroscopy, Lasers, Remote sensing, Wet snow, Atmospheric composition.

45-2108
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Concrete strength, Concrete placing, Temperature control, Cryogenics, Cracking (fracturing), Countermeasures, Cooling, Concrete aggregates.

45-2109
Snowmelt modeling in a balsam fir forest: comparison between an energy balance model and other simplified models.
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Barry, R., Stein, J., Plamondon, A.P.
Snowmelt, Periodic variations, Models, Forest canopy, Meteorological factors, Radiation absorption, Meltwater, Heat balance, Runoff.

45-2110
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Seegebrecht, G.W., et al, *Concrete international: design & construction,* Oct. 1989, 11(10), p.47-50, 3 refs.
Litvin, A., Gebler, S.H.
Concrete durability, Concrete admixtures, Freeze thaw tests, Physical properties, Permeability.

45-2111
Durability of prestressed concrete tanks.
Schupack, M., et al, *Concrete international: design & construction,* Oct. 1989, 11(10), p.51-55, 58.
Poston, R.W.
Concrete structures, Storage tanks, Concrete durability, Freeze thaw cycles, Prestressed concretes.

45-2112
Durability of dry-mix shotcrete containing regulated-set cement.
Gebler, S.H., *Concrete international: design & construction,* Oct. 1989, 11(10), p.56-58, 3 refs.
Concrete durability, Concrete admixtures, Freeze thaw tests, Concrete strength, Compressive properties.

45-2113
Ablation of avalanched and undisturbed snow, Himalaya Mountains, Pakistan.
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Gardner, J.S.
Avalanche deposits, Snow cover stability, Ablation, Snowmelt, Runoff, Snow density, Air temperature, Heat flux, Pakistan—Himalaya Mountains.

45-2114
Proceedings of the 58th annual meeting, Sacramento, CA, April 17-19, 1990.
Western Snow Conference, Fort Collins, Colorado State University, [1990], 170p. + appends., Refs. passim. For individual papers see 45-2115 through 45-2138.
Shafer, B., ed.
Snow surveys, Water supply, Forecasting, Snowmelt, Hydrology, Watersheds, Telemetering equipment, Runoff, Snow water equivalent, Precipitation (meteorology), Snow fences, Remote sensing, Climatic changes, Data processing, Models.

45-2115
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Frost resistance, Tundra, Plants (botany), Cold tolerance.

45-2116
Status of the California Cooperative Snow Surveys Program.
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Gehrke, F.
Snow surveys, Water supply, Forecasting.

45-2117
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Snow surveys, Water supply, Forecasting, Data processing.

45-2118
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Hansen-Bristow, K.J.
Snow accumulation, Snow water equivalent, Snow density, Ablation, Forest canopy.

45-2119
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Brandow, C.A.
Snowmelt, Watersheds, Hydrology, Streams.

45-2120
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Snow hydrology, Snow accumulation, Snowmelt, Runoff, Stream flow, Hydrology.

45-2121
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Clow, D.W.
Avalanches, Watersheds, Hydrology, Lakes, Animals.

45-2122
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Benson, C.S., Santana, B.W., Ganguly, P.
Blowing snow, Snow mechanics, Snow fences, Wind velocity, Analysis (mathematics), Forecasting, Snowdrifts.

45-2123
Automated snow depth and snowpack temperature measurements.
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Gaza, B.
Snow depth, Snow temperature, Temperature measurement, Thermocouples, Measurement, Acoustic measurement, Telemetering equipment.

45-2124
Refinements in the remote sensing of snow-covered area.
Holroyd, E.W., III, et al, *Western Snow Conference. Proceedings,* 1990, 58th, p.79-86, 3 refs.
Carroll, T.R.
Remote sensing, Sensor mapping, Snow cover distribution, Radiometry.

45-2125
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Snowmelt, Runoff, Water supply, Records (extremes).

45-2126
Using ratios of runoff to snow water content and projected rainfall-to-come as a method of narrowing the water supply forecast range.
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Runoff, Snow water content, Precipitation (meteorology), Rain, Water supply, Forecasting, Watersheds.

45-2127
Evaluation of methods used by different river forecast centers to calculate reasonable maximum and reasonable minimum forecasts.
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Watersheds, Water supply, Forecasting, Runoff, Statistical analysis, Snow water equivalent.

45-2128
Method of modeling the frequency characteristics of daily snow amount, for stochastic simulation of rain-on-snowmelt events.
Brunengo, M.J., *Western Snow Conference. Proceedings,* 1990, 58th, p.110-121, 16 refs.
Snowmelt, Computerized simulation, Mathematical models, Rain, Precipitation (meteorology).

45-2129
Snow in mountain watersheds: connections to climate and ecosystem health.
Sommerfeld, R.A., et al, *Western Snow Conference. Proceedings,* 1990, 58th, p.122-129, 28 refs.
Fox, D.G., Musselman, R.C.
Watersheds, Ecosystems, Snow composition, Snow water equivalent, Climatic changes, Metamorphism (snow), Snowmelt.

45-2130
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Climatic changes, Snowmelt, Water supply, Runoff, Deltas, Electric power, Water level.

45-2131
Let's involve schoolkids in data collection efforts.
Clagett, G.P., *Western Snow Conference. Proceedings,* 1990, 58th, p.137-140.
Education, Data processing, Climate, Snow surveys.

45-2132
Precipitation extremes at the Central Sierra Snow Laboratory, California.
Azuma, D., et al, *Western Snow Conference. Proceedings*, 1990, 58th, p.141-144, 3 refs.
Berg, N.H.
Precipitation (meteorology), Forecasting, Records (extremes), Snowfall, Statistical analysis.

45-2133
Coping with extreme points of view.
Brandow, C.A., *Western Snow Conference. Proceedings*, 1990, 58th, p.145-149, 33 refs.
Legislation, Environmental protection, Watersheds, Snow surveys, Telemetering equipment.

45-2134
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Fedora, M.A., *Western Snow Conference. Proceedings*, 1990, 58th, p.150-153, 7 refs.
Stream flow, Watersheds, Snow water equivalent, Time factor, Snowmelt, United States—Oregon—Eagle Creek.

45-2135
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Hart, D.
Snow survey tools, Telemetering equipment, Damage, Water supply.

45-2136
Snow fencing near pit reservoirs to improve water supplies.
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Schmidt, R.A.
Water supply, Snow fences, Reservoirs, Ponds, Models.

45-2137
1948 flood on the Columbia River: an analysis of its cause and its importance in operational planning.
Speers, D.D., et al, *Western Snow Conference. Proceedings*, 1990, 58th, p.160-163, 3 refs.
Barcellos, D.J., Wortman, R.T.
Flooding, Precipitation (meteorology), Floods, Models, Water supply, Snow water equivalent, Snow melt, Flood forecasting, United States—Columbia River.

45-2138
Icing affects fall discharge characteristics of a rangeland stream.
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Streams, Stream flow, Icing, River ice.

45-2139
Theoretical and experimental approach to the functioning of a snow drift barrier system. [Approche théorique et expérimentale du fonctionnement d'un système de barrières pare-congères],
Brugnot, G., *Houille blanche*, 1984, No.6/7, p.445-450, In French. 5 refs.
Snow fences, Snowdrifts.

45-2140
Process study of sorted patterns in arctic soils. Final report.
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Patterned ground, Cryogenic soils, Active layer, Soil freezing, Freeze thaw cycles, Thaw consolidation, Soil texture.

45-2141
Examination of dislocations in ice. Final report.
Baker, I., et al, U.S. Army Research Office, Hanover, NH, Dartmouth College, Thayer School of Engineering, Feb. 19, 1991, 8p., Contract No. DAA29-85-K-0251, 3 refs.
Liu, F.P.
Ice crystals, Ice deformation, Dislocations (materials), X ray analysis.

45-2142
In-situ measurement of window performance.
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Windows, Thermal insulation, Air leakage, Heat loss.

45-2143
Surface water hydrology.
Wolman, M.G., ed. Geology of North America, Vol. O-1, Boulder, CO, Geological Society of America, 1990, 374p., Refs. passim. For selected papers see 45-2144 through 45-2152.
Riggs, H.C., ed.
Surface waters, Hydrology, Stream flow, Hydrologic cycle, Meltwater, Ice conditions, Snow cover.

45-2144
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Lins, H.F., et al, Surface water hydrology. Edited by M.G. Wolman and H.C. Riggs. Geology of North America, Vol. O-1, Boulder, CO, Geological Society of America, 1990, p.11-53, 85 refs.
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Atmospheric circulation, Hydrologic cycle, Climatic changes, Water balance, Air water interactions, Surface waters.

45-2145
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Shiau, S.Y.
Surface waters, Stream flow, Topography, Vegetation patterns, Soil patterns, Tundra.

45-2146
Temporal and spatial variability of streamflow.
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Harvey, K.D.
Stream flow, Runoff, Meltwater.

45-2147
Floods.
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Floods, Ice jams, Lake bursts, Mudflows.

45-2148
Low flows and hydrologic droughts.
Rogers, J.D., et al, Surface water hydrology. Edited by M.G. Wolman and H.C. Riggs. Geology of North America, Vol. O-1, Boulder, CO, Geological Society of America, 1990, p.121-130, 14 refs.
Armbruster, J.T.
Stream flow, Water supply, Water level, Water table, Snow water content.

45-2149
Snow and ice.
Meier, M.F., Surface water hydrology. Edited by M.G. Wolman and H.C. Riggs. Geology of North America, Vol. O-1, Boulder, CO, Geological Society of America, 1990, p.131-158, 64 refs.
Snow cover distribution, Snow depth, Ice cover, Glaciers, Runoff, Ice (water storage), Snow hydrology, Glacial hydrology.

45-2150
Hydrology of lakes and wetlands.
Winter, T.C., et al, Surface water hydrology. Edited by M.G. Wolman and H.C. Riggs. Geology of North America, Vol. O-1, Boulder, CO, Geological Society of America, 1990, p.159-187, 91 refs.
Woo, M.K.
Lakes, Swamps, Hydrology, Ice conditions, Permafrost, Tundra.

45-2151
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Meade, R.H., et al, Surface water hydrology. Edited by M.G. Wolman and H.C. Riggs. Geology of North America, Vol. O-1, Boulder, CO, Geological Society of America, 1990, p.255-280, Refs. p.276-280.
Yuzyk, T.R., Day, T.J.
Sediment transport, Suspended sediments, Meltwater.

45-2152
Riverscape.
Wolman, M.G., et al, Surface water hydrology. Edited by M.G. Wolman and H.C. Riggs. Geology of North America, Vol. O-1, Boulder, CO, Geological Society of America, 1990, p.281-328, 91 refs.
Rivers, River ice, Ice conditions, Hydrology, Hydrogeology.

45-2153
Outer Continental Shelf Environmental Assessment Program; Final reports of principal investigators, Vol.70. Anchorage, AK, U.S. National Oceanic and Atmospheric Administration, Ocean Assessments Division, Alaska Office, Oct. 1990, 652p., OCS/MMS 90-0084, Refs. passim. Contains 6 papers.
Ocean currents, Tidal currents, Water transport, Oil spills, Oceanographic surveys, Bering Sea.

45-2154
Outer Continental Shelf Environmental Assessment Program; Final reports of principal investigators, Vol.71. Anchorage, AK, U.S. National Oceanic and Atmospheric Administration, Ocean Assessments Division, Alaska Office, Nov. 1990, 472p., PB91-140434, OCS/MMS-90-0094, Refs. passim. Contains 4 papers.
Plankton, Marine biology, Ocean environments.

45-2155
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Sea ice, Drift, Ice edge, Bottom ice, Sea water freezing, Ocean currents, Oceanographic surveys.

45-2156
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Jarvela, L.E., ed, *U.S. Department of the Interior. Minerals Management Service. Alaska Outer Continental Shelf Region. OCS study*, 1989, MMS 89-0041, 179p., Refs. passim. For selected papers see 45-2157 and 45-2158.
Thorsteinson, L.K., ed.
Environmental impact, Ocean environments, Marine biology, Oil spills, Environmental protection.

45-2157
Coastal zone oil spill model: performance test of wave propagation components.
Reed, M., *U.S. Department of the Interior. Minerals Management Service. Alaska Outer Continental Shelf Region. OCS study*, 1989, MMS 89-0041, Gulf of Alaska, Cook Inlet, and North Aleutian Basin Information Update Meeting, Anchorage, AK, Feb. 7-8, 1989. Proceedings. Edited by L.E. Jarvela and L.K. Thorsteinson, p.151-159, 4 refs.
Oil spills, Ocean waves, Shores, Mathematical models, Ocean environments, Environmental impact.

45-2158
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Whitney, J.W., et al, *U.S. Department of the Interior. Minerals Management Service. Alaska Outer Continental Shelf Region. OCS study*, 1989, MMS 89-0041, Gulf of Alaska, Cook Inlet, and North Aleutian Basin Information Update Meeting, Anchorage, AK, Feb. 7-8, 1989. Proceedings. Edited by L.E. Jarvela and L.K. Thorsteinson, p.161-170, 8 refs.
Oil spills, Oil recovery, Environmental protection, Ocean environments, Shores.

45-2159
Chukchi Sea Oil and Gas Lease Sale 126. Draft environmental impact statement.
U.S. Department of the Interior. Minerals Management Service. Alaska Outer Continental Shelf Region, *Outer Continental Shelf environmental impact statement/environmental assessment*, July 1990, OCS EIS/EA MMS 90-0035, 2 vols., Bibliography 33p.
Environmental impact, Petroleum industry, Economic development, Ocean environments, Offshore drilling, Natural resources, Marine biology, Oil spills, Sea ice, Chukchi Sea.

45-2160
OCS Mining Program: Norton Sound Lease Sale. Final environmental impact statement.
U.S. Department of the Interior. Minerals Management Service. Alaska Outer Continental Shelf Region, *Outer Continental Shelf environmental impact statement/environmental assessment*, Mar. 1991, OCS EIS/EA MMS 90-0009, Var. p., Bibliography 28p.
Environmental impact, Ocean environments, Mining, Dredging, Economic development, Natural resources, Marine biology, United States—Alaska—Norton Sound.

45-2161
OCS Mining Program: Norton Sound Lease Sale. Second draft environmental impact statement.
U.S. Department of the Interior. Minerals Management Service. Alaska Outer Continental Shelf Region, *Outer Continental Shelf environmental impact statement/environmental assessment*, June 1990, OCS EIS/EA MMS 90-0032, Var. p., Bibliography 29p.
Environmental impact, Ocean environments, Mining, Dredging, Economic development, Natural resources, Marine biology, United States—Alaska—Norton Sound.

45-2162
Beaufort Sea Planning Area Oil and Gas Lease Sale 124. Draft environmental impact statement.
U.S. Department of the Interior. Minerals Management Service. Alaska Outer Continental Shelf Region, *Outer Continental Shelf environmental impact statement/environmental assessment*, Feb. 1990, OCS EIS/EA MMS 90-0006, 2 vols., Bibliography 30p.
Petroleum industry, Economic development, Environmental impact, Ocean environments, Shores, Sea ice, Marine biology, Offshore drilling, Natural resources, Oil spills, Beaufort Sea.

45-2163
Local advection processes in the surface layer of the marginal ice zone.
Claussen, M., *Boundary-layer meteorology*, Jan. 1991, 54(1-2), p.1-27, 34 refs.
Sea ice, Air water interactions, Ice air interface, Turbulent flow, Advection, Mathematical models, Ice heat flux, Surface energy, Ice edge.

45-2164
Scheme of calculating single-layer overthrust of ice onto a shore slope.
Kozitskiĭ, I.E., *Hydrotechnical construction*, Nov. 1990, 24(5), p.297-299, Translated from Gidrotekhnicheskoe stroitel'stvo, May, 1990. 5 refs.
Shores, Ice floes, Grounded ice, Ice override, Ice mechanics, Ice cover strength.

45-2165
Regulation of the temperature regime of lower pools of high-head hydro developments.
Liapin, V.E., *Hydrotechnical construction*, Nov. 1990, 24(5), p.329-335, Translated from Gidrotekhnicheskoe stroitel'stvo, May, 1990. 18 refs.
Reservoirs, Water temperature, Temperature control, River flow, River ice, Thermal regime, Flooding, Dams.

45-2166
Fluid volcanism on Miranda and Ariel: flow morphology and composition.
Schenk, P.M., *Journal of geophysical research*, Feb. 10, 1991, 96(B2), p.1887-1906, 78 refs.
Extraterrestrial ice, Ground ice, Landforms, Fluid flow, Volcanoes, Topographic features, Magma, Geologic processes.

45-2167
Spectra of dangling OH bonds in amorphous ice: assignment to 2- and 3-coordinated surface molecules.
Buch, V., et al, *Journal of chemical physics*, Mar. 1, 1991, 94(5), p.4091-4092, 14 refs.
Devlin, J.P.
Amorphous ice, Ice physics, Ice surface, Hydrogen bonds, Molecular structure, Low temperature research, Spectra.

45-2168
2-D microscopic simulation of heat and mass transport in dry snow.
Christon, M., et al, *Chemical engineering communications*, Jan. 1990, Vol.87, p.87-105, 21 refs.
Burns, P., Sommerfeld, R.A.
Metamorphism (snow), Ice air interface, Temperature gradients, Computerized simulation, Snow impurities, Vapor diffusion, Thermodynamics, Air pollution.

45-2169
Stratigraphic studies of the snow and the process of the ice formation on Nelson Ice Cap, Antarctica.
Wang, X., et al, *Antarctic research*, 1990, 2(2), p.13-21, In Chinese with English summary. 6 refs.
Qin, D., Liu, C.
Snow density, Ice formation, Firn stratification, Polar regions, Antarctica—Nelson Island.
The Nelson Ice Cap is a polar-maritime glacier. The development of snow and firn depends on wet metamorphic processes from melting water infiltration and freezing. The velocity of snow densification depends on the temperature, the amount of melting water and its physical characteristics. The process of densification appears in the form of homogenization and change. Climatic conditions and amount of melting water also affect the time, depth and shape of ice formation, amounting to 23 to 25 m in 17 to 19 years. Zones of ice formation can be distinguished as warm infiltration-recrystallization, infiltration-congelation and ablation zones. The distribution of these zones is influenced by climatic variations. (Auth.)

45-2170
Temperature regime of glaciers in the neighbourhood of Great Wall Station, Antarctica.
Ren, J., *Antarctic research*, 1990, 2(2), p.22-27, In Chinese with English summary. 6 refs.
Glacier heat balance, Ice temperature, Antarctica—Nelson Island, Antarctica—King George Island.
Temperature measurements in ice cores drilled in the summer of 1985-1986, in glaciers on Nelson and King George Islands, are discussed. Analysis shows that the temperature at 10 m depth is a little lower than -1 C in the ablation area, and close to 0 C in the accumulation area, except in the central part of King George I., where the elevation is about 680 m and the temperature at 10 m is estimated to be around -5 C. Based on the estimates of temperature distribution in the active layer or the near-surface layer, the temperature regime of the deep layer is discussed qualitatively. It is concluded that the glacier temperature regime in this region is very different from that in the cold glaciers of the higher latitudes, but is not the same as in the temperate glaciers of the lower latitudes. The glaciers in this region are mostly temperate, but at high altitudes, such as in the central part of King George I., the temperature in the active layer is lower due to decrease in air temperature and surface melting with increasing elevation. (Auth. mod.)

45-2171
Seismological observation at the Great Wall Station during austral winter of 1986.
Jia, G., *Antarctic research*, 1990, 2(2), p.81-85, In Chinese with English summary. 3 refs.
Icequakes, Earthquakes, Seismic reflection, Seismology, Antarctica—Great Wall Station.
Seismological observations were carried out at the Great Wall Station during Mar. 30-Oct. 25, 1986, for a total of 271 days in which more than 3000 seismic events were recorded, most of them microseisms generated by the breaking and fractures of ice layers. Four are shallow marine earthquakes near the South Shetland Is. An M=8.1 earthquake occurred in the Aleutian Is. on May 7, and an M=6.4 earthquake occurred in the South Sandwich Is. on Apr. 14, 1986. There is a significant difference between icequakes and tectonic earthquakes as seen from seismic records on Nov. 16. The icequake is characterized by a sharp first motion, high frequency and rapid attenuation. (Auth. mod.)

45-2172
Navarin Basin Oil and Gas Lease Sale 107. Final environmental impact statement.
U.S. Department of the Interior. Minerals Management Service. Alaska Outer Continental Shelf Region, *Outer Continental Shelf environmental impact statement/environmental assessment*, Feb. 1991, OCS EIS/EA MMS 91-0008, Var. p., Bibliography 28p.
Environmental impact, Petroleum industry, Ocean environments, Economic development, Offshore drilling, Natural resources, Marine biology, Oil spills, Bering Sea.

45-2173
Chukchi Sea Oil and Gas Lease Sale 126. Final environmental impact statement.
U.S. Department of the Interior. Minerals Management Service. Alaska Outer Continental Shelf Region, *Outer Continental Shelf environmental impact statement/environmental assessment*, Jan. 1991, OCS EIS/EA MMS 90-0095, 2 vols., Bibliography 32p.
Environmental impact, Petroleum industry, Economic development, Ocean environments, Offshore drilling, Natural resources, Marine biology, Oil spills, Sea ice, Chukchi Sea.

45-2174
High Arctic thrust block moraines.
Evans, D.J.A., et al, *Canadian geographer*, 1991, 35(1), p.93-97, 17 refs.
England, J.
Moraines, Landforms, Glacier beds, Outwash, Sediment transport, Glacial geology, Tectonics, Canada—Northwest Territories—Ellesmere Island.

45-2175
Conservative algorithm for multidimensional conduction phase change.
Comini, G., et al, *International journal for numerical methods in engineering*, Sep. 1990, 30(4), p.697-709, 18 refs.
Del Giudice, S., Saro, O.
Phase transformations, Liquid solid interfaces, Freezing, Thermal conductivity, Mathematical models, Enthalpy, Temperature variations.

45-2176
Numerical study of three-dimensional natural convection during freezing of water.
Yeoh, G.H., et al, *International journal for numerical methods in engineering*, Sep. 1990, 30(4), p.899-914, 21 refs.
Behnia, M., De Vahl Davis, G., Leonardi, E.
Ice water interface, Freezing, Phase transformations, Convection, Mathematical models, Heat transfer, Temperature effects.

45-2177
Characteristics of the low-level temperature inversion along the Alaskan arctic coast.
Kahl, J.D., *International journal of climatology*, July-Aug. 1990, 10(5), p.537-548, 15 refs.
Air temperature, Temperature inversions, Ice cover effect, Boundary layer, Atmospheric composition, Meteorological data, Ice air interface, Temperature variations, United States—Alaska.

45-2178
Researches of glacier lake outburst floods of the Yarkant River in Xinjiang.
Zhang, X.S., et al, *Science in China, Ser. B*, Aug. 1990, 30(8), p.1014-1024, 11 refs.
Li, N.J., You, X.Y., Wang, W.X.
Glacial lakes, Lake bursts, Floods, Glacier oscillation, Computerized simulation, Glacial hydrology, Glacier ablation, China.

45-2179
Rime and reason.
Manningham, D., *Business & commercial aviation*, Jan. 1991, 68(1), p.82-85.
Aircraft icing, Helicopters, Ice conditions, Performance, Safety, Ice accretion.

45-2180
Late Wisconsin iceberg-calving rates and ice-sheet mass balance reconstructed from paleo-sea levels, Mount Desert Island, Maine.
Lowell, T.V., *Geology*, Feb. 1991, 19(2), p.155-158, 21 refs.
Glacier flow, Glacier mass balance, Paleoclimatology, Calving, Icebergs, Ice sheets, United States—Maine.

45-2181
Proceedings of the 47th annual Eastern Snow Conference, Bangor, ME, June 7-8, 1990.
Eastern Snow Conference, *U.S. Army Cold Regions Research and Engineering Laboratory*, 1990, SR 90-44, 250p., ADA-233 320, Refs. passim. For selected papers see 45-2182 through 45-2203.
Ferrick, M.G., ed, Pangburn, T., ed.
Snowfall, Snow cover, Snowmelt, Lake effects, River ice, Meltwater, Snow air interface, Ice cover strength, Snow water equivalent, Snow surveys, Runoff.

45-2182
Air temperature variation over snow-covered terrain.
Hogan, A., et al, *Eastern Snow Conference. Proceedings*, 1990, 47th, MP 2838, U.S. Army Cold Regions Research and Engineering Laboratory. Special report SR 90-44. Edited by M. Ferrick and T. Pangburn, p.1-12, 26 refs.
Ferrick, M.G.
Air temperature, Temperature variations, Snow cover effect, Snow air interface, River ice, Ice air interface.
December 1989 was not only one of the coldest months for which instrumental records exist in the Northeastern United States, but was also unusual in that the air temperature remained continuously below freezing during all but the last day of the month. This prolonged cold period provided relatively homogeneous meteorological conditions in which to study the relationship among complex terrain variables and early morning air temperatures. An experiment was conducted in the Connecticut River Valley near 43N latitude, based on the hypothesis that the river pool above Wilder Dam would provide a homogeneous surface reference for comparison of air temperatures observed nearby in differing geographic settings. Temperatures were measured 1.5 m above the surface at 92 relocatable points along a 33 km north-south transect and 12 km east-west transect. Morning twilight temperatures measured on five days prior to a 30 cm snowfall on Dec. 16 were compared with temperatures at the same locations on the five following days. Prior to the snowfall, the temperatures near the river were higher than those immediately upslope by more than 2 C. This trend was reversed following the snowfall, with colder air near the river. An analysis is presented to demonstrate that the heat rejected from river ice growth would be sufficient to provide the observed local warming. The quantity of heat available from this source decreased by an order of magnitude coincident with the observed reversal in temperature trends near the river. The influences of terrain slope, vegetation and the "heat island" of a village are also discussed.

45-2183
Numerical investigation of border ice failure.
Abdel-Zaher, A.K., *Eastern Snow Conference. Proceedings*, 1990, 47th, U.S. Army Cold Regions Research and Engineering Laboratory. Special report SR 90-44. Edited by M. Ferrick and T. Pangburn, p.13-25, 23 refs.
River ice, Fast ice, Ice cover strength, Mathematical models, Ice water interface, Water level, Ice mechanics, Ice deformation.

45-2184
Microscopic observations of snow deformation.
Shoop, S.A., et al, *Eastern Snow Conference. Proceedings*, 1990, 47th, MP 2839, U.S. Army Cold Regions Research and Engineering Laboratory. Special report SR 90-44. Edited by M. Ferrick and T. Pangburn, p.27-38.
Taylor, S.
Snow strength, Snow deformation, Snow compression, Microanalysis, Snow cover structure, Trafficability.
Snow grains subjected to shearing or compressive forces, or both, were examined with a microscope to explore the conditions that cause melting of grains during snow deformation. Researchers have studied the deformation of snow, caused by wheels, tracks, sliders and skis, but little work has been done on snow deformation at a microscopic scale. This information is useful in defining the processes involved in snow deformation and is applicable to research on vehicle mobility and construction on snow, skiing and avalanches. Snow samples were deformed using a variety of instruments and studied via thin sections and single grain observations. In general, the sheared zones contained broken grains, crushed material and aggregates of crushed material. Evidence of melting was observed immediately adjacent to sheared surfaces, and when the pressure and temperature conditions were conducive to pressure melting. Snow with large, rounded grains showed changes from deformation most clearly.

45-2185
What makes a good snow fence? Results from 12 years of testing at the Ontario Ministry of Transportation.
Perchanok, M.S., *Eastern Snow Conference. Proceedings*, 1990, 47th, U.S. Army Cold Regions Research and Engineering Laboratory. Special report SR 90-44. Edited by M. Ferrick and T. Pangburn, p.39-49, 5 refs.
Snow fences, Snowdrifts, Road maintenance, Tensile properties.

45-2186
Ice detector measurements of atmospheric icing on a cable.
McComber, P., et al, *Eastern Snow Conference. Proceedings*, 1990, 47th, U.S. Army Cold Regions Research and Engineering Laboratory. Special report SR 90-44. Edited by M. Ferrick and T. Pangburn, p.51-64, 11 refs.
Druez, J., St-Louis, M.
Power line icing, Ice detection, Icing rate, Ice loads, Analysis (mathematics), Glaze.

45-2187
Snowmelt runoff modeling using GIS parameter estimation in a western Adirondack watershed.
Mellander, M.K., et al, *Eastern Snow Conference. Proceedings*, 1990, 47th, U.S. Army Cold Regions Research and Engineering Laboratory. Special report SR 90-44. Edited by M. Ferrick and T. Pangburn, p.65-72, 12 refs.
Eschner, A.R.
Snowmelt, Runoff forecasting, Watersheds, Mathematical models, Data processing, Degree days, Snow water equivalent.

45-2188
Preliminary investigations on monitoring the snow water equivalent using synthetic aperture radar.
Leconte, R., et al, *Eastern Snow Conference. Proceedings*, 1990, 47th, U.S. Army Cold Regions Research and Engineering Laboratory. Special report SR 90-44. Edited by M. Ferrick and T. Pangburn, p.73-86, 25 refs.
Carroll, T.R., Tang, P.
Snow water equivalent, Microwaves, Side looking radar, Remote sensing, Snow surveys.

45-2189
Operational airborne and satellite snow cover products of the National Operational Hydrologic Remote Sensing Center.
Carroll, T.R., *Eastern Snow Conference. Proceedings*, 1990, 47th, U.S. Army Cold Regions Research and Engineering Laboratory. Special report SR 90-44. Edited by M. Ferrick and T. Pangburn, p.87-98, 10 refs.
Snow surveys, Snow cover distribution, Remote sensing, Snow water equivalent, Data processing, Aerial surveys, Spaceborne photography.

45-2190
Recent developments in snow-chemistry research in the western United States.
Davis, R.E., et al, *Eastern Snow Conference. Proceedings*, 1990, 47th, MP 2840, U.S. Army Cold Regions Research and Engineering Laboratory. Special report SR 90-44. Edited by M. Ferrick and T. Pangburn, p.99-107, 13 refs.
Bales, R.C.
Snow composition, Snow impurities, Snowmelt, Water chemistry, Chemical composition, Gas inclusions, Mathematical models.
Three active areas of detailed research in snow and ice chemistry are described with emphasis on the connection between processes at different scales: i) modeling chemical hydrographs from seasonal snowpacks in alpine watersheds, ii) studying processes affecting ion redistribution in, and elution from snow, and iii) investigating the interaction of trace gases in snow. First, in alpine watersheds where snowmelt runoff dominates basin hydrology, accurate hydrochemical modeling depends on developing adequate descriptions of snowmelt chemistry. Whole-watershed hydrochemical modeling using point descriptions of snowmelt chemistry, along with distributed estimates of snowmelt volume, is being pursued for the Emerald Lake (Sierra Nevada) and other alpine watersheds in the western U.S. Second, tracer studies at the Sierra Nevada Aquatic Research Laboratory are being used to develop point estimates of snowmelt volume versus chemistry for use in the distributed watershed models. Complimentary field studies are ongoing at the U.S. Forest Service's Glacier Lakes site in Wyoming, and the Mammoth Mountain (California) field site of the University of California, Santa Barbara. Third, recent studies by researchers at the University of Arizona and the U.S. Forest Service have used chromatographic methods to examine the interaction of reactive gases (SO2, H2O2) with ice surface, continuing earlier investigations of gaseous deposition to snow.

45-2191
Prototype physically-based model for the prediction of the spatial distribution of snowcover.
Sambles, K.M., et al, *Eastern Snow Conference. Proceedings*, 1990, 47th, MP 2841, U.S. Army Cold Regions Research and Engineering Laboratory. Special report SR 90-44. Edited by M. Ferrick and T. Pangburn, p.109-119, 22 refs.
Harrison, A.R., Anderson, M.G., Pangburn, T.
Snow cover distribution, Snow depth, Snowmelt, Runoff forecasting, Mathematical models, Data processing.
A prototype digital model, SNOMO, has been developed to predict the pattern of snowcover and snowdepth distribution over a small catchment during the melt season. The catchment is subdivided into homogeneous areas on the basis of elevation, slope angle, aspect and vegetation cover using a GIS driven algorithm. The energy budget of the snowpack is calculated for each area. A simplified version of the snowpack internal structure and characteristics is used to alleviate data availability problems. The energy-budget terms are used to calculate the amount of melt, which is then subtracted from the existing snowpack depth in terms of centimeters of snow. The model has been tested on the W3 watershed (8.4 sq km), part of Sleepers River Research Watershed, Danville, VT. Point predictions are shown to accord well with observed values, and spatial predictions of snow distributions for the complete catchment are presented.

45-2192
Objective guidance for 1- and 2-day mesoscale forecasts of lake-effect snow.
Burrows, W.A., *Eastern Snow Conference. Proceedings*, 1990, 47th, U.S. Army Cold Regions Research and Engineering Laboratory. Special report SR 90-44. Edited by M. Ferrick and T. Pangburn, p.121-134, 14 refs.
Snowfall, Lake effects, Weather forecasting, Computer programs.

45-2193
Impacts of heavy snowfall during December 1989 in the Lake Erie snowbelt.
Schmidlin, T.W., *Eastern Snow Conference. Proceedings*, 1990, 47th, U.S. Army Cold Regions Research and Engineering Laboratory. Special report SR 90-44. Edited by M. Ferrick and T. Pangburn, p.135-142, 8 refs.
Snowfall, Records (extremes), Economic analysis, Road maintenance, Erie, Lake.

45-2194
Comparison of Great Lakes winter severity and ice cover winter 1990 vs. the historical record.
Assel, R.A., et al, *Eastern Snow Conference. Proceedings*, 1990, 47th, U.S. Army Cold Regions Research and Engineering Laboratory. Special report SR 90-44. Edited by M. Ferrick and T. Pangburn, p.143-154, 13 refs.
Norton, D.C.
Winter, Snowfall, Ice conditions, Records (extremes), Lake ice, Ice cover, Great Lakes.

45-2195
Use of aeration to prevent ice buildup at gaging station controls.
Wagner, C.R., *Eastern Snow Conference. Proceedings*, 1990, 47th, U.S. Army Cold Regions Research and Engineering Laboratory. Special report SR 90-44. Edited by M. Ferrick and T. Pangburn, p.155-158.
Aeration, Bubbling, Ice prevention, River ice.

45-2196
Restigouche River Ice Project.
Beltaos, S., et al, *Eastern Snow Conference. Proceedings*, 1990, 47th, U.S. Army Cold Regions Research and Engineering Laboratory. Special report SR 90-44. Edited by M. Ferrick and T. Pangburn, p.159-173, 17 refs.
Burrell, B.C.
River ice, Ice jams, Ice breakup, Ice conditions.

45-2197
Lake Ontario winter storms (LOWS) project.
Niziol, T.A., et al, *Eastern Snow Conference. Proceedings*, 1990, 47th, U.S. Army Cold Regions Research and Engineering Laboratory. Special report SR 90-44. Edited by M. Ferrick and T. Pangburn, p.175-187, 7 refs.
Lake effects, Snowfall, Snowstorms, Weather forecasting, Remote sensing, Ontario, Lake.

45-2198
Regional snowfall intensity and the Great Lakes anomaly.
Ryerson, C.C., et al, *Eastern Snow Conference. Proceedings*, 1990, 47th, MP 2842, U.S. Army Cold Regions Research and Engineering Laboratory. Special report SR 90-44. Edited by M. Ferrick and T. Pangburn, p.189-199, 14 refs.
Bates, R.E.
Snowfall, Snowstorms, Lake effects, Synoptic meteorology.
Snowfall intensity widely varies spatially and temporally within individual storms and within regions. However, regional snowfall intensity has not been mapped or characterized systematically as a climatic phenomenon. Snowfall intensity was compiled and mapped over the continental United States from four years of National Weather Service 6-hour synoptic reports to show general patterns. Intensities are generally greatest in both eastern and western mountain areas and along the East Coast, and are generally lowest in the northern Plains and Great Lakes. The low Great Lakes intensities were unexpected because of the frequent lake-effect storms along their southeast shores. Methodological and meteorological reasons for this pattern are discussed, and methods of resolving whether the Great Lakes patterns are true are suggested.

45-2199
Annual balance of North Cascade, Washington glaciers predicted from climatic records.
Pelto, M.S., *Eastern Snow Conference. Proceedings*, 1990, 47th, U.S. Army Cold Regions Research and Engineering Laboratory. Special report SR 90-44. Edited by M. Ferrick and T. Pangburn, p.201-212, 12 refs.
Runoff forecasting, Glacier mass balance, Meltwater, Glacier melting, Mountain glaciers, Seasonal variations, Glacier oscillation, United States—Washington—North Cascade Mountains.

45-2200
Role of natural flaws and variability in ice-cover fracture during river-ice break-up.
Demuth, M.N., et al, *Eastern Snow Conference. Proceedings*, 1990, 47th, U.S. Army Cold Regions Research and Engineering Laboratory. Special report SR 90-44. Edited by M. Ferrick and T. Pangburn, p.213-218, 13 refs.
Prowse, T.D.
River ice, Ice cover strength, Ice breakup, Ice deformation, Ice override, Analysis (mathematics).

45-2201
Lake Ontario Winter Storms Experiment (LOWS) and the Lake-Effect Snow Observation Network (LESON) report for the 1989-1990 snow season.
Ferlito, J.J., et al, *Eastern Snow Conference. Proceedings*, 1990, 47th, U.S. Army Cold Regions Research and Engineering Laboratory. Special report SR 90-44. Edited by M. Ferrick and T. Pangburn, p.219-224.
Bedford, C., Palma, T., Osborne, S., Sykes, R.B., Jr., Caiazza, R.
Snowfall, Lake effects, Weather observations, United States—New York.

45-2202
Statewide cooperative snow survey for Maine.
Loiselle, M., et al, *Eastern Snow Conference. Proceedings*, 1990, 47th, U.S. Army Cold Regions Research and Engineering Laboratory. Special report SR 90-44. Edited by M. Ferrick and T. Pangburn, p.225-230, 5 refs.
Keezer, G.
Snow surveys, Snow water equivalent, United States—Maine.

45-2203
Comparison of meltwater discharge from a debris-free and a debris-covered glacier, Canadian Rocky Mountains.
Mattson, L.E., *Eastern Snow Conference. Proceedings*, 1990, 47th, U.S. Army Cold Regions Research and Engineering Laboratory. Special report SR 90-44. Edited by M. Ferrick and T. Pangburn, p.237-242, 5 refs.
Meltwater, Glacier surfaces, Glacier ablation, Glacier heat balance.

45-2204
Frost resistance of elastomers. [Morozostoĭkost' elastomerov],
Bukhina, M.F., et al, Moscow, Khimiia, 1989, 176p., In Russian. 293 refs.
Kurliand, S.K.
Frost resistance, Plastics, Rubber, Polymers, Cold weather performance, Low temperature research, Strength, Thermal stresses.

45-2205
Avalanche hazard regions in Kazakhstan. [Lavinoopasnye raĭony Kazakhstana],
Severskiĭ, I.V., et al, Alma-Ata, Nauka, 1990, 170p., In Russian. 93 refs.
Blagoveshchenskiĭ, V.P
Avalanches, Avalanche mechanics, Avalanche forecasting, Avalanche formation.

45-2206
Remote control methods and instruments for obtaining data on earth natural resources and environments. [Distantsionnye metody i apparatura polucheniia dannykh o prirodnykh resursakh zemli i okruzhaiushcheĭ srede],
Goncharov, A.K., ed, *Gosudarstvennyĭ nauchno-issledovatel'skiĭ tsentr izucheniia prirodnykh resursov. Trudy*, 1990, Vol.37, 200p., In Russian. For selected papers see 45-2207 through 45-2209.
Remote sensing, Radiometry, Radar photography, Spaceborne photography, Sea ice, Ice sheets, Ice conditions, Spacecraft.

45-2207
Spaceborne information and measuring means for remote sensing of the earth from space. [Bortovye informatsionno-izmeritel'nye sredstva distantsionnogo zondirovaniia zemli iz kosmosa],
Volkov, A.M., et al, *Gosudarstvennyĭ nauchno-issledovatel'skiĭ tsentr izucheniia prirodnykh resursov. Trudy*, 1990, Vol.37, p.5-20, In Russian. 11 refs.
Remote sensing, Spaceborne photography, LANDSAT, Spacecraft, Sea ice, Snow depth.

45-2208
Study of natural microwave and infrared range emissions from a continental ice sheet, dry snow and sea ice. [Nabliudenie sobstvennogo izlucheniia materikovogo lednika, sukhogo snega i morskogo l'da v mikrovolnovom i IK-diapazonakh],
Khapin, IU.B., *Gosudarstvennyĭ nauchno-issledovatel'skiĭ tsentr izucheniia prirodnykh resursov. Trudy*, 1990, Vol.37, p.148-157, In Russian. 16 refs.
Radiometry, Microwaves, Sea ice, Ice sheets, Infrared radiation, Remote sensing.
Results from experimental investigations of natural emissions from a continental ice sheet, dry snow, sea ice, and fresh ice at wavelengths of 18, 8, 4, 1.5, 0.8, 0.34 cm and in the 8-12 micron range are presented. Some characteristics of their radiation spectra are discussed. Radiothermal characteristics of glaciers in Antarctica and Greenland are included. (Auth. mod.)

45-2209
Features of determining the condition of sea ice in the beginning of the fall period based on radar and radiometric images from oceanographic satellites. [Osobennosti opredeleniia sostoianiia morskogo l'da v nachale osennego perioda po radiolokatsionnym i radiometricheskim snimkam s okeanograficheskikh ISZ],
Bukharov, M.V., et al, *Gosudarstvennyĭ nauchno-issledovatel'skiĭ tsentr izucheniia prirodnykh resursov. Trudy*, 1990, Vol.37, p.175-185, In Russian. 7 refs.
Nikitin, P.A., Golovnia, V.A.
Sea ice, Ice conditions, Radar photography, Radiometry, Remote sensing, Spaceborne photography, Spacecraft.

45-2210
Soils with a texture-differentiated profile in the main cryogenic areas of the northern Russian Plain. [Pochvy s teksturno-differentsirovannym profilem osnovnykh kriogennykh arealov severa Russkoĭ ravniny],
Makeev, A.O., et al, Pushchino, Nauchnyĭ tsentr biologicheskikh issledovaniĭ AN SSSR, 1989, 270p., In Russian. Refs. p.257-270.
Makeev, O.V.
Soil profiles, Soil classification, Soil texture, Soil chemistry, Soil aggregates, Soil formation, Cryogenic soils, Minerals.

45-2211
Landscape indication of Quaternary deposits and soils in the Pripet Marshes. [Landshaftnaia indikatsiia chetvertichnykh otlozheniĭ i pochv Pripiatskogo Poles'ia],
Obukhovskiĭ, IU.M., Minsk, Navuka i tekhnika, 1990, 192p., In Russian. 296 refs.
Moraines, Landscape types, Swamps, Geomorphology, Quaternary deposits, Dislocations (materials), Glacial geology, Glacial erosion, Glacial deposits, USSR—Pripet Marshes.

45-2212
Arctic contribution to upper-ocean variability in the North Atlantic.
Walsh, J.E., et al, *Journal of climate*, Dec. 1990, 3(12), p.1462-1473, 26 refs.
Chapman, W.L.
Ocean currents, Sea ice distribution, Salinity, Atmospheric circulation, Drift, Atmospheric pressure, Climatic fa[illegible], Ice cover effect.

45-2213
Snowpack structure and avalanching, Craigieburn Range, New Zealand.
McGregor, G.R., *New Zealand journal of geology and geophysics*, 1990, 33(3), p.405-417, 43 refs.
Snow cover structure, Avalanche formation, Freeze thaw cycles, Snow cover stability, Metamorphism (snow), Avalanche forecasting, Temperature gradients, Snow density, New Zealand.

45-2214
Use of magnetic susceptibility anisotropy in the study of the matrix fabric of frost-disturbed soils.
Warburton, J., *New Zealand journal of geology and geophysics*, 1990, 33(3), p.507-510, 12 refs.
Soil structure, Soil analysis, Frost action, Anisotropy, Magnetic properties, Magnetometers, Orientation, Patterned ground.

45-2215
Method of construction in a prefrozen limited soil mass.
Mirenburg, IU.S., et al, *Soil mechanics and foundation engineering*, Nov. 1990, 27(3), p.114-118, Translated from Osnovaniia, fundamenty i mekhanika gruntov, May-June, 1990. 10 refs.
Kondakov, V.V.
Permafrost beneath structures, Foundations, Cold weather construction, Artificial freezing, Frost heave, Soil tests, Stability.

45-2216
Collection efficiency of aerosol particles by circular disks modelling snowflakes, snowout and washout coefficient.
Sparmacher, H., et al, *Journal of aerosol science*, 1990, 21(S1), p.S209-S212, 9 refs.
Adam, M., Fülber, K., Bonka, H.
Aerosols, Scavenging, Sampling, Simulation, Snowflakes, Snow impurities, Models.

45-2217
Mechanisms of heterogeneous ice nucleation onto mixed ice nuclei in the atmosphere.
Smorodin, V.E., *Journal of aerosol science*, 1990, 21(S1), p.S249-S253, 15 refs.
Precipitation (meteorology), Ice nuclei, Heterogeneous nucleation, Aerosols, Atmospheric composition.

45-2218
Surface kinetic limitation of ice crystal growth in the stratosphere.
Mackenzie, A.R., *Journal of aerosol science*, 1990, 21(S1), p.S259-S262, 3 refs.
Ice crystal growth, Ice air interface, Condensation, Aerosols, Stratosphere, Clouds (meteorology), Air pollution.

45-2219
Scavenging of soot particles by ice crystals.
Oraltay, R.G., et al, *Journal of aerosol science*, 1990, 21(S1), p.S263-S266, 11 refs.
Hallett, J.
Aerosols, Ice nuclei, Ice crystal growth, Scavenging, Clouds (meteorology).

45-2220
Measurements of concentration, chemical composition and size distribution of background aerosol at high alpine stations.
Schiwikowski, M., et al, *Journal of aerosol science*, 1990, 21(S1), p.S321-S324, 5 refs.
Aerosols, Glaciers, Air pollution, Chemical composition, Sampling, Atmospheric composition.

45-2221
Tiny tubes prevent liquids from freezing. *New scientist*, Jan. 19, 1991, 129(1752), p.27.
Liquid cooling, Supercooling, Freezing points, Pipes (tubes).

45-2222
Satellite mapping of alpine pastures in the Himalayas.
Lal, J.B., et al, *International journal of remote sensing*, Mar. 1991, 12(3), p.435-443, 18 refs.
Gulati, A.K., Bist, M.S.
Alpine landscapes, Spaceborne photography, Sensor mapping, Snow cover distribution, Natural resources, India—Himalayas.

45-2223
Comparative digital analysis of Seasat-SAR and Landsat-TM data for Iceland.
Rast, M., et al, *International journal of remote sensing*, Mar. 1991, 12(3), p.527-544, 19 refs.
Jaskolla, F., Arnason, K.
Spaceborne photography, Radar photography, Landforms, Photogrammetry, Accuracy, Data processing, Glacier surfaces, Microwaves, Iceland.

45-2224
Comparison of Geosat altimeter and synthetic aperture radar measurements over east Greenland pack ice.
Fetterer, F.M., et al, *International journal of remote sensing*, Mar. 1991, 12(3), p.569-583, 25 refs.
Laxon, S., Johnson, D.R.
Sea ice, Height finding, Geodetic surveys, Radar photography, Spaceborne photography, Correlation, Backscattering, Accuracy, Ice edge, Greenland.

45-2225
Assessment of the capability of the satellite radar altimeter for measuring ice sheet topographic change.
Partington, K.C., et al, *International journal of remote sensing*, Mar. 1991, 12(3), p.585-609, 42 refs.
Cudlip, W., Rapley, C.G.
Ice sheets, Topographic features, Spaceborne photography, Radar echoes, Height finding, Accuracy, Periodic variations, Antarctica—Wilkes Land.
The potential of the satellite radar altimeter to monitor surface topography of ice sheets is examined in detail, using Seasat and Geosat altimeter data recorded over the Wilkes plateau in East Antarctica. Range measurement precision is optimized by the use of an improved retracking technique. However, tilt and bias orbit adjustment techniques are shown to leave errors in the measurement of surface elevation change. Additional orbit error, which cannot be identified from crossover residuals, is almost certainly present in the difference measurements. Variable mispointing of the Geosat antenna is considered the most likely explanation for an apparent change in surface scattering properties which results in errors in the measurement of elevation differences. As a result of these two uncorrected sources of error remaining in the data, the best estimate for surface elevation change between 1978 and 1985, along a narrow strip 2748 km long at 72S, is +1.05 m, which includes correction for a -22 cm systematic bias in the Geosat range measurements. The results have implications for altimeter measurements of surface elevation change over all land surfaces, and indicate that much further research needs to be carried out to make full use of data from ERS-1 and subsequent satellites. (Auth. mod.)

45-2226
Snowpack and the distribution of a major vegetation ecotone in the Sierra Nevada of California.
Barbour, M.G., et al, *Journal of biogeography*, Mar. 1991, 18(2), p.141-149, 35 refs.
Berg, N.H., Kittel, T.G.F., Kunz, M.E.
Forest ecosystems, Snow cover effect, Snow water equivalent, Freezing, Vegetation patterns, Altitude, Snow surveys, Mountains.

45-2227
Performance of an omnidirectional wheel on snow and ice.
Blaisdell, G.L., *Naval engineers journal*, Jan. 1991, 103(1), MP 2843, p.34-41, 7 refs.
Vehicle wheels, Snow cover effect, Ice cover effect, Mechanical tests, Performance, Traction, Design, Aircraft landing areas.
This study investigated the suitability of service vehicles equipped with a unique omnidirectional wheel operating aboard aircraft carriers in northern latitudes, where ice and snow on flight decks is not uncommon. It addressed the comparative performance of the omnidirectional wheel, a bias-ply highway tire as used on current Navy MD-3 aircraft tow vehicles, a typical nonpneumatic forklift truck tire, and an automotive radial-ply all-season tire. The tires were tested for driving trac

tion levels on prepared ice, hard-packed snow, and fresh shallow snow. In general, the omnidirectional wheel showed performance superior to the forklift truck tire and the bias-ply highway tire. The radial all-season tire, however, outperformed the omnidirectional wheel in traction on slippery surfaces. The omnidirectional wheel was well-behaved during traction testing and shows promise for operation on winter surfaces. Recommendations are provided that might further improve omnidirectional wheel performance on snow and ice.

45-2228
Variations in permafrost thickness in response to changes in paleoclimate.
Osterkamp, T.E., et al, *Journal of geophysical research*, Mar. 10, 1991, 96(B3), p.4423-4434, 32 refs.
Gosink, J.P.
Permafrost thickness, Permafrost heat transfer, Paleoclimatology, Surface temperature, Analysis (mathematics), Thawing, Permafrost thermal properties, Stefan problem.

45-2229
ICE-3G: a new global model of late Pleistocene deglaciation based upon geophysical predictions of postglacial relative sea level change.
Tushingham, A.M., et al, *Journal of geophysical research*, Mar. 10, 1991, 96(B3), p.4497-4523, Refs. p.4520-4523.
Pleistocene, Glacier oscillation, Sea level, Isostasy, Paleoclimatology, Mathematical models, Glacier mass balance, Age determination, Viscoelasticity.
A new high resolution global model of late Pleistocene deglaciation is inferred on the basis of geophysical predictions of postglacial relative sea level variations in which the ice-ocean-solid Earth interaction is treated in a gravitationally self-consistent fashion. For the purpose of these analyses, the radial viscoelastic structure of the planet is assumed known on the basis of previously published sensitivity tests on solutions of the forward problem. Only radiocarbon controlled relative sea level histories from sites that were actually ice covered (with one or two additions) are employed to confirm its consistency. Here the new deglaciation model, referred to as ICE-3G, is compared to previous models derived by several independent means and tested against a number of additional observations other than sea level histories, including geologically controlled retreat isochrones, oxygen-isotope data from deep-sea sedimentary cores, and coral terrace elevations. The latter two observations strongly constrain the net sea level rise that has occurred since the onset of deglaciation and therefore the mass of ice that melted during the last glacial-interglacial transition. Applications of the model include antarctic deglaciation. (Auth. mod.)

45-2230
Implications for palaeoenvironmental reconstruction of recent ice-wedge development at Mayo, Yukon Territory.
Burn, C.R., *Permafrost and periglacial processes*, Jan.-Mar. 1990, 1(1), p.3-14, With French summary. 40 refs.
Ice wedges, Cracking (fracturing), Ice composition, Paleoclimatology, Ground ice, Discontinuous permafrost, Thermal stresses, Chemical analysis, Permafrost indicators, Canada—Yukon Territory.

45-2231
Some observations on the growth and deformation of epigenetic, syngenetic and anti-syngenetic ice wedges.
Mackay, J.R., *Permafrost and periglacial processes*, Jan.-Mar. 1990, 1(1), p.15-29, With French summary. 44 refs.
Ice wedges, Ice growth, Ground ice, Epigenesis, Permafrost transformation, Geocryology, Deformation, Thermal stresses.

45-2232
Observations on buried glacier ice and massive segregated ice, western arctic coast, Canada.
French, H.M., et al, *Permafrost and periglacial processes*, Jan.-Mar. 1990, 1(1), p.31-43, With French summary. 30 refs.
Harry, D.G.
Glacier ice, Ground ice, Permafrost structure, Origin, Classifications, Ice formation, Geocryology, Stratigraphy, Ice solid interface.

45-2233
Permafrost and groundwater conditions, Huola River Basin, northeast China.
Wang, B.L., *Permafrost and periglacial processes*, Jan.-Mar. 1990, 1(1), p.45-52, With French summary. 23 refs.
River basins, Discontinuous permafrost, Subpermafrost ground water, Ground ice, Permafrost hydrology, Hydrogeology, Geocryology, Boreholes, China.

45-2234
Analysis of the segmentation in the profile of alpine talus slopes.
Francou, B., et al, *Permafrost and periglacial processes*, Jan.-Mar. 1990, 1(1), p.53-60, With French summary. 35 refs.
Manté, C.
Periglacial processes, Talus, Slope orientation, Alpine landscapes, Rock mechanics, Dislocations (materials), Rock properties.

45-2235
Mechanical weathering rates on Signy Island, maritime Antarctic.
Hall, K., *Permafrost and periglacial processes*, Jan.-Mar. 1990, 1(1), p.61-67, With French summary. 18 refs.
Frozen rocks, Weathering, Frost shattering, Freeze thaw cycles, Rock properties, Cold weather tests, Snow cover effect, Geocryology, Antarctica—Signy Island.
By re-evaluating properties of rock tablets left in the field for varying time periods, an estimation of rock breakdown rates is attained. From data obtained during the last five years, it would appear that weathering rates are very slow, with only of the order of 2% mass loss per 100 years. These rates refer to omnidirectionally frozen, relatively wet samples and, on the basis of laboratory simulation results, are over 50 times greater than for unidirectionally frozen bedrock. It is suggested that mechanical weathering rates in the maritime Antarctic are very slow. (Auth. mod.)

45-2236
Apparent hydraulic conductivities associated with thawing, frost-susceptible soils.
Egginton, P.A., et al, *Permafrost and periglacial processes*, Jan.-Mar. 1990, 1(1), p.69-77, With French summary. 19 refs.
Dyke, L.D.
Permafrost hydrology, Ground thawing, Water flow, Permeability, Ice lenses, Soil tests, Freeze thaw cycles.

45-2237
Natural convection heat transfer in water near its density maximum.
Yen, Y.C., *U.S. Army Cold Regions Research and Engineering Laboratory*, Dec. 1990, M 90-04, 92p., ADA-233 106, 42 refs.
Ice water interface, Heat transfer, Phase transformations, Convection, Water, Analysis (mathematics), Temperature effects, Hydrodynamics, Density (mass/volume).
This monograph reviews and summarizes to date the experimental and analytical results on the effect of water density near its maximum on convection, transient flow and temperature structure characteristics: 1) in a vertical enclosure; 2) in a vertical annulus; 3) between horizontal concentric cylinders; 4) in a square enclosure; 5) in a rectangular enclosure; 6) in a horizontal layer; 7) in a circular confined melt layer; and 8) in bulk water during melting. In a layer of water containing a maximum density temperature of 4 C, the onset of convection (the critical number) is not a constant value as in the classical normal fluid but one that varies with the imposed thermal and hydrodynamic boundaries. In horizontal layers, a nearly constant temperature zone forms and continuously expands between the warm and cold boundaries. A minimum heat transfer exists in most of the geometries studied and, in most cases, can be expressed in terms of a density distribution parameter. The effect of this parameter on the formation, disappearance, and transient structure of a cell is discussed, and the effect of split-boundary flow on heat transfer is presented.

45-2238
AVHRR imagery reveals antarctic ice dynamics.
Bindschadler, R.A., et al, *Eos*, June 5, 1990, 71(23), p.741-742, 21 refs.
Vornberger, P.L.
Ice sheets, Ice shelves, Glacier flow, Spaceborne photography, Ice creep, Ice mechanics, Radiometry.
Many of the most significant dynamic features of ice sheets can be identified by a careful examination of AVHRR imagery. The relatively low resolution of this instrument makes it ideal for obtaining a broad view of the ice sheets, while its wide swath allows coverage of areas beyond the reach of high-resolution imagers either currently in orbit or planned. The replacement of high-resolution imagery with AVHRR is not advocated, but rather, the two are viewed as highly complementary. Low-resolution imagery can be effectively used for the initial assessments of the regional dynamics of ice sheets and should be used as guides for choosing the location of more expensive, high-resolution imagery. High-resolution image data will continue to be used for detailed determination of surface velocity and stress fields, mapping, and a host of other applications. With so much of the antarctic continent still poorly mapped, it is likely that there will be more surprises of current and past ice flow resulting from future glaciological investigations. AVHRR imagery, and data from similar instruments such as the 600-m-resolution Defense Meteorological Satellite Program (DMSP) data, can play a significant role in uncovering many of these and should become a more familiar tool of the antarctic scientist. (Auth.)

45-2239
Natural variability of the climate system and detection of the greenhouse effect.
Wigley, T.M.L., et al, *Nature*, Mar. 22, 1990, 344(6264), p.324-327, 24 refs.
Raper, S.C.B.
Climatic changes, Temperature variations, Mathematical models.

45-2240
Is Antarctica breaking apart.
Hill, C., *Australian geographic*, Mar. 22, 1990, 344(6264), p.22-23.
Icebergs, Ice shelves, Calving, Pack ice.
An average of 1450 cu km of ice calves from Antarctica annually. In 1986 and 1987, 7 icebergs—ranging from 15 km x 50 km to 95 km x 95 km and amounting to more than 7000 cu km of ice—calved from Antarctica. The equivalent of more than 3 times Antarctica's annual ice accumulation, these calvings raise the concern that something is "upsetting the balance" of the continent.

45-2241
Effect of macro- and mesoscale circulation factors on the intensity of hail processes in the Caucasus region. [Vliianie faktorov makro- i mezomasshtabnykh tsirkuliatsii na intensivnost' gradovykh protsessov v regione Kavkaza],
Barekova, M.B., *Gidrometeorologicheskiĭ nauchno-issledovatel'skiĭ tsentr SSSR. Trudy*, 1990, Vol.308, p.101-108, In Russian. 3 refs.
Atmospheric circulation, Hail.

45-2242
Glaciology.
Barry, R.G., et al, *Geotimes*, Feb. 1990, 35(2), p.58-59, Refs. passim.
Armstrong, R.L.
Glaciology, Research projects.

45-2243
Polar research.
Molnia, B.F., *Geotimes*, Feb. 1990, 35(2), p.59-60.
Data processing, Research projects, Mapping, Polar regions.

45-2244
Effect of erosion and deflation on the structure of soil cover in semi-arid and arid Kazakhstan. [Vliianie erozii i defliatsii na strukturu pochvennogo pokrova polupustyn' i pustyn' Kazakhstana],
Dzhanpeisov, R.D., et al, Alma-Ata, Nauka, 1990, 91p., In Russian. 57 refs.
Zonov, G.V., Smagulov, T.
Soil erosion, Wind erosion, Desert soils, Cryogenic soils, Soil structure, Soil chemistry.

45-2245
Determining the breakdown parameters of packed and frozen explosives during their deliveries in soft containers. [Opredelenie parametrov razrusheniia slezhavshikhsia i smerzshikhsia vzryvchatykh veshchestv pri ikh postavkakh v miagkikh konteĭnerakh],
Dzhos, V.F., et al, Razrushenie gornykh porod pri statisticheskom i dinamicheskom nagruzhenii. Sbornik nauchnykh trudov (Shattering of rocks under static and dynamic loads. Collected scientific papers). Edited by E.I. Efremov, Kiev, Naukova dumka, 1990, p.33-35, In Russian.
Nikolenko, E.V., Kalinichenko, I.V.
Explosives, Transportation, Frozen cargo.

45-2246
Improving borehole and blasthole drilling in frozen conglomerate. [Intensifikatsiia bureniia shpurov i skvazhin v merzlykh gornykh porodakh konglomeratnof struktury],
Panasenko, N.N., et al, Razrushenie gornykh porod pri statisticheskom i dinamicheskom nagruzhenii. Sbornik nauchnykh trudov (Shattering of rocks under static and dynamic loads. Collected scientific papers). Edited by E.I. Efremov, Kiev, Naukova dumka, 1990, p.58-61, In Russian.
Prikhod'ko, T.V., Kudria, P.P.
Rock drilling, Drills, Design, Design criteria, Boreholes, Permafrost, Frozen rock strength.

45-2247
Theoretical basis for the width of planned snow-retention afforestation roads. [Teoreticheskoe obosnovanie moshchnosti proektiruemogo snegozashchitnogo ozeleneniia dorog],
Kolomiets, V.A., *Izvestiia vysshikh uchebnykh zavedeniĭ. Stroitel'stvo i arkhitektura*, Nov. 1990, No.11, p.93-94, In Russian. 5 refs.
Snow retention, Roads, Snowdrifts, Forest strips, Design.

45-2248
Frozen type filled ash dump. (Nasypnoĭ zolootval merzlogo tipa),
Kuznetsov, G.I., et al, *Izvestiia vysshikh uchebnykh zavedenii. Stroitel'stvo i arkhitektura*, Oct. 1990, No.10, p.77-83, In Russian. 5 refs.
Shalginova, L.T., Sysoev, IU.M.
Frozen ground thermodynamics, Ground water, Thermal regime, Freeze thaw cycles, Frozen ground temperature.

45-2249
Impact of decadal fluctuations in mean precipitation and temperature on runoff: a sensitivity study over the United States.
Karl, T.R., et al, *Climatic change*, Dec. 1989, 15(3), p.423-447, 20 refs.
Riebsame, W.E.
Runoff forecasting, Precipitation (meteorology), Temperature effects, Seasonal variations.

45-2250
Variations of Mount Kenya's glaciers 1963-87.
Hastenrath, S., et al, *Erdkunde*, Sep. 1989, 43(3), p.202-210, 11 refs.
Rostom, R., Caukwell, R.A.
Glacier surveys, Glacier oscillation, Glacier mass balance.

45-2251
Dynamic transport of river ice.
Shen, H.T., et al, *Journal of hydraulic research*, 1990, 28(6), p.659-671, With French summary. 12 refs. For another version see 43-3028.
Shen, H.T., Tsai, S.M.
River ice, Ice jams, Ice cover strength, Water flow, Mathematical models, Hydraulics, Flow rate, Ice water interface, Ice mechanics.

45-2252
Jam initiation in unobstructed channels: laboratory observations.
Ettema, R., *Journal of hydraulic research*, 1990, 28(6), p.673-684, With French summary. 15 refs.
Channels (waterways), Banks (waterways), River ice, Ice jams, Water flow, Simulation, Ice cover strength, Hydraulics, Flow rate.

45-2253
Deterioration of freshwater ice due to radiation decay.
Prowse, T.D., et al, *Journal of hydraulic research*, 1990, 28(6), p.685-697, With French summary. 26 refs.
Chew, H.A.M., Demuth, M.N.
River ice, Ice deterioration, Ice melting, Radiation absorption, Solar radiation, Ice optics, Snow cover effect, Ice strength, Porosity.

45-2254
Ice jams and flood control on the Berounka River.
Matoušek, V., *Journal of hydraulic research*, 1990, 28(6), p.699-710, With French summary. 2 refs.
River ice, Ice jams, Ice breakup, River flow, Flood control, Water level, Flood forecasting, Czechoslovakia—Berounka River.

45-2255
Effect of river barrages on ice regime.
Starosolszky, Ö., *Journal of hydraulic research*, 1990, 28(6), p.711-718, With French summary. 13 refs.
River ice, Dams, River flow, Ice breakup, Ice control, Ice conditions, Periodic variations, Cold weather operation, Reservoirs.

45-2256
On-line early warning system for ice jams and stoppages on the upper Niagara River.
Crissman, R.D., *Journal of hydraulic research*, 1990, 28(6), p.719-736, With French summary. 5 refs.
River flow, River ice, Ice jams, Warning systems, Forecasting, Dams, Electric power, Water level.

45-2257
Stability of floating and submerged blocks.
Daly, S.F., et al, *Journal of hydraulic research*, 1990, 28(6), MP 2844, p.737-752, With French summary. 13 refs.
Axelson, K.D.
Simulation, Floating ice, Underwater ice, Stability, Fluid flow, Hydrodynamics, Physical properties, Analysis (mathematics), Ice forecasting.
The rotational stability of floating and submerged rectangular blocks is described. The limit of stability is reached when the underturning moment acting on the block is equal to the maximum hydrostatic righting moment. The hydrostatic righting moment is derived and a convenient expression for its maximum is presented in nondimensional form. A moment coefficient is defined that relates the underturning moment at the limt of stability to the moment produced by the product of the dynamic pressure of the flow and the plan area of the block. An exponential function of the ratio of block thickness to flow depth is postulated as a general expression for the moment coefficient. The parameters of this function are related to the block geometry by analyzing the existing experimental data. The limit of rotational stability for rectangular blocks can then be described in terms of a densimetric Froude number based on block thickness.

45-2258
Comment on "Enhanced boulder weathering under late-lying snow patches" by C.K. Ballantyne, N.M. Black, and D.P. Finlay.
McCarroll, D., *Earth surface processes and landforms*, Aug. 1990, 15(5), p.467-469, 5 refs. For article under comment see 44-3347.
Rock properties, Nivation, Hardness tests, Weathering, Snow cover effect.

45-2259
Use of the Schmidt test hammer to detect enhanced boulder weathering under late-lying snowpatches.
Ballantyne, C.K., et al, *Earth surface processes and landforms*, Aug. 1990, 15(5), p.471-474, 6 refs. For articles under comment see 44-3347 and 45-2258.
Black, N.M., Finlay, D.P.
Rock properties, Nivation, Hardness tests, Weathering, Snow cover effect.

45-2260
Volume and entropy changes of water in electrolyte solutions below 0 deg C.
Leyendekkers, J.V., *Chemical Society, London. Journal. Faraday transactions*, June 21, 1990, 86(12), p.2231-2236, 19 refs.
Water structure, Solutions, Volume, Freezing points, Thermodynamics, Chemical analysis.

45-2261
Critical cooling rates to avoid ice crystallization in solutions of cryoprotective agents.
Sutton, R.L., *Chemical Society, London. Journal. Faraday transactions*, Jan. 7, 1991, 87(1), p.101-105, 23 refs.
Solutions, Cooling rate, Ice crystal growth, Preserving, Ice prevention, Cryogenics, Liquid cooling.

45-2262
Warming in the Arctic.
Quadfasel, D., et al, *Nature*, Apr. 4, 1991, 350(6317), p.385, 4 refs.
Sy, A., Wells, D., Tunik, A.L.
Polar regions, Climatic changes, Sea water.

45-2263
Revised projection of future greenhouse warming.
Schlesinger, M.E., et al, *Nature*, Mar. 21, 1991, 350(6315), p.219-221, 8 refs.
Jiang, X.
Climatic changes, Heat transfer, Polar regions, Models.
Using a simple climate ocean model, the authors make projections for four greenhouse-gas warming scenarios, whose radiative effects in 2100, expressed in terms of an equivalent amount of CO2, ranged from 2 to 5.5 times the pre-industrial CO2 concentration. All projections are revised by prescribing a lower value for a key parameter of the simple ocean model, *Pi*, which indicates the warming of the polar ocean relative to the warming of the non-polar ocean. For any value of *delta T2x*, the atmospheric temperature increases more rapidly with time as a consequence of the reduction in *Pi*. A delay of ten years in initiating a 20-year transition from the IPCC 'business-as-usual' scenario to any other IPCC scenario has only a small effect on the projected warming in 2100, regardless of the value of *delta T2x*. This indicates that the penalty for a 10-year delay is small. (Auth. mod.)

45-2264
Impact of oceanic sources of biogenic sulphur on sulphate aerosol concentrations at Mawson, Antarctica.
Prospero, J.M., et al, *Nature*, Mar. 21, 1991, 350(6315), p.221-223, 28 refs.
Savoie, D.L., Saltzman, E.S., Larsen, R.
Atmospheric composition, Ice cores, Ice composition, Snow composition, Wind (meteorology), Antarctica - Mawson Station.
Sulphate is the dominant aerosol species in the antarctic atmosphere and an important constituent in antarctic snow and ice. Various sources have been suggested for antarctic non-sea-salt sulphate: volcanic emissions, stratospheric injection, pollutants transported from the low latitudes, and biogenic dimethylsulphide (DMS) from the ocean. Although the oceanic source is now believed to be especially important, there has been no strong chemical evidence directly linking oceanic DMS with the Antarctic n.s.s. sulphate concentrations. Here are presented extended measurements from the Antarctic for both n.s.s. sulphate and methanesulphonate (MSA), an oxidation product of DMS. Both species have a very strong seasonal cycle with a maximum in the austral summer; this cycle parallels that of the oceanic biogenic sulphur producers, thereby suggesting a strong link between the antarctic atmospheric sulphur cycle and biological processes in the southern ocean. (Auth.)

45-2265
Breakup of antarctic ice.
Zwally, H.J., *Nature*, Mar. 28, 1991, 350(6316), p.274, 9 refs.
Ice shelves, Sea level, Climatic changes, Antarctica—Wordie Ice Shelf.
This essay provides a brief overview of the observations and discussions which make up the central theme of this issue of *Nature*. Some of the questions are introduced along with a caveat or two about hasty conclusions, the need for thoroughness in investigating viewpoints, and the necessity for recognizing and understanding the relationships between ice, air, and water.

45-2266
Rapid disintegration of the Wordie Ice Shelf in response to atmospheric warming.
Doake, C.S.M., et al, *Nature*, Mar. 28, 1991, 350(6316), p.328-330, 20 refs.
Vaughan, D.G.
Air temperature, Climatic changes, Ice shelves, Heat transfer, Antarctica—Wordie Ice Shelf.
The breaking up of ice shelves around the Antarctic Peninsula has been cited as a "sign that a dangerous warming is beginning in Antarctica". Satellite images show the disintegration of the Wordie Ice Shelf, which lies off the west coast of the Antarctic Peninsula. Fracture, either in the form of surface crevasses or rifts extending to the bottom of the ice shelf, has been responsible for iceberg calving and weakening the central region of the ice shelf. These fracture processes, which led to retreat of the ice front, were apparently enhanced by the presence of increased amounts of melt water, resulting from a warming trend recorded in mean annual air temperatures in Marguerite Bay. If this warming trend continues, other nearby ice shelves on the Antarctic Peninsula may be at risk. But substantial additional warming would be required before similar processes could initiate breakup of the Ross and Filchner-Ronne ice shelves, which help stabilize the West Antarctic ice sheet. (Auth.)

45-2267
Satellite-image-derived velocity field of an antarctic ice stream.
Bindschadler, R.A., et al, *Science*, Apr. 12, 1991, 252(5003), p.242-246, 24 refs.
Scambos, T.A.
Ice sheets, Ice creep, Velocity, Remote sensing, Antarctica—West Antarctica.
The surface velocity of a rapidly moving ice stream has been determined to high accuracy and spatial density with the use of sequential satellite imagery. Variations of ice velocity are spatially related to surface undulations, and transverse velocity variations of up to 30 per cent occur. Such large variations negate the concept of plug flow and call into question earlier mass-balance calculations for this and other ice streams where sparse velocity data were used. The coregistration of images with the use of the topographic undulations of the ice stream, and the measurement of feature displacement with cross-correlation of image windows, provide significant improvements in the use of satellite imagery for ice-flow determination. (Auth.)

45-2268
Surface mass balance and its variability in the Mizuho Plateau, 1987-1988, Antarctic.
Zhang, W., et al, *Antarctic research*, 1990, 2(3), p.1-10, In Chinese with English summary. 13 refs.
Yamanouchi, T.
Snow accumulation, Snow cover distribution, Mass balance, Antarctica—Mizuho Plateau.
Surface mass accumulation data for the years 1987-1988, including snow distribution and variability of the annual mass balance on Mizuho Plateau, differ greatly from data of previous years. In the region below 550 m a.s.l., which is near the coast, the balance was negative. Eighty km inland, the annual net mass balance was 0.84 m of snow depth. From that point to Mizuho Station, considered as a low mass balance zone, only 0.14 m of snow depth is reported. It is concluded that the short term climatic and topographic variations had a greater influence on the mass balance in 1987-1988 than in previous years. In the high accumulation zone, the influence of the short term climatic variation is greater than that of the topographic variation, while in the low value zone, the latter is greater than the former. (Auth. mod.)

45-2269
Morphologic analyses of snow crystals of Antarctica.
Jia, G., et al, *Antarctic research*, 1990, 2(3), p.11-17, In Chinese with English summary. 2 refs.
Mao, J.
Snow crystal structure, Polar regions, Antarctica—Great Wall Station.
From morphological analyses of 303 snow crystal samples, collected at the Great Wall Station during the 2nd Chinese Antarctic Expedition in Dec. 1985-Jan. 1987, 23 different types are identified.

45-2270
Coastal phenomena around Fildes Peninsula of King George Island, South Shetland Islands, Antarctica.
Liu, G., et al, *Antarctic research*, 1990, 2(3), p.18-26, In Chinese with English summary. 17 refs.
Cui, Z.
Geomorphology, Geology, Ice water interface, Antarctica—Fildes Peninsula.
Investigations around Fildes Peninsula revealed 3 kinds of modern coastal features: fragmental coast, rock coast, and ice cliff

coast. The fragmental coast shows some peculiar high latitude landforms formed by wave action with floating ice: linear gravel ridges near back-shore terrace, vertical gravel channels and ridges, pavements, gravel pits and network structure in tideland. Typical features appear in tideland, with gravel of 15-20 cm diameter and slopes below 5 deg. Wave action is an important process in the ablation of the ice cliff coast, and can accelerate the collapse of the ice cliff. The raised coastal features belong to two groups: the younger group is located below 20 m a.s.l. and was formed in the Holocene; the elevation of the older group is approximately 20 m a.s.l. and was formed during the last interglaciation. The raising rate of Fildes Peninsula is 10.0 mm/a, which is greater than that of the continental margin. (Auth. mod.)

45-2271
Statistical approach for predicting accuracies of soil properties measured by single, double and dual gamma beams.
Miyazaki, T., et al, *Journal of soil science*, Mar. 1991, 42(1), p.127-137, 9 refs.
Kasubuchi, T., Hasegawa, S.
Soil composition, Gamma irradiation, Measurement, Accuracy, Soil tests, Statistical analysis.

45-2272
Development of models of the survival of winter grain crops in a zone with stable snow cover. [Razvitie modeli perezimovki ozimykh zernovykh kul'tur dlia zony ustoĭchivogo snezhnogo pokrova],
Bogomolova, N.A., et al, *Gidrometeorologicheskiĭ nauchno-issledovatel'skiĭ tsentr SSSR. Trudy*, 1990, Vol.308, p.113-118, In Russian. 2 refs.
Chukaeva, E.V.
Plants (botany), Agriculture, Frost resistance, Snow cover stability, Models.

45-2273
Applying the principal factors method in evaluating the information of parameters used in forecasting hail. [Primenenie metoda glavnykh faktorov pri otsenke informativnosti parametrov, ispol'zuemykh v prognoze grada],
Kagermazov, A.Kh., *Gidrometeorologicheskiĭ nauchno-issledovatel'skiĭ tsentr SSSR. Trudy*, 1990, Vol.308, p.143-148, In Russian. 3 refs.
Forecasting, Hail.

45-2274
Method of long range forecasting of the time distribution of spring water inflow into the Tsimliansk reservoir. [Metodika dolgosrochnogo prognoza raspredeleniia vo vremeni vesennego pritoka vody v Tsimlianskoe vodokhranilishche],
Komarov, V.D., *Gidrometeorologicheskiĭ nauchno-issledovatel'skiĭ tsentr SSSR. Trudy*, 1989, Vol.309, p.3-10, In Russian. 2 refs.
Long range forecasting, Reservoirs, Water flow, Snowmelt, River basins, Time factor.

45-2275
Calculating the interdependent effect of water reserves and depth of soil freezing in long range forecasting of spring runoff of lowland rivers. [Ob uchete v dolgosrochnykh prognozakh vesennego stoka ravninnykh rek vzaimozavisimogo vliianiia zapasa vlagi i glubiny promerzaniia pochvy],
Komarov, V.D., *Gidrometeorologicheskiĭ nauchno-issledovatel'skiĭ tsentr SSSR. Trudy*, 1989, Vol.309, p.21-29, In Russian. 7 refs.
Soil freezing, Runoff, Long range forecasting, Meltwater, Frost penetration, Soil water, Water reserves.

45-2276
Methods of long-range forecasting of the beginning of intensive ice drift on the Yenisey River. [Metodika dolgosrochnogo prognoza srokov nachala intensivnogo ledokhoda na Enisee],
Efremova, N.D., *Gidrometeorologicheskiĭ nauchno-issledovatel'skiĭ tsentr SSSR. Trudy*, 1989, Vol.309, p.82-87, In Russian. 4 refs.
Drift, River ice, Long range forecasting, Ice forecasting.

45-2277
Time of ice cover growth to a set thickness on the Kuybyshev and Gor'kiy reservoirs as a function of temperature anomalies in Atlantic waters. [O zavisimosti srokov narastaniia ledianogo pokrova do zadannoĭ tolshchiny na Kuĭbyshevsko, i Gor'kovskom vodokhranilishchakh ot anomaliĭ temperatury vody v Atlantike],
Podsechina, T.V., *Gidrometeorologicheskiĭ nauchno-issledovatel'skiĭ tsentr SSSR. Trudy*, 1989, Vol.309, p.87-93, In Russian. 18 refs.
Ice cover thickness, Ice growth, Ice accretion, Temperature variations, Lake ice.

45-2278
Zoning of Kazakhstan territory according to dates of river freezeup. [Raĭonirovanie territorii Kazakhstana po odnorodnosti srokov zamerzaniia rek],
Shmarova, I.N., *Gidrometeorologicheskiĭ nauchno-issledovatel'skiĭ tsentr SSSR. Trudy*, 1989, Vol.309, p.93-102, In Russian. 7 refs.
Freezeup, River ice, Ice forecasting.

45-2279
Methods of long range forecasting of dates of ice cover breakup and removal of ice from Volga water reservoirs. [Metodika dolgosrochnogo prognoza srokov razrusheniia ledianogo pokrova i ochishcheniia oto l'da akvatorii Volzhskikh vodokhranilishch],
Poliakova, K.N., *Gidrometeorologicheskiĭ nauchno-issledovatel'skiĭ tsentr SSSR. Trudy*, 1989, Vol.309, p.102-108, In Russian. 7 refs.
Ice cover, Ice breakup, Lake ice, Long range forecasting, Ice removal, Ice forecasting.

45-2280
Allowing for ice cover structure in an algorithm for calculating its thickness. [Uchet struktury ledianogo pokrova v algoritme rascheta ego tolshchina],
Ponomarev, M.B., et al, *Gidrometeorologicheskiĭ nauchno-issledovatel'skiĭ tsentr SSSR. Trudy*, 1989, Vol.309, p.108-112, In Russian. 16 refs.
Kaliadina, N.V.
Ice cover thickness, Ice structure, Analysis (mathematics).

45-2281
Improving the method of calculating the breakup of ice cover on rivers and reservoirs. [Ob usovershenstvovanii metoda rascheta razrusheniia ledianogo pokrova rek i vodokhranilishch],
Borshch, S.V., et al, *Gidrometeorologicheskiĭ nauchno-issledovatel'skiĭ tsentr SSSR. Trudy*, 1989, Vol.309, p.113-120, In Russian. 10 refs.
Silant'eva, T.P.
Ice cover, Ice breakup, Lake ice, River ice, Reservoirs, Ice forecasting, Analysis (mathematics).

45-2282
Effects of ice coverage and ice-rafted material on sedimentation in the Fram Strait.
Hebbeln, D., et al, *Nature*, Apr. 4, 1991, 350(6317), p.409-411, 13 refs.
Wefer, G.
Ocean currents, Sediments, Sea ice, Fram Strait.

45-2283
Deuterium excess in recent antarctic snow.
Petit, J.R., et al, *Journal of geophysical research*, Mar. 20, 1991, 96(D3), p.5113-5122, 19 refs.
White, J.W.C., Young, N.W., Jouzel, J., Korotkevich, Y.S.
Paleoclimatology, Ice cores, Isotope analysis, Snow composition, Snowfall, Models.
Deuterium excess values in surface snow are presented for central and East Antarctica. The samples are primarily from Soviet, French, and Australian traverses. The *d* values exhibit a large change going from coastal sites to high-altitude sites on the ice sheet. The *d* values are relatively constant at 3 to 6 per mill from the coast to an altitude of 2500 m, and at higher elevations *d* increases steadily to values of 16 to 18 per mill at Vostok and Plateau Station. The data are modeled. Vapor originating from 20-60S was tested with different supersaturation functions. The data could only be fit with moisture originating from 30-40S, indicating that these latitudes are the main source of vapor for snow falling in Antarctica. The model was also tested with moisture simultaneously originating from all latitudes from 30S to the antarctic coast. The addition of up to 20% of moisture evaporated from latitudes south of 50 deg, and 5% from latitudes south of 60 deg, is compatible with low *d* values occasionally observed in snow near the coast. The conclusion of a "local moisture" effect for coastal and near coastal (< 2000 m elevation) snowfall supports a similar conclusion by Saigne and Legrand from their analysis of methanesulphonic acid in antarctic snow. The effects of changes in the sea surface temperature and changes in oceanic humidity on the *d* values observed in antarctic snow are greatly modified during the precipitation process. Hence the interpretation of *d* values in ice cores should be done in the context of a precipitation model. (Auth. mod.)

45-2284
Studies on the fluidized snow dynamics.
Nishimura, K., *Hokkaido University, Sapporo, Japan. Institute of Low Temperature Science. Contributions. Series A*, 1990, No.37, 55p., Refs. p.53-55.
Snow mechanics, Velocity measurement, Shear rate, Viscous flow, Mechanical tests, Dynamic properties, Flow rate, Avalanche modeling, Viscosity.

45-2285
Frozen-liquid PMR spectra and interactions of water with spherical carbon adsorbents.
Turov, V.V., et al, *Theoretical and experimental chemistry*, July 1990, 26(1), p.102-105, Translated from Teoreticheskaia i eksperimental'naia khimiia, Jan.-Feb. 1990. 8 refs.
Frozen liquids, Adsorption, Nuclear magnetic resonance, Spectra, Hygroscopic water, Temperature effects, Chemical analysis.

45-2286
Glacial waters, solid transport and decantation in hydroelectrical systems. [Eaux glaciaires, transports solides et décantation en hydro-électricité],
Bezinge, A., et al, *Houille blanche*, 1989, No.3/4, p.247-256, In French with English summary. 21 refs.
Aeschlimann, R.
Mountain glaciers, Meltwater, Water intakes, Design, Sediment transport, Water flow, Filters, Electric power.

45-2287
Mass and energy transport in sublimating cometary ice cracks.
Kömle, N.I., et al, *Icarus*, Jan. 1991, 89(1), p.73-84, 15 refs.
Dettleff, G.
Extraterrestrial ice, Ice models, Ice cracks, Ice sublimation, Vapor diffusion, Porosity, Ice surface, Analysis (mathematics).

45-2288
Rheological properties of ammonia-water liquids and crystal-liquid slurries: planetological applications.
Kargel, J.S., et al, *Icarus*, Jan. 1991, 89(1), p.93-112, 55 refs.
Croft, S.K., Lunine, J.I., Lewis, J.S.
Extraterrestrial ice, Slush, Ice composition, Viscosity, Geocryology, Liquid cooling, Magma, Rheology, Low temperature tests.

45-2289
Coagulation of particles in saturn's rings: measurements of the cohesive force of water frost.
Hatzes, A.P., et al, *Icarus*, Jan. 1991, 89(1), p.113-121, 14 refs.
Bridges, F., Lin, D.N.C., Sachtjen, S.
Extraterrestrial ice, Ice crystal collision, Frost, Cohesion, Surface structure, Simulation, Velocity, Impact tests.

45-2290
Steep climbs for Scania-powered snow groomers.
Brebeck, J., *Diesel progress-engines and drives*, Feb. 1990, 56(2), p.36-38.
Snow vehicles, Diesel engines, Design, Performance, Snow removal.

45-2291
Sea ice noise-generating processes.
Pritchard, R.S., *Acoustical Society of America. Journal*, Dec. 1990, 88(6), p.2830-2842, 34 refs.
Sea ice, Noise (sound), Underwater acoustics, Ice acoustics, Ice breaking, Wave propagation, Pressure ridges, Simulation, Sound waves.

45-2292
Arctic abyssal T phases: coupling seismic energy to the ocean sound channel via under-ice scattering.
Keenan, R.E., et al, *Acoustical Society of America. Journal*, Mar. 1991, 89(3), p.1128-1133, 18 refs.
Merriam, L.R.L.
Underwater acoustics, Sea ice, Seismic reflection, Scattering, Ice cover effect, Wave propagation, Acoustic measurement.

45-2293
Initial period of operation of the channel dam of the Kureika hydroelectric station.
Miznikov, IU.N., et al, *Hydrotechnical construction*, Apr. 1990, 32(10), p.578-583, Translated from Gidrotekhnicheskoe stroitel'stvo, Oct. 1989. 3 refs.
Panov, S.I., Shakov, N.A.
Earth dams, Cold weather construction, Rock fills, Freezing, Frozen ground mechanics, Deformation, Reservoirs.

45-2294
Low temperature brittle fracture behavior of steel in mixed modes I and II.
Maccagno, T.M., et al, *Engineering fracture mechanics*, 1991, 38(2-3), p.111-128, 25 refs.
Knott, J.F.
Steels, Loading, Cracking (fracturing), Low temperature tests, Microstructure, Brittleness, Tensile properties.

45-2295
Storage of refrigerated liquefied gases in rock caverns: charactristics of rock under very low temperatures.
Aoki, K., et al, *Tunnelling and underground space technology*, 1990, 5(4), p.319-325, With French summary. 4 refs.
Hibiya, K., Yoshida, T.
Rock properties, Cryogenics, Freeze thaw tests, Thermal conductivity, Underground storage, Low temperature tests, Liquified gases, Caves.

45-2296
Aerosol production processes from marine waters sampled in Antarctica and multielemental characterization of the particulated matter involved.
Calvelli, G., et al, *Annali di chimica*, 1989, 79(11-12), p.639-676, 19 refs.
Ceccato, D., Mittner, P., Schiavuta, E.
Snow impurities, Air water interactions, Aerosols, Antarctica—Terra Nova Bay.
Particulate matter is an important component of the materials transported through the sea-air interface in marine aerosol formation processes. Processes of this type have been reproduced in the laboratory by using 11 samples of seawater collected in 1987-88. Two gas bubble extraction processes have been performed as well, the first from a seawater sample, the second from a snow water sample. Results are reported of a multielemental characterization of the particulated matter contained in all the samples, and the values of 2 parameters which significantly describe the behavior of each particular element in each particular process: enrichment and mass unbalance. The second parameter is relevant from the point of view of flocculation-deflocculation phenomena associated with the processes. (Auth.)

45-2297
Analysis of the principal components of antarctic precipitations.
Piccardi, G., et al, *Annali di chimica*, 1989, 79(11-12), p.701-712, 23 refs.
Udisti, R., Barbolani, E.
Snow impurities, Ice composition, Polar regions, Antarctica—South Pole, Antarctica—Terra Nova Bay.
Some relevant inorganic ions (Na+, K+, Ca2+, Mg2+, H+, SO4, SO2-, NO3-, Cl-) were determined in snow and ice samples collected during the austral summer of 1987-88. The source of these components may be ascribed to a rich aerosol of marine and crustal origin. Statistical analysis also reveals a contribution of HNO3 analogous to that found in other parts of the continent. Insoluble impurities play a negligible role. (Auth.)

45-2298
Determination of copper, nickel and cadmium in antarctic seawater and snow.
Saini, G., et al, *Annali di chimica*, 1989, 79(11-12), p.713-721, 18 refs.
Baiocchi, C., Bertolo, P.
Snow impurities, Polar regions, Antarctica—Terra Nova Bay
Copper, nickel and cadmium have been determined in seawater samples collected by the Italian expedition in 1987-88. The determinations have been performed with GFAAS on a preconcentrate obtained by reductive precipitation. Samples of snow preconcentrated by lyophilization were analyzed by means of GFAAS for Cd, Ni, Cu and Cr. The results are discussed by considering the possible sources of contamination of samples. The amount of Cd in 2 of the samples collected near the Italian station and on the coast is higher than the average content in the other samples, which could reflect an anthropogenic contamination. (Auth. mod.)

45-2299
Investigations of space-time variations in meteorological visibility. [Issledovaniia vremennoĭ i prostranstvennoĭ izmenchivosti meteorologicheskoĭ dal'nosti vidimosti],
Laĭkhtman, V.I., et al, *Leningrad. Glavnaia geofizicheskaia observatoriia. Trudy*, 1987, Vol.512, p.108-120, In Russian. 7 refs.
Persin, S.M.
Visibility, Snowfall, Fog, Time factor, Snow optics.

45-2300
Approximate analytical expressions for the relation between the saturation of water vapor and temperature. [Priblizhennye analiticheskie vyrazheniia zavisimosti mezhdu davleniem nasyshchennogo vodianogo para i temperaturoĭ],
Afinogenov, L.P., Leningrad. Glavnaia geofizicheskaia observatoriia. Trudy, 1987, Vol.512, p.129-133, In Russian. 2 refs.
Analysis (mathematics), Water vapor, Ice surface, Air temperature, Vapor pressure, Air water interactions, Ice air interface, Computer applications.

45-2301
Mobility of rock avalanches.
Hungr, O., *Japan. National Research Institute for Earth Science and Disaster Prevention. Report*, Dec. 1990, No.46, p.11-20, With Japanese summary. 27 refs.
Landslides, Avalanche mechanics, Rock mechanics, Slope stability, Analysis (mathematics), Avalanche deposits.

45-2302
Prediction of failure time of a slope by reciprocal of mean velocity; study on prediction of slope failure (3).
Fukuzono, T., *Japan. National Research Institute for Earth Science and Disaster Prevention. Report*, Dec. 1990, No.46, p.45-81, In Japanese with English summary. 24 refs.
Landslides, Slope stability, Avalanche forecasting, Avalanche mechanics, Analysis (mathematics).

45-2303
Frequency distributions of densities for four types of snow in Shinjo.
Abe, O., *Japan. National Research Institute for Earth Science and Disaster Prevention. Report*, Dec. 1990, No.46, p.83-92, In Japanese with English summary. 9 refs.
Snow cover distribution, Snow density.

45-2304
Sublimation rate of collected blowing snow in a collector; a case of cyclone type collector.
Sato, T., *Japan. National Research Institute for Earth Science and Disaster Prevention. Report*, Dec. 1990, No.46, p.93-116, In Japanese with English summary. 12 refs.
Snow air interface, Sublimation, Blowing snow, Precipitation gages, Analysis (mathematics).

45-2305
Application of GPS relative positioning for height determination above sea level in the antarctic marginal ice zone.
Shibuya, K., et al, *Journal of physics of the Earth*, 1990, 38(2), p.149-162, 10 refs.
Fukuda, Y., Michida, Y.
Ice sheets, Topographic features, Height finding, Geodetic surveys, Antarctica—Breid Bay.
GPS relative positioning was made at Breid Bay for determining height above sea level on the marginal ice sheet (L0 point). Two GPS receiver systems were installed at L0 point and on the deck of the icebreaker *Shirase* (S point). A water-level recorder was installed at the anchoring site of *Shirase*, and sea level variation was monitored for 4 days. The combined accuracy of height determination of L0 point above sea level can thus be considered as +/- 0.3 m. Overall accuracy may further be degraded to +/- 0.5 m uncertainty from the effect of possible local gravity anomalies between L0 point and S point of 30 km distance. This error budget is allowable for the starting experiment of installation of a height datum station in the marginal ice zone of Antarctica. The method applied in this experiment cannot give exact orthometric height, but can effectively be extended to the "GPS traverse leveling" to the inland outcrop area of Antarctica.

45-2306
Forecasting the frost resistance of concrete based on local materials. [Prognozirovanie morozostoĭkosti betonov na mestnykh materialakh],
Akimov, A.V., et al, Kishinev, Shtiintsa, 1988, 83p., In Russian. 169 refs.
Kryzhanovskiĭ, I.I., Morozova, L.V.
Concrete freezing, Concrete durability, Frost resistance, Freeze thaw cycles, Forecasting, Ultrasonic tests.

45-2307
Anticipated dates for the appearance of ice on rivers in Siberia and in the northeastern European territory of the USSR in 1990. [Ozhidaemye sroki poiavleniia l'da na rekakh Sibiri i severo-vostoka evropeĭskoĭ territorii SSSR v 1990 g.], *Gidrometeorologicheskiĭ nauchno-issledovatel'skiĭ tsentr SSSR. Biulleten'*, 1990, No.72, 3p., In Russian.
Ice forecasting, River ice, Rivers.

45-2308
Anticipated dates for the appearance of ice on rivers in the southern, southwestern, and western European territory of the USSR in 1990. [Ozhidaemye sroki poiavleniia l'da na rekakh iuga, iugo-zapada i zapada evropeĭskoĭ territorii SSSR v 1990 g.], *Gidrometeorologicheskiĭ nauchno-issledovatel'skiĭ tsentr SSSR. Biulletin'*, 1990, No.91, 2p., In Russian.
Ice forecasting, River ice, Rivers.

45-2309
Long range forecasting of ice conditions on non-arctic seas in the USSR winter 1990/91. [Dolgosrochnyĭ prognoz ledovykh usloviĭ na nearkticheskikh moriakh SSSR zimoĭ 1990/91 g.], *Gidrometeorologicheskiĭ nauchno-issledovatel'skiĭ tsentr SSSR. Biulletin'*, 1990, No.77, 9p., In Russian.
Long range forecasting, Ice conditions, Ice forecasting, Sea ice, Ice melting.

45-2310
Development and use of an electrical resistivity cone for groundwater contamination studies.
Campanella, R.G., et al, *University of British Columbia. Department of Civil Engineering. Soil mechanics series*, May 1990, No.140, 42p., 21 refs.
Weemees, I.
Ground water, Water pollution, Soil pollution, Electrical resistivity.

45-2311
Ice engineering for rivers and lakes bibliography.
Wortley, C.A., Madison, University of Wisconsin, College of Engineering, 1990, 158p.
Bibliographies, River ice, Lake ice, Ice mechanics, Ice control, Ice loads, Hydraulics.

45-2312
Characterization of polymer networks by measurements of the freezing point depression.
Arndt, K.F., et al, *Colloid & polymer science*, Sep. 1990, 268(9), p.806-813, 46 refs.
Zander, P.
Polymers, Liquid cooling, Freezing points, Liquid phases, Temperature effects, Chemical analysis, Temperature measurement.

45-2313
New method for assessment of air voids in plastic concrete.
Ansari, F., *Cement and concrete research*, Nov. 1990, 20(6), p.901-909, 6 refs.
Concrete durability, Frost resistance, Air entrainment, Bubbles, Probes, Detection, Concretes, Microstructure.

45-2314
Holocene glacier variations of Blåisen, Hardangerjökulen, central southern Norway.
Nesje, A., et al, *Quaternary research*, Jan. 1991, 35(1), p.25-40, Refs. p.38-40.
Dahl, S.O.
Paleoclimatology, Glacier oscillation, Quaternary deposits, Radioactive age determination, Sedimentation, Stratigraphy, Meltwater, Norway.

45-2315
Land-sea correlations and evolution of the Cambridge Fiord marine basin during the last deglaciation of northern Baffin Island.
Stravers, J.A., et al, *Quaternary research*, Jan. 1991, 35(1), p.72-90, Refs. p.89-90.
Syvitski, J.P.M.
Glaciation, Quaternary deposits, Moraines, Sedimentation, Glacier oscillation, Correlation, Marine sediments, Seismic surveys, Canada—Baffin Island.

45-2316
Cold regions engineering.
International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991, MP 2845, New York, American Society of Civil Engineers, 1991, 790p., Refs. passim. For individual papers see 45-2317 through 45-2387.
Sodhi, D.S., ed.
Soil freezing, Frozen ground strength, Water treatment, Frost action, Cold weather construction, River ice, Ice mechanics, Ice strength, Snowdrifts, Ice water interface, Ice loads, Ice detection, Recording instruments.

45-2317
MUT1D: User-friendly one-dimensional thermal model.
Braley, W.A., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.1-10, 4 refs.
Zarling, J.P.
Soil freezing, Ground thawing, Heat flux, Mathematical models, Computer programs, Soil air interface, Surface temperature, Thaw depth.

45-2318
Soil-pipe interaction during frost heaving around a buried chilled pipeline.
Shen, M., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.11-21, 9 refs.
Ladanyi, B.
Frost heave, Soil freezing, Underground pipelines, Frozen ground strength, Pipeline freezing, Mathematical models.

45-2319
Thermal strain behaviour of clays cooled to cryogenic temperatures.
Landva, J., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.22-31, 13 refs.
Ladanyi, B.
Clays, Soil freezing, Frozen ground strength, Cryogenics, Cold storage, Underground storage, Liquefied gases.

45-2320
Laboratory methods for preparing low-density frozen saline soil samples for strength tests.
Ayorinde, O.A., MP 2846, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.32-43, 2 refs.
Soil freezing, Frozen ground strength, Artificial freezing, Artificial islands, Saline soils, Offshore structures, Analysis (mathematics), Earth fills.
Laboratory methods were developed for preparing low-density frozen saline soil samples with density values ranging from 85-110 lb/cu ft. This range of density values is typical of below-water fill for winter-constructed arctic islands and causeways. These low-density frozen saline soil samples were used for triaxial-compression consolidated-drained (CD) tests to estimate the island/causeway strength. Two laboratory methods found adequate for low-density frozen samples were (a) backsaturating compacted freshwater frozen-soil chunks or lumps with seawater at the freezing temperature, and (b) depositing and consolidating freshwater frozen-soil chunks in a seawater column maintained at the freezing temperature.

45-2321
Single pile and pile group in permafrost.
Vialov, S.S., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.44-53, 11 refs.
Slepak, M.E., Lunev, M.V.
Piles, Frozen ground strength, Permafrost beneath structures, Settlement (structural), Pile load tests, Frozen ground settling, Soil creep, Analysis (mathematics).

45-2322
Laboratory study of shock waves in frozen soil.
Dutta, P.K., et al, MP 2847, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.54-70, 27 refs.
Farrell, D., Kalafut, J.
Frozen ground mechanics, Frozen ground strength, Shock waves, Laboratory techniques, Analysis (mathematics).
This work has focused on two aspects of dynamic behavior of frozen soil: first, on the shock pressure attenuation, and second, on the shock Hugoniot. The use of long bars of frozen soil mounted with a stress transfer cap mated to the Hopkinson pressure bar was investigated as a technique for shock attenuation studies. Hugoniot shock data were obtained from the high stress level impact on the specimens in the Hopkinson pressure bar (HPB) by applying the elementary theory of unidirectional stress propagation. Wave attenuation from low-level impact was exponential but the results are suspected to be influenced by wave dispersion and shear deformation effects. Hugoniot data were obtained over only a small deformation range, owing to the short (250-microsecond) wavelength developed by the HPB apparatus.

45-2323
Effect of loading rate on the bending strength of alluvium reinforced ice.
Weber, L.J., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.71-84, 27 refs.
Nixon, W.A.
Ice (construction material), Ice strength, Alluvium, Ice loads, Flexural strength.

45-2324
Water conservation at the antarctic Wasa Base—results 1989-90.
Marklund, S., International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.85-94, 2 refs.
Sanitary engineering, Water supply, Utilities.
The Swedish Wasa Base was erected in the Norwegian sector of Antarctica during the 1988-89 summer season. The base consisted of a house with full living facilities for 10 people and a machine building. The sanitary system consisted of indoor running hot and cold water, a dishwater, a washing machine, two showers, a sauna and two dry toilets. All sanitary installations were, at the time of delivery, standard manufactured versions chosen to be water conservative. The specific water demand for 1989-90 summer season was 62.8 l or 16.6 gal per day. Of that 1/3 was used in the kitchen and 1/4 each for laundry and showers/sauna. (Auth. mod.)

45-2325
Wetlands sewage treatment system for the community of Teslin.
Lorimer, R.J., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.95-107.
Quinn, O.P., Lakshman, G., Grainger, J.M.
Swamps, Sewage treatment.

45-2326
Sludge dewatering in freezing beds.
Martel, C.J., MP 2848, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.108-115, 6 refs.
Sludges, Artificial freezing, Water treatment, Freeze drying, Artificial thawing.
This paper summarizes the results of laboratory and pilot scale studies on the development of the sludge freezing bed. Laboratory studies indicated that a freezing bed could dewater up to 2.0 m of typical water and wastewater sludges. Pilot plant results indicated that adequate drainage during thaw was critical for odor control. After thawing, the sludge was dry enough for removal with mechanical equipment. The cost of constructing a freezing bed was estimated to be considerably higher than that of an equivalent drying bed. However, this extra expense would be more than offset by higher loading rates and lower operation and maintenance costs.

45-2327
PS 5 sewage lagoon embankment stabilization.
Mobley, K., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.116-125, 7 refs.
Harle, J.C.
Sewage treatment, Ponds, Embankments, Soil stabilization, Slope stability.

45-2328
Winter sewer construction in Campbell Lake.
Corwin, B.J., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.126-135, 6 refs.
Barber, L.L.
Lakes, Sewage treatment, Cold weather construction.

45-2329
Freeze-thaw effects on clay covers and liners.
Chamberlain, E.J., et al, MP 2849, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.136-151, 18 refs.
Ayorinde, O.A.
Waste disposal, Clay soils, Freeze thaw cycles, Permeability, Soil freezing, Soil stabilization, Soil compaction.
This report reviews laboratory experiments on the effects of freezing and thawing on the permeability of clayey soils and develops compaction requirements to minimize damage to clay layers caused by freezing and thawing. Permeability increases greater than two orders of magnitude have been observed. The smallest changes in permeability occurred when the soils were compacted to high densities. The authors show how a relationship between the percent increase in permeability and the liquidity index of the soil affects the acceptable range of moisture contents and densities required for compaction. A simple method for estimating the acceptable zone based on the plastic limit and the degree of saturation is also provided.

45-2330
Experimental study of adfreeze heaving of augered caisson footings.
Iordanescu, M., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.152-163, 9 refs.
Lavigne, P., Amorim, E.
Footings, Ice adhesion, Frost heave, Concrete piles.

45-2331
Thermal regime surrounding a longitudinal edge drain.
Allen, W.L., MP 2850, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.164-177, 3 refs.
Seasonal freeze thaw, Runways, Drains, Drainage, Pavements, Waterproofing, Frost heave.
Newton Airfield in Jackman, Maine, was constructed in 1986 to perform as a drained pavement system. The drainage design consisted of a permeable base course with a longitudinal edge drain along one side of the runway. The drain was placed 5 1/2 to 7 ft below the pavement surface to provide service throughout the freezing season. Initial observations of the site showed that during the winter, outflow from the drain outlet stops. Problems with the performance of the system were observed in the form of water coming up through the pavement surface and flowing over the top of the pavement. A hypothesis was proposed that frozen soil material was blocking the flow of water into the drain structure. Instrumentation placed to monitor the ground freezing regime around the drain indicated that the drainage system and the pavement structure thaw relatively quickly. A closer look at the pavement geometry and the permeability of the base course indicated that the base course cannot provide the flow capacity to drain the water available from snow melt during the spring thaw period.

45-2332
Numerical analysis of frost shields.
Coutermarsh, B.A., et al, MP 2851, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.178-190, 12 refs.
Phetteplace, G.
Frost protection, Thermal insulation, Mathematical models, Underground pipelines, Frost penetration, Pipeline insulation, Soil freezing.
A finite element heat transfer program has been developed to assess the practicality of currently used frost shielding techniques by allowing the designer to model frost penetration using different burial depths, insulation schemes and backfill materials around the utility line. The information obtained is then used to perform an economic analysis on the possible schemes to determine the most cost-effective solution to the problem. This paper discusses the program development and rationale. Also discussed are the particulars of finite element modeling and the necessary precautions that must be followed when this method is used. Verification is demonstrated by numerical approximation with analytical solutions and by presenting actual frost penetration data obtained under controlled conditions in the CRREL Frost Effects Research Facility. Some sample results for promising frost shield applications are presented along with an example of the cost savings possible.

45-2333
Computer predictions of thaw beneath gravel embankments on warm permafrost.
Bigl, S.R., et al, MP 2852, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.191-199, 7 refs.
Berg, R.L.
Computerized simulation, Embankments, Permafrost beneath roads, Ground thawing, Thaw depth.
The model, using a one-dimensional finite-difference code, FREZID, predicted that a gravel embankment can be constructed on an ice-rich clay permafrost without generating excessive amounts of thaw settlement. Gravel embankments thicker than 19 ft are predicted to contain thaw penetrations for a 10-yr period experiencing air temperatures similar to the 1976-86 decade. Thinner embankments will require additional treatments to prevent thaw from penetrating the permanently frozen clay. Inclusion of extruded polystyrene insulation at 2 ft below the gravel surface was extremely effective in reducing thaw penetration depths.

45-2334
New admixtures for cold weather concreting.
Korhonen, C.J., et al, MP 2853, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. *Proceedings.* Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.200-209, 7 refs.
Cortez, E.R., Smith, C.E., Jr.
Winter concreting, Concrete admixtures, Antifreezes, Concrete strength, Concrete curing.
Chemicals were tested for their ability to promote strength gain in portland cement concrete at low temperature. The admixtures depressed the freezing point of the mix water and accelerated the hydration of cement at low temperature. Tests were conducted at 20, -5 and -10 C. The results show that low-temperature strength gain of antifreeze concrete can be comparable to that of additive-free concrete cured at room temperature. These additives, so-called "antifreeze admixtures" have potential for use in the cold regions.

45-2335
High-performance concrete in all-weather deck pours.
Strand, G.W., International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. *Proceedings. Edited by D.S. Sodhi.* Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.210-229, 12 refs.
Winter concreting, Concrete admixtures, Concrete strength.

45-2336
Impact of cold weather on building construction scheduling.
Shahbodaghlou, F., International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.230-239, 7 refs.
Cold weather construction, Meteorological factors, Computer applications.

45-2337
Processed-snow foundation design at the summit of the Greenland Ice Cap.
Curtis, K.C., et al, MP 2854, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.240-249.
Tobiasson, W.
Snow (construction material), Snow stabilization, Foundations, Embankments, Research projects, Ice sheets, Snow compaction, Greenland.
The design and construction of a processed-snow foundation berm for an elevated building located at the summit of the Greenland Ice Cap is described. Weather conditions and design provisions at the Greenland Ice Sheet Project (GISP) 2 site are described. Undisturbed snow densities are compared to processed-snow densities measured in the compacted foundation berm.

45-2338
Environment One: a master plan study for a new scientific research station at the geographic South Pole.
Osgood, S.G., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.250-271, 15 refs.
Haehnle, R.J.
Cold weather construction, Stations, Research projects, Buildings, Human factors engineering, Antarctica—Amundsen-Scott Station.
This master plan study focusses on determining the technical and functional requirements of a new facility. Technical requirements are those aspects of the station affected and determined by the extreme climate. Functional requirements are those dictated by contemporary research needs. Environment One will establish the groundwork for the design and construction of an Amundsen-Scott Station that will support globally significant scientific research into the twenty-first century. (Auth. mod.)

45-2339
Cold climate building research at Wasa Base, Antarctica.
Haugun, D., International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.272-281.
Cold weather construction, Stations, Research projects, Buildings, Antarctica—Wasa station.
During the antarctic summer season of 1988-89 a permanent Swedish research station was erected in Dronning Maud Land. The station, named Wasa, is situated on a nunatak. A corresponding Finnish station named Aboa is situated 200 m from the Swedish base. The common name of the stations is Nordenskiold Base. The nunatak, named "Basen", is the most northeastern spur of the Vestfjella range. Wasa's position is S74 35' and W11 13'. The building research project was conducted during the 1988-89 and 1989-90 expeditions. This paper gives details of the design and construction of Wasa Research Station, as well as the installation of data loggers and sensors. A general outline is also provided of the observations which were made during the 1989-90 expedition, i.e. one year after the completion of the station.

45-2340
River ice research in China.
Sun, Z.C., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.282-293, 14 refs.
Shen, H.T.
River ice, Ice conditions, Ice surveys, Research projects, Ice jams, China.

45-2341
Evolution of ice cover roughness.
Ashton, G.D., et al, MP 2855, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.294-305, 11 refs.
Zufelt, J.E.
River ice, Ice formation, Surface roughness, Ice bottom surface, Ice cover thickness, River flow, Ice cover effect, Ice water interface, Analysis (mathematics).
The formation of an ice cover on a river results in an increase of stage relative to open water stages at the same discharge. Due to the formation process, especially for freeze-up ice jams, the underside of the ice cover is very rough initially and smooths with time. Observations in the field have shown considerable reductions of stage or head loss with time. Three mechanisms responsible for the evolution of ice cover roughness are investigated: freeze smoothing, melt smoothing, and depositional smoothing. While these mechanisms have previously been noted as the cause of smoothing with time, this paper presents quantitative estimates of the magnitude of roughness changes based on the physics of the three processes.

45-2342
Ice jam configuration: second generation model.
Beltaos, S., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.306-315, 11 refs.
Wong, J.
River ice, Ice jams, Ice models, River flow, Mathematical models, Ice breakup.

45-2343
Friction and cohesion in ice rubble reviewed.
Ettema, R., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.316-325, 8 refs.
Urroz-Aguirre, G.E
Ice friction, Ice adhesion, Cohesion, Analysis (mathematics).

45-2344
Analysis of waterbody surface heat exchange.
Huang, N.C., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.326-335, 17 refs.
Rumer, R.R., Jr.
Ice water interface, Ice air interface, Heat transfer, Mathematical models, Lake ice, Wind factors.

45-2345
Conceptual model for vertical frazil distribution in turbulent flows.
Liou, C.P., et al, MP 2856, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.336-347, 30 refs.
Ferrick, M.G.
Frazil ice, Ice models, Turbulent flow, Heat transfer, Ice formation, Ice water interface, Mathematical models.
A conceptual model is presented for the evolution of frazil over depth in a turbulent flow. The net upward migration due to buoyancy of the frazil is opposed by intermittent mixing induced by large energy-containing eddies. A surface renewal model is adopted to describe the large eddy mixing. Averages over an ensemble of discrete local volumes for the concentration profile, surface age and surface layer thickness are obtained with a probability density function. A dimensionless surface renewal frequency characterizes the frazil distribution at equilibrium as either well-mixed or layered. The model provides a physical basis for understanding the transition between these conditions, and is consistent with existing empirical criteria and field data.

45-2346
Heat exchange at the ice/water interface on flowing water.
Hausser, R., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.348-354, 6 refs.
Parkinson, F.E.
Ice water interface, Heat transfer, Water flow.

45-2347
Two-dimensional surface drift model for river ice.
Shen, H.T., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.355-362, 11 refs.
Chen, Y.C., Wake, A., Crissman, R.R.
River ice, Ice models, Drift, Mathematical models, Ice jams.

45-2348
River ice cover cracking for various boundary conditions.
Abdel-Zaher, A.K., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.363-375, 18 refs.
Davar, K.S., Dawe, J.L.
River ice, Ice breakup, Boundary value problems, Ice models.

45-2349
River Ice Management (RIM) Program: developing new options for waterways operations in winter.
Carey, K.L., MP 2857, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.376-385, 7 refs.
River ice, Ice control, Ice navigation, Research projects, Channels (waterways), Locks (waterways), Dams, Manuals.
Most of the navigable inland waterways of the United States are utilized year-round. In northern portions of this network (mainly parts of the Ohio and Upper Mississippi River basins), ice reduces transportation efficiency and interferes with the operation of Corps of Engineers locks and dams. In parallel with Corps programs for rehabilitation or replacement of certain aging and inadequate locks and dams (averaging about 50 years old), the Corps' five-year River Ice management (RIM) Program developed ways to incorporate structural improvements in new and existing navigation projects, and examined new operational techniques, all aimed at improving waterway operations in the presence of the ice. RIM Program studies focused on four functional areas: a) improving ice-conditions information to aid decision-making by the Corps and the navigation industry, b) helping locks and dams cope with ice in winter operations; c) influencing river ice formation and movement; and d) easing winter navigation operations in the vicinity of Corps projects. Several RIM Program demonstrations provided immediate improvements to winter operations. An Engineer Manual was produced giving uniform direction to Corps Districts in matters involving river ice, and containing guidance for studies leading to River Ice Management Plans for specific basins, mainstem rivers, or tributaries.

45-2350
Designing for control of ice conditions in marinas.
Wortley, C.A., International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.386-395, 3 refs.
Lake ice, Ports, Ice control, Ice conditions.

45-2351
Shallow-draft icebreaker for the upper Niagara River.
Crissman, R.D., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.396-405, 10 refs.
Hollmer, A.
River ice, Icebreakers.

45-2352
Radar monitoring of ice on the upper Niagara River.
Crissman, R.D., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.406-415, 3 refs.
Lalumiere, L.A.
River ice, Ice detection, Radar tracking, Monitors.

45-2353
Mechanistic approach to pavement design for Nome Airport.
Vinson, T.S., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.416-427, 8 refs.
Rooney, J.R.
Pavements, Runways, Frost protection, Bituminous concretes, Frost heave, Thaw weakening.

45-2354
Use of rigid insulation below grade for roadways and parking areas.
Larsen, L.A., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.428-437, 7 refs.
Krzewinski, T.G., Bergman, J.D.
Pavements, Thermal insulation, Frost protection, Frost action, Subgrades.

45-2355
Future technology for disbonding snow and ice from pavements.
Wuori, A.F., International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.438-447, 3 refs.
Road icing, Ice removal, Snow removal, Pavements, Road maintenance.

45-2356
Treatment of unstable foundation areas in Alaska's pavement management system.
Johnson, E.G., International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.448-453, 3 refs.
Permafrost beneath roads, Road maintenance, Frozen ground settling, United States--Alaska.

45-2357
Small-scale meteorology of freezing precipitation.
Hogan, A.W., MP 2858, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.454-462, 8 refs.
Ice storms, Glaze, Precipitation (meteorology), Topographic effects.
Freezing rain and glazing are extremely disruptive to transportation, communication and power transmission. Local variations in the occurrence of freezing rain may be difficult to forecast. This paper describes terrain-induced temperature differences, and provides an analysis showing terrain-induced cold air retention during warm advection. Calculations indicate that it may be possible to locally ameliorate freezing rain in valleys with more than 300 m of local relief.

45-2358
Minnesota Road Research Project—an overview.
Newcomb, D.E., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.463-471, 3 refs.
Benke, R., Cochran, G.R.
Road maintenance, Pavements, Research projects.

45-2359
Analysis of soil-stress cell interaction.
Van Deusen, D.A., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.472-482, 8 refs.
Newcomb, D.E.
Soil strength, Soil tests, Strain tests, Static loads, Subgrade soils.

45-2360
On the constitutive behavior of single ice crystals due to dislocation mechanisms.
Brown, R.L., International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.483-493, 17 refs.
Ice crystal structure, Ice mechanics, Ice deformation, Analysis (mathematics), Ice strength.

45-2361
Visco-elasticity and the compressive failure of polycrystalline ice.
Duval, P., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.494-503, 21 refs.
Kalifa, P., Lestringant, R.
Ice crystal structure, Ice mechanics, Ice deformation, Viscoelasticity, Compressive properties, Ice strength.

45-2362
Anelastic straining in polycrystalline ice.
Cole, D.M., MP 2859, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.504-518, 26 refs.
Ice crystal structure, Ice mechanics, Ice deformation, Ice elasticity, Ice strength, Ice creep.
This paper presents experimental observations on the influence of stress, grain size and total strain level on the magnitude of anelastic strain in granular freshwater ice. Cyclic loading experiments carried out at low total strain levels indicate that the anelastic strain is a function of grain size. Strain recovery experiments, wherein the specimens were deformed to strains as high as 0.07, indicate that the anelastic strain reaches a maximum value at relatively low total strain levels and thereafter remains relatively constant. The results indicate for a given ice type, that when the total strain level is relatively high (e.g. >0.01), the anelastic strain is no longer a function of grain size, but only of temperature and stress level. A nonlinear relationship between the anelastic strain and applied stress level emerged for the strain recovery experiments. A dislocation-based model that explains the stress dependency is developed and is seen to represent the experimental observations reasonably well. The grain size dependency of the internal friction is explained qualitatively in terms of the structure of grain boundaries. Discussions center on the development of a unified dislocation-based view of the anelastic strain observed under all experimental conditions.

45-2363
Microstructure and mechanical behaviour of ice.
Sinha, N.K., International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.519-530, 32 refs.
Ice microstructure, Ice crystal structure, Ice mechanics, Ice cracks, Analysis (mathematics), Ice deformation.

45-2364
Fractal crushing.
Palmer, A.C., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.531-541, 10 refs.
Sanderson, T.J.O.
Ice deformation, Ice breaking, Fracturing, Ice floes, Analysis (mathematics).

45-2365
Effect of grain size variation on damage in polycrystalline ice.
Wu, M.S., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.542-553, 20 refs.
Shyam Sunder, S.
Ice crystal structure, Ice crystal size, Ice deformation, Ice cracks, Mathematical models, Ice microstructure, Cracking (fracturing).

45-2366
Ductile-brittle transition in ice & size effect.
Schulson, E.M., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.554-568, 46 refs.
Zhang, J.
Ice strength, Ice mechanics, Brittleness, Tensile properties, Ice loads, Analysis (mathematics).

45-2367
Preliminary results of direct tension tests on first-year sea ice samples.
Richter-Menge, J.A., et al, MP 2860, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.569-578, 15 refs.
Claffey, K.J.
Sea ice, Ice strength, Strain tests, Tensile properties, Ice mechanics, Ice loads, Temperature effects.
The initial results of the tests are presented to determine the tensile behavior of columnar sea ice over a range of temperatures extending from -20 to -3 C and strain rates of 100,000/s and 1000/s. The temperature of a test specimen was dictated by its in-situ location within the sheet; samples located near the top of the sheet were tested at the lower temperature. All samples were taken from the horizontal plane of the ice sheet. The maximum stress achieved during a test was most notably influenced by temperature, while loading rate was the primary variable in determining the failure strain and the modulus.

45-2368
Fracture resistance to cracking in ice: initiation and growth.
Dempsey, J.P., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.579-594, 42 refs.
Wei, Y., DeFranco, S.J.
Ice strength, Ice cracks, Ice breaking, Cracking (fracturing), Ice mechanics, Analysis (mathematics).

45-2369
Size effects in the fracture of quasi-brittle materials.
Bažant, Z.P., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.595-604, 20 refs.
Gettu, R.
Ice strength, Fracturing, Brittleness, Ice mechanics, Analysis (mathematics).

45-2370
Laboratory observations of macroscopic failure modes in freshwater ice.
Timco, G.W., International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.605-614, 12 refs.
Ice strength, Ice loads, Ice breaking, Ice solid interface, Offshore structures, Laboratory techniques.

45-2371
Some questions on fracture mechanics of ice and ice covers.
Gol'dshtein, R.V., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.615-618, 5 refs.
Osipenko, N.M.
Ice strength, Analysis (mathematics), Ice breaking, Ice deformation, Fracturing, Ice mechanics.

45-2372
Effective pressures measured during indentation tests in freshwater ice.
Sodhi, D.S., MP 2861, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.619-627, 7 refs.
Ice strength, Ice pressure, Impact tests, Ice deformation, Ice loads, Ice solid interface.
Indentation tests were conducted by pushing flat, vertical indentors of two different widths (50 and 100 mm) against the edges of floating freshwater ice at different velocities (0.6-150 mm/s). The stiffness of the indentor support system and the ice thickness were in the range of 0.8-3.5 MN/m and 18-57 mm, respectively. Three different modes of ice-structure interactions were observed: creep deformation at low velocities, intermittent crushing at intermediate velocities and continuous crushing at high velocities. The maximum effective pressures measured at different indentor velocities were found to differ by a factor of 3 to 5; high pressures (8-13 MPa) were measured at low indentor velocities (< 20 mm/s), and low pressures (1.2-4.3 MPa) at high indentor velocities (> 100 mm/s).

5-2373
lodeling of floating ice sheets.
hilton, D.S., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, H, Feb. 26-28, 1991. Proceedings. Edited by D.S. odhi. Cold regions engineering, New York, Amerian Society of Civil Engineers, 1991, p.628-637, 19 efs.
Vekezer, J.W.
ce floes, Ice mechanics, Ice models, Mathematical nodels, Ice deformation, Ice elasticity.

15-2374
oads and vibration induced by compressive failure of ce.
ordaan, I.J., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, Amerian Society of Civil Engineers, 1991, p.638-649, 21 efs.
Kennedy, K.P., McKenna, R.F., Maes, M.A.
Ice pressure, Ice breaking, Ice loads, Ice models, Mathematical models, Ice solid interface.

45-2375
Application of ice/structure interaction concepts to a real time ice risk assessment computer model.
Blanchet, D., International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.650-665, 26 refs.
Ice loads, Offshore structures, Impact strength, Safety, Computer applications, Statistical analysis.

45-2376
Wang's equation for ice forces from a pressure ridge.
Nevel, D.E., International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.666-672, 1 ref.
Ice pressure, Pressure ridges, Analysis (mathematics), Ice loads, Ice solid interface.

45-2377
Multiphase flows and the modeling of drifting snow.
Decker, R., International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.673-684, 39 refs.
Snowdrifts, Fluid flow, Air flow, Mathematical models.

45-2378
Wind tunnel modeling of time-dependent drift topography.
Iversen, J.D., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.685-697, 24 refs.
Wang, W.P.
Snowdrifts, Wind tunnels, Turbulent boundary layer, Air flow, Sediment transport, Mathematical models.

45-2379
Drifted snow on roofs.
O'Rourke, M., International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.698-707, 13 refs.
Snowdrifts, Snow loads, Roofs, Mathematical models.

45-2380
***Snow fence* operational and material testing.**
Perchanok, M.S., International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. *Cold regions engineering*, New York, American Society of Civil Engineers, 1991, p.708-718, 9 refs.
Snowdrifts, Snow fences.

45-2381
Research study of highway snowdrifting in Canada.
Baker, H.A., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.719-728, 3 refs.
Williams, C.J.
Road maintenance, Snowdrifts, Canada.

45-2382
Snow transport as a function of *wind speed* and height.
Tabler, R.D., International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.729-738, 15 refs.
Snowdrifts, Wind factors, Air flow, Sediment transport, Snow *mechanics*, Analysis (mathematics).

45-2383
New hydrologic instrumentation in the U.S. Geological Survey.
Latkovich, V.J., et al, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.739-747.
Shope, W.G.
Geological surveys, Hydrology, Recording instruments, River flow, Water level, Flow measurement.

45-2384
Spray and ice measurement instrumentation for ships.
Ryerson, C.C., et al, MP 2862, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.748-757, 5 refs.
Walsh, M.R., Knuth, K.V.
Ship icing, Sea spray, Ice detection, Thickness gages, Ice forecasting, Recording instruments, Measuring instruments.
Bow slamming is the primary water delivery mechanism for ship superstructure icing. Spray flux is largely dependent upon hull dynamics, and cannot be computed numerically with current understanding of hydrodynamic processes. Therefore, ship icing models must rely upon empirical algorithms for water delivery. The Cold Regions Research and Engineering Laboratory has developed an instrumentation system that automatically measures spray flux and ice growth for use in icing forecast model development and validation. Though the spray measurement system is similar in concept to a rain gauge and the ice measurement system is similar to an ultrasonic camera rangefinder, the systems are more complex because of their need to operate reliably on a ship deck in heavy weather. This paper describes the design, testing, construction, and fielding of this equipment.

45-2385
USACRREL underwater frazil ice detector.
Daly, S.F., et al, MP 2863, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.758-764, 1 ref.
Rand, J.H.
Underwater ice, Frazil ice, Ice detection, Recording instruments.
A modified underwater frazil ice detector has been developed at USACRREL. This detector, which operates remotely, can automatically start deicing procedures and alert operators to the presence of frazil. The detector operates by monitoring the flow rate through a small intake screen. The intake screen is, in effect, a miniature trash rack that will allow frazil ice to accumulate much quicker than the actual trash racks. This patent-pending detector was tested in the laboratory and in field conditions. The system is an economical solution to the early detection of frazil ice.

45-2386
Wind power in Antarctica: case histories of the North Wind HR2 wind turbine.
Coleman, C.J., International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. Cold regions engineering, New York, American Society of Civil Engineers, 1991, p.765-771.
Wind power generation, Cold weather performance, Antarctica, Black Island, Antarctica, McMurdo Station.
Since 1985, Northern Power Systems wind systems have provided power to remote sites in Antarctica's harsh polar environment. The overall perspective provided by this experience is that wind power can effectively provide reliable electrical power and heat to the variety of loads needed to support the manned and unmanned stations in the Antarctic. The combination of extreme weather conditions and remoteness of the antarctic sites makes them even better suited for wind turbine installations, since the alternative power sources are more severely affected by these limitations than are wind-powered systems. This coupled with the vast wind energy resources on almost all sections of the continent, which range from moderate to extreme, make wind energy the most cost effective source of electrical power in Antarctica. (Auth. mod.)

45-2387
***Recommended* cold regions meteorological instrumentation.**
Bates, R.E., MP 2864, International Cold Regions Engineering Specialty Conference, 6th, West Lebanon, NH, Feb. 26-28, 1991. Proceedings. Edited by D.S. Sodhi. *Cold regions engineering*, New York, American Society of Civil Engineers, 1991, p.772-783, 12 refs.
Meteorological instruments, Weather observations, Cold weather performance, Humidity, Air temperature, Wind (meteorology), Precipitation (meteorology).
The northern temperate climatic zones experience a varying scenario of winter environmental extremes of cold, icing, and precipitation, which severely influence people, equipment and operations. Even instruments designed to measure cold and/or wet adverse environments may be incapable of operation if employed during severe cold weather. It is important to know the equipment's environmental restrictions and to evaluate the frequency and duration of disabling weather. In some instances, functional impairments persist after the causative meteorological conditions have subsided, e.g., glaze, rime and heavy snow and ice accumulation. For nearly 30 years, CRREL has studied environmental conditions in winter weather. These efforts have concentrated on providing field-measured meteorological data, as well as instrumentation support for many experiments conducted throughout cold regions of the Northern Hemisphere. These efforts have involved characterizing atmospheric conditions as well as surface conditions. This paper will discuss instrumentation currently being used to gather atmospheric and background environmental data during winter field testing. Current state-of-the-art developments such as a new laser diode for measuring relative humidity will be discussed. Finally a brief summary of data gathered and data analysis methods will be presented.

45-2388
Arctic navigation: problems of 2 sea passages. [Arkticheskoe sukhodstvo: problemy dvukh morskikh prokhodov].
Young, O.R., *Morskoĭ flot*, Oct. 1990, No.10, p.35-39, In Russian.
Ice navigation, Marine transportation, Legislation, International cooperation.

45-2389
Terramechanics and off-road vehicles.
Wong, J.Y., Amsterdam, Elsevier Science Publishers, 1989, 251p., Refs. p.242-248.
Tracked vehicles, Traction, Trafficability, Soil strength, Snow strength, Analysis (mathematics).

45-2390
Heat transfer with freezing and thawing.
Lunardini, V.J., MP 2865, Developments in geotechnical engineering, No.65, Amsterdam, Elsevier Science Publishers, 1991, 437p., Refs. passim.
Heat transfer, Phase transformations, Analysis (mathematics), Freezing, Thawing, Liquid solid interfaces, Boundary value problems, Temperature effects, Soil freezing, Ground thawing, Porous materials.

45-2391
Seasonal ice zone studies.
Sandven, S., et al, Sea: ideas and observations on progress in the study of the seas. Vol.9, Part A. Ocean engineering science. Edited by B. Le Méhauté and D.M. Hanes, New York, John Wiley & Sons, 1990, p.567-591, 56 refs.
Johannessen, O.M.
Ice edge, Sea ice distribution, Seasonal variations, Drift, Ocean currents, Atmospheric circulation, Ice models.

45-2392
Ice forces on structures.
Gerwick, B.C., Jr., Sea: ideas and observations on progress in the study of the seas. Vol.9, Part B. Ocean engineering science. Edited by B. Le Méhauté and D.M. Hanes, New York, John Wiley & Sons, 1990, p.1263-1301, 76 refs.
Ice cover strength, Ice loads, Offshore structures, Ice solid interface, Ice mechanics, Analysis (mathematics).

45-2393
Ice on the equator: Quaternary geology of Mount Kenya, East Africa.
Mahaney, W.C., Sister Bay, WI, Wm Caxton Ltd, 1990, 386p. + 7 plates, Refs. p.367-386.
DLC QE696.M33 1990
Glacial geology, Geological surveys, Quaternary deposits, Alpine glaciation, Paleoclimatology, Glacier surveys, Glacial deposits, Kenya, Kenya, Mount

45-2394
Goals, objectives and priorities to guide United States arctic research.
U.S. Arctic Research Commission, *U.S. Arctic Research Commission. Findings and recommendations*, Jan. 1991, No.7, 39p., 22 refs.
Research projects, Natural resources, Environmental protection, Economic development, Polar regions, International cooperation, Legislation, Engineering.

45-2395
Arctic research in a changing world. Report of the U.S. Arctic Research Commission to the President and the Congress of the United States of America for the period 1 October 1989-30 September 1990.
U.S. Arctic Research Commission, Washington, D.C., Jan. 31, 1991, 36p., Refs. passim.
Research projects, Natural resources, Economic development, Environmental protection, International cooperation, Polar regions, Legislation.

45-2396
Charging of aircraft: high-velocity collisions.
Keith, W.D., et al, *Journal of aircraft*, Mar. 1990, 27(3), 18-222, 6 refs.
Saunders, C.P.R.
Aircraft, Charge transfer, Ice crystal collision, Hailstone electrification, Simulation, Impact tests, Cloud electrification, Velocity measurement.

45-2397
Chemical profiles of polar ice on Earth and Mars: what we read from the first; what we could read from the second.
Jones, H.G., *Space science reviews*, Apr. 1991, 56(1-2), p.43-57, 32 refs.
Ice sheets, Extraterrestrial ice, Mars (planet), Ice composition, Chemical analysis, Hydrologic cycle, Climatic factors, Atmospheric composition.

45-2398
Improved methods of testing piles in frozen soils.
Vialov, S.S., et al, *Soil mechanics and foundation engineering*, Jan. 1991, 27(4), p.155-161, Translated from Osnovaniia, fundamenty i mekhanika gruntov, July-Aug. 1990. 7 refs.
Mirenburg, I.U.S.
Pile load tests, Frozen ground strength, Soil creep, Settlement (structural), Design criteria, Dynamic loads, Accuracy.

45-2399
Effect of permafrost conditions and type of foundations on deformation of building in Vorkuta.
Belotserkovskaia, G.V., *Soil mechanics and foundation engineering*, Jan. 1991, 27(4), p.161-163, Translated from Osnovaniia, fundamenty i mekhanika gruntov, July-Aug. 1990. 5 refs.
Permafrost beneath structures, Buildings, Foundations, Thaw weakening, Deformation, Piles, Design criteria.

45-2400
Basic causes of deformation of buildings constructed on permafrost.
Zhukov, V.F., *Soil mechanics and foundation engineering*, Jan. 1991, 27(4), p.174-178, Translated from Osnovaniia, fundamenty i mekhanika gruntov, July-Aug. 1990.
Buildings, Damage, Permafrost beneath structures, Countermeasures, Cold weather construction, Settlement (structural), Deformation, Building codes.

45-2401
Modeling the acoustic scattering by under-ice-ridge keels.
Rubenstein, D., et al, *Acoustic Society of America. Journal*, Feb. 1991, 89(2), p.666-672, 13 refs.
Greene, R.
Sea ice, Ice bottom surface, Underwater acoustics, Scattering, Mathematical models, Sound transmission, Wave propagation, Surface roughness, Pressure ridges.

45-2402
Directionality of ice cracking events.
Zakarauskas, P., et al, *Acoustic Society of America. Journal*, Feb. 1991, 89(2), p.722-734, 21 refs.
Thorleifson, J.M.
Sea ice, Cracking (fracturing), Underwater acoustics, Acoustic measurement, Noise (sound), Wave propagation, Ice breaking, Temperature effects, Ice cover effect.

45-2403
Modeling runoff in semiarid rangeland watersheds.
Heydarpour, J., *Environmental software*, Dec. 1989, 4(4), p.210-215, 15 refs.
Watersheds, Surface waters, Water pollution, Snowmelt, Runoff forecasting, Computerized simulation, Hydrology, River basins.

45-2404
Challenge of arctic shipping: science, environmental assessment, and human values.
VanderZwaag, D.L., ed, Montreal, McGill-Queen's University Press, 1990, 282p., Refs. p.245-268. For selected paper see 45-2405.
Lamson, C., ed.
Marine transportation, Environmental impact, Petroleum industry, Ocean environments, Sea ice, Oil spills, Arctic Ocean.

45-2405
Physical environment.
Lake, R.A., Challenge of arctic shipping: science, environmental assessment, and human values. Edited by D.L. VanderZwaag and C. Lamson, Montreal, McGill-Queen's University Press, 1990, p.20-58, Refs. included in bibliography p.245-268.
Sea ice, Oceanography, Ocean environments, Tides, Ocean currents, Arctic Ocean.

45-2406
Polar research from satellites.
Thomas, R.H., Washington, D.C., Joint Oceanographic Institutions, Inc., [1991], 91p., Refs. p.65-69.
Radiometry, Spaceborne photography, Mapping, Climatic changes, Instruments, Sensor mapping, Data processing, Polar regions.
This report presents a review of existing and planned satellite sensors with applications to polar research, a description of the major sets of polar data already acquired by satellites, and a preview of planned missions that will both extend these data sets into the future and provide entirely new types of polar data. In addition, it includes some examples of how these various data should be used to address specific problems. Emphasis is on instruments that measure surface, or near-surface parameters of particular importance to polar research. A summary is provided of major polar-research objectives in order to help identify the types of satellite measurement that can be used to address these objectives. It represents an attempt to identify a set of polar research objectives that contribute to larger studies of the global system, with a clear bias towards research that can benefit significantly from satellite measurements.

45-2407
Synergetics of ocean processes. [Sinergetica okeanskikh protsessov],
Seidov, D.G., Leningrad, Gidrometeoizdat, 1989, 287p., In Russian with English summary. 258 refs.
Oceanography, Ocean currents, Climatic factors, Mathematical models, Atmospheric circulation.
Presented is an analysis of self-organization of Earth's climatic system and its main part, the ocean. Synergetics, the general approach to the study of universal features of self-organization phenomena, emerges in the book as a basis for understanding the ocean processes. Structure and variability of the ocean climate on different time and space scales, the interactions between ocean eddies and between them and the large-scale currents are considered. The results of the eddy-resolving numerical modelling of the ocean circulation are carefully discussed. A phenomenological low-parametric model of the ocean circulation energetics is constructed. Antarctic glaciations, their history and their role in global climatic changes, are briefly reviewed. (Auth. mod.)

45-2408
Cryogenic processes in moraines of the Zailiyskiy Alatau and their role in the formation of glacial mudflows. [Kriogennye protsessy v morennykh otlozheniiakh Zailiĭskogo Alatau i ikh rol' v formirovanii gliatsial'nykh seleĭ],
Kan, M.S., et al, Problemy gidrogeologii i okhrany geologicheskoi sredy Kazakhstana (Problems in hydrogeology and the protection of the geological environment of Kazakhstan). Edited by S.M. Mukhamedzhanov, Alma-Ata, Nauka KazSSR, 1990, p.167-173, In Russian.
Polovinkin, G.F.
Moraines, Mudflows, Geocryology, Glacial deposits, Solifluction.

45-2409
Interaction of sea ice, snow and glaciers with the atmosphere and ocean (part 3).
Kotliakov, V.M., ed, *Polar geography and geology*, July-Sep. 1990, 14(3), p.155-248, Refs. p.242-248. For part 1 see 45-1261. For Russian originals see 42-2853 through 42-2855.
Grosval'd, M.G., ed.
Sea level, Sea ice distribution, Ice air interface, Climatic changes, Mountain glaciers, Heat transfer, Glacier ice, Ice surface, Glacier alimentation, Pleistocene, Paleoclimatology, Glaciation, Glacier mass balance.

45-2410
Experimental study of the mechanism of skiing turns. 2. Measurement of edging angles.
Sahashi, T., et al, *Japanese journal of applied physics, pt. 1*, June 1990, 29(6), p.1203-1208, 3 refs.
Ichino, S.
Skis, Sliding, Simulation, Mechanical tests, Artificial snow, Orientation.

45-2411
Formation mechanisms of twelve-branched snow crystals.
Uyeda, H., et al, *Meteorological Society of Japan. Journal*, Oct. 1990, 68(5), p.549-555, 9 refs.
Kikuchi, K.
Snow crystal structure, Snow crystal growth, Snowflakes, Sampling, Orientation.

45-2412
Paleoclimatic implications of an early Holocene glacier advance on Disko Island, West Greenland.
Ingólfsson, O., et al, *Boreas*, 1990, 19(4), p.297-311, 40 refs.
Frich, P., Funder, S., Humlum, O.
Glacier oscillation, Glaciation, Paleoclimatology, Glacial deposits, Sea level, Radioactive age determination, Moraines, Greenland.

45-2413
Seasonal and annual variation of pollen content in the snow of a Canadian high arctic ice cap.
Bourgeois, J.C., *Boreas*, 1990, 19(4), p.313-322, 36 refs.
Ice sheets, Snow composition, Pollen, Snow stratigraphy, Palynology, Seasonal variations, Layers, Canada —Ellesmere Island.

45-2414
Soil wedge polygons in northern Quebec: description and paleoclimatic significance.
Jetchick, E., et al, *Boreas*, 1990, 19(4), p.353-367, 48 refs.
Allard, M.
Patterned ground, Permafrost transformation, Geocryology, Wedges, Paleoclimatology, Soil structure, Polygonal topography, Radioactive age determination, Fires.

45-2415
Unexpectedly stable nitrogen, oxygen, carbon monoxide and argon clathrate hydrates from vapour-deposited amorphous solid water: an X-ray and two-step differential scanning calorimetry study.
Hallbrucker, A., et al, *Chemical Society, London. Journal. Faraday transactions*, Nov. 21, 1990, 86(22), p.3785-3792, 32 refs.
Mayer, E.
Clathrates, Amorphous ice, Gases, Stability, Vapor pressure, Chemical analysis, Ice formation, Temperature measurement, Extraterrestrial ice, Hydrates.

45-2416
Model pile-settlement behavior in frozen sand.
Stelzer, D.L., et al, *Journal of cold regions engineering*, Mar. 1991, 5(1), p.1-13, 7 refs.
Andersland, O.B.
Pile load tests, Simulation, Settlement (structural), Dynamic loads, Frozen ground strength, Shear stress, Sands.

45-2417
Flexural strength of sand-reinforced ice.
Nixon, W.A., et al, *Journal of cold regions engineering*, Mar. 1991, 5(1), p.14-27, 22 refs.
Weber, L.J.
Ice (construction material), Flexural strength, Mechanical tests, Alluvium, Temperature effects, Spray freezing, Cold weather construction, Unfrozen water content, Brittleness.

45-2418
Thaw-subsidence effects on offshore pipelines.
Nixon, J.F., *Journal of cold regions engineering*, Mar. 1991, 5(1), p.28-39, 9 refs.
Subsea permafrost, Underground pipelines, Offshore structures, Geothermal thawing, Subsidence, Design criteria, Settlement (structural), Petroleum transportation, Hot oil lines.

45-2419
Activation energy for creep of spray ice.
Chandler, N., et al, *Journal of cold regions engineering*, Mar. 1991, 5(1), p.42-49, 9 refs.
Shields, D., Domaschuk, L.
Ice creep, Spray freezing, Temperature effects, Rheology, Ice islands, Ice (construction material).

45-2420
Ecology and modeling post-fire larch fall and regeneration on permafrost. [Ekologiia i modelirovanie poslepozharnogo otpada i vozobnovleniia listvennitsy na mnogoletneĭ merzlote],
Matveev, P.M., et al, *Lesnoĭ zhurnal*, 1990, No.1, p.14-21, In Russian. 9 refs.
Usol'tsev, V.A.
Trees (plants), Mathematical models, Plant ecology, Forest ecosystems, Permafrost, Forest fires.

45-2421
Development of the Earth's surface in Finland. [Suomen maankamaran vaiheet],
Aartolahti, T., *Terra*, 1990, 102(4), p.203-219, In Finnish with English summary. 16 refs.
Quaternary deposits, Landforms, Glacial erosion, Sedimentation, Finland, Baltic Sea.

45-2422
Changing climate. [Muuttuva ilmasto],
Eronen, M., *Terra*, 1990, 120(4), p.220-238, In Finnish with English summary. 51 refs.
Climatic changes, Paleoclimatology, Ice cores, Glaciation.

45-2423
Reliability of the frozen bearing ground of structures. [Nadezhnost' merzlykh osnovanii sooruzhenii],
Zhelezniak, I.I., Novosibirsk, Nauka, 1990, 171p., In Russian. Refs. p.165-171.
Foundations, Frozen ground strength, Structures, Bearing strength, Permafrost beneath structures, Ground thawing, Economic analysis, Soil freezing.

45-2424
Cryolithology of the lower course of the Lena River. [Kriolitologiia nizov'ia Leny],
Kunitskii, V.V., Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1989, 162p., In Russian. Refs. p.147-160.
Taliks, Lithology, Geocryology, Cryogenic processes, Periglacial processes, Glacial deposits, Nivation, Permafrost, Seasonal freeze thaw, Frozen rock temperature, USSR—Lena River.

45-2425
Development of the cryolithozone of Transbaikal. [Inzhenernoe osvoenie kriolitozony Zabaĭkal'ia],
Aleksandrov, A.S., et al, Novosibirsk, Nauka, 1990, 105p., In Russian. Refs. p.102-105.
Zhelezniak, I.I., Mosenkis, IU.M.
Geocryology, Permafrost beneath structures, Economic development, Engineering geology, Seasonal freeze thaw, Frozen ground mechanics, Foundations, Cold weather construction, Frost heave, USSR—Transbaikal.

45-2426
Workshop on antarctic meteorite stranding surfaces.
Cassidy, W.A., ed, *Lunar and Planetary Institute. Technical report*, 1990, LPI TR90-3, 103p., Refs. passim.
Whillans, I.M., ed.
Meetings, Ice volume, Climatic changes, Antarctica.
The workshop recognized three prime functions of meteorite stranding surfaces. They provide: a proxy record of climatic changes; a proxy record of ice volume change; and a source of unique nonterrestrial material. The workshop focused on the first two, with presentations by meteoriticists, glaciologists, geologists, meteorologists, and geophysicists. Agreement was unanimous that the potential exists in meteorite stranding surfaces for clear proxy records of climate and ice change. Specific recommendations, written by three different authors to convey the views of the group, are included as separate sections of this report. They are *Deducing Past Climate* by G. Crozaz, *Origin of Stranding Surfaces* by G. Faure, and *Strategies for the Future* by M. Lipschutz. These are followed by abstracts of the papers presented at the Workshop.

45-2427
Storm and cloud dynamics.
Cotton, W.R., et al, International geophysics series, Vol.44, San Diego, CA, Academic Press, 1989, 883p., Refs. passim.
Anthes, R.A.
DLC QC921.6.D95C67 1989
Cloud physics, Storms, Clouds (meteorology), Precipitation (meteorology), Analysis (mathematics), Atmospheric circulation, Hail, Thunderstorms, Topographic effects, Nucleation.

45-2428
Selected problems of the thermohaline structure and dynamics of the water masses in Norwegian and Greenland Seas.
Jankowski, A., et al, *Polish polar research*, 1990, 11(1-2), p.3-16, 8 refs.
Swerpel, S.
Ocean currents, Water temperature, Salinity, Ice water interface, Greenland Sea, Norwegian Sea.

45-2429
Influence of humidity and temperature upon the rate of soil metabolism in the area of Hornsund (Spitsbergen).
Fischer, Z., *Polish polar research*, 1990, 11(1-2), p.17-24, 6 refs.
Periglacial processes, Peat, Cryogenic soils, Soil physics, Soil temperature, Humidity, Carbon dioxide.

45-2430
Thermic and humidity relations of chosen Spitsbergen soils during spring ablation of the snow cover.
Angiel, M., *Polish polar research*, 1990, 11(1-2), p.25-37, 18 refs.
Periglacial processes, Soil temperature, Cryogenic soils, Humidity, Permafrost, Grain size, Seasonal ablation, Ground water, Water balance, Snow cover.

45-2431
Rate of cellulose decomposition in soils of Spitsbergen tundra.
Bieńkowski, P., *Polish polar research*, 1990, 11(1-2), p.39-45, 3 refs.
Tundra, Cryogenic soils, Decomposition, Plants (botany), Mosses.

45-2432
Ice and snow—construction materials. [Led i sneg—stroitel'nye materialy],
Renkel', A.F., *Stroitel'stvo truboprovodov*, Oct. 1990, No.10, p.43-45, In Russian. For part 2 see 45-2433.
Snow (construction material), Ice (construction material).

45-2433
Snow and ice—construction materials. [Sneg i led—stroitel'nye materialy],
Renkel', A.F., *Stroitel'stvo truboprovodov*, Dec. 1990, No.12, p.50-52, In Russian. For part 1 see 45-2432.
Snow (construction material), Ice (construction material).

45-2434
Climate change and glacier fluctuation during the last 1,000 years in the southern mountains of the USSR.
Kotliakov, V.M., et al, *Mountain research and development*, Feb. 1991, 11(1), p.1-12, With French and German summaries. 31 refs.
Serebriannyĭ, L.R., Solomina, O.N.
Climatic changes, Glacier oscillation, Lichens, USSR—Altai Mountains, USSR—Tien Shan.

45-2435
Past and present changes of mudflow intensity in the Central Caucasus.
Seinova, I.B., *Mountain research and development*, Feb. 1991, 11(1), p.13-17, With French and German summaries. 6 refs.
Mudflows, River basins, Lichens, Watersheds.

45-2436
Formalization of ice data for computer processing. [Formalizatsiia ledovoĭ informatsii dlia ee mashinnoĭ obrabotki],
Likhachev, A.V., Navigatsiia i upravlenie sudnom. Sbornik nauchnykh trudov (Navigation and ship control. Collected scientific works). Edited by V.I. Peresypkin, et al., Moscow, Transport, 1990, p.54-59, In Russian. 6 refs.
Data processing, Computer applications, Ice surveys, Ice navigation.

45-2437
Two packages for meteorological data processing and runoff simulation for personal computers.
Gandolfi, C., et al, *Environmental software*, Dec. 1987, 2(4), p.192-198, 10 refs.
Pirovano, G., Soncini-Sessa, R.
Runoff forecasting, Computer programs, Computerized simulation, Snowmelt, River basins, Hydrology, Meteorological data.

45-2438
Experience in using the method of long-range forecasting of the spring runoff for estimating its possible variations in connection with climatic changes.
Kuznetsova, L.P., et al, *Water resources*, Jan. 1991, 17(2), p.126-132, Translated from Vodnye resursy, Mar.-Apr. 1990. 7 refs.
Fonareva, O.A.
Precipitation (meteorology), Runoff forecasting, Snowmelt, River basins, Snow water equivalent, Climatic changes, Water resources, Snow hydrology.

45-2439
Use of uranium-isotope information for modeling water inflow in fractured rocks under permafrost conditions.
Chalov, P.I., et al, *Water resources*, Jan. 1991, 17(2), p.166-174, Translated from Vodnye resursy, Mar.-Apr. 1990. 10 refs.
Tunnels, Ground water, Permafrost hydrology, Subsurface investigations, Isotope analysis, Water flow, Seepage, Hydrogeology.

45-2440
Ice rafting of sedimentary material in the Azov Sea.
Aibulatov, N.A., et al, *Water resources*, Jan. 1991, 17(2), p.179-187, Translated from Vodnye resursy, Mar.-Apr. 1990. 15 refs.
Grudinova, L.IA.
Ice rafting, Ice composition, Sediments, Drift, Sediment transport, Particle size distribution, Ice scouring.

45-2441
Influence of lead iodide aerosol dispersity on its ice-forming activity.
Baklanov, A.M., et al, *Journal of aerosol science*, 1991, 22(1), p.9-14, 9 refs.
Aerosols, Lead iodide, Cloud chambers, Heterogeneous nucleation, Ice nuclei, Ice crystal growth, Condensation nuclei, Cloud seeding, Particle size distribution.

45-2442
Shear cell experiments of snow and ice friction.
Casassa, G., et al, *Journal of applied physics*, Mar. 15, 1991, 69(6), p.3745-3756, 28 refs.
Narita, H., Maeno, N.
Ice friction, Shear stress, Snow mechanics, Snow hardness, Mechanical tests, Avalanche mechanics, Snow strength, Surface roughness.

45-2443
Cable rime accretion measurements on a Laurentian mountain.
McComber, P., et al, *Canadian journal of civil engineering*, Dec. 1990, 17(6), p.1022-1032, With French summary. 13 refs. For another version see 43-2654.
Druez, J., Félin, B.
Power line icing, Cables (ropes), Ice accretion, Hoarfrost, Ice detection, Meteorological factors, Ice breaking, Cloud droplets, Wind factors.

45-2444
***Fluctuations of snow accumulation in the antarctic* and sea level pressure in the Southern Hemisphere in the last 100 years.**
Enomoto, H., *Climate change*, Jan. 1991, 18(1), p.67-87, 40 refs.
Snow accumulation, Atmospheric pressure.
This paper summarizes the long-term fluctuations of snow accumulation in the Antarctic and analyzes its correlation with the sea level pressure (SLP) in the middle latitudes of the Southern Hemisphere. Stratigraphic data which were compiled from studies on ice cores and snow-pits at eight stations in the Antarctic were used in the present study. Data concerning fluctuations in snow accumulation for East Antarctica showed *correlations, whereas no such correlation was observed for the data* from West Antarctica. This study shows possible relationships between snow accumulation in the Antarctic and SLP in the middle latitudes. *The fluctuations of accumulation at South* Pole, Dome C, Wilkes and South Ice Point show correlations with SLP over a large area in the 40-50S latitudinal zone. For the long-term fluctuations of SLP in the 40-50S latitudinal zone, a zonal fluctuation with wave number zero structure and a longitudinal variation of SLP anomalies due to their out-of-phase-fluctuation between the Pacific and the Indian Oceans were observed. The temporal scales for these fluctuations were found to be in the order of 20-30 years and 40-60 years, respectively. The influences of these two modes on the behavior of snow accumulation in the Antarctic is also discussed. (Auth.)

45-2445
Structure and material composition of deposits of the glacial paleoshelf in the Bol'shezemel'skaya tundra. [Stroenie i veshchestvennyĭ sostav otlozheniĭ gliatsial'nogo paleoshel'fa Bol'shezemel'skoĭ tundry],
Lavrushin, IU.A., et al, Litologiia kainozoĭskikh shel'fovykh otlozheniĭ (Litnology of Cenozoic shelf deposits). Edited by IU.A. Lavrushin, Moscow, Geologicheskiĭ institut AN SSSR, 1989, p.3-51, In Russian. 18 refs.
Lithology, Glacial deposits, Ice shelves, Moraines, Tundra, USSR—Bol'shaya Zemlya.

45-2446
Structure and regime of swamps in the permafrost zone of Western Siberia. [Stroenie i rezhim bolot zony mnogoletnei merzloty Zapadnoĭ Sibiri],
Novikov, S.M., Resursy bolot SSSR i puti ikh ispol'zovaniia. Sbornik nauchnykh trudov (Resources of USSR swamps and ways of utilizing them. Collected scientific works). Edited by S.E. Vomperskiĭ and IU.S. Prozorov, Khabarovsk, Dal'nevostochnoe otdelenie AN SSSR, 1989, p.80-89, In Russian. 16 refs.
Swamps, Permafrost, Seasonal freeze thaw

45-2447
Transformation of the chemical composition of soil and ground waters in freezing swamps of the Slavyanka settlement. [Preobrazovanie khimicheskogo sostava pochvenno-gruntovykh vod pri promerzanii bolot bolotnogo massiva u pos. Slavianka],
Ivanov, A.V., et al, Resursy bolot SSSR i puti ikh ispol'zovaniia. Sbornik nauchnykh trudov (Resources of USSR swamps and ways of utilizing them. Collected scientific works). Edited by S.E. Vomperskiĭ and IU.S. Prozorov, Khabarovsk, Dal'nevostochnoe otdelenie AN SSSR, 1989, p.149-154, In Russian. 13 refs.
Shesterkin, V.P.
Ground water, Water chemistry, Ice composition, Swamps, Chemical composition, USSR—Kazakhstan.

45-2448
Regionalization of avalanche-prone territories of the USSR according to types of avalanche regime. [Raĭonirovanie lavinoopasnykh territoriĭ SSSR po tipam lavinnogo rezhima],
Troshkina, E.S., *Moscow. Universitet. Vestnik. Seriia 5: geografiia*, Jan.-Feb. 1991, No.1, p.48-55, In Russian. 12 refs.
Avalanche formation, Avalanche forecasting, Avalanche mechanics, USSR.

45-2449
Arctic tundra rehabilitation: observations of progress and benefits to Alaska.
McKendrick, J.D., *Agroborealis*, Jan. 1991, 23(1), p.29-40, 19 refs.
Tundra, Land reclamation, Revegetation, Petroleum industry, Environmental impact, Environmental protection, United States—Alaska.

45-2450
Strip mine reclamation and Alaska's big game wildlife.
Elliott, C.L., et al, *Agroborealis*, Jan. 1991, 23(1), p.41-44, 18 refs.
McKendrick, J.D.
Tundra, Land reclamation, Revegetation, Mining, United States—Alaska.

45-2451
From boreal forest to reclaimed site: revegetation at the Usibelli Coal Mine.
Helm, D.J., *Agroborealis*, Jan. 1991, 23(1), p.45-50.
Tundra, Land reclamation, Revegetation, Mining, United States—Alaska.

45-2452
Building a worldwide roofing community.
International Symposium on Roofing Technology, 3rd, 1991, Rosemont, IL, National Roofing Contractors Association, 1991, 536p., Refs. passim. For selected papers see 45-2453 through 45-2466.
Kocich, F., ed.
Roofs, Meetings, Thermal insulation, Cold stress, Temperature effects, Bitumens, Polymers.

45-2453
Single-ply membranes: effect of cold temperatures and heat aging on tensile properties.
Turenne, R.G., et al, International Symposium on Roofing Technology, 3rd, 1991. Proceedings. Building a worldwide roofing community, Rosemont, IL, National Roofing Contractors Association, 1991, p.7-14.
Stenman, H.K., Mech, M.N., Dutt, O.
Roofs, Thermal insulation, Cold stress, Tensile properties, Temperature effects, Viscoelastic materials, Polymers.

45-2454
***Fatigue endurance program* for classification of built-up roofing.**
Bonafont, R.L., International Symposium on Roofing Technology, 3rd, 1991. Proceedings. Building a worldwide roofing community, Rosemont, IL, National Roofing Contractors Association, 1991, p.26-32, 5 refs.
Roofs, Computer programs, Fatigue (materials), Thermal insulation, Cold stress.

45-2455
Effects of hail on residential roofing products.
Koontz, J.D., International Symposium on Roofing Technology, 3rd, 1991. Proceedings. Building a worldwide roofing community, Rosemont, IL, National Roofing Contractors Association, 1991, p.206-215, 4 refs.
Roofs, Hail, Impact strength.

45-2456
Durability assessment of roofing membranes.
Beech, J.C., International Symposium on Roofing Technology, 3rd, 1991. Proceedings. Building a worldwide roofing community, Rosemont, IL, National Roofing Contractors Association, 1991, p.227-233, 12 refs.
Roofs, Thermal insulation, Fatigue (materials), Cold stress.

45-2457
Practical experience in design, application and field performance of roofing in developing countries: the special case of Argentina.
Lopez Diaz, M.P., et al, International Symposium on Roofing Technology, 3rd, 1991. Proceedings. Building a worldwide roofing community, Rosemont, IL, National Roofing Contractors Association, 1991, p.246-253, 8 refs.
Oroz, A.
Roofs, Climatic factors, Argentina.

45-2458
Studies into aging of the roofing coatings on the basis of chlorosulfopolyethylene and forecasting of their durability.
Shul'zhenko, IU.P., et al, International Symposium on Roofing Technology, 3rd, 1991. Proceedings. Building a worldwide roofing community, Rosemont, IL, National Roofing Contractors Association, 1991, p.327-334, 20 refs.
Poluianov, A.F.
Roofs, Thermal insulation, Cold stress, Bitumens.

45-2459
Field experiences versus standards and designs.
Booth, R.J., et al, International Symposium on Roofing Technology, 3rd, 1991. Proceedings. Building a worldwide roofing community, Rosemont, IL, National Roofing Contractors Association, 1991, p.351-355, 18 refs.
Minialoff, J.M., Murphy, M.
Roofs, Thermal insulation, Cold weather construction, Bitumens, Standards, Canada.

45-2460
Outdoor construction test facility, Saskatoon, Canada.
Hedlin, C.P., International Symposium on Roofing Technology, 3rd, 1991. Proceedings. Building a worldwide roofing community, Rosemont, IL, National Roofing Contractors Association, 1991, p.377-381, 6 refs.
Roofs, Thermal insulation, Cold weather tests, Environment simulation.

45-2461
New wetting curves for common roof insulations.
Tobiasson, W., et al, MP 2866, International Symposium on Roofing Technology, 3rd, 1991. Proceedings. Building a worldwide roofing community, Rosemont, IL, National Roofing Contractors Association, 1991, p.383-390, 11 refs.
Greatorex, A., Van Pelt, D.
Roofs, Thermal insulation, Moisture, Vapor pressure, Temperature effects, Thermal conductivity.
Specimens of common roof insulations were placed in an apparatus that maintained an air temperature of 4 C and 75% relative humidity (RH) above the insulation, and 29 C and 100% RH (or 70% RH) below. The specimens were periodically removed from this apparatus, weighted, wrapped in a thin plastic film and then tested in a thermal conductivity instrument with its top plate maintained at about 4 C and its bottom plate at about 29 C. After a specimen's insulating ability was determined in this instrument according to the ASTM C 518-76 procedure, it was returned to the apparatus for further wetting. Some insulations accumulated moisture rapidly, but others gained very little moisture even after years of testing. The ratio of a material's wet thermal resistivity to its dry thermal resistivity, expressed as a percentage, is termed its thermal resistance ratio (TRR). As moisture accumulates in a material, its TRR decreases. Graphs of TRR vs. moisture content were developed for fiberboard, perlite, cork, gypsum, insulating concrete, cellular glass, fibrous glass, expanded polystyrene, extruded polystyrene, urethane isocyanurate, foamed-in-place urethane and phenolic insulations. TRR vs. moisture content equations have also been developed for each material. Insulation with a TRR of 80% or less is deemed 'wet' and unacceptable. The moisture content at which the TRR equals 80% is tabulated for these materials.

45-2462
Attic testing at the Roof Research Center—initial results.
Wilkes, K.E., et al, International Symposium on Roofing Technology, 3rd, 1991. Proceedings. Building a worldwide roofing community, Rosemont, IL, National Roofing Contractors Association, 1991, p.391-400, 4 refs.
Wendt, R.L., Delmas, A., Childs, P.W.
Roofs, Thermal insulation, Cold weather tests, Environment simulation.

45-2463
***Analysis of modified bitumen roofing materials* using the stiffness modulus.**
Norris, R.E., et al, International Symposium on Roofing Technology, 3rd, 1991. Proceedings. Building a worldwide roofing community, Rosemont, IL, National Roofing Contractors Association, 1991, p.401-417, 10 refs.
Alumbaugh, R.L., Humm, E.F., Monismith, C.L.
Bitumens, Roofs, Strain tests, Temperature effects.

45-2464
Cold weather roofing application.
Stoll, J.W., International Symposium on Roofing Technology, 3rd, 1991. Proceedings. Building a worldwide roofing community, Rosemont, IL, National Roofing Contractors Association, 1991, p.418-422, 3 refs.
Roofs, Cold weather construction.

45-2465
Glass transitions in polymeric roofing membranes—determination by dynamic mechanical analysis.
Dutt, O., et al, International Symposium on Roofing Technology, 3rd, 1991. Proceedings. Building a worldwide roofing community, Rosemont, IL, National Roofing Contractors Association, 1991, p.495-501, 11 refs.
Paroli, R.M., Mailvaganam, N.P., Turenne, R.G.
Roofs, Thermal insulation, Cold stress, Polymers, Temperature effects.

45-2466
Application of thermal analysis to the characterization of EPDM roofing membrane materials after exposure in service.
Gaddy, G.D., et al, International Symposium on Roofing Technology, 3rd, 1991. Proceedings. Building a worldwide roofing community, Rosemont, IL, National Roofing Contractors Association, 1991, p.502-507, 15 refs.
Rossiter, W.J., Jr., Eby, R.K.
Roofs, Thermal insulation, Cold stress, Polymers, Thermal analysis.

45-2467
Infrared and mass spectral studies of proton irradiated H2O + CO2 ice: evidence for carbonic acid.
Moore, M.H., et al, *Spectrochimica acta*, 1991, 47A(2), p.255-262, 23 refs.
Khanna, R.K.
Ice spectroscopy, Films, Molecular structure, Spectra, Chemical analysis, Infrared spectroscopy, Extraterrestrial ice, Low temperature research, Carbon dioxide.

45-2468
Comparisons between lakes and seas during the arctic winter.
Welch, H., *Arctic and alpine research*, Feb. 1991, 23(1), Circumpolar Ecosystems in Winter: a Symposium and Workshop, Churchill, Manitoba, Canada, Feb. 16-21, 1990. Edited by P.A. Scott and K.A. Salzberg, p.11-23, Refs. p.21-23.
Frozen lakes, Oceans, Ice cover effect, Winter, Ecosystems, Ice water interface, Ice composition, Salinity, Photosynthesis, Freezeup.

45-2469
Impacts of Hudson Bay on the terrestrial climate of the Hudson Bay Lowlands.
Rouse, W.R., *Arctic and alpine research*, Feb. 1991, 23(1), Circumpolar Ecosystems in Winter: a Symposium and Workshop, Churchill, Manitoba, Canada, Feb. 16-21, 1990. Edited by P.A. Scott and K.A. Salzberg, p.24-30, 19 refs.
Climatic factors, Sea ice distribution, Ice cover effect, Air temperature, Heat balance, Wind factors, Air masses, Evapotranspiration, Climatic changes, Canada—Hudson Bay.

45-2470
Influence of a simulated transport corridor on snowpack characteristics, Fort Norman, N.W.T., Canada.
Kershaw, G.P., *Arctic and alpine research*, Feb. 1991, 23(1), Circumpolar Ecosystems in Winter: a Symposium and Workshop, Churchill, Manitoba, Canada, Feb. 16-21, 1990. Edited by P.A. Scott and K.A. Salzberg, p.31-40, 25 refs.
Subpolar regions, Site surveys, Snow thermal properties, Snow depth, Forest canopy, Topographic effects, Snow cover stability, Sampling, Permafrost heat balance, Snow density, Wind factors, Canada—Northwest Territories.

45-2471
Snowpack and the subnivean environment for different aspects of an open meadow in Jackson Hole, Wyoming, U.S.A.
Auerbach, N.A., et al, *Arctic and alpine research*, Feb. 1991, 23(1), Circumpolar Ecosystems in Winter: a Symposium and Workshop, Churchill, Manitoba, Canada, Feb. 16-21, 1990. Edited by P.A. Scott and K.A. Salzberg, p.41-44, 10 refs.
Halfpenny, J.C.
Snow depth, Snow cover structure, Snow cover effect, Meadow soils, Ecosystems, Soil temperature, Temperature gradients, Sampling, Pits (excavation), United States—Wyoming.

45-2472
Effect of abiotic factors on the overwintering success in the meadow vole *Microtus pennsylvanicus*: winter redefined.
Courtin, G.M., et al, *Arctic and alpine research*, Feb. 1991, 23(1), Circumpolar Ecosystems in Winter: a Symposium and Workshop, Churchill, Manitoba, Canada, Feb. 16-21, 1990. Edited by P.A. Scott and K.A. Salzberg, p.45-52, 17 refs.
Kalliomaki, N.M., Hillis, T., Robitaille, R.L.
Animals, Survival, Winter, Snow cover effect, Snow accumulation, Radiation absorption, Metamorphism (snow), Seasonal variations, Temperature effects.

45-2473
Holocene soligenous fens on a high arctic fault block, northern Ellesmere Island (82 deg N), N.W.T., Canada.
LaFarge-England, C., et al, *Arctic and alpine research*, Feb. 1991, 23(1), Circumpolar Ecosystems in Winter: a Symposium and Workshop, Churchill, Manitoba, Canada, Feb. 16-21, 1990. Edited by P.A. Scott and K.A. Salzberg, p.80-98, 54 refs.
Vitt, D.H., England, J.E.
Arctic landscapes, Peat, Soil analysis, Fossils, Paleoecology, Radioactive age determination, Stratigraphy, Mosses, Organic soils, Canada—Northwest Territories—Ellesmere Island.

45-2474
Cellular slime molds in soils of Alaskan tundra, U.S.A.
Stephenson, S.L., et al, *Arctic and alpine research*, Feb. 1991, 23(1), Circumpolar Ecosystems in Winter: a Symposium and Workshop, Churchill, Manitoba, Canada, Feb. 16-21, 1990. Edited by P.A. Scott and K.A. Salzberg, p.104-107, 8 refs.
Landolt, J.C., Laursen, G.A.
Soil microbiology, Tundra, Soil analysis, Sampling, Fungi, Ecosystems.

45-2475
Date of snowmelt at Barrow, Alaska, U.S.A.
Dutton, E.G., et al, *Arctic and alpine research*, Feb. 1991, 23(1), Circumpolar Ecosystems in Winter: a Symposium and Workshop, Churchill, Manitoba, Canada, Feb. 16-21, 1990. Edited by P.A. Scott and K.A. Salzberg, p.115-119, 10 refs.
Endres, D.J.
Snowmelt, Periodic variations, Tundra, Radiometry, Albedo, Climatic changes, Heat balance, Meteorological data, United States—Alaska—Barrow.

45-2476
Supergene corundum in the Quaternary permafrost of Yakutia.
Zigert, Kh., et al, *Akademiia nauk SSSR. Doklady. Earth science sections*, Aug. 1990, 305(1-6), p.155-159, 11 refs. For Russian original see 43-4188.
Quaternary deposits, Frozen rocks, Minerals, Permafrost weathering, Cryogenics, Geocryology.

45-2477
Microwave-emitting properties of various types of underlying surface at below-zero temperatures.
Kondrat'ev, K.IA., et al, *Akademiia nauk SSSR. Doklady. Earth science sections*, Jan. 1991, 306(1-6), p.7-9, 9 refs. For Russian original see 44-180.
Melent'ev, V.V., Aleksandrov, V.IU.
River ice, Ice cover thickness, Microwaves, Sounding, Snow depth, Dielectric properties, Snow cover effect, Remote sensing.

45-2478
Maximum advance of the Scandinavian ice sheet onto the shelf of the Barents Sea in Valday time.
Dunaev, N.N., et al, *Akademiia nauk SSSR. Doklady. Earth science sections*, Jan. 1991, 306(1-6), p.70-73, 14 refs. For Russian original see 44-979.
Levchenko, O.V., Merklin, L.R., Pavlidis, IU.A.
Glaciation, Pleistocene, Ice shelves, Marine geology, Ice edge, Ice sheets, Glacier oscillation, Barents Sea.

45-2479
Cryogenic diagenesis as the cause of ice deposits in arctic marine sediments.
Danilov, I.D., *Akademiia nauk SSSR. Doklady. Earth science sections*, Jan. 1991, 306(1-6), p.78-80, 4 refs. For Russian original see 44-163.
Marine deposits, Bottom sediment, Bottom ice, Diagenesis, Geocryology, Springs (water), Hydrogeology.

45-2480
Two types of catastrophic glacial advance.
Kazanskiĭ, A.B., *Akademiia nauk SSSR. Doklady. Earth science sections*, Jan. 1991, 306(1-6), p.193-195, 9 refs. For Russian original see 43-4398.
Mountain glaciers, Glacier surges, Glacier mass balance, Periodic variations, Glacier flow.

45-2481
Thermodynamic estimation of the supercooling temperature of water on the basis of a two-structure model.
Maliarenko, V.V., *Soviet progress in chemistry*, 1989, 55(8), p.26-29, Translated from Ukrainskii khimicheskii zhurnal. 6 refs.
Water structure, Supercooling, Water temperature, Phase transformations, Thermodynamics, Ice formation, Molecular structure, Hydrogen bonds.

45-2482
Moraine formation in northwestern Ontario: product of subglacial fluvial and glaciolacustrine sedimentation.
Sharpe, D.R., et al, *Canadian journal of earth sciences*, Nov. 1990, 27(11), p.1478-1486, With French summary. 42 refs.
Cowan, W.R.
Moraines, Glacial lakes, Sedimentation, Pleistocene, Glacier melting, Subglacial drainage, Water level, Lake bursts.

45-2483
Altitude calculation of climatic snowlines and their changing rules in China.
Wu, X.H., et al, *Chinese science bulletin*, Jan. 1991, 36(1), p.56-60, 7 refs.
Zhu, Y.Z.
Snow line, Distribution, Altitude, Climatic factors, Paleoclimatology, Snow accumulation, China.

45-2484
Determination of ice sublimation and sputtering yields by reflectance measurements.
Spinella, F., et al, *Radiation effects and defects in solids*, Jan. 1991, 15(4), p.307-313, 11 refs.
Baretta, G.A., Strazzulla, G., Torrisi, L.
Ice formation, Ice sublimation, Lasers, Light scattering, Ice temperature, Ice physics, Extraterrestrial ice, Ice erosion.

45-2485
Dielectric studies of the transition of ice Ih to ice XI.
Zaretskii, A.V., et al, *Philosophical magazine B*, Mar. 1991, 63(3), p.757-768, 16 refs.
Howe, R., Whitworth, R.W.
Doped ice, Ice relaxation, Ice physics, Hydrogen bonds, Dielectric properties, Phase transformations, Molecular structure, Electrical measurement, Ion exchange.

45-2486
Logistic support of United States research in Greenland: current situation and prospects.
U.S. Arctic Research Commission, *U.S. Arctic Research Commission. Findings and recommendations*, Dec. 1990, No.6, 20p.
Research projects, Logistics, International cooperation, Greenland.

45-2487
Lubricants at low temperatures.
Diemand, D., *U.S. Army Cold Regions Research and Engineering Laboratory*, Dec. 1990, TD 90-01, 24p., ADA-234 536, 21 refs.
Lubricants, Low temperature tests, Cold weather performance, Temperature effects.

45-2488
High-temperature penetrometer for boring ice and rocks by melting. [Vysokotemperaturnyĭ penetrator dlia bureniia l'dov i gornykh porod plavleniem].
Kudriashov, B.B., et al, *Antarktika; doklady komissii*, 1990, No.29, p.66-73, In Russian with English abstract. 2 refs.
Litvinenko, V.S.
Thermal drills, Rock drilling, Borehole instruments, Frozen rocks.
The melting method used in boring deep boreholes in ice is found to be very efficient in antarctic conditions. A high temperature penetrometer, which was developed and tested for the above purpose, is described and illustrated. It is found to be reliable and durable, and can also be used for boring holes by melting in a variety of rocks

45-2489
Borehole gas sampler operation control and methods of gas sampling in ice sheets. [Upravlenie rabotoĭ skvazhinnogo gazovogo probootbornika i metodika otbora gazovykh prob iz ledovykh tolshch].
Zemtsov, A.A., et al, *Antarktika; doklady komissii*, 1990, No.29, p.73-79, In Russian with English summary. 5 refs.
Mitin, S.V., Shkurko, A.M.
Radioactive age determination, Ice dating, Core samplers, Antarctica—Vostok Station.
Experimental investigations are discussed concerning a borehole gas sampler used at Vostok Station for the determination of absolute age of glacier ice by the radiocarbon method. The apparatus and its operation are described and illustrated.

45-2490
Antarctic ice cover dynamic activity zones in the Vostok Station region. [Zony dinamicheskoĭ aktivnosti v lednikovom pokrove Antarktidy v ralone st. Vostok].
Blinov, K.V., et al, *Antarktika; doklady komissii*, 1990, No.29, p.79-89, In Russian with English summary. 16 refs.
Markov, A.N.
Paleoclimatology, Glacier flow, Dynamic properties, Rheology, Antarctica—Vostok Station.
The analysis of inclinometric measurements of the deep borehole at Vostok Station, obtained in 1980-1986, made it possible to distinguish several zones varying both in velocity and direction of ice displacement within the thickness of the glacier. The method of distinguishing such zones of abnormal dynamic activity within the ice cover by inclinometric monitoring is proposed. Comparison of the results with the isotope-oxygen analysis data proved their correlation, thus testifying to the connection between the climatic changes and the formation of ice layers with different dynamic qualities. (Auth.)

45-2491
Role of icebergs in terrigenous sedimentation in the world ocean. [O roli aĭsbergov v terrigennom osadkoobrazovanii Mirovogo okeana].
Vasil'ev, V.P., *Antarktika; doklady komissii*, 1990, No.29, p.113-119, In Russian with English summary. 19 refs.
Icebergs, Glacial deposits, Moraines.
Terrigenous clastic material transportation from recent glacial areas to the world ocean is discussed. Results of ice shelf drilling showed the lack of clastic material in the bottom layers of the ice sheet flowing into the ocean, probably due to the peculiarities of the ice sheet dynamics and thermophysics. Bottom melting is caused by geothermal heat flow (in the central part of the ice sheet) and ice friction at the bed (in the peripheral parts). It was calculated that the thickness of the ice bottom layer, which annually melts in peripheral areas of the continent, is 7.5 m, i.e. the whole bottom moraine-bearing layer is melting. Clastic material released as the result of this melting is partly accumulated in the hollows of the sub-ice topography and is partly transported to the shelf as a sediment discharge of the subglacial melting streams. Thus the interice beds and lenses of the moraine located 5-10 m above the continental ice sheet basement are the main source of clastic material transported to the ocean sedimentation areas within icebergs. (Auth.)

45-2492
Bank recession and channel changes near dikes on the Tanana River, Alaska.
Gatto, L.W., MP 2867, D.B. Simons Symposium on Erosion and Sedimentation. Proceedings. Edited by R.M. Li and P.F. Lagasse, American Society of Civil Engineers, 1983, p.4.2-4.21, 8 refs.
Water erosion, Channels (waterways), Banks (waterways), Bank protection (waterways), Rivers, United States—Alaska—Tanana River.
Two dikes were built from the Tanana River levee into the Tanana River in 1975 and 1979 as part of a flood control project. New dikes will be constructed wherever it appears likely that bank recession will encroach into the 500 ft safe zone between the levee and the north bank of the river. The objectives of this analysis were to measure linear bank recession and bank land lost, to evaluate relationships between bank erosion and dike construction, and to describe channel changes before and after construction. Aerial photographs were used to map historical bankline positions and to document channel changes from 1948 to 1982. Most bank recession near the dikes occurred along the north channel prior to construction. After construction the dikes diverted flows away from the north bank, and bank erosion increased along the islands and south bank. Both dikes effectively reduced north bank erosion at sites immediately downstream. However, it appears that this solution may be temporary. The river is re-establishing its preconstruction length in the reaches where the dikes were built by forming meanders at the ends of the dikes. The river is again attacking the north bank downstream of the preconstruction locations, and erosion rates at some of these new sites are high.

45-2493
Formation of relief, correlated deposits and placers in northeastern USSR. Collected scientific works. [Formirovanie rel'efa, korreliatnykh otlozhenii i rossypei Severo-Vostoka SSSR. Sbornik nauchnykh trudov],
Ivanov, V.F., ed, Magadan, SVKNII DVI AN SSSR, 1989, 156p., In Russian. For selected papers see 45-2494 through 45-2500.
Palymskii, B.F., ed.
Pleistocene, Ground ice, Glacial deposits, Geocryology, Glaciation.

45-2494
Vegetation and climate of the Malyk-Siyensk region in the early Pleistocene (Kolyma highlands). [Rastitel'nost' i klimat Malyk-Sienskogo raĭona v rannem pleĭstotsene (Kolymskoe nagor'e)],
Prokhorova, T.P., Formirovanie rel'efa, korreliatnykh otlozhenii i rossypei Severo-Vostoka SSSR. Sbornik nauchnykh trudov (Formation of relief, correlated deposits and placers in northeastern USSR. Collected scientific works). Edited by V.F. Ivanov and B.F. Palymskii, Magadan, SVKNII DVI AN SSSR, 1989, p.10-20, In Russian. 6 refs.
Vegetation, Climate, Pleistocene, Ground ice, Air temperature.

45-2495
History of the development of the relief of northern Chukotka. [K istorii razvitiia rel'efa Severnoĭ Chukotki],
Glushkova, S.IU., et al, Formirovanie rel'efa, korreliatnykh otlozhenii i rossypei Severo-Vostoka SSSR. Sbornik nauchnykh trudov (Formation of relief, correlated deposits and placers in northeastern USSR. Collected scientific works). Edited by V.F. Ivanov and B.F. Palymskii, Magadan, SVKNII DVI AN SSSR, 198[illegible] p.73-88, In Russian. 14 refs.
Smirnov, V.N.
River basins, Landscape development, Glaciation, Glacial deposits, Moraines, USSR--Chukotskiy Peninsula.

45-2496
Experiment in using satellite photography for geomorphological and paleogeographical investigations of Late Pleistocene glaciation areas in northeast USSR. [Opyt ispol'zovaniia kosmicheskikh snimkov v geomorfologicheskikh i paleogoegraficheskikh issledovaniiakh raĭonov pozdnepleĭstotsenovykh oledeneniĭ na Severo-Vostoke SSSR],
Glushkova, O.IU., Formirovanie rel'efa, korreliatnykh otlozhenii i rossypei Severo-Vostoka SSSR. Sbornik nauchnykh trudov (Formation of relief, correlated deposits and placers in northeastern USSR. Collected scientific works). Edited by V.F. Ivanov and B.F. Palymskii, Magadan, SVKNII DVI AN SSSR, 1989, p.89-101, In Russian. 10 refs.
Spaceborne photography, Geomorphology, Glaciation, Geocryology, Landscape development, Glacier ice, Pleistocene.

45-2497
Pleistocene glaciations of the Cherskiy mountain system and their effects on the development of the river network. [Pleistotsenovye oledeneniia gornoĭ sistemy Cherskogo i ikh vliianie na razvitie rechnoĭ seti],
Krutous, V.I., et al, Formirovanie rel'efa, korreliatnykh otlozhenii i rossypei Severo-Vostoka SSSR. Sbornik nauchnykh trudov (Formation of relief, correlated deposits and placers in northeastern USSR. Collected scientific works). Edited by V.F. Ivanov and B.F. Palymskii, Magadan, SVKNII DVI AN SSSR, 1989, p.102-112, In Russian. 20 refs.
Kyshtymov, A.I.
Pleistocene, Glaciation, Glacial rivers, Glacial deposits.

45-2498
Facies changes and permafrost conditions during the formation of Upper Quaternary deposits of the Mayn River valley (Chukotka). [Merzlotno-fatsial'nye usloviia formirovaniia verkhnechetvertichnykh otlozhenii doliny r.Maĭn (Chukotka)],
Kotov, A.N., et al, Formirovanie rel'efa, korreliatnykh otlozhenii i rossypei Severo-Vostoka SSSR. Sbornik nauchnykh trudov (Formation of relief, correlated deposits and placers in northeastern USSR. Collected scientific works). Edited by V.F. Ivanov and B.F. Palymskii, Magadan, SVKNII DVI AN SSSR, 1989, p.117-131, In Russian. 9 refs.
Lozhkin, A.V., Riabchun, V.K.
Quaternary deposits, Valleys, Geocryology, Permafrost, Cryogenic structures, Ground ice.

45-2499
Recurrent infiltration ice on the northern shore of the Sea of Okhotsk. [Povtorno-infil'tratsionnye l'dy severnogo poberezh'ia Okhotskogo moria],
Meshkov, A.P., et al, Formirovanie rel'efa, korreliatnykh otlozhenii i rossypei Severo-Vostoka SSSR. Sbornik nauchnykh trudov (Formation of relief, correlated deposits and placers in northeastern USSR. Collected scientific works). Edited by V.F. Ivanov and B.F. Palymskii, Magadan, SVKNII DVI AN SSSR, 1989, p.132-136, In Russian.
Skorodumov, I.N.
Ground ice, Peat, Ice formation, Boreholes.

45-2500
Mineral composition of Late Pleistocene cryolithogenic deposits of the Mayn River valley. [Mineral'nyĭ sostav pozdnepleĭstotsenovykh kriolitogennykh otlozhenii doliny r. Maĭn],
Kotov, A.N., et al, Formirovanie rel'efa, korreliatnykh otlozhenii i rossypei Severo-Vostoka SSSR. Sbornik nauchnykh trudov (Formation of relief, correlated deposits and placers in northeastern USSR. Collected scientific works). Edited by V.F. Ivanov and B.F. Palymskii, Magadan, SVKNII DVI AN SSSR, 1989, p.152-156, In Russian. 5 refs.
Riabchun, V.K.
Pleistocene, Glacial deposits, Microelement content, Minerals, Valleys, Cryogenic structures.

45-2501
Effect of Cenozoic ice sheet fluctuations in Antarctica on the stratigraphic signature of the Neogene.
Bartek, L.R., et al, *Journal of geophysical research*, Apr. 10, 1991, 96(B4), p.6753-6778, Refs. p.6775-6778.
Vail, P.R., Anderson, J.B., Emmet, P.A., Wu, S.
Ice shelves, Ice sheets, Glacier ice, Glacial geology, Glacial deposits, Antarctica—Ross Sea.
Stratigraphic successions from the Gulf of Mexico-offshore Alabama, northeast Java-Indonesia, Ross Sea-Antarctica, and several other continental margins have been examined. All are characterized by very similar Neogene stratal geometries. The interregional character of the Neogene stratal signature and its similarity to the stratal geometry found in seismic data from the Ross Sea continental shelf suggest that the Neogene stratal signature is a manifestation of glacioeustatic fluctuations. A review of the literature and an analysis of recently acquired and published data indicate that the first major ice sheet grounding event in the Ross Sea occurred during middle to late Oligocene time. The Ross Sea is the repository for ice flowing from a major portion of the continental interior. Thus the glacial record of the Ross Sea should serve as a gage of ice volume changes on the continent that were large enough to influence global eustasy. The ice advance onto the Ross Sea continental shelf during middle to late Oligocene time may have been the result of a decrease in the rate of shelf subsidence as rifting in the Ross Sea slowed or ceased. Advance of the ice sheet resulted in widespread erosion of the continental shelf and shelf overdeepening. It is hypothesized that metastable, marine-based ice sheets have waxed and waned on the antarctic continental shelf since at least the Oligocene and that these waxing and waning events were responsible for the development of a global Neogene stratigraphic signature. (Auth. mod.)

45-2502
Tertiary ice sheet dynamics: the snow gun hypothesis.
Prentice, M.L., et al, *Journal of geophysical research*, Apr. 10, 1991, 96(B4), p.6811-6827, Refs. p.6825-6827.
Matthews, R.K.
Ice cover thickness, Glacial geology, Ice water interface, Paleoclimatology, Glacier ablation.
Strong negative correlation is noted between Tertiary low- to mid-latitude planktonic foraminiferal delta O-18 and the difference between these data and coeval benthic foraminiferal delta O-18. Late Quaternary data do not show this correlation. Coupling statistical model/delta O-18 comparisons and evidence for antarctic ice and ocean temperature variation, it is inferred that Tertiary ice volume, recorded by tropical planktonic delta O-18, increased as the deep ocean warmed. Because the isotopic signatures of deepwater temperature variation and ice volume change were of opposite sign, the sum of these signals in Tertiary benthic delta O-18 became lost in the noise. This renders low correlation between Tertiary planktonic and benthic delta O-18 time series compared to late Quaternary data. It is contended that Tertiary ice sheet growth was commonly driven by warming of deep water from low- to mid-latitude marginal seas (snow gun hypothesis). In contrast, late Quaternary ice sheets grew as deep water, formed at high latitude, cooled. Because tectonic forcing and orbital forcing at low-latitude primarily controlled production and temperature variations of this Warm Saline Deep Water, these influences largely dictated Tertiary ice volume fluctuations. Through the Tertiary, it is inferred that ice volume fluctuations were an important component of sea level history on timescales between 1,000 and 10,000,000 years. (Auth.)

45-2503
Unlocking the ice house: Oligocene-Miocene oxygen isotopes, eustasy, and margin erosion.
Miller, K.G., et al, *Journal of geophysical research*, Apr. 10, 1991, 96(B4), p.6829-6848, Refs. p.6845-6848.
Wright, J.D., Fairbanks, R.G.
Glacial geology, Glacial erosion, Oxygen isotopes, Sea level, Ice cover thickness.
Oxygen isotope records and glaciomarine sediments indicate at least an intermittent presence of large continental ice sheets on Antarctica since the earliest Oligocene (c. 35 Ma). The growth and decay of ice sheets during the Oligocene to modern "ice house world" caused glacioeustatic sea level changes. The early Eocene was an ice-free "greenhouse world," but it is not clear if ice sheets existed during the middle to late Eocene "doubt house world." Benthic foraminiferal delta O-18 records place limits on the history of glaciation, suggesting the presence of ice sheets at least intermittently since the earliest Oligocene. The best indicator of ice growth is a coeval increase in global benthic and western equatorial planktonic delta O-18 records. Benthic foraminiferal delta O-18 increases which are associated with the bases of Zones Oi1 (c. 35.8 Ma), Oi2 (c. 32.5 Ma), and Mi1 (c. 23.5 Ma) can be linked with delta O-18 increases in subtropical planktonic foraminifera and with intervals of glacial sedimentation on or near Antarctica. (Auth. mod.)

45-2504
Flow band model of the Ross Ice Shelf, Antarctica: response to CO2-induced climatic warming.
Lingle, C.S., et al, *Journal of geophysical research*, Apr. 10, 1991, 96(B4), p.6849-6871, Refs. p.6870-6871.
Schilling, D.H., Fastook, J.L., Paterson, W.S.B., Brown, T.J.
Ice shelves, Flow rate, Ice models, Glacier oscillation, Carbon dioxide, Antarctica—Ross Ice Shelf.
A time-dependent model is applied to the Ross Ice Shelf flow band discharging ice stream B, West Antarctica. The model includes the effects of temperature, depth-dependent density, and backpressure from the coasts of the Ross embayment and Crary Ice Rise. Data from the Ross Ice Shelf Geophysical and Glaciological Survey and the Siple Coast Project are used as input. Accuracy and stability are verified by reproducing the flow band for 10,000 model years with equilibrium distributions of accumulation, surface temperature, and basal balance. The response of the ice shelf to three climatic scenarios that may result from increasing carbon dioxide and trace greenhouse gases is simulated. The results range from slight thickening with moderately increased backpressure in the grounding zone to rapid thinning accompanied by rapidly decreasing backpressure during 175- to 600-year simulations, depending primarily upon whether increasing surface temperatures and accumulation rates are accompanied by increased rates of basal melting. The central ice shelf, about 400 km upglacier from the calving front, thins by 22% in 600 years when basal melting is increased linearly to a maximum of 0.5 m/yr after 150 years, then holds steady. The ice shelf thins by 40% in 175 years at the same location when basal melting is increased linearly to 2.0 m/yr after 150 years, then holds steady. The present calculated equilibrium rate of basal melting, averaged over the bottom surface of the flow band, is 0.17 m/yr. (Auth. mod.)

45-2505
Marine transgression, shoreline emergence: evidence in seabed and terrestrial ground temperatures of changing relative sea levels, Arctic Canada.
Taylor, A.E., *Journal of geophysical research*, Apr. 10, 1991, 96(B4), p.6893-6909, Refs. p.6908-6909.
Sea level, Shoreline modification, Soil temperature, Surface temperature, Subsea permafrost.

45-2506
Investigative report on the observation characteristics of radar rain and snow gages. [Reda usetsu ryokei no kansoku tokusei ni kansuru chosa hokoku],
Takahashi, T., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1987 (Pub. Feb. 88), No.31, p.53-58, In Japanese.
Baba, H., Ipposhi, T.
Precipitation gages, Snowfall, Radar echoes.

45-2507
Study on environmental protection of salt lakes in cold regions; hydrology and water quality of Lake Saroma. [Kanreichi ken'iki no kaisekiko ni okeru kankyo hozen ni kansuru kenkyu; Saroma-ko no suiri suishitsu tokusei ni tsuite],
Takeuchi, T., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1987 (Pub. Feb. 88), No.31, p.65-70, In Japanese.
Miyamoto, Y., Sakata, T., Masuda, T.
Salt lakes, Water pollution, Environmental protection, Lake water, Water chemistry, Hydrology, Japan—Saroma, Lake.

45-2508
Efficiency of ducts for cold protection and preservation. [Bokan yojo ni okeru dakuto no koyo ni tsuite],
Sasaki, O., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1987 (Pub. Feb. 88), No.31, p.71-76, In Japanese.
Nakano, H., Abe, H., Saito, T.
Concrete heating, Frost protection, Ventilation, Winter concreting.

45-2509
Frost resistance of lightweight concrete. [Keiryo konkurito no taitogaisei ni tsuite],
Uozumi, K., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1987 (Pub. Feb. 88), No.31, p.83-86, In Japanese.
Ohashi, T.
Lightweight concretes, Frost resistance.

45-2510
Work report on special pavements; status of paved road surfaces in winter. [Tokushu hoso no koji hokoku; tokikan ni okeru hoso romen jokyo],
Nakamura, T., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1987 (Pub. Feb. 88), No.31, p.149-154, In Japanese.
Nakagawa, T., Matsuda, T., Yoshikawa, T.
Pavements, Road maintenance, Winter maintenance, Frost resistance.

45-2511
Treatment of cracks in paved road surfaces. [Hoso romen ni okeru kurakku shori ni tsuite],
Ueno, M., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1987 (Pub. Feb. 88), No.31, p.155-158, In Japanese. 3 refs.
Asao, S., Uchida, T.
Pavements, Road maintenance, Winter maintenance.

45-2512
Effect of freeze thaw action on wear-resistant asphalt pavements. [Toketsu yukai sayo ga taimamo asufaruto hoso ni ataeru eikyo],
Tsukahara, K., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1987 (Pub. Feb. 88), No.31, p.159-164, In Japanese. 6 refs.
Kumagai, S., Sato, S., Hoshi, T.
Pavements, Frost action, Frost resistance, Freeze thaw tests, Road maintenance.

45-2513
***Countermeasures against frost heave on national* highways.** [Kokudo no tojo taisaku ni tsuite],
Saito, T., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1987 (Pub. Feb. 88), No.31, p.171-176, In Japanese. 2 refs.
Kumagai, S., Sato, S., Mizushima, T.
Frost heave, Road maintenance, Frost protection.

45-2514
Measuring blowing snow by visibility meters. [Shiteikei ni yoru hisetsuryo sokutei],
Nohara, T., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1987 (Pub. Feb. 88), No.31, p.189-192, In Japanese. 5 refs.
Takeuchi, M., Ishimoto, K., Fukuzawa, Y.
Blowing snow, Visibility, Precipitation gages, Snow optics.

45-2515
Measuring the efficiency of snow fences by vehicle-mounted blowing-snow counters. [Shasaikei fubukikei ni yoru bosetsusaku setchi koka no sokutei],
Ishimoto, K., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1987 (Pub. Feb. 88), No.31, p.193-196, In Japanese. 2 refs.
Takeuchi, M.
Blowing snow, Snow fences, Precipitation gages.

45-2516
Snow drainage ditches in Hokkaido. [Hokkaido ni okeru ryusetsuko ni tsuite],
Sakaguchi, K., *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1987 (Pub. Feb. 88), No.31, p.211-216, In Japanese. 7 refs.
Snow removal, Drains, Road maintenance.

45-2517
Snow drainage ditches as winter (severe winter) countermeasures in Shimokawa. [Shimokawa ryusetsuko toki (gentoki) shiyo taisaku ni tsuite],
Yoshikawa, M., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1987 (Pub. Feb. 88), No.31, p.217-222, In Japanese. 3 refs.
Watanabe, M., Yui, S.
Snow removal, Drains, Road maintenance, Winter maintenance.

45-2518
Snowmelt runoff forecasting system for the Rumoi River. [Rumoi-kawa yusetsu shussui yosoku shisutemu],
Hata, T., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1987 (Pub. Feb. 88), No.31, p.395-398, In Japanese.
Yamamoto, T., Amano, H.
Snowmelt, Runoff forecasting.

45-2519
Report on improving the accuracy of observations of flow in winter. [Toki ryuryo kansoku seido kojo ni kansuru hokoku],
Hiragaki, T., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1987 (Pub. Feb. 88), No.31, p.489-494, In Japanese. 2 refs.
Kizawa, K., Fujita, N.
River flow, Flow measurement, Flow rate, Water level, Winter, Seasonal variations.

45-2520
Snowmelt in converting mountain land into farmland (Part 3). [Kairyo sansei zoseibata ni okeru josetsusui (dai-3-ho)],
Sawada, N., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1987 (Pub. Feb. 88), No.31, p.837-842, In Japanese. 4 refs.
Onodera, Y., Hirota, T.
Snowmelt, Land development, Land reclamation, Agriculture.

45-2521
Tests on rotary snowplows (Continuation). [Rotari josetsu kikai ni kansuru chosa shiken (keizoku)], *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1987 (Pub. Feb. 88), No.31, p.1031-1048, In Japanese. 4 refs.
Snow removal, Road maintenance.

45-2522
Tests on the safety and efficiency of operation of sidewings for snow removal trucks. [Josetsu torakku no saidouingu sagyo no anzensei oyobi koritsuka ni kansuru chosa shiken],
Nakajima, J., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1987 (Pub. Feb. 88), No.31, p.1055-1060, In Japanese.
Ushiki, S., Itabashi, N.
Snow removal, Motor vehicles, Road maintenance.

45-2523
Tests on the efficiency of snow removal equipment for snow removal trucks. [Josetsu torakku no josetsu sochi no koritsuka ni kansuru chosa shiken],
Tsukagata, K., et al, *Hokkaido kaihatsukyoku gijutsu kenkyu happyokai koen gaiyoshu (Hokkaido Development Bureau Technical Research Meeting. Lecture summaries)*, 1987 (Pub. Feb. 88), No.31, p.1061-1064, In Japanese.
Itabashi, N., Nakajima, J.
Snow removal, Motor vehicles, Road maintenance.

45-2524
Net radiation model for calculating daily snowmelt in *open environments*.
Granger, R.J., et al, *Nordic hydrology*, 1990, 21(4-5), Northern Research Basins Symposium - Workshop, 8th, Abisko, Sweden, Mar 1990, p.217-234, 29 refs.
Gray, D.M.
Snowmelt, Radiation balance, Solar radiation, Mathematical models, Snow cover effect, Runoff forecasting, Albedo.

45-2525
Response of soil moisture change to hydrological processes in a continuous permafrost environment.
Woo, M.K., et al, *Nordic hydrology*, 1990, 21(4-5), Northern Research Basins Symposium Workshop, 8th, Abisko, Sweden, Mar. 1990, p.235-252, 20 refs.
Marsh, P.
Permafrost hydrology, Active layer, Soil water migration, Water balance, Moisture transfer, Hydrologic cycle.

45-2526
Evapotranspiration from a small Alaskan arctic watershed.
Kane, D.L., et al, *Nordic hydrology*, 1990, 21(4-5), Northern Research Basins Symposium Workshop, 8th, Abisko, Sweden, Mar. 1990, p.253-272, 42 refs.
Gieck, R.E., Hinzman, L.D.
Evapotranspiration, Watersheds, Water balance, Surface energy, Continuous permafrost, Heat balance.

45-2527
Climate, hydrology and vegetation patterns, Hot Weather Creek, Arctic Canada.
Edlund, S.A., et al, *Nordic hydrology*, 1990, 21(4-5), Northern Research Basins Symposium - Workshop, 8th, Abisko, Sweden, Mar. 1990, p.273-286, 19 refs.
Woo, M.K., Young, K.L.
Vegetation patterns, Climatic factors, Hydrologic cycle, Thermal regime, Arctic landscapes, Ground ice, Geobotanical interpretation, Canada—Northwest Territories—Ellesmere Island.

45-2528
Condensation of humidity onto a snow covered roof.
Nordell, B., *Nordic hydrology*, 1990, 21(4-5), Northern Research Basins Symposium Workshop, 8th, Abisko, Sweden, Mar. 1990, p.287-298, 17 refs.
Roofs, Snow loads, Condensation, Air flow, Computerized simulation, Design criteria.

45-2529
Difficulties in deducing temporal changes in precipitation chemistry from snow and ice cores: the spatial variability problem.
Metcalf, R.C., et al, *Nordic hydrology*, 1990, 21(4-5), Northern Research Basins Symposium - Workshop, 8th, Abisko, Sweden, Mar. 1990, p.299-316, 38 refs.
Peck, D.V.
Snow stratigraphy, Snow impurities, Chemical analysis, Accuracy, Precipitation (meteorology), Climatic changes, Air pollution.

45-2530
Review of techniques used by Canada and other northern countries for measurement and computation of streamflow under ice conditions.
Pelletier, P.M., *Nordic hydrology*, 1990, 21(4-5), Northern Research Basins Symposium Workshop, 8th, Abisko, Sweden, Mar. 1990, p.317-340, Refs. p.337-339.
Stream flow, Velocity measurement, Subglacial observations, Flow measurement, Ice cover effect, Accuracy, Water flow.

45-2531
Changes in the flexural strength of ice under radiation decay.
Prowse, T.D., et al, *Nordic hydrology*, 1990, 21(4-5), Northern Research Basins Symposium - Workshop, 8th, Abisko, Sweden, Mar 1990, p.341-354, 14 refs.
Demuth, M.N., Chew, H.A.M.
River ice, Ice cover strength, Flexural strength, Ice deterioration, Radiation absorption, Porosity, Mechanical tests.

45-2532
Morphological structure of snowburst in the winter monsoon surges.
Shirooka, R., et al, *Meteorological Society of Japan. Journal*, Dec. 1990, 68(6), p.677-686, With Japanese summary. 17 refs.
Uyeda, H.
Snowstorms, Precipitation (meteorology), Air flow, Clouds (meteorology), Radar photography, Wind direction.

45-2533
Parameterization of the accretion process between different precipitation elements.
Mizuno, H., *Meteorological Society of Japan. Journal*, June 1990, 68(3), p.395-398, 26 refs.
Precipitation (meteorology), Mass transfer, Particles, Analysis (mathematics), Nucleation, Cloud physics, Snow crystals.

45-2534
Searching for the waters of Mars.
Squyres, S.W., *Astronomy*, Aug. 1989, 17(8), p.20-28.
Mars (planet), Extraterrestrial ice, Ground ice, Water reserves, Planetary environments, Geologic processes.

45-2535
Detection of climatic change in the western North American Arctic using a synoptic climatological approach.
Kalkstein, L.S., et al, *Journal of climate*, Oct. 1990, 3(10), p.1153-1167, 34 refs.
Dunne, P.C., Vose, R.S.
Climatic changes, Air masses, Air temperature, Climatology, Periodic variations, Air pollution.

45-2536
Polar marine diatoms.
Medlin, L.K., ed, Cambridge, UK, British Antarctic Survey, Natural Environment Research Council, 1990, 214p., Refs. p.199-214.
Priddle, J., ed.
Sea ice, Algae.
This book provides an account of diatoms in polar marine habitats, principally in the plankton and sea-ice communities. It has been designed as a practical sourcebook for marine biologists who are working with diatoms in polar seas. An international group of seventeen authors has contributed 9 chapters on ecology, 15 chapters on taxonomy and a bibliography. Both antarctic and arctic habitats and species are covered. The Ecology section contains environmental descriptions and brief overviews of diatom communities. Additional attention is paid to methods and to the significance of diatoms in the fossil records in polar oceans. The Taxonomy section is prefaced by a key to families and a simple glossary. Following these, chapters treat families or single genera, concentrating on key diagnostic features visible in the light microscope. Detailed systematic discussion is avoided, but the authors have tried to use the latest nomenclature. The Bibliography not only indexes the references cited in the text, but also provides additional titles of relevance to polar marine diatom studies. (Auth.)

45-2537
Sea ice: its formation, distribution and properties.
Squire, V.A., Polar marine diatoms, edited by L.K. Medlin and J. Priddle, Cambridge, UK, British Antarctic Survey, Natural Environment Research Council, 1990, p.3-8.
Sea ice distribution, Ice formation, Ice physics.
At its maximum extent (Sep.) antarctic sea ice covers approximately 20 million sq km, but in Feb., at the end of the austral summer, the ice recedes to its minimum of only 4 million sq km. Implicit in these statistics is a particularly important point, namely that antarctic sea ice is predominantly less than a year old. Whereas some multi-year ice is found in Antarctica, for example in the Western Weddell Sea, the Bellingshausen Sea, the Amundsen Sea and to the east of Ross Ice Shelf, it is in the minority. Although the discussion in this article is directed towards the physical properties of the sea ice itself, it is important to realize that the polar winter plays a crucial role in the development of biological matter due to extended periods of no direct sunlight. (Auth. mod.)

45-2538
Canadian Beaufort Sea physical shore-zone analysis. Final report.
Harper, J.R., et al, Ottawa, Canada, Department of Indian and Northern Affairs, 1985, 105p. + append., NOGAP A5/2, Refs. p.96-105.
Reimer, P.D., Collins, A.D.
Shore erosion, Shoreline modification, Geological surveys, Marine geology, Sediment transport, Ground ice, Coastal topographic features, Natural resources, Beaufort Sea.

45-2539
Environmental effects information database report.
U.S. Navy Ships Environmental Analysis Center, Long Beach, CA, July 1989 (Revised Oct. 1989), Var. p., SEAC-89001, 413 refs. with abstracts
Bibliographies, Ship icing, Ice navigation, Marine transportation, Military transportation, Ice loads, Cold weather operation, Military operation

45-2540
Techniques for sampling sea-ice algae.
Horner, R., Polar marine diatoms, edited by L.K. Medlin and J. Priddle, Cambridge, UK, British Antarctic Survey, Natural Environment Research Council, 1990, p.19-23.
Core samplers, Algae, Ice sampling.
Sampling is one of the most difficult problems in the study of ice algae. Part of the problem is the structure of the ice. In the Antarctic, layers of frazil (platelet) ice crystals may occur between layers of congelation ice, or may form layers up to 4 m deep on the underside of the ice. These variations in the ice structure then may add to the difficulties in choosing an adequate sampling technique for the ice algae. As a result, many techniques have been used, but not all of them have been equally successful or adequately described in the literature. This is an attempt to describe the sampling methods that have been used and to point out some of their strengths and weaknesses. The most commonly used ice sampler has been a surface-operated coring device usually known as a SIPRE corer. Ice samples collected with SIPRE corers have been used to determine primary productivity both in laboratory incubators and *in situ*, and to determine chlorophyll *a*, species composition, cell numbers, and salinity and nutrient concentration. (Auth. mod.)

45-2541
Glacial indicator tracing.
Kujansuu, R., ed, Rotterdam, A.A. Balkema, 1990, p.252p., Refs. passim. For individual papers see 45-2542 through 45-2553.
Saarnisto, M., ed.
Glacial deposits, Glacial geology, Geomorphology, Moraines, Lithology, Landforms, Glacier flow, Geochemistry, Cost analysis.

45-2542
Outline of glacial indicator tracing.
Saarnisto, M., Glacial indicator tracing. Edited by R. Kujansuu and M. Saarnisto, Rotterdam, A.A. Balkema, 1990, p.1-13, Refs. 11-13.
Glacial geology, Glacial deposits, Geomorphology, Moraines.

45-2543
Modelling of glacial transport of tills.
Puranen, R., Glacial indicator tracing. Edited by R. Kujansuu and M. Saarnisto, Rotterdam, A.A. Balkema, 1990, p.15-34, Refs. p.33-34.
Glacial deposits, Glacial geology, Ice models, Glacier oscillation, Moraines.

45-2544
Formation, deposition, and identification of subglacial and supraglacial tills.
Dreimanis, A., Glacial indicator tracing. Edited by R. Kujansuu and M. Saarnisto, Rotterdam, A.A. Balkema, 1990, p.35-59, Refs. p.53-55.
Glacial deposits, Glacial geology, Glacier ice, Moraines.

45-2545
Glacial morphology as an indicator of the direction of glacial transport.
Lundqvist, J., Glacial indicator tracing. Edited by R. Kujansuu and M. Saarnisto, Rotterdam, A.A. Balkema, 1990, p.61-70, 26 refs.
Glacial geology, Glacier ice, Moraines, Landforms, Glacial deposits, Geomorphology.

45-2546
Glacial flow indicators in air photographs.
Kujansuu, R., Glacial indicator tracing. Edited by R. Kujansuu and M. Saarnisto, Rotterdam, A.A. Balkema, 1990, p.71-86, 12 refs.
Glacier flow, Spaceborne photography, Landforms, Moraines, Mapping.

45-2547
Boulder transport in shield areas.
Bouchard, M., et al, Glacial indicator tracing. Edited by R. Kujansuu and M. Saarnisto, Rotterdam, A.A. Balkema, 1990, p.87-107, Refs. p.105-107.
Salonen, V.
Glacial deposits, Glacial geology, Rock mechanics, Moraines, Ice sheets, Glacier flow.

45-2548
Glacial dispersal trains.
Dilabio, R.N.W., Glacial indicator tracing. Edited by R. Kujansuu and M. Saarnisto, Rotterdam, A.A. Balkema, 1990, p.109-122, 33 refs.
Glacial geology, Glacial deposits, Glacier flow, Dispersions.

45-2549
Compositional variability of till in marginal areas of continental glaciers.
Stewart, R.A., et al, Glacial indicator tracing. Edited by R. Kujansuu and M. Saarnisto, Rotterdam, A.A. Balkema, 1990, p.123-149, Refs. p.147-149
Broster, B.E.
Glacial deposits, Moraines, Landforms, Geomorphology, Lithology.

45-2550
Lithology and transport distance of glaciofluvial material.
Lilliesköld, M., Glacial indicator tracing. Edited by R. Kujansuu and M. Saarnisto, Rotterdam, A.A. Balkema, 1990, p.151-164, Refs. p.162-164.
Lithology, Glacial deposits, Glacial geology.

45-2551
Heavy minerals in glacial material.
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Geochemistry, Minerals, Glacial deposits, Glacial geology.

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Aircraft, Weather modification, Ice crystals, Ice formation, Supercooled clouds, Clouds (meteorology), Aircraft icing.

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Exploration, Offshore drilling, Petroleum industry, United States—Alaska.

45-2556
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Roofs, Plastics, Hail prevention, Impact tests, Hailstones, Design criteria, Physical properties.

45-2557
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Transmission lines, Electric power, Permafrost beneath structures, Electrical resistivity, Attenuation, Electrical measurement, Design criteria.

45-2558
Allowing for mechanical strength of ice deposits during calculation of overhead line wires.
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Power line icing, Ice loads, Stresses, Ice strength, Tensile properties, Accuracy, Design criteria.

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Ice water interface, Heat flux, Water temperature, Sea ice distribution, Ice cover thickness, Oceanography, Ice cover effect, Bottom topography, Ice thermal properties.

45-2561
Linear problem of water-ice phase transitions in unsaturated soils.
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Soil freezing, Frozen ground mechanics, Moisture transfer, Phase transformations, Mathematical models, Permeability.

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DLC TH7201.A5
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45-2563
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45-2564
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Ice crystal nuclei, Heterogeneous nucleation, Molecular structure, Ice physics, Theories, Substrates, Molecular energy levels, Latticed structures, Hydrogen bonds.

45-2565
Molecular theory of heterogeneous nucleation of crystals on small substrates. Probability of heterogeneous nucleation: comparison with experiment.
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Efimov, Iu.A.
Ice physics, Heterogeneous nucleation, Ice crystal nuclei, Molecular energy levels, Theories, Ice crystal growth, Phase transformations, Substrates.

45-2566
Heat transfer under frosting conditions to plain and thick-finned tubes.
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Pipes (tubes), Heat transfer, Frost, Ice cover effect, Thermal analysis, Ice accretion, Analysis (mathematics), Heat transfer coefficient, Air conditioning.

45-2567
Requirements for protection of DC ice melting units on overhead lines.
Molodtsov, B.S., et al, *Advances in Soviet power systems pt.2 -electrical generation and distribution*, 1989, No.4, p.40-44, Translated from Elektricheskie stantsii, 1989, No.7. 6 refs.
Seredin, M.M., Izotov, M.E.
Power line icing, Ice prevention, Electronic equipment, Cold weather performance, Protection.

45-2568
Serviceability of communications channels along power transmission lines during ice-frost formations on wires.
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Knizhnik, R.G.
Power line icing, Telecommunication, Attenuation, Transmission lines, Ice cover effect, Cold weather performance, Climatic factors.

45-2569
Provision of meteorological information for safe navigation in the southern ocean. [Nekotorye voprosy meteorologicheskogo obespecheniia bezopasnosti moreplavaniia v IUzhnom okeane].
Lutsenko, E.I., *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten'*, 1990, No.113, p.35-40, In Russian. 8 refs.
Ice navigation, Sea ice distribution, Weather forecasting.
The risks of navigation in the Antarctic, especially toward the end of the fall season, such as severe storms, ship icing or collision with icebergs, etc. are discussed. To increase accuracy in weather forecasting, and provide greater safety to ships, gathering of data at the Soviet Molodezhnaya, Bellingshausen and Leningradskaya meteorological stations, including satellite information, is described. Data dissemination and services available to ships are reviewed.

45-2570
Water level and ice melting observations on Beaver Lake. [Nabliudeniia za urovnem vody i taianiem l'da na ozere Biver].
Piskun, A.A., *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten'*, 1990, No.113, p.55-64, In Russian. 8 refs.
Ice melting, Limnology, Tides, Lake ice, Water level, Antarctica--Beaver Lake.
Investigations carried out by the 29th Soviet Antarctic Expedition in 1983-1984, concerning the melting rate of snow and ice of the permanently ice-covered Beaver Lake, are discussed. A graph is presented showing the fluctuations of the lake's water level in Dec. 1983 and in Feb. 1984, the tidal harmonic constants are shown in a table. It is suggested that in calculating the water level, it is indispensible to take into consideration the surfacing of the lake's melting ice, which is equal to the amplitude of the tidal waves. A method for the determination of seasonal melting and surfacing of the ice is proposed.

45-2571
Ice condition features in antarctic waters in summer 1986-1987. [Osobennosti ledovykh uslovĭ v antarkticheskikh vodakh letom 1986/87 g].
Vanda, IU.A., *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten'*, 1990, No.113, p.64-71, In Russian. 2 refs.
Ice navigation, Sea ice distribution, Icebergs, Ice surveys.
Ice structural and physico-mechanical properties, and its distribution in various antarctic seas during summer 1986-1987, are summarized. Data include dates, location, name of recording ship, the prevailing conditions for navigation in the area and the optimal times for passage. Maps are presented showing sea ice type and distribution in antarctic coastal waters in the first half of Jan. 1987, ice conditions in the Russkaya Station area on Feb. 8-22, 1987, and the ice conditions of Mar. 3-13 of the same year, during unloading operations of the *Mikhail Somov* in the Somov Sea.

45-2572
Main features of the geomorphological structure of Bunger Oasis (East Antarctica). [Osnovnye cherty geomorfologicheskogo stroeniia oazisa Bangera (Vostochnaia Antarktida)].
Bol'shiianov, D.IU., *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten'*, 1990, No.113, p.79-90, In Russian. 6 refs.
Glacial geology, Glacier flow, Glacier surfaces, Topographic maps, Antarctica--Bunger Hills.
A glacio-morphological map of Bunger Hills is presented and reviewed, based on field data and the use of the first geocryological and geological maps of the area. The dimensions, topography and other peculiarities of the ice free area, numerous lakes, islands, and surrounding glaciers are discussed. The last massive ice cover withdrawal from the region is estimated to have taken place no later than Early Holocene.

45-2573
Results of isotope hydrochemical testing of Beaver and Radok Lakes. [Rezul'taty izotopno-gidrokhimicheskogo aprobirovaniia ozer Biver i Radok].
Vand, U., et al, *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten'*, 1990, No.113, p.90-95, In Russian. 6 refs.
Khermikhen, V.D., Klokov, V.D., Ufimtsev, A.V.
Lake ice, Limnology, Ice shelves, Antarctica--Beaver Lake, Antarctica--Radok Lake.
Bathymetry, water mass structure and hydrological regime investigations carried out on two antarctic shelf-ice lakes, Beaver and Radok, in the summer of 1984-1985, show the following: Beaver Lake has a year round ice cover 3-6 m thick, maximum water depth of 400 m, occurrence of salinity at 220-250 m depth, at which point fresh water turns into sea water, indicating the oceanic origin of the lake's water masses. Radok Lake also has a year round ice cover about 2 m thick, maximum water depth of 362 m, and temperature of 0.0-0.2 C, its waters, however, are entirely salt-free.

45-2574
Design and construction of ash dumps. [Proektirovanie i stroitel'stvo zolootvalov].
Sysoev, IU.M., et al, Moscow, Energoatomizdat, 1990, 249p., In Russian. 80 refs.
Kuznetsov, G.I.
Design, Cold weather construction, Waste disposal, Tailings, Earth dams, Permafrost beneath structures, Electric power.

45-2575
Education and continuing development for the civil engineer; setting the agenda for the 90's and beyond.
American Society of Civil Engineers, New York, 1990, 1101p., Proceedings of the ASCE national forum, Las Vegas, Apr. 17-20, 1990. For selected papers see 45-2576 through 45-2580.
Engineering, Education.

45-2576
Are transportation engineers prepared for winter.
Education and continuing development for the civil engineer, New York, American Society of Civil Engineers, 1990, p.1040-1046.
Cold weather construction, Highway planning, Education, Transportation.

45-2577
ASCE technical council on cold regions monograph series.
Tart, R.G., Jr., et al, Education and continuing development for the civil engineer, New York, American Society of Civil Engineers, 1990, p.1047-1052, 2 refs.
Crissman, R.D.
Cold weather construction, Engineering, Education.

45-2578
Information systems for cold regions engineering.
Alkire, B.D., Education and continuing development for the civil engineer, New York, American Society of Civil Engineers, 1990, p.1053-1059, 3 refs.
Cold weather construction, Engineering, Education.

45-2579
Cold regions engineering, a research agenda.
Carlson, R.F., Education and continuing development for the civil engineer, New York, American Society of Civil Engineers, 1990, p.1060-1065, 5 refs.
Cold weather construction, Engineering, Research projects, Education.

45-2580
***In search of library excellence* in cold regions research.**
Liston, N.C., MP 2868, Education and continuing development for the civil engineer, New York, American Society of Civil Engineers, 1990, p.1066-1069.
Research projects, Data processing, Bibliographies, Education, Organizations, Cold regions.
In the age of the information explosion engineers and librarians must work together to achieve a value-added research product. The importance of the librarian's role in the research process was never more important than it is today in a world of diminishing resources and expanding demands. This paper presents a special engineering librarian's view of how the information specialist will enhance the research process in the 1990s.

45-2581
Yearly dynamics of the front zone of the Hansa Glacier (1987-1988). [Roczna dynamika strefy czolowej Lodowca Hansa (1987-1988)].
Dabrowski, S., et al, *Warsaw. Institute of Geodesy and Cartography. Proceedings*, 1990, 37(1-2), p.109-130, In Polish with English and Russian summaries. 7 refs.
Kurczynski, Z.
Photogrammetric surveys, Glacier oscillation, Glacier flow, Velocity measurement, Glacier mass balance, Periodic variations, Spitsbergen--Hansa Glacier.

45-2582
Effect of time and temperature on R-value of rigid polyurethane foam insulation manufactured with alternative blowing agents.
Bomberg, M.T., et al, *Journal of thermal insulation*, Jan. 1991, Vol.14, p.241-267, 11 refs.
Kumaran, M.K., Ascough, M.R., Sylvester, R.G.
Insulation, Cellular plastics, Thermal conductivity, Temperature effects, Vapor diffusion, Environmental protection.

45-2583
Solution of the time discretized Stefan problem by Newton's method.
Kelley, C.T., et al, *Nonlinear analysis, theory, methods & applications*, May 1990, 14(10), p.851-872, 8 refs.
Rulla, J.
Stefan problem, Analysis (mathematics), Permafrost heat transfer.

45-2584
Strength and deformability of plastic pipe in cold climate.
Riabets, IU.S., et al, *Soviet journal of applied physics*, July-Aug. 1989, 3(4), p.132-135, Translated from Akademii nauk SSSR. Seriia tekhnicheskikh nauk, 1989 No.1. 7 refs.
Vulmanis, V.N.
Pipes (tubes), Cold weather performance, Plastics, Flexural strength, Pipelines, Impact tests, Temperature effects, Design criteria.

45-2585
Numerical modeling of recurrent thermal perturbations of permafrost—prevention of collapse of oil wells drilled in permafrost.
Medvedskiĭ, R.I., et al, *Soviet journal of applied physics*, May-June 1989, 3(3), p.74-82, Translated from Akademii nauk SSSR. Seriia tekhnicheskikh nauk, 1989 No.6. 6 refs.
Sigunov, IU.A.
Oil wells, Well casings, Permafrost transformation, Frozen ground strength, Stefan problem, Stability, Mathematical models, Soil temperature.

45-2586
CO2-climate relationship as deduced from the Vostok ice core: a re-examination based on new measurements and on a re-evaluation of the air dating.
Barnola, J.M., et al, *Tellus*, Apr. 1991, 43B(2), p.83-90, 20 refs.
Pimienta, P., Raynaud, D., Korotkevich, Y.S.
Ice cores, Carbon dioxide, Climatic changes, Age determination, Surface temperature, Atmospheric composition, Bubbles.
Interpretation of the past CO2 variations recorded in polar ice during large climatic transitions requires an accurate determination of the air-age difference. For the Vostok core, age differences resulting from different assumptions on the firn densification process are compared, and a new procedure is proposed to date the air trapped in this core. The penultimate deglaciation is studied on the basis of this new air dating and new CO2 measurements. These measurements, and results obtained on other ice cores, indicate that at the beginning of the deglaciations, the CO2 increase is either in phase or lags by less than about 1000 years with respect to the antarctic temperature, while it clearly lags the temperature at the onset of the last glaciation. (Auth. mod.)

45-2587
CO2 measurements from polar ice cores: more data from different sites.
Staffelbach, T., et al, *Tellus*, Apr. 1991, 43B(2), p.91-96, 13 refs.
Stauffer, B., Sigg, A., Oeschger, H.
Ice cores, Atmospheric composition, Bubbles, Climatic changes, Carbon dioxide, Ice composition, Measurement.
Air in the bubbles of polar ice has in principle the same composition as the atmospheric air at the time of ice formation. Based on this relationship, an increase in atmospheric CO2 since the beginning of industrialization has been documented in antarctic ice cores. In this paper, small deviations of the CO2 concentration in air bubbles from that of the atmosphere at the time of enclosure are discussed. New results from Crête (Central Greenland) ice cores covering the period since the beginning of industrialization are presented, showing a good agreement with the data from antarctic ice cores. In addition, the record of the atmospheric CO2 concentration during the transition from the last glaciation to the Holocene, and the rapid variations in the concentration of atmospheric CO2 during parts of the last glaciation, as suggested by Greenland ice core data, is discussed. (Auth. mod.)

45-2588
Concentration of atmospheric carbon dioxide at the Japanese antarctic station, Syowa.
Nakazawa, T., et al, *Tellus*, Apr. 1991, 43B(2), p.126-135, 23 refs.
Polar atmospheres, Carbon dioxide, Atmospheric composition, Periodic variations, Antarctica—Showa Station.
Continuous measurements of the atmospheric CO2 concentration have been made at Showa Station since Feb. 1984. The diurnal CO2 variation was hardly observable throughout the year. The secular CO2 trend was variable with time, showing slow increase in 1984, 1986 and 1988 and rapid increase in 1985 and 1987. The annual CO2 increase was especially large in 1987, which may be related to the 1986/87 ENSO event. The average rate of annual CO2 increase over the last 5 years was about 1.6 ppmv/yr. The average seasonal CO2 cycle showed minimum and maximum concentrations in mid-Apr. and early in Oct., respectively, and its peak-to-peak amplitude was about 1.1 ppmv. The measured seasonal cycle was variable from year to year, but there was no indication of a long-term increase of the amplitude. It was found that irregular CO2 variations, with amplitudes of 0.2 ppmv at most and periods of a few weeks, show high correlation with airmass exchange by synoptic scale weather disturbances. The results from Showa are compared with those from the South Pole and Cape Grim, Tasmania. (Auth.)

45-2589
Application of the theory of dispersion forces to the surface melting of ice.
Elbaum, M., et al, *Physical review letters*, Apr. 1, 1991, 66(13), p.1713-1716, 19 refs.
Schick, M.
Ice melting, Ice physics, Films, Ice air interface, Dielectric properties, Thermodynamic properties, Surface energy.

45-2590
Pack ice as a landscape. (Les "paysages" de la banquise).
Griselin, M., *Mappemonde*, 1990, No.2, p.27-32, In French with English and Spanish summaries. 4 refs.
Pack ice, Ice floes, Arctic landscapes, Ice water interface, Ice mechanics, Drift, Sea ice distribution.

45-2591
Long-term iceberg collision-risk assessment methods for fixed offshore structures.
Korsnes, R., *Probabilistic engineering mechanics*, Dec. 1989, 4(4), p.203-214, 21 refs.
Offshore structures, Icebergs, Impact, Forecasting, Mathematical models, Drift, Sea ice distribution.

45-2592
Gully development.
Higgins, C.G., et al, Groundwater geomorphology. The role of subsurface water in earth-surface processes and landforms. (Special paper 252). Edited by C.G. Higgins and D.R. Coates, Boulder, CO, Geological Society of America, 1990, p.139-155, Refs. p.154-155.
Hill, B.R., Lehre, A.K.
Gullies, Ground water, Snowmelt, Frozen ground.

45-2593
Permafrost and thermokarst; geomorphic effects of subsurface water on landforms of cold regions.
Higgins, C.G., et al, Groundwater geomorphology. The role of subsurface water in earth-surface processes and landforms. (Special paper 252). Edited by C.G. Higgins and D.R. Coates, Boulder, CO, Geological Society of America, 1990, p.211-218, 17 refs.
Coates, D.R., Péwé, T.L., Schmidt, R.A.M., Sloan, C.E.
Permafrost, Ground ice, Frost heave, Landforms, Karst.

45-2594
Geomorphic controls of groundwater hydrology.
Coates, D.R., Groundwater geomorphology. The role of subsurface water in earth-surface processes and landforms. (Special paper 252). Edited by C.G. Higgins and D.R. Coates, Boulder, CO, Geological Society of America, 1990, p.341-356, Refs. p.355-356.
Geomorphology, Ground water, Hydrology, Landforms, Glacial erosion, Glacial deposits.

45-2595
Development of the JARE deep ice coring system.
Fujii, Y., et al, *Antarctic record*, Nov. 1990, 34(3), p.303-345, In Japanese with English summary. 12 refs.
Ice coring drills, Borehole instruments, Ice cores, Antarctica—Queen Maud Land.
A deep ice coring system, which is to be used on the Queen Maud Land ice sheet in 1994-1995 with a plan named "Dome Project", has been developed since 1988. A mechanical system was adopted because of lower power consumption and smaller size compared with a thermal system. Experiments were done for mechanisms of ice cutting, chip transportation, chip storage, antitorque, monitoring sensors, and winch control with a 20 m drill experiment tower. Some experiments were done in Antarctica. This is an interim report of the development of the JARE deep ice coring system. (Auth.)

45-2596
Fine-scale observation on salinity stratification in an ice hole during melting season of antarctic sea ice.
Matsuda, O., et al, *Antarctic record*, Nov. 1990, 34(3), p.357-362, 8 refs.
Ishikawa, S., Kawaguchi, K.
Sea ice, Algae, Ice melting, Sea water, Salinity, Antarctica—Showa Station.
Observation of seasonal variations of sea water temperature and salinity was carried out through an ice hole near Showa Station as part of JARE-25. From Mar. 1984 to Jan. 1985, temperature and salinity stratification were observed in the upper layers of the water. In order to clarify the microstructure of the stratification, fine-scale observations on temperature and salinity profiles were conducted through the ice hole with the use of a CSTD monitor at depth intervals from 5 to 10 cm on Jan. 6, 1985. Results revealed that an intensified halocline occurred at depths between 120 and 150 cm, where salinity changed considerably (from 3.33 to 27.88 per mill.) This halocline supposedly occurs in the underlying sea water, immediately below the ice, and around the ice hole. Such a condition may naturally occur in the area of puddles within the thawing holes and cracks. Ice algae inhabiting the undersurface of ice may be physiologically affected by the extremely low salinity of the underlying sea water. (Auth.)

45-2597
Fluctuating movement of the permafrost boundary.
Mel'nikov, P.I., et al, *Akademiia nauk SSSR. Doklady. Earth science sections*, Jan.-Feb. 1989, 304(1), p.50-52, 2 refs. For Russian original see 43-4383.
Tetel'baum, A.S., Fel'dman, G.M.
Soil freezing, Permafrost heat balance, Thermal regime, Boundary layer, Soil temperature, Frozen ground mechanics.

45-2598
Effect of the continental snow cover in the Southern Hemisphere on the distribution of moisture among oceans.
Kotliakov, V.M., et al, *Akademiia nauk SSSR. Doklady. Earth science sections*, Jan.-Feb. 1989, 304(1), p.242-246, 5 refs. For Russian original see 43-4287 or 17J-40048.
Snow cover distribution, Snow cover effect, Moisture transfer, Meteorological factors, Oceans, Precipitation (meteorology).
Snow cover constitutes a primary reserve for surface waters, and thus it plays a crucial role in the global distribution of water between ocean basins. In this article, snow cover distribution in the Southern Hemisphere, including Antarctica, is correlated to the meteorological redistribution of its moisture via atmospheric transport to major ocean basins. The fraction of solid precipitation eventually redistributed to other oceans is less for the Southern Hemisphere than for other continents. 81% of the solid precipitation falling in the Southern Hemisphere is returned to the basin of its origin via this redistribution mechanism.

45-2599
Dependency of dielectric relaxation time on alkali metal ion (Li+, Na+, K+, Rb+) in alkali-hydroxide-doped ice.
Abe, H., et al, *Journal of physics and chemistry of solids*, 1991, 52(4), p.617-621, 22 refs.
Kawada, S.
Ice physics, Doped ice, Ice electrical properties, Ice relaxation, Ion diffusion, Dielectric properties, Temperature effects.

45-2600
Ocean drilling program proposal for arctic ocean drilling.
Mudie, P.J., et al, *Canada. Geological Survey. Atlantic Geoscience Centre. AGC open file report*, 1988, No.2222, 20p. + appends., 28 refs.
Jackson, H.R., Blasco, S.M.
Offshore drilling, Bottom sediment, Oceanographic surveys, Geological surveys, Coring.

45-2601
Radargrammetric image processing.
Leberl, F.W., Norwood, MA, Artech House, 1990, 595p. (pertinent p.499-525), Refs. passim.
Side looking radar, Remote sensing, Sea ice distribution, Drift, Radar tracking, Data processing, Mapping, Aerial surveys.

45-2602
High latitude limnology.
Vincent, W.F., ed, Developments in hydrobiology, No.49, Dordrecht, Kluwer Academic Publishers, 1989, 323p., Refs. passim. Reprinted from Hydrobiologia, 1989, Vol.172. For individual papers see 43-3700, 43-3701, 44-86, 44-87, and 45-2603 through 45-2620.
Ellis-Evans, J.C., ed
Streams, Frozen lakes, Limnology, Microbiology, Cryobiology, Algae, Photosynthesis, Biomass, Tundra, Nutrient cycle, Meltwater, Biogeography, Water chemistry.

45-2603
Filamentous green algae in freshwater streams on Signy Island, Antarctica.
Hawes, I., High latitude limnology. Edited by W.F. Vincent and J.C. Ellis-Evans, Dordrecht, Kluwer Academic Publishers, 1989, p.1-18, 50 refs.
Algae, Cryobiology, Streams, Limnology, Antarctica, Signy Island.

45-2604
Effects of nutrient limitation and stream discharge on the epilithic microbial community in an oligotrophic arctic stream.
Hullar, M.A., et al, High latitude limnology. Edited by W.F. Vincent and J.C. Ellis-Evans, Dordrecht, Kluwer Academic Publishers, 1989, p.19-26, 20 refs.
Vestal, J.R.
Streams, Microbiology, Biomass, Tundra, Algae, Bacteria, Nutrient cycle, Stream flow.

45-2605
Microbial communities in southern Victoria Land streams (Antarctica) I. Photosynthesis.
Howard-Williams, C., et al, High latitude limnology. Edited by W.F. Vincent and J.C. Ellis-Evans, Dordrecht, Kluwer Academic Publishers, 1989, p.27-38, 23 refs.
Vincent, W.F.
Meltwater, Streams, Microbiology, Photosynthesis, Bacteria, Algae, Chlorophylls, Biomass, Antarctica—Victoria Land.

45-2606
Microbial communities in southern Victoria Land streams (Antarctica) II. The effects of low temperature.
Vincent, W.F., et al, High latitude limnology. Edited by W.F. Vincent and J.C. Ellis-Evans, Dordrecht, Kluwer Academic Publishers, 1989, p.39-49, 23 refs.
Howard-Williams, C.
Meltwater, Streams, Microbiology, Photosynthesis, Bacteria, Algae, Temperature effects, Antarctica—Victoria Land.

45-2607
Nitrogen dynamics in two antarctic streams.
Howard-Williams, C., et al, High latitude limnology. Edited by W.F. Vincent and J.C. Ellis-Evans, Dordrecht, Kluwer Academic Publishers, 1989, p.51-61, 21 refs.
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Meltwater, Streams, Nutrient cycle, Microbiology, Algae, Bacteria, Antarctica—Victoria Land.

45-2608
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Streams, Algae, Biomass, Chlorophylls.

45-2609
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45-2610
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Oswood, M.W., High latitude limnology. Edited by W.F. Vincent and J.C. Ellis-Evans, Dordrecht, Kluwer Academic Publishers, 1989, p.97-110, 49 refs.
Streams, Biogeography, Animals, United States—Alaska.

45-2611
Variability of macroinvertebrate community composition in an arctic and subarctic stream.
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Streams, Biogeography, Animals.

45-2612
Geochemical processes in the Lake Fryxell Basin (Victoria Land, Antarctica).
Green, W.J., et al, High latitude limnology. Edited by W.F. Vincent and J.C. Ellis-Evans, Dordrecht, Kluwer Academic Publishers, 1989, p.129-148, 32 refs.
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Streams, Water chemistry, Meltwater, Geochemistry, Limnology, Nutrient cycle, Antarctica—Fryxell, Lake.

45-2613
Some aspects of iron cycling in maritime antarctic lakes.
Ellis-Evans, J.C., et al, High latitude limnology. Edited by W.F. Vincent and J.C. Ellis-Evans, Dordrecht, Kluwer Academic Publishers, 1989, p.149-164, 44 refs.
Lemon, E.C.G.
Water chemistry, Lakes, Limnology, Nutrient cycle, Microbiology, Antarctica.

45-2614
Nitrogen cycling in arctic lakes and ponds.
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Lakes, Ponds, Nutrient cycle, Tundra, Water chemistry, Plankton.

45-2615
Photon dependence of inorganic nitrogen transport by phytoplankton in perennially ice-covered antarctic lakes.
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Frozen lakes, Nutrient cycle, Plankton, Photosynthesis, Lake ice, Ice cover effect, Algae, Antarctica—Fryxell, Lake, Antarctica—Vanda, Lake.

45-2616
Patterns of energy storage in *Pseudoboeckella poppei* (Crustacea, Copepoda) from two contrasting lakes on Signy Island, Antarctica.
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Lakes, Animals, Cold weather survival, Ice cover effect, Physiological effects, Antarctica—Signy Island.

45-2617
Vertical distributions of a planktonic harpacticoid and a calanoid (Copepoda) in a meromictic antarctic lake.
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Eslake, D.
Frozen lakes, Plankton, Animals, Limnology, Biogeography, Antarctica—Vestfold Hills.

45-2618
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Frozen lakes, Salt lakes, Shoreline modification, Geomorphology, Limnology, Sea level, Isostasy, Salinity, Antarctica—Vestfold Hills.

45-2619
Biogeochemical study of organic substances in antarctic lakes.
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Lakes, Water chemistry, Microbiology, Limnology, Bottom sediment, Geochemistry, Antarctica.

45-2620
Vertical distribution of organic constituents in an antarctic lake: Lake Fryxell.
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Watanuki, K., Torrii, T.
Frozen lakes, Water chemistry, Microbiology, Limnology, Bottom sediment, Antarctica—Fryxell, Lake.

45-2621
Antarctic sea ice biota.
Garrison, D.L., *American zoologist*, 1991, 31(1), p.17-33, Refs. p.30-33.
Sea ice, Algae, Ecology, Ice cover effect, Ice physics, Ice composition.
The sea ice surrounding Antarctica provides an extensive habitat for organisms ranging in size from bacteria to marine birds and mammals. Over 200 species have been reported living on, in, or in association with antarctic sea ice. The ice biota includes bacteria, a variety of algae, heterotrophic protozoans and small metazoans. The diatom assemblages are the only taxonomic group that is known well enough to make comparisons among the various habitats. Studies by a number of workers suggest some specific diatom assemblages along with occurrence of species that are widely distributed in both ice and plankton. Ice may also serve as a temporary habitat for species that also comprise planktonic communities, so that providing a "seed population" for ice edge plankton blooms may be an important role of the ice biota. Trophic interactions among organisms in ice suggest that the ice assemblage is a true community with a well-developed microbial food web. The ice microbial community may be an important part of the antarctic marine food web because large consumers from the adjacent planktonic and benthic communities appear to feed on the ice biota. (Auth.)

45-2622
Ecological studies of seaweeds in McMurdo Sound, Antarctica.
Miller, K.A., et al, *American zoologist*, 1991, 31(1), p.35-48, Refs. p.47-48.
Pearse, J.S.
Sea ice, Algae, Ecology, Ice cover effect, Antarctica—McMurdo Sound.
Three species of benthic marine macroalgae comprise the chief components of the seaweed flora of McMurdo Sound. Quantitative studies at Cape Evans demonstrate a depth-related distribution pattern, with *Iridaea cordata* (Turner) Bory in shallow water, *Phyllophora antarctica* A. and E.S. Gepp abundant and fertile at intermediate depths, and *Leptophytum coulmanicum* (Foslie) Adey dominant below 20 m. The vertical distribution of species is correlated with irradiance levels. At sites with thinner annual sea ice and less snow accumulation (e.g., Cape Evans, Cape Royds, and Granite Harbor), vertical distributions are shifted downward relative to those at sites that remain covered most of the year with thick or snow-covered fast ice (e.g., Cape Armitage and New Harbor). Disturbance caused by ice scour and anchor ice probably determines the upper limit of algal distribution, herbivory is apparently absent. There is a disproportionate representation of cystocarpic female gametophytes in populations of *I. cordata* and *P. antarctica*. Perennation via persistent basal crusts and apogamic recycling of gametophytes are suggested as factors structuring phase distribution. (Auth. mod.)

45-2623
Combined geocryological and hydrogeological investigations. Collected scientific articles. (Kompleksnye merzlotno-gidrogeologicheskie issledovaniia. Sbornik nauchnykh statei).
Anisimova, N.P., ed, Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1989, 163p., In Russian.
For individual papers see 45-2624 through 45-2640.
Geocryology, Water chemistry, Hydrogeology, Hydrogeochemistry, Suprapermafrost ground water, Active layer, Water intakes.

45-2624
Types of formation regimes of suprapermafrost ground water. (O tipakh rezhima formirovaniia nadmerzlotnykh vod).
Lomovtseva, N.S., et al, Kompleksnye merzlotno-gidrogeologicheskie issledovaniia. Sbornik nauchnykh statei (Combined geocryological and hydrogeological investigations. Collected scientific articles). Edited by N.P. Anisimova, Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1989, p.5-12, In Russian. 5 refs.
Tolstikhin, O.N.
Suprapermafrost ground water, Hydrogeology, Geocryology.

45-2625
Classifying lithological complexes of seasonally-saturated deposits in Yakut ASSR. (Tipizatsiia litologicheskikh kompleksov sezonno-obvodennykh otlozhenii IAASSR).
Ivanova, L.D., et al, Kompleksnye merzlotno-gidrogeologicheskie issledovaniia. Sbornik nauchnykh statei (Combined geocryological and hydrogeological investigations. Collected scientific articles). Edited by N.P. Anisimova, Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1989, p.13-22, In Russian. 8 refs.
Nikitina, N.M.
Lithology, Seasonal variations, Saturation, Geocryology, Hydrogeology, Permeability.

45-2626
Chemical composition of suprapermafrost ground water in the active layer in Yakut ASSR. (Khimicheskii sostav nadmerzlotnykh vod sezonno-talogo sloia IAkutskoi ASSR).
Lebedeva, T.N., Kompleksnye merzlotno-gidrogeologicheskie issledovaniia. Sbornik nauchnykh statei (Combined geocryological and hydrogeological investigations. Collected scientific articles). Edited by N.P. Anisimova, Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1989, p.22-33, In Russian. 6 refs.
Suprapermafrost ground water, Active layer, Water chemistry, Hydrogeology, Geocryology, Hydrogeochemistry.

45-2627
Gas-hydrogeochemical variations in the active layer in northeast USSR. [Gazogidrogeokhimicheskie izmeneniia v sezonno-talom sloe na Severo-Vostoke SSSR].
Glotov, V.E., Kompleksnye merzlotno-gidrogeologicheskie issledovaniia. Sbornik nauchnykh statei (Combined geocryological and hydrogeological investigations. Collected scientific articles). Edited by N.P. Anisimova, Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1989, p.33-46, In Russian. 15 refs.
Active layer, Ions, Chemical properties, Freeze thaw cycles, Gases, Hydrogeology, Hydrogeochemistry, Ground water, Water chemistry.

45-2628
Geochemistry of cryogenic salts in eastern Yakutia and their use in exploration for mineral deposits. [Geokhimiia kriogennykh solei Vostochnoi IAkutii i ikh ispol'zovanie pri poiskakh poleznykh iskopaemykh].
Makarov, V.N., Kompleksnye merzlotno-gidrogeologicheskie issledovaniia. Sbornik nauchnykh statei (Combined geocryological and hydrogeological investigations. Collected scientific articles). Edited by N.P. Anisimova, Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1989, p.47-61, In Russian. 19 refs.
Geochemistry, Geocryology, Salinity, Microelement content, Naleds.

45-2629
Formation and regime of the flow of suprapermafrost ground water. [O formirovanii i rezhime gruntovykh potokov nadmerzlotnykh vod].
Boltsov, A.V., Kompleksnye merzlotno-gidrogeologicheskie issledovaniia. Sbornik nauchnykh statei (Combined geocryological and hydrogeological investigations. Collected scientific articles). Edited by N.P. Anisimova, Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1989, p.61-65, In Russian. 4 refs.
Suprapermafrost ground water, Water flow, Hydrogeology, Geocryology.

45-2630
Evaluating the thermal effect of surface water on permafrost in arctic regions. [Otsenka teplovogo vliianiia *poverkhnostnykh vod na mnogoletnemerzlye* porody v arkticheskikh rafonakh].
Klimovskii, I.V., et al, Kompleksnye merzlotno-gidrogeologicheskie issledovaniia. Sbornik nauchnykh statei (Combined geocryological and hydrogeological investigations. Collected scientific articles). Edited by N.P. Anisimova, Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1989, p.66-73, In Russian. 9 refs.
Liubomirov, A.S.
Temperature effects, Surface waters, Permafrost, Hydrogeology, Geocryology.

45-2631
Formation of a specific subaqueous talik in a coastal zone of the Kara Sea (Mutnyy Strait). [Formirovanie spetsificheskogo subakval'nogo talika v pribrezhnoi zone Karskogo *moria* (prol. Mutnyi)].
Grigor'ev, N.F., et al, Kompleksnye merzlotno-gidrogeologicheskie issledovaniia. Sbornik nauchnykh statei (Combined geocryological and hydrogeological investigations. Collected scientific articles). Edited by N.P. Anisimova, Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1989, p.74-78, In Russian. 5 refs.
Ermakov, O.V.
Taliks beneath lakes, Geomorphology, Frozen rock temperature, Geocryology.

45-2632
Characteristics of the formation of the chemical composition of water in Kolyma Bay. [Osobennosti formirovaniia khimicheskogo sostava vod Kolymskogo zaliva].
Razumov, S.O., Kompleksnye merzlotno-gidrogeologicheskie issledovaniia. Sbornik nauchnykh statei (Combined geocryological and hydrogeological investigations. Collected scientific articles). Edited by N.P. Anisimova, Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1989, p.78-87, In Russian. 5 refs.
Rivers, Water chemistry, Hydrogeochemistry, Geocryology, Hydrogeology

45-2633
New data on the relict cryolithozone in the Timan-Pechora petroleum province. [Novye dannye o reliktovoi kriolitozone Timano-Pechorskoi neftegazonosnoi provintsii].
Oberman, N.G., Kompleksnye merzlotno-gidrogeologicheskie issledovaniia. Sbornik nauchnykh statei (Combined geocryological and hydrogeological investigations. Collected scientific articles). Edited by N.P. Anisimova, Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1989, p.88-96, In Russian. 11 refs.
Geocryology, Lithology, Frozen rock strength, Frozen rock temperature.

45-2634
Characteristics of the use and improvement in the quality of water in sublacustrine taliks. [Osobennosti ekspluatatsii i uluchsheniia kachestva vody podozernykh talikov].
Fedorov, A.M., Kompleksnye merzlotno-gidrogeologicheskie issledovaniia. Sbornik nauchnykh statei (Combined geocryological and hydrogeological investigations. Collected scientific articles). Edited by N.P. Anisimova, Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1989, p.96-107, In Russian. 10 refs.
Taliks beneath lakes, Hydrogeology, Water intakes, Geocryology.

45-2635
Hydrochemical investigations for determining subaqueous discharging of suprapermafrost ground water. [Gidrokhimicheskie issledovaniia dlia vyiavleniia subakval'noi razgruzki nadmerzlotnykh vod].
Anisimova, N.P., et al, Kompleksnye merzlotno-gidrogeologicheskie issledovaniia. Sbornik nauchnykh statei (Combined geocryological and hydrogeological investigations. Collected scientific articles). Edited by N.P. Anisimova, Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1989, p.108-114, In Russian. 1 ref.
Makarova, E.V., Golovanova, T.V.
Suprapermafrost ground water, Water intakes, Water pollution, Hydrogeology, Geocryology, Hydrogeochemistry.

45-2636
Some results of investigations into the effect of saline soil *cements on frozen rocks* and construction materials. [Nekotorye rezul'taty issledovaniia vliianiia solevykh gruntovykh rastvorov na merzlye porody i stroitel'nye materialy].
Gaĭdaenko, E.I., Kompleksnye merzlotno-gidrogeologicheskie issledovaniia. Sbornik nauchnykh statei (Combined geocryological and hydrogeological investigations. Collected scientific articles). Edited by N.P. Anisimova, Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1989, p.114-123, In Russian. 6 refs.
Saline soils, Frozen rocks, Construction materials, Corrosion, Frozen ground, Steels, Geocryology.

45-2637
Effect of electrical treatment of the active layer on the mineralization of ground water. [Vliianie elektroobrabotki deiatel'nogo sloia na mineralizatsiiu gruntovykh vod].
Kuzakov, V.O., Kompleksnye merzlotno-gidrogeologicheskie issledovaniia. Sbornik nauchnykh statei (Combined geocryological and hydrogeological investigations. Collected scientific articles). Edited by N.P. Anisimova, Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1989, p.123-126, In Russian. 2 refs.
Active layer, Ground water, Minerals, Hydrogeology, Geocryology.

45-2638
Impulse induction sounding in the study of the geocryological conditions of the Apsat coal deposits. [Impul'snoe induktsionnoe zondirovanie pri izuchenii geokriologicheskikh uslovii Apsatskogo ugol'nogo mestorozhdeniia].
Nim, IU.A., et al, Kompleksnye merzlotno-gidrogeologicheskie issledovaniia. Sbornik nauchnykh statei (Combined geocryological and hydrogeological investigations. Collected scientific articles). Edited by N.P. Anisimova, Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1989, p.126-135, In Russian. 4 refs.
Zheleznıak, M.N., Krokholev, V.F., Lasygin, A.V.
Geocryology, Coal, Sounding.

45-2639
Modified differential method with smoothing coefficients for solving the Stefan problem. [Modifitsirovannyi raznostnyi metod so sglazhivaniem koeffitsientov dlia resheniia zadachi Stefana].
Tetel'baum, A.S., Kompleksnye merzlotno-gidrogeologicheskie issledovaniia. Sbornik nauchnykh statei (Combined geocryological and hydrogeological investigations. Collected scientific articles). Edited by N.P. Anisimova, Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1989, p.136-146, In Russian. 8 refs. For another source see 45-1207.
Stefan problem, Analysis (mathematics), Freeze thaw cycles.

45-2640
Characteristics of the hydrogeological construction and hydrochemical zonality of the Udachnaya kimberlite plug. [Osobennosti gidrogeologicheskogo stroeniia i gidrokhimicheskoi zonal'nosti kimberlitovoi trubki Udachnaia].
Drozdov, A.V., et al, Kompleksnye merzlotno-gidrogeologicheskie issledovaniia. Sbornik nauchnykh statei (Combined geocryological and hydrogeological investigations. Collected scientific articles). Edited by N.P. Anisimova, Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1989, p.146-155, In Russian. 8 refs.
Egorov, K.N., Gotovtsev, S.P., Klimovskii, I.V.
Hydrogeology, Hydrogeochemistry, Brines, Geocryology.

45-2641
Computer model of atmospheric ice accretion on transmission lines.
Jones, K.F., et al, *U.S. Army Cold Regions Research and Engineering Laboratory*, Feb. 1991, CR 91-03, 24p., ADA-234 273, 34 refs.
Egelhofer, K.Z.
Power line icing, Ice accretion, Ice loads, Wind pressure, Mathematical models, Computerized simulation.
Atmospheric ice accretions on *transmission lines* cause increased gravity and wind loads on the lines. In regions subject to icing conditions, transmission line design must take these loads into account. This report describes a numerical model for determining the accretion of ice on transmission lines. The eccentric ice load causes a gradual rotation of the flexible conductor, which affects the shape and size of the accretion. The sensitivity of the gravity and wind load on the conductor to both atmospheric and structural variables is examined.

45-2642
Rotating multicylinder method for the measurement of cloud liquid-water content and droplet size.
Howe, J.B., *U.S. Army Cold Regions Research and Engineering Laboratory*, Jan. 1991, CR 91-02, 18p., ADA-234 780, 11 refs.
Cloud droplets, Unfrozen water content, Measuring instruments, Aircraft icing.
Since its development at the Mount Washington Observatory in the 1940s, the rotating multicylinder (RMC) method has been the simplest, most reliable, and usually the most accurate means of measuring the liquid-water content and droplet size in clouds and fog. The development history of the method is reviewed in this report. Fabrication of the instrument, exposure and data-reduction techniques, and the underlying theory of the method are described in detail. Accuracy of the RMC method is discussed and comparison tests with other instruments are briefly reviewed.

45-2643
Use of insulation for frost prevention: Jackman Airport, Maine, 1986-1987 winter.
Kestler, M.A., et al, *U.S. Army Cold Regions Research and Engineering Laboratory*, Jan. 1991, CR 91-01, 45p., ADA-234 274, 5 refs.
Berg, R.L.
Runways, Thermal insulation, Frost protection, Pavements, Frost heave, Frost penetration.
In 1986, Newton Field, a small runway in Jackman, ME, was reconstructed using a 2 inch thick layer of extruded polystyrene insulation. At the same time, Nichols Road, a nearby town road, was reconstructed to a conventional, uninsulated cross section. Both Newton Field and Nichols Road were similarly monitored: thermocouples, tensiometers, and groundwater wells were installed during construction; and, following construction, a pavement surface elevation grid was established at each of the test sites for monitoring frost heave. This report discusses the performance of the insulated and uninsulated pavements during the first of four winters of observation.

45-2644
Marine accident report. Grounding of the U.S. Tankship Exxon Valdez on Bligh Reef, Prince William Sound near Valdez, Alaska, March 24, 1989.
U.S. National Transportation Safety Board Report, July 31, 1990, NTSB MAR-90/04, 255p. PB90-916405
Accidents, Oil spills, United States, Alaska, Valdez.

45-2645
Arctic system science: ocean-atmosphere-ice interactions.
Moritz, R.E., ed, Washington, D.C., Joint Oceanographic Institutions Incorporated, Dec. 1990, 132p. + appends., Refs. passim. Report of a workshop held at Lake Arrowhead, CA, Mar. 12-16, 1990.
Climatic changes, Air water interactions, Ice air interface, Ice water interface, Sea ice, Ocean currents, Biomass, Nutrient cycle, Water transport.

45-2646
Enhancements to the Shaft Modeling Tool Kit.
Cowper, D.N.B., et al, *Transport Canada. Report*, Nov. 1990, TP 10766E, 42p., With French summary. 62 refs.
Steele, M., Ritch, R.
Computer programs, Ice navigation, Propellers, Ships, Ice loads, Mathematical models, Metal ice friction.

45-2647
Ice conditions on inland waterways.
Frankenstein, G.E., et al, MP 2875, International Navigation Congress, 27th, Osaka, Japan, May 20-26, 1990. Proceedings, Brussels, Permanent International Association of Navigation Congresses, [1990], p.61-65, With French summary. 16 refs.
Rand, J.H., Wortley, C.A.
River ice, Ice control, Ice conditions, Ice navigation, Frazil ice, Chemical ice prevention, Electric heating, Locks (waterways).

45-2648
In-situ heat flux measurements in buildings; applications and interpretations of results.
Flanders, S.N., ed, *U.S. Army Cold Regions Research and Engineering Laboratory*, Feb. 1991, SR 91-03, 260p., ADA-234 924, Refs. passim. Papers presented at the Workshop on In-Situ Heat Flux Measurements in Buildings, Hanover, NH, May 22-23, 1990. For individual papers see 45-2649 through 45-2662.
Buildings, Heat flux, Temperature measurement, Thermal insulation, Thermal conductivity.

45-2649
Design, construction, and application of heat flux transducers to the study of insulations during the 1950s.
Perrine, E.L., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Feb. 1991, SR 91-03, In-situ heat flux measurements in buildings; applications and interpretations of results. Edited by S.N. Flanders, p.3-12, ADA-234 924, 4 refs.
Buildings, Heat flux, Thermal insulation, Temperature measurement

45-2650
Systematic errors with surface mounted heat flux transducers and how to live with them.
Trethowen, H.A., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Feb. 1991, SR 91-03, In-situ heat flux measurements in buildings; applications and interpretations of results. Edited by S.N. Flanders, p.15-27, ADA-234 924, 4 refs.
Buildings, Heat flux, Temperature measurement, Mathematical models.

45-2651
HFT guard plate for exterior envelope surface measurements.
Christian, J.E., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Feb. 1991, SR 91-03, In-situ heat flux measurements in buildings; applications and interpretations of results. Edited by S.N. Flanders, p.29-51, ADA-234 924, 13 refs.
Buildings, Heat flux, Temperature measurement, Thermal insulation.

45-2652
Development of a method to assess HFT shunting error.
Mack, R.T., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Feb. 1991, SR 91-03, In-situ heat flux measurements in buildings; applications and interpretations of results. Edited by S.N. Flanders, p.53-79, ADA-234 924, 27 refs.
Beardon, T.W.
Buildings, Heat flux, Temperature measurement, Analysis (mathematics)

45-2653
Verification of a thin-heater device as a secondary HFT calibration source.
Beardon, T.W., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Feb. 1991, SR 91-03, In-situ heat flux measurements in buildings; applications and interpretations of results. Edited by S.N. Flanders, p.81-94, ADA-234 924, 3 refs.
Mack, R.T.
Buildings, Heat flux, Temperature measurement.

45-2654
Use of combined reflective and normal heat flux transducers in determining convective heat transfer coefficients and room thermal radiative balance.
Emery, A.F., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Feb. 1991, SR 91-03, In-situ heat flux measurements in buildings; applications and interpretations of results. Edited by S.N. Flanders, p.97-110, ADA-234 924, 7 refs.
Kippenhan, C.J., Nocolaisen, K.H., Garbini, J.L., Heerwagen, J.H., Heerwagen, D.R., Varey, G.B.
Buildings, Heat flux, Temperature measurement, Heat transfer coefficient, Mathematical models.

45-2655
Evaluation of the heat flux transducer technique for measuring the thermal performance of walls.
Burch, D.M., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Feb. 1991, SR 91-03, In-situ heat flux measurements in buildings; applications and interpretations of results. Edited by S.N. Flanders, p.111-122, ADA-234 924, 7 refs.
Zarr, R.R.
Walls, Heat flux, Temperature measurement, Thermal insulation, Thermal conductivity.

45-2656
Determining the thermal admittance of a wall from in situ measurements of heat flux and surface temperature at the same location.
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Duthoit, B., Thery, P.
Walls, Heat flux, Temperature measurement, Thermal conductivity, Analysis (mathematics).

45-2657
On the extensive use of heat flux transducers for evaluating residential building component performance —calibration and deployment.
Kippenhan, C.J., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Feb. 1991, SR 91-03, In-situ heat flux measurements in buildings; applications and interpretations of results. Edited by S.N. Flanders, p.143-158, ADA-234 924, 5 refs.
Emery, A.F., Nicholaisen, K.H., Varey, G.B., Garbini, J.L., Heerwagen, D.R.
Houses, Heat flux, Temperature measurement.

45-2658
Using parameter estimation to analyze building envelope thermal performance.
Beck, J.V., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Feb 1991, SR 91-03, In-situ heat flux measurements in buildings; applications and interpretations of results. Edited by S.N. Flanders, p.161-191, ADA-234 924, 7 refs.
Petrie, T.W., Courville, G.E.
Roofs, Heat flux, Temperature measurement, Computer programs, Analysis (mathematics), Thermal conductivity, Thermal insulation.

45-2659
Prediction of errors for in-situ measurement of thermal resistance.
Flanders, S.N., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Feb. 1991, SR 91-03, MP 2869, In-situ heat flux measurements in buildings; applications and interpretations of results. Edited by S.N. Flanders, p.193-219, ADA-234 924, 17 refs.
Mack, R.T.
Buildings, Heat flux, Temperature measurement, Thermal conductivity, Thermal insulation, Computer programs, Mathematical models.
A sufficient measurement time is key to the accurate determination of thermal resistance from in-situ heat flux and temperature data. Given some assumed thermal properties of the construction to be measured, this paper presents a means for predicting an error that might result from anticipated temperature conditions or for estimating the error that may be attributable to a temperature history. The error-prediction procedure is useful for deciding in advance whether to make in-situ thermal resistance measurements during expected temperature conditions of buildings and of structures that contain hot or cold media. This procedure estimates errors in the calculation of thermal resistance only, that result from obtaining non-steady-state temperature and heat flow data over a finite period of time. Random errors due to instrumentation techniques should be analyzed separately using propagation of errors or other methods. Errors that result from changes in the apparent thermal conductivity of the constituent materials of the element studied are also beyond the scope of this paper. Such changes may be due to variation in internal temperatures, moisture migration or air movement.

45-2660
Thermistor-based system for thermal conductivity measurement.
Atkins, R.T., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Feb. 1991, SR 91-03, MP 2870, In-situ heat flux measurements in buildings; applications and interpretations of results. Edited by S.N. Flanders, p.223-236, ADA-234 924, 7 refs.
Wright, E.A.
Thermal conductivity, Temperature measurement, Thermistors, Analysis (mathematics), Thermal insulation, Soil temperature, Sludges.
This report describes a patented method for using commercially available thermistors to make in-situ thermal conductivity measurements with commonly available electronic equipment such as digital voltmeters. The emphasis is on the use of a single thermistor to measure the thermal conductivity of soils. Calibration techniques are explained and examples provided. Limits on this technique are discussed, including measurement range, material grain size, the amount of material needed for a valid measurement, and temperature stability. Specific examples of the use of this technique are provided for thermal conductivity measurements of soils, building materials, and the sludges in a sewage treatment plant. Data analysis is provided, including a statistical approach to finding the thermal conductivity in large volumes of material.

45-2661
In-situ method for thermal conductivity and diffusivity measurements.
Morabito, P., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Feb. 1991, SR 91-03, In-situ heat flux measurements in buildings; applications and interpretations of results. Edited by S.N. Flanders, p.237-249, ADA-234 924, 5 refs.
Thermal conductivity, Temperature measurement, Thermal insulation, Concrete structures.

45-2662
Calibration transfer standards for fenestration systems.
Goss, W.P., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Feb. 1991, SR 91-03, In-situ heat flux measurements in buildings; applications and interpretations of results. Edited by S.N. Flanders, p.251-260, ADA-234 924, 16 refs.
Elmahdy, H.A., Bowen, R.P.
Heat flux, Temperature measurement, Windows, Building codes.

45-2663
Microphysical characteristics through the melting region of a midlatitude winter storm.
Raga, G.B., et al, *Journal of the atmospheric sciences*, Mar. 15, 1991, 48(6), p.843-855, 23 refs.
Stewart, R.E., Donaldson, N.R.
Storms, Precipitation (meteorology), Melting, Air temperature, Phase transformations, Thermodynamics, Cloud physics, Particles, Wind factors.

45-2664
Development of soil structure in some turbic cryosols in the Canadian low Arctic
Smith, C.A.S., et al, *Canadian journal of soil science*, Feb. 1991, 71(1), p.11-29, With French summary. 25 refs.
Fox, C.A., Hargrave, A.E.
Cryogenic soils, Soil structure, Cryoturbation, Patterned ground, Periglacial processes, Hummocks, Cryogenic textures, Soil formation.

45-2665
Finite element prediction of temperature gradients in walls of cylindrical concrete storage structures.
Jofriet, J.C., et al, *Canadian journal of civil engineering*, Feb. 1991, 18(1), p.12-19, With French summary. 14 refs.
Jiang, S., Tang, S.W.
Storage tanks, Concrete structures, Walls, Thermal stresses, Temperature gradients, Heat transfer, Design criteria, Thermal conductivity.

45-2666
Observation and inversion of seismo-acoustic waves in a complex arctic ice environment.
Miller, B.E., et al, *Acoustical Society of America. Journal*, Apr. 1991, 89(4-pt.1), p.1668-1685, 38 refs.
Schmidt, H.
Ice acoustics, Sound waves, Wave propagation, Sea ice, Underwater acoustics, Ice elasticity, Acoustic measurement, Attenuation, Seismic refraction, Ice cover effect, Low frequencies

45-2667
Operational remote sensing of snow cover in the U.S. and Canada.
Carroll, T.R., et al, *International Symposium on the Hydraulics and Hydrology of Arid Lands*, San Diego, CA, July 30-Aug. 2, 1990. Proceedings. Edited by R.H. French, New York, American Society of Civil Engineers, 1990, p.286-291, 7 refs.
Holroyd, E.W., III.
Radiometry, Snow cover distribution, Snow hydrology, Remote sensing, Snow water equivalent, Airborne surveys.

45-2668
Evaporation and snowmelt estimates from satellite data.
Miller, W., International Symposium on the Hydraulics and Hydrology of Arid Lands, San Diego, CA, July 30-Aug. 2, 1990. Proceedings. Edited by R.H. French, New York, American Society of Civil Engineers, 1990, p.298-303, 5 refs.
Spaceborne photography, Snowmelt, Runoff forecasting, Salt lakes, Evaporation, Remote sensing, Water temperature, Salinity.

45-2669
Comparison of the irradiance response of photosynthesis and nitrogen uptake by sea ice microalgae.
Priscu, J.C., et al, *Marine ecology progress series*, Feb. 28, 1991, 70(2), p.201-210, Refs. p.209-210.
Lizotte, M.P., Cota, G.F., Palmisano, A.C., Sullivan, C.W.
Algae, Sea ice, Sunlight, Photosynthesis, Antarctica—McMurdo Sound.
The response of photosynthesis, and of the uptake of NO3-, NH4+ and serine, to irradiance was measured in diatom-dominated sea ice microbial assemblages from bottom ice and surface ice of McMurdo Sound. According to model predictions, uptake rates in the bottom ice assemblage were always limited by irradiance; neither light saturation nor photoinhibition regulated photosynthesis or DIN utilization in this assemblage. Conversely, photosynthesis in the surface ice assemblage was nearly always light-saturated, whereas DIN uptake was photo-inhibited near midday and saturated at the minimum irradiance. Integrated daily C:DIN uptake ratios (g:g) in the bottom ice and surface assemblages were 8.6 and 9.7, respectively, corresponding to particulate C:N ratios (g:g) of 8.1 and 5.8 for these respective diatom-dominated communities. Results indicate that information on diel patterns of photosynthesis and N uptake is required to evaluate accurately the stoichiometric balance of essential elements in sea ice microalgae. (Auth. mod.)

45-2670
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Squire, V.A.
Sea ice, Fast ice, Ice edge, Ice breakup, Ocean waves, Ice cover strength, Mathematical models, Ice water interface, Stress concentration.

45-2671
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Sea ice, Ice edge, Biomass, Photosynthesis, Ocean environments, Plankton, Ecosystems, Greenland Sea.

45-2672
K-u band airborne radar altimeter observations of marginal sea ice during the 1984 Marginal Ice Zone Experiment.
Drinkwater, M.R., *Journal of geophysical research*, Mar. 15, 1991, 96(C3), p.4555-4572, 44 refs.
Sea ice distribution, Airborne radar, Ice edge, Height finding, Ice surface, Ice conditions, Radar echoes, Backscattering.

45-2673
Numerical study of interannual ocean forcing on arctic ice.
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Semtner, A.J., Jr.
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45-2674
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Holt, B., Vachon, P.W.
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45-2675
Wind-induced mesoscale features in a coupled ice-ocean system.
Ikeda, M., *Journal of geophysical research*, Mar. 15, 1991, 96(C3), p.4623-4629, 11 refs.
Ocean currents, Sea ice distribution, Ice cover effect, Wind factors, Ice models, Ice water interface, Drift, Ice air interface.

45-2676
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Allard, R., Warn-Varnas, A.
Sea ice distribution, Ocean currents, Ice cover effect, Ice edge, Ice water interface, Ice models, Water temperature, Heat balance, Seasonal variations.

45-2677
Arctic snow and air temperature budget over sea ice during winter.
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Guest, P.S.
Sea ice, Ice cover effect, Air temperature, Snow temperature, Heat balance, Snow air interface, Boundary layer, Radiant cooling, Snow cover effect.

45-2678
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Boundary layer, Aerial surveys, Wind factors, Turbulence, Heat flux, Air masses, Gravity, Air temperature, Snow cover effect.

45-2679
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Sea ice distribution, Ocean currents, Ice edge, Topographic effects, Bottom topography, Ice floes, Drift, Ice water interface, Ice models.

45-2680
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Davidson, K.L.
Sea ice, Surface roughness, Air flow, Boundary layer, Ice air interface, Ice edge, Surface properties, Wind velocity, Velocity measurement.

45-2682
Two-dimensional thermodynamic model for sea ice advance and retreat in the Newfoundland marginal ice zone.
Tang, C.L., *Journal of geophysical research*, Mar. 15, 1991, 96(C3), p.4723-4737, 46 refs.
Sea ice distribution, Ice edge, Ice melting, Ice models, Heat flux, Ice water interface, Thermodynamics, Periodic variations, Pack ice, Water temperature.

45-2683
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Quadfasel, D., Warpakowski, A.
Ocean currents, Interfaces, Hydrography, Water temperature, Salinity, Biogeography, Convection, Temperature variations, Plankton, Greenland Sea.

45-2684
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Fowler, C.W., Hawkins, J., Preller, R.H.
Sea ice distribution, Drift, Spaceborne photography, Radiometry, Velocity measurement, Forecasting, Resolution, Wind factors, Ocean currents, Remote sensing.

45-2685
Turbulent mixing near the Yermak Plateau during the Coordinated Eastern Arctic Experiment.
Padman, L., et al, *Journal of geophysical research*, Mar. 15, 1991, 96(C3), p.4769-4782, 44 refs.
Dillon, T.M.
Ocean currents, Water temperature, Ice cover effect, Hydrography, Heat loss, Topographic effects, Subglacial observations, Ice water interface, Thermal diffusion, Turbulent flow.

45-2686
Evidence for stability enhancement of sea ice in the Greenland and Labrador Seas.
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Mysak, L.A., Myers, R.A.
Sea ice distribution, Convection, Ice formation, Hydrography, Salinity, Water temperature, Periodic variations, Correlation, Greenland Sea.

45-2687
Interannual variability of the spatial distribution of sea ice in the north polar region.
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Sea ice distribution, Periodic variations, Ice edge, Radiometry, Remote sensing, Climatic changes, Climatology, Microwaves.

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Observation of wave refraction at an ice edge by synthetic aperture radar.
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Sea ice, Ice growth, Pressure ridges, Ice models, Computerized simulation, Dynamic properties, Ice floes, Ice mechanics, Ice friction, Ice cover thickness.

45-2690
Sea ice thickness distribution in the northwestern Weddell Sea.
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Eicken, H.
Sea ice, Ice cover thickness, Snow depth, Variations, Surface roughness, Classifications, Statistical analysis, Profiles, Oceanographic surveys, Antarctica--Weddell Sea.
New data on distribution of snow and sea ice thicknesses in the northwestern Weddell Sea are presented, which were obtained through direct measurements along 19 profiles, each approximately 100 m long on 17 different floes located between 54-46W and 59-64S. The overall probability density functions (PDFs) for ice thicknesses reflect the complex mixture of first-, second-, and multi-year ice to be expected in the outflowing branch of the Weddell Gyre. Further differentiation of the data reveals four distinct thickness classes which represent strongly deformed first year ice, less deformed first- and second-year ice, and deformed second- or multi-year ice, respectively. Each of the classes is characterized by a specific set of quantities related to ice texture and surface snow characteristics, and by distinct PDFs for snow and ice thicknesses. In addition, geometric surface and bottom roughness characteristics differ significantly for each of the floe classes. (Auth. mod.)

45-2691
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Kivimaa, S.
Ice breaking, Ice cover strength, Ice loads, Mathematical models, Sea ice, Ships, Ice solid interface, Ice deformation.

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Mlakar, P.F.
Concrete durability, Frost action, Freeze thaw tests, Concrete structures, Statistical analysis.

45-2695
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Koval'chuk, A.I., ed, Sverdlovsk, UrO AN SSSR, 1990, 119p., In Russian. For selected papers see 45-2696 through 45-2716.
Ice caves, Caves, Microclimatology, Air temperature, Thermal regime, Karst, Rocks, Frozen rocks.

45-2696
Rocks—accumulators of cold. [Gornye porody—akkumuliatory kholoda],
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IUrganov, M.M.
Thermal properties, Thermal conductivity, Moisture transfer, Unfrozen water content, Rock mechanics.

45-2697
Basic conditions for the formation and preservation of ice in caves, abandoned mining excavations, and talus. [Osnovnye usloviia obrazovaniia i sokhraneniia l'da v peshcherakh, zabroshennykh gornykh vyrabotkakh i kamennykh osypiakh],
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Ice formation, Ice formation indicators, Caves, Excavation, Talus, Ice caves.

45-2698
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Ice caves, Ice crystals, Permafrost, Ground ice.

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Ice caves, Temperature variations, Ice formation, Air temperature.

45-2700
Interrelationship between air temperature, rocks, and ground water in the Kungur cave. [Vzaimosviaz' temperatury vozdukha, gornykh porod i podzemnykh vod Kungurskoĭ peshchery],
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Air temperature, Ground water, Frozen rock temperature, Ice caves, Seasonal variations.

45-2701
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Caves, Ice caves.

45-2702
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Ice caves, Thermal regime, Tunnels, Karst.

45-2703
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Microclimatology, Caves.

45-2704
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Microclimatology, Karst, Ice melting.

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Temperature variations, Permafrost.

45-2706
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Thermal regime, Cryogenic structures, Frozen rocks, Sediments.

45-2707
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Microclimatology, Caves, Blowing snow.

45-2708
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Microclimatology, Karst, Caves, Air temperature, Snow, Ice.

45-2709
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Microclimatology, Caves, Air temperature, Ice.

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Thermal regime, Ice caves, Subglacial caves.

45-2711
Modelling the accumulation of winter cold in rocks. [Modelirovanie akkumuliatsii zimnego kholoda v gornykh porodakh],
Ezhov, IU.A., Problemy geometeorologii i akkumuliatsii zimnego kholoda. Sbornik nauchnykh trudov (Problems in geometeorology and the accumulation of winter cold. Collected scientific papers). Edited by A.I. Koval'chuk, Sverdlovsk, UrO AN SSSR, 1990, p.79-87, In Russian. 4 refs.
Models, Rocks, Ice caves, Air temperature.

45-2712
Calculating thermal economy in horizontal mine shafts. [K raschetu teplooborotov v gorizontal'nykh gornykh vyrabotkakh],
IUrganov, M.M., et al, Problemy geometeorologii i akkumuliatsii zimnego kholoda. Sbornik nauchnykh trudov (Problems in geometeorology and the accumulation of winter cold. Collected scientific papers). Edited by A.I. Koval'chuk, Sverdlovsk, UrO AN SSSR, 1990, p.88-89, In Russian. 1 ref.
Orzhekhovskiĭ, IU.R.
Analysis (mathematics), Heat balance, Heat capacity, Frozen ground thermodynamics, Mine shafts.

45-2713
Air circulation in embankments in western Yakutia.
[Tsirkuliatsiia vozdukha v nasypiakh Zapadnoĭ [Akutii].
Olovin, B.A., Problemy geometeorologii i akkumuliatsii zimnego kholoda. Sbornik nauchnykh trudov (Problems in geometeorology and the accumulation of winter cold. Collected scientific papers). Edited by A.I. Koval'chuk, Sverdlovsk, UrO AN SSSR, 1990, p.92-94, In Russian. 4 refs.
Atmospheric circulation, Embankments, Permafrost physics.

45-2714
Thermal regime of clayey soils at the weather station base of Kungur station. [Temperaturnyĭ rezhim glinistykh gruntov na ploshchadke meteostantsii Kungurskogo stantsionara].
Lukin, A.V., Problemy geometeorologii i akkumuliatsii zimnego kholoda. Sbornik nauchnykh trudov (Problems in geometeorology and the accumulation of winter cold. Collected scientific papers). Edited by A.I. Koval'chuk, Sverdlovsk, UrO AN SSSR, 1990, p.95-97, In Russian. 2 refs.
Thermal regime, Clay soils, Frozen ground temperature.

45-2715
Using natural cold in automated underground cold storage areas. [Ispol'zovanie prirodnogo kholoda v podzemnykh mashinnykh kholodil'nikakh].
Kuz'min, M.P., et al, Problemy geometeorologii i akkumuliatsii zimnego kholoda. Sbornik nauchnykh trudov (Problems in geometeorology and the accumulation of winter cold. Collected scientific papers). Edited by A.I. Koval'chuk, Sverdlovsk, UrO AN SSSR, 1990, p.98-100, In Russian.
Bobkov, V.A., Gindlin, I.M.
Cold storage, Cost analysis, Frozen cargo, Underground storage.

45-2716
Natural air conditioning in the Kungur Ice Cave.
[Estestvennoe konditsirovanie vozdukha v Kungurskoĭ ledianoĭ peshchere].
Vishnevskaia, N.L., et al, Problemy geometeorologii i akkumuliatsii zimnego kholoda. Sbornik nauchnykh trudov (Problems in geometeorology and the accumulation of winter cold. Collected scientific papers). Edited by A.I. Koval'chuk, Sverdlovsk, UrO AN SSSR, 1990, p.104-105, In Russian. 5 refs.
Kichigin, V.A.
Ice caves, Air conditioning.

45-2717
Ice Technology for Polar Operations: proceedings of the 2nd international conference.
International Conference on Ice Technology, 2nd, Cambridge, England, Sep. 18-20, 1990, Southampton, England, Computational Mechanics Publications, 1990, 426p., Refs. passim. For individual papers see 45-2718 through 45-2748.
Murthy, T.K.S., ed, Paren, J.G., ed, Sackinger, W.M., ed, Wadhams, P., ed.
Meetings, Sea ice, Ice navigation, Ice forecasting, Icebreakers, Ice solid interface, Drift, Marine transportation, Safety, Remote sensing, Radar photography, Ice floes, Ice acoustics, Underwater acoustics, Side looking radar.

45-2718
Ice thickness distribution in the Arctic Ocean.
Wadhams, P., International Conference on Ice Technology, 2nd, Cambridge, England, Sep. 18-20, 1990. Proceedings. Edited by T.K.S. Murthy, J.G. Paren, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1990, p.3-20, 40 refs.
Sea ice, Ice cover thickness, Distribution, Ice surface, Statistical analysis, Surface roughness, Periodic variations, Arctic Ocean.

45-2719
Wave structure in the seas off an ice edge.
Squire, V.A., et al, International Conference on Ice Technology, 2nd, Cambridge, England, Sep. 18-20, 1990. Proceedings. Edited by T.K.S. Murthy, J.G. Paren, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1990, p.21-32, 16 refs.
Fox, C.
Ocean waves, Wave propagation, Reflection, Sea ice, Ice cover effect, Ice edge, Surface structure, Analysis (mathematics).

45-2720
Wave energy and floe collisions in marginal ice zones.
McKenna, R.F., et al, International Conference on Ice Technology, 2nd, Cambridge, England, Sep. 18-20, 1990. Proceedings. Edited by T.K.S. Murthy, J.G. Paren, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1990, p.33-45, 17 refs.
Crocker, G.B.
Sea ice, Ice floes, Impact strength, Ocean waves, Ice edge, Ice mechanics, Attenuation, Ice deformation, Mathematical models.

45-2721
Dynamic forces induced by buckling failure of moving ice.
Vinogradov, O.G., et al, International Conference on Ice Technology, 2nd, Cambridge, England, Sep. 18-20, 1990. Proceedings. Edited by T.K.S. Murthy, J.G. Paren, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1990, p.49-60, 11 refs.
Vinogradov, A.M.
Ice solid interface, Ice floes, Ice breaking, Dynamic loads, Computerized simulation, Ice mechanics, Ice models.

45-2722
Multi-national, interdisciplinary arctic experiments: planning, logistics and operations coordination.
Horn, D.A., International Conference on Ice Technology, 2nd, Cambridge, England, Sep. 18-20, 1990. Proceedings. Edited by T.K.S. Murthy, J.G. Paren, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1990, p.65-78, 7 refs.
Research projects, Oceanography, Organizations, Sea ice, Ice edge, International cooperation, Arctic Ocean.

45-2723
Measurements of the DC resistivity of annual sea ice.
Sackinger, W.M., et al, International Conference on Ice Technology, 2nd, Cambridge, England, Sep. 18-20, 1990. Proceedings. Edited by T.K.S. Murthy, J.G. Paren, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1990, p.79-89, 13 refs.
Rogers, D.C.
Sea ice, Ice electrical properties, Electrical measurement, Electrical resistivity, Temperature effects, Brines.

45-2724
Examination of the semi-brittle uniaxial and triaxial deformation behaviour of polycrystalline ice using acoustic emission measurement techniques.
Rist, M.A., et al, International Conference on Ice Technology, 2nd, Cambridge, England, Sep. 18-20, 1990. Proceedings. Edited by T.K.S. Murthy, J.G. Paren, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1990, p.91-102, 32 refs.
Murrell, S.A.F.
Ice crystals, Ice deformation, Ice acoustics, Acoustic measurement, Mechanical properties, Cracking (fracturing), Microstructure.

45-2725
On the ductile to brittle transition in ice under compression: physical processes.
Schulson, E.M., International Conference on Ice Technology, 2nd, Cambridge, England, Sep. 18-20, 1990. Proceedings. Edited by T.K.S. Murthy, J.G. Paren, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1990, p.103-114, 21 refs.
Ice plasticity, Ice cracks, Crack propagation, Brittleness, Rheology, Ice crystals, Strain tests, Ice mechanics, Compressive properties.

45-2726
Environmental aspects on the development of hydrocarbon resources in the arctic seas.
Jumppanen, P., International Conference on Ice Technology, 2nd, Cambridge, England, Sep. 18-20, 1990. Proceedings. Edited by T.K.S. Murthy, J.G. Paren, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1990, p.117-130, 8 refs.
Ocean environments, Hydrocarbons, Petroleum industry, Exploration, Environmental impact, Economic development, Climatic changes.

45-2727
Dynamics, flexural response, and damage of ships in ice.
Vaughan, H., et al, International Conference on Ice Technology, 2nd, Cambridge, England, Sep. 18-20, 1990. Proceedings. Edited by T.K.S. Murthy, J.G. Paren, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1990, p.133-144, 9 refs.
Asadi, G.V.
Ships, Ice floes, Ice solid interface, Damage, Impact strength, Flexural strength, Dynamic loads, Mathematical models.

45-2728
Icebreaker manoeuvrability.
Peirce, T.H., et al, International Conference on Ice Technology, 2nd, Cambridge, England, Sep. 18-20, 1990. Proceedings. Edited by T.K.S. Murthy, J.G. Paren, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1990, p.145-154, 1 ref.
Hart, A.L.
Icebreakers, Design, Performance, Ice cover effect, Structural analysis.

45-2729
Model tests of a naval combatant in broken ice fields.
Thomas, W.L., III, et al, International Conference on Ice Technology, 2nd, Cambridge, England, Sep. 18-20, 1990. Proceedings. Edited by T.K.S. Murthy, J.G. Paren, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1990, p.155-165, 13 refs.
Schultz, L.A.
Ships, Floating ice, Ice edge, Military research, Performance, Impact strength, Simulation, Design, Ice solid interface.

45-2730
***Design features and operation capability of the new* US antarctic research vessel.**
Kennedy, H., et al, International Conference on Ice Technology, 2nd, Cambridge, England, Sep. 18-20, 1990. Proceedings. Edited by T.K.S. Murthy, J.G. Paren, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1990, p.167-176, 1 ref.
Voelker, R.P., St. John, J.W.
Icebreakers, Design, Design criteria, Performance, Oceanography.
A new research vessel with ice breaking capability has been designed and is currently under construction for long term charter to support the U.S. Antarctic Program. The program plan is for the vessel to operate in the Antarctic throughout the entire year as a marine research platform in regions around the antarctic continent. This paper describes the vessel, its mission profile, operational performance requirements and the environmental conditions it is likely to encounter. (Auth. mod.)

45-2731
Mathematical model for predicting icebreaker performance.
Carter, D., et al, International Conference on Ice Technology, 2nd, Cambridge, England, Sep. 18-20, 1990. Proceedings. Edited by T.K.S. Murthy, J.G. Paren, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1990, p.177-192, 18 refs. For another version see 42-1557.
Laframboise, J., Peirce, T.
Icebreakers, Performance, Mathematical models, Design, Ice solid interface, Computerized simulation, Ice cover strength.

45-2732
Practical scenarios and force determinations for iceberg impact on fixed structures.
Gerwick, B.C., Jr., International Conference on Ice Technology, 2nd, Cambridge, England, Sep. 18-20, 1990. Proceedings. Edited by T.K.S. Murthy, J.G. Paren, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1990, p.195-210, 13 refs.
Icebergs, Offshore structures, Ice solid interface, Impact strength, Forecasting, Ice loads, Design.

45-2733
Interaction of arctic offshore structures with drifting ice islands and thick sea ice floes.
Sackinger, W.M., et al, International Conference on Ice Technology, 2nd, Cambridge, England, Sep. 18-20, 1990. Proceedings. Edited by T.K.S. Murthy, J.G. Paren, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1990, p.211-228, 23 refs.
Jeffries, M.O., Li, F.C., Lu, M.C.
Sea ice, Ice floes, Offshore structures, Ice solid interface, Drift, Ice islands, Countermeasures.

45-2734
Service temperature of steel in cold climates.
Huther, M., et al, International Conference on Ice Technology, 2nd, Cambridge, England, Sep. 18-20, 1990. Proceedings. Edited by T.K.S. Murthy, J.G. Paren, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1990, p.229-239, 10 refs.
Regrettier, J.F.
Steels, Cold weather performance, Air temperature, Surface temperature, Cracking (fracturing), Temperature effects, Climatic factors, Heat transfer, Brittleness, Safety.

45-2735
Analysis of ice island dynamics.
Lu, M.C., et al, International Conference on Ice Technology, 2nd, Cambridge, England, Sep. 18-20, 1990. Proceedings. Edited by T.K.S. Murthy, J.G. Paren, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1990, p.241-256, 15 refs.
Sackinger, W.M., Li, F.C.
Sea ice, Ice islands, Drift, Wind factors, Velocity measurement, Shear stress, Ice water interface, Ice forecasting, Analysis (mathematics).

45-2736
Technological possibility of safe convoy of non-ice class ships along the Northern Sea Route.
Arikainen, A.I., et al, International Conference on Ice Technology, 2nd, Cambridge, England, Sep. 18-20, 1990. Proceedings. Edited by T.K.S. Murthy, J.G. Paren, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1990, p.259-267, 2 refs.
Kossov, O.A.
Ships, Icebreakers, Ice navigation, Design, Marine transportation, Safety, Economics.

45-2737
Polar ice-breaker caught in active shear ridge.
Voelker, R.P., et al, International Conference on Ice Technology, 2nd, Cambridge, England, Sep. 18-20, 1990. Proceedings. Edited by T.K.S. Murthy, J.G. Paren, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1990, p.269-281, 2 refs.
Seibold, F.
Icebreakers, Ice navigation, Rescue operations, Ice conditions, Pressure ridges, Ice cover strength, Damage, Performance.

45-2738
Ramming icebreaking performance of the USCG polar class icebreakers.
Minnick, P.V., et al, International Conference on Ice Technology, 2nd, Cambridge, England, Sep. 18-20, 1990. Proceedings. Edited by T.K.S. Murthy, J.G. Paren, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1990, p.283-294, 5 refs.
St. John, J.W., Voelker, R.P., Forhan, T.
Icebreakers, Performance, Impact tests, Ice solid interface, Ice cover strength, Design criteria, Mathematical models.
Ramming mode icebreaking tests were performed in the thick level ice of McMurdo Sound during Jan. 1989. The test objective was to collect an adequate set of full-scale data for the development of a mathematical model which could be used to predict an icebreaker's overall speed of advance while ramming. The tests were conducted with the U.S. Coast Guard icebreaker *Polar Sea in level ice, ranging in thickness from* 4 to 8 feet, with impact speeds of 1 to 9 knots. 91 ramming mode data points were obtained and correlated with the measured ice thickness and strength data. The method of analyzing the full-scale data is presented. (Auth. mod.)

45-2739
Probabilistic concept of safe speeds for arctic shipping.
Tunik, A.L., et al, International Conference on Ice Technology, 2nd, Cambridge, England, Sep. 18-20, 1990. Proceedings. Edited by T.K.S. Murthy, J.G. Paren, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1990, p.295-306, 14 refs.
Kheisin, D.E., Kurdiumov, V.A.
Sea ice, Ships, Ice navigation, Impact, Damage, Velocity, Safety, Ice conditions, Design criteria, Ice solid interface.

45-2740
Ice conditions in the Barents Sea during SIZEX 89.
Sandven, S., et al, International Conference on Ice Technology, 2nd, Cambridge, England, Sep. 18-20, 1990. Proceedings. Edited by T.K.S. Murthy, J.G. Paren, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1990, p.309-320, 5 refs.
Johannessen, O.M.
Sea ice, Ice surveys, Ice conditions, Oceanography, Remote sensing, Drift stations, Barents Sea.

45-2741
Near-real-time, synthetic aperture radar detection of a calving event at the Milne Ice Shelf, N.W.T. and the contribution of offshore winds.
Jeffries, M.O., et al, International Conference on Ice Technology, 2nd, Cambridge, England, Sep. 18-20, 1990. Proceedings. Edited by T.K.S. Murthy, J.G. Paren, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1990, p.321-331, 14 refs.
Sackinger, W.M.
Sea ice, Ice shelves, Radar photography, Calving, Pack ice, Drift, Side looking radar, Synthetic aperture radar, Wind factors, Ice conditions.

45-2742
Overview of the geophysical sea ice products generated at the Alaska SAR facility.
Holt, B., et al, International Conference on Ice Technology, 2nd, Cambridge, England, Sep. 18-20, 1990. Proceedings. Edited by T.K.S. Murthy, J.G. Paren, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1990, p.333-344, 5 refs.
Kwok, R., Carsey, F., Curlander, J.
Sea ice, Side looking radar, Ice conditions, Synthetic aperture radar, Radar photography, Spaceborne photography, Ice surveys, Radar tracking, Data processing, Classifications, Drift, Ocean waves

45-2743
Radio scattering characteristics of the Roi Baudouin ice shelf, East Antarctica.
Uratsuka, S., et al, International Conference on Ice Technology, 2nd, Cambridge, England, Sep. 18-20, 1990. Proceedings. Edited by T.K.S. Murthy, J.G. Paren, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1990, p.345-351, 8 refs.
Nishio, F., Mae, S.
Sea ice, Ice shelves, Ice bottom surface, Radio echo soundings, Scattering, Ice water interface, Mass balance, Antarctica—Breid Bay.
This paper discusses bottom features of the Roi Baudouin ice shelf, East Antarctica, which were revealed by analyzing radio echo sounding data. Smoothness of the ice shelf bottom is inferred from the coherent component of scattering characteristics. Coastal regions have a higher number of smooth bottom features than near continental areas, which suggests that the interaction between sea water and ice shelf bottom is associated with the distance from the grounding line. Furthermore, at the coastal edge of the shelf where echoes from the bottom have strong specular scattering, double trip scattering echoes were observed. This suggests that power losses due to specular scattering are low. (Auth. mod.)

45-2744
Surface radar investigations of an icing mound on the Sagavanirktok River, Alaska.
Arcone, S.A., et al, MP 2872, International Conference on Ice Technology, 2nd, Cambridge, England, Sep. 18-20, 1990. Proceedings. Edited by T.K.S. Murthy, J.G. Paren, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1990, p.353-363, 9 refs.
Chacho, E.F., Jr., Collins, C.M., Delaney, A.J.
River ice, Frost mounds, Water storage, Detection, Radar echoes, Ice surveys, Ice water interface, Subsurface investigations, Water reserves.
A short-pulse radar survey was carried out on the surface of a water-bearing icing mound on the Sagavanirktok River on Alaska's North Slope in Apr., 1989. The purpose was to map the extent of the subsurface water-filled cavity contained within the icing mound formation. Such mounds represent a possible winter water resource for exploration and development activities. The investigated mound was approximately 2.3 m high and over 110 m long. All radar profiles, made both parallel and perpendicular to the long axis of the mound, recorded water surface reflections, but only along the ends of the longitudinal profile were reflections received from the bottom of the water cavity, apparently rugged bottom relief prevented signals from being received from the water bottom. Snow depth and ice surface elevation were measured along all cross sections, and ice thickness and water depth were measured at a few locations along the cross sections. The radar data were then used with the drilling data to estimate the shape and dimensions of the water cavity. It appears that the mound was located in a small meander bend of one of the channels, with the cavity positioned over the pool and extending to the riffles at both ends. The water volume is estimated at about 900 cu m.

45-2745
Multi-frequency imaging radar polarimetry of sea ice.
Drinkwater, M.R., International Conference on Ice Technology, 2nd, Cambridge, England, Sep. 18-20, 1990. Proceedings. Edited by T.K.S. Murthy, J.G. Paren, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1990, p.365-376, 12 refs.
Sea ice, Radar photography, Radar echoes, Ice surveys, Polarization (waves), Backscattering, Side looking radar, Synthetic aperture radar, Surface structures, Ice surface, Airborne radar.

45-2746
Design and development of an operational sea ice forecasting system for the Barents Sea.
Preller, R., et al, International Conference on Ice Technology, 2nd, Cambridge, England, Sep. 18-20, 1990. Proceedings. Edited by T.K.S. Murthy, J.G. Paren, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1990, p.379-393, 10 refs.
Posey, P.
Sea ice distribution, Ice models, Ice forecasting, Ice conditions, Drift, Ice cover thickness, Oceanography, Meteorological data.

45-2747
Deployment strategy for satellite tracked drifters to support iceberg drift forecasting.
El-Tahan, M., et al, International Conference on Ice Technology, 2nd, Cambridge, England, Sep. 18-20, 1990. Proceedings. Edited by T.K.S. Murthy, J.G. Paren, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1990, p.395-411, 15 refs.
Sanderson, B., Venkatesh, S.
Sea ice distribution, Icebergs, Drift, Ice forecasting, Drift stations, Remote sensing, Ocean currents, Oceanography.

45-2748
Influence of sea ice on ocean ambient sound.
Sagen, H., et al, International Conference on Ice Technology, 2nd, Cambridge, England, Sep. 18-20, 1990. Proceedings. Edited by T.K.S. Murthy, J.G. Paren, W.M. Sackinger and P. Wadhams, Southampton, England, Computational Mechanics Publications, 1990, p.415-426, 12 refs.
Johannessen, O.M., Sandven, S.
Sea ice, Acoustic measurement, Ice edge, Underwater acoustics, Sound transmission, Ice cover effect, Ice conditions, Correlation.

45-2749
Sloping land with snow and ice.
Lang, H., Comparative hydrology; an ecological approach to land and water resources. Edited by M. Falkenmark and T. Chapman, Paris, UNESCO, 1989, p.146-162, Refs. p.429-473.
DLC GB661.2.C66 1989
Mountains, Snow hydrology, Glacial hydrology, Runoff.

45-2750
Flatlands with snow and ice.
Chernogaeva, G.M., Comparative hydrology; an ecological approach to land and water resources. Edited by M. Falkenmark and T. Chapman, Paris, UNESCO, 1989, p.324-331, Refs. p.429-473.
DLC GB661.2.C66 1989
Tundra, Hydrology, Plains, Snow cover, Runoff, River ice.

45-2751
Humid temperate flatlands.
Chernogaeva, G.M., Comparative hydrology; an ecological approach to land and water resources. Edited by M. Falkenmark and T. Chapman, Paris, UNESCO, 1989, p.332-337, Refs. p.429-473.
DLC GB661.2.C66 1989
Taiga, Hydrology, Plains, Frozen ground, Runoff.

45-2752
Snow hydrology.
Brooks, K.N., et al, Hydrology and the management of watersheds, Ames, Iowa State University Press, 1991, p.262-286, 380-381, 9 refs.
Ffolliott, P.F., Gregersen, H.M., Thames, J.L.
DLC TC409.H93 1991
Snow hydrology, Snow water equivalent, Snowmelt, Analysis (mathematics), Runoff forecasting, Watersheds

45-2753
Relationships between weather and road safety: past and future research directions.
Andrey, J., et al, *Climatological bulletin*, Dec. 1990, 4(3), p.123-137, With French summary. 42 refs.
Olley, R.
Roads, Safety, Climatic factors, Research projects, Climatology.

45-2754
Study of the cold wave phenomenon in Quebec as a natural catastrophe. [Étude du phénomène des vagues de froid au Québec en tant que catastrophe naturelle].
Lacroix, J., et al, *Climatological bulletin*, Dec. 1990, 24(3), p.138-157, In French with English summary. 9 refs.
Boivin, D.J.
Air temperature, Records (extremes), Periodic variations, Wind factors, Air flow, Meteorological data, Statistical analysis.

45-2755
Change in frost season characteristics in Winnipeg, 1872-1988.
Rannie, W.F., *Climatological bulletin*, Dec. 1990, 24(3), p.168-177, With French summary. 9 refs.
Freezing points, Air temperature, Seasonal variations, Climatic changes, Statistical analysis, Meteorological data, Canada—Ontario—Winnipeg.

45-2756
Determining the specific active area of scattering of a probed surface according to data from the Kosmos-1500 satellite side-look radar. [Opredelenie udel'noĭ effektivnoĭ ploshchadi rasseianiia zondiruemoĭ poverkhnosti po dannym RLS BO ISZ tipa "Kosmos-1500"].
Milekhin, O.E., et al, *Leningrad. Gosudarstvennyĭ nauchno-issledovatel'skiĭ tsentr izucheniia prirodnykh resursov. Trudy*, 1989, Vol.33, p.104-113, In Russian. 4 refs.
Popov, V.I., Spiridonov, IU.G., Vol'pian, G.V.
Spacecraft, Scattering, Analysis (mathematics), Glaciers, Sea ice, Ice shelves, Side looking radar, Synthetic aperture radar, Antarctica—Ronne Ice Shelf, Antarctica—Filchner Ice Shelf, Antarctica—Antarctic Peninsula.
Characteristics of the formation of radar images are reviewed, and a method is described for using the data in the determination of the magnitude of the specific active area of scattering. Some drawbacks of the method are considered. The process is illustrated with graphs of glacier and sea ice profiles and radar images of the Antarctic Peninsula and the Ronne and Filchner Ice Shelves obtained by Kosmos-1500 in Feb. 1986.

45-2757
Characteristics of external calibration of the Kosmos-1500 satellite side-look radar. [Ob osobennostiakh vneshneĭ kalibrovki RLS BO ISZ tipa "Kosmos-1500"].
Bukharov, M.V., et al, *Leningrad. Gosudarstvennyĭ nauchno-issledovatel'skiĭ tsentr izucheniia prirodnykh resursov. Trudy*, 1989, Vol.33, p.114-125, In Russian. 9 refs.
Spiridonov, IU.G.
Spacecraft, Ice shelves, Sea ice, Radar echoes, Side looking radar, Synthetic aperture radar.
The features of the variability of radar signals specific to the arctic perennial ice and to antarctic ice shelves are analyzed. The conditions are determined in which external calibration of the radar signal requires a supplementary procedure for every measuring session. The relationship is established between highly contrasting radar signals and the different humidity levels of compact, perennial ice during the summer and fall periods.

45-2758
Creating a computer radar map of Antarctica. [Avtomatizirovannoe postroenie radiolokatsionnoĭ karty Antarktidy].
Spiridonov, IU.G., et al, *Leningrad. Gosudarstvennyĭ nauchno-issledovatel'skiĭ tsentr izucheniia prirodnykh resursov. Trudy*, 1989, Vol.33, p.126-134, In Russian. 4 refs.
Milekhin, O.E., Popov, V.I., Sizenova, E.A.
Spaceborne photography, Mapping, Maps, Computer applications, Radar photography, Side looking radar, Synthetic aperture radar, Antarctica.
The first variant of a digital radar map, compiled from data obtained by Kosmos-1500, is discussed and illustrated. The method used in the process is described, and a preliminary feature analysis of the map is presented. Values of specific active area of scattering for 7 different antarctic regions are shown in a table.

45-2759
Experience in using satellite radar images for ice navigation. [Opyt ispol'zovaniia sputnikovykh radiolokatsionnykh izobrazheniĭ dlia obespecheniia ledovogo plavaniia].
Nikitin, P.A., et al, *Leningrad. Gosudarstvennyĭ nauchno-issledovatel'skiĭ tsentr izucheniia prirodnykh resursov. Trudy*, 1989, Vol.33, p.135-141, In Russian. 6 refs.
Ice navigation, Spacecraft, Radar photography, Spaceborne photography.

45-2760
Icebergs as oceanographic tracers (in the example of the Weddell Sea in Antarctica). [Aĭsbergi kak okeanograficheskie trassery (na primere moria Ueddella v Antarktike)].
Nazirov, M., *Leningrad. Gosudarstvennyĭ nauchno-issledovatel'skiĭ tsentr izucheniia prirodnykh resursov. Trudy*, 1989, Vol.33, p.142-148, In Russian. 6 refs.
Icebergs, Oceanography, Drift, Hydrothermal processes, Thermodynamics, Antarctica—Weddell Sea.
Data are presented confirming that the use of drifting ice, in the capacity of freely floating tracers, helps to discover new aspects of global and regional mechanisms of hydrothermal processes, and to specify the genetic interrelationship between the local and global manifestation of those mechanisms.

45-2761
Predicting the durability of paving bricks.
Winslow, D., *Journal of testing and evaluation*, Jan. 1991, 19(1), p.29-33, 2 refs.
Pavements, Bricks, Frost resistance, Porosity, Freeze thaw cycles, Forecasting, Cold weather performance, Subsurface drainage.

45-2762
Water thermal storage with solidification.
Chen, S.L., et al, *Heat recovery systems & CHP*, 1991, 11(1), p.79-90, 6 refs.
Yue, J.S.
Ice (water storage), Heat recovery, Freezing, Air conditioning, Heat transfer, Liquid cooling, Analysis (mathematics), Ice thermal properties, Phase transformations

45-2763
Prediction of depolarisation distributions on earth-space paths.
Fukuchi, H., *IEE proceedings. Microwaves, antennas and propagation*, Dec. 1990, 137H(6), p.325-330, 11 refs.
Radio communication, Radio waves, Polarization (waves), Attenuation, Precipitation (meteorology), Ice crystals.

45-2764
Ice measurements by GEOSAT radar altimetry.
Zwally, H.J., et al, *Johns Hopkins APL technical digest*, 1987, 8(2), p.251-254, 11 refs.
Major, J.A., Brenner, A.C., Bindschadler, R.A.
Ice sheets, Topographic surveys, Spacecraft, Radar echoes.
The surface topography of the Greenland and antarctic ice sheets is the principal ice parameter obtainable from satellite radar altimetry. The improved ability of the GEOSAT altimeter to follow irregular surfaces and its extended operation have greatly increased the available topographic data on ice sheets for the study of ice dynamics and the possible detection of changes in global ice volume. (Auth.)

45-2765
Annual report 1990.
Canada. Environmental Studies Research Funds, Ottawa, Feb. 1991, 17p., With French version separately paged. 106 refs.
Research projects, Environmental impact, Oil spills, Icebergs, Ice scoring, Bibliographies, Canada.

45-2766
Hydrologic bibliography of Switzerland for 1989. [Hydrologische Bibliographie der Schweiz für das Jahr 1989].
Sevruk, B., et al, *Bibliographia scientiae naturalis Helvetica*, 1989, Vol.65, p.145-164, Citations in German, French, English, and Italian.
Caflisch, A.
Bibliographies, Avalanches, Hydrology.

45-2767
Hydrology of disasters.
Starosolszky, Ö., ed, London, James and James, 1989, 319p., Refs. passim. Proceedings of the Technical Conference in Geneva organized by the World Meteorological Organization, Nov. 1988. For selected papers see 45-2768 through 45-2772.
Melder, O.M., ed.
DLC GB5001.H93 1989
Floods, Avalanches, Snowmelt, Meltwater, Mudflows, Hydrology.

45-2768
Morphological changes in the Swiss Alps resulting from the 1987 summer storms.
Naef, F., et al, Hydrology of disasters. Edited by Ö. Starosolszky and O.M. Melder, London, James and James, 1989, p.36-42.
Haeberli, W., Jäggi, M.
DLC GB5001.H93 1989
Floods, Avalanche erosion, Water erosion, Valleys, Geomorphology, Mudflows, Avalanche deposits, Switzerland—Alps.

45-2769
Hazardous hydrologic consequences of volcanic eruptions and goals for mitigative action: an overview.
Pierson, T.C., Hydrology of disasters. Edited by Ö. Starosolszky and O.M. Melder, London, James and James, 1989, p.220-236, 86 refs.
DLC GB5001.H93 1989
Volcanoes, Avalanche triggering, Floods, Mudflows.

45-2770
Non-meteorological flood disasters in Chile.
Peña, H., et al, Hydrology of disasters. Edited by Ö. Starosolszky and O.M. Melder, London, James and James, 1989, p.243-258, 27 refs.
Klohn, W.
DLC GB5001.H93 1989
Floods, Glacial lakes, Lake bursts, Volcanoes, Mudflows, Landslides, Chile.

45-2771
Hydrological consequences of snow avalanches.
Martinec, J., Hydrology of disasters. Edited by Ö. Starosolszky and O.M. Melder, London, James and James, 1989, p.284-293, 7 refs.
DLC GB5001.H93 1989
Avalanches, Avalanche deposits, Snowmelt, Runoff.

45-2772
Hazards to water resources development in high mountain regions. The Himalayan sources of the Indus.
Hewitt, K., Hydrology of disasters. Edited by Ö. Starosolszky and O.M. Melder, London, James and James, 1989, p.294-312, 29 refs.
DLC GB5001.H93 1989
Water supply, Snowmelt, Meltwater, Avalanches, Floods, Mountains, Indus River.

45-2773
Long-term compressive strength of silica-fume concrete.
Aïtcin, P.C., et al, *Journal of materials in civil engineering*, Aug. 1990, 2(3), p.164-170, 12 refs.
Laplante, P.
Concrete strength, Concrete admixtures, Compressive properties, Freeze thaw cycles, Cold weather performance, Construction materials.

45-2774
Study of frost melting on a heat pump heat exchanger.
Sugawara, M., et al, *Heat transfer—Japanese research*, 1990, 19(6), p.570-583, Translated from Japan Society of Mechanical Engineers. Transactions, Vol.55B, 1989. 3 refs.
Frost, Ice melting, Air conditioning, Defrosting, Fluid flow, Temperature effects, Ice solid interface, Heat flux.

45-2775
Inelastic incoherent neutron scattering study of ice II, IX, V, and VI—in the range from 2 to 140 meV.
Li, J.-C., et al, *Journal of chemical physics*, May 15, 1991, 94(10), p.6770-6775, 26 refs.
High pressure ice, Neutron probes, Neutron scattering, Molecular structure, Spectra, Ice physics, Latticed structures, Molecular energy levels.

45-2776
Density, structural lifetime, and entropy of H-bond cages promoted by monohydric alcohols in normal and supercooled water.
Bulone, D., et al, *Journal of chemical physics*, May 15, 1991, 94(10), p.6816-6826, 48 refs.
Donato, I.D., Palma-Vittorelli, M.B., Palma, M.U.
Water structure, Supercooling, Solutions, Density (mass/volume), Temperature effects, Hydrogen bonds, Thermodynamics, Molecular structure.

45-2777
Electron diffraction studies of the kinetics of phase changes in molecular clusters. Freezing of CCl4 in supersonic flow.
Bartell, L.S., et al, *Journal of physical chemistry*, Feb. 7, 1991, 95(3), p.1159-1167, 57 refs.
Dibble, T.S.
Organic nuclei, Vapor diffusion, Phase transformations, Freezing, Molecular structure, Homogeneous nucleation, Supercooling, Freezing rate, Spectra, Low temperature research.

45-2778
Glacimarine environments: processes and sediments.
Dowdeswell, J.A., ed, Geological Society. Special publication No.53, London, Geological Society, 1990, 423p., Refs. passim. For selected papers see 45-2779 through 45-2786.
Scourse, J.D., ed.
Sedimentation, Sediment transport, Glacial deposits, Marine deposits, Marine geology, Glacier melting, Meltwater, Oceanography, Bottom sediment, Ice water interface, Ice rafting, Suspended sediments, Estuaries, Ice shelves.

45-2779
On the description and modelling of glacimarine sediments and sedimentation.
Dowdeswell, J.A., et al, Glacimarine environments: processes and sediments. Edited by J.A. Dowdeswell and J.D. Scourse. Geological Society. Special publication No.53, London, Geological Society, 1990, p.1-13, Refs. p.11-13.
Scourse, J.D.
Marine geology, Marine deposits, Glacial deposits, Sedimentation, Sediment transport, Models, Bottom sediments, Ice floes, Oceanography.

45-2780
Sedimentary and sea level changes during glacial cycles and their control on glacimarine facies architecture.
Boulton, G.S., Glacimarine environments: processes and sediments. Edited by J.A. Dowdeswell and J.D. Scourse. Geological Society. Special publication No.53, London, Geological Society, 1990, p.15-52, 58 refs.
Marine geology, Glacier oscillation, Sea level, Isostasy, Sedimentation, Sediment transport, Marine deposits, Ocean currents, Glacial deposits, Calving.

45-2781
Glacimarine processes at grounding-line fans and their growth to ice-contact deltas.
Powell, R.D., Glacimarine environments: processes and sediments. Edited by J.A. Dowdeswell and J.D. Scourse. Geological Society. Special publication No.53, London, Geological Society, 1990, p.53-73, 60 refs.
Marine geology, Marine deposits, Glacier melting, Meltwater, Subglacial drainage, Deltas, Grounded ice, Outwash, Turbidity, Ice water interface.

45-2782
Suspended sediment transport and deposition of cyclically interlaminated sediment in a temperate glacial fjord, Alaska, U.S.A.
Cowan, E.A., et al, Glacimarine environments: processes and sediments. Edited by J.A. Dowdeswell and J.D. Scourse. Geological Society. Special publication No.53, London, Geological Society, 1990, p.75-89, 36 refs.
Powell, R.D.
Marine geology, Estuaries, Glacier melting, Sediment transport, Meltwater, Marine deposits, Suspended sediments, Upwelling, Subglacial drainage, Tidal currents, Ice water interface.

45-2783
Laminated terrigenous sediments from the Antarctic Peninsula: the role of subglacial and marine processes.
Domack, E.W., Glacimarine environments: processes and sediments. Edited by J.A. Dowdeswell and J.D. Scourse. Geological Society. Special publication No.53, London, Geological Society, 1990, p.91-103, 30 refs.
Marine geology, Marine deposits, Glacial deposits, Sedimentation, Bottom sediment, Subglacial observations, Meltwater, Ice shelves, Mud, Oceanography.
Although laminites from the continental slope and rise are known from a number of regions in Antarctica, laminated muds on the continental shelf have not been widely recognized. During USAP-88 cruise III of the RV *Polar Duke*, piston cores were collected along the Danco Coast of the Antarctic Peninsula within a submarine valley which appears to extend beneath the terminus of a tidewater glacier (Cayley Glacier). The glacial regime of the area today is polar to sub-polar, with restricted ice surface melting. Fine-scale horizontal layers in the water column transport fine-grained sediment at mid-water depths. Such features are not related to surface meltwater processes, but may be caused by tidal pumping of the basal cavity. The random bedding thickness of the sediments is related to the present depositional environment which includes iceberg rafting, bioturbation, pelagic settling of biogenic detritus, and sediment gravity flows. The rhythmic units likely represent subglacial marine deposition within the valley, possibly under the influence of tidal processes. (Auth. mod.)

45-2784
Rafting in glacimarine environments.
Gilbert, R., Glacimarine environments: processes and sediments. Edited by J.A. Dowdeswell and J.D. Scourse. Geological Society. Special publication No.53, London, Geological Society, 1990, p.105-120, Refs. p.117-120.
Ice rafting, Sediment transport, Glacial deposits, Marine deposits, Sedimentation, Marine geology, Geologic processes, Oceanography.

45-2785
Modelling rates of sedimentation from icebergs.
Dowdeswell, J.A., et al, Glacimarine environments: processes and sediments. Edited by J.A. Dowdeswell and J.D. Scourse. Geological Society. Special publication No.53, London, Geological Society, 1990, p.121-137, 42 refs.
Murray, T.
Icebergs, Sediment transport, Ice rafting, Sedimentation, Marine deposits, Marine geology, Models, Drift, Calving, Oceanography.

45-2786
Iceberg scours in the geological record: examples from glacial Lake Agassiz.
Woodworth-Lynas, C.M.T., et al, Glacimarine environments: processes and sediments. Edited by J.A. Dowdeswell and J.D. Scourse. Geological Society. Special publication No.53, London, Geological Society, 1990, p.217-233, 24 refs.
Guigné, J.Y.
Ice scoring, Icebergs, Pleistocene, Quaternary deposits, Bottom sediment, Deformation, Glacial lakes, Underground pipelines, Design criteria.

45-2787
Aerosol characterization and snow chemistry at Terra Nova Bay.
Santachiara, G., et al, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.27, Bologna, Italian Physical Society, 1990, p.61-72, 24 refs.
Prodi, F., Vivarelli, F., Vitale, V.
Snow composition, Aerosols, Polar regions, Antarctica—Terra Nova Bay.
Condensation nuclei (CN) concentrations were measured at Terra Nova Bay with an alcohol-based particle counter. In Jan. 1989, the mean value for CN was 490. Aerosol particles were sampled by a high flow-rate inertial spectrometer and their number concentration, size distribution and chemical composition were determined. The two filters analyzed showed particle number concentration in the 0.1 to 1 micron radius range to be 50 and 180/cu cm and Junge distribution exponent 3.7 and 3.9. The concentrations of eight major ions were determined from fresh snow samples. These showed that precipitation is acidic, a fact depending on H_2SO_4, HCl and HNO_3. The origin of some ions is discussed. (Auth.)

45-2788
Arctic hurricanes.
Businger, S., *American scientist*, Jan.-Feb. 1991, 79(1), p.18-33, 19 refs.
Polar atmospheres, Atmospheric disturbances, Storms, Atmospheric circulation, Fronts (meteorology), Heat flux, Wind velocity, Meteorological factors, Thermodynamics, Air water interactions.

45-2789
Glacial and volcanic geomorphology of the Chimborazo—Carihuairazo Massif, Ecuadorian Andes.
Clapperton, C.M., *Royal Society of Edinburgh. Transactions—earth sciences*, 1990, 81(Pt.2), p.91-116, Refs. p.114-116.
Volcanoes, Mass movements (geology), Glaciation, Mountain glaciers, Geomorphology, Landforms, Magma, Moraines, Ecuador—Andes Mountains.

45-2790
Snow as a field-teaching medium for earth science.
Custer, S.G., *Journal of geological education*, Jan. 1991, 39(1), p.34-43, 14 refs.
Education, Snow morphology, Snow surveys, Sampling, Metamorphism (snow), Classifications.

45-2791
Role of large-scale under-ice topography in separating estuary and ocean on an arctic shelf.
Macdonald, R.W., et al, *Atmosphere-ocean*, Mar. 1991, 29(1), p.37-53, With French summary. 31 refs.
Carmack, E.C.
Estuaries, Ice shelves, Pressure ridges, Water flow, Ice cover effect, Ice bottom surface, Ice growth, Water chemistry, Subglacial observations, Topographic features.

45-2792
Comparison of dynamic and static chambers for methane emission measurements from subarctic fens.
Moore, T.R., et al, *Atmosphere-ocean*, Mar. 1991, 29(1), p.102-109, With French summary. 20 refs.
Roulet, N.T.
Swamps, Subarctic landscapes, Atmospheric composition, Gases, Hydrocarbons, Decomposition, Samplers, Climatic changes.

45-2793
Model of the thermal conductivity of porous water ice at low gas pressures.
Steiner, G., et al, *Planetary and space science*, Mar. 1991, 39(3), p.507-513, 24 refs.
Kömle, N.I.
Extraterrestrial ice, Ice models, Ice thermal properties, Thermal conductivity, Vapor pressure, Porosity, Temperature effects.

45-2794
Ice sublimation below artificial crusts: results from comet simulation experiments.
Kömle, N.I., et al, *Planetary and space science*, Mar. 1991, 39(3), p.515-524, 22 refs.
Ice sublimation, Extraterrestrial ice, Simulation, Ice temperature, Thermal conductivity, Porous materials, Subsurface investigations, Ice thermal properties, Vapor pressure.

45-2795
Modeling solute transport in ground water at or near freezing.
Zukowski, M.D., et al, *Ground water*, Jan.-Feb. 1991, 29(1), p.21-25, 18 refs.
Tumeo, M.A.
Ground water, Soil water, Soil freezing, Viscosity, Soil water migration, Water temperature, Temperature effects, Mathematical models, Soil pressure, Porosity.

45-2796
Use of satellite data for water resources modelling—a Canadian example.
Kite, G.W., *Water resources development*, Mar. 1991, 7(1), p.21-29, 17 refs.
Water supply, Watersheds, Snow cover distribution, Hydrology, Spacecraft, Remote sensing, Computerized simulation, Runoff forecasting, Snow water *equivalent*.

45-2797
Measurements of nitrogen oxides at Barrow, Alaska during spring: evidence for regional and northern hemispheric sources of pollution.
Jaffe, D.A., et al, *Journal of geophysical research*, Apr. 20, 1991, 96(D4), p.7395-7405, 51 refs.
Atmospheric composition, Air pollution, Sampling, Atmospheric circulation, Climatic changes, Chemical analysis, Air masses, Periodic variations, United States—Alaska—Barrow.

45-2798
Classification of snow cover and precipitation using the special sensor microwave imager.
Grody, N.C., *Journal of geophysical research*, Apr. 20, 1991, 96(D4), p.7423-7435, 22 refs.
Snow cover, Precipitation (meteorology), Remote sensing, Radiometry, Classifications, Scattering, Microwaves, Data processing, Surface properties.

45-2799
Increased ocean heat transports and warmer climate.
Rind, D., et al, *Journal of geophysical research*, Apr. 20, 1991, 96(D4), p.7437-7461, 93 refs.
Chandler, M.
Climatic changes, Air water interactions, Air temperature, Ocean currents, Heat transfer, Atmospheric circulation, Temperature variations, Paleoclimatology, Radiation balance, Periodic variations.

45-2800
Variation of the stable isotopes of water with altitude in the Saint Elias Mountains of Canada.
Holdsworth, G., et al, *Journal of geophysical research*, Apr. 20, 1991, 96(D4), p.7483-7494, 54 refs.
Fogarasi, S., Krouse, H.R.
Snow cover, Meltwater, Isotope analysis, Wind factors, Snow composition, Atmospheric circulation, Altitude, Sampling, Variations.

45-2801
Mineral resources potential of Antarctica.
Splettstoesser, J.F., ed, *American Geophysical Union. Antarctic research series*, 1990, Vol.51, 310p., Refs. passim. For individual papers see 45-2802 through 45-2817 or A-44066, A-44067, B-44065, E-44050 through E-44061, E-44063, F-44062 and G-44064.
Dreschhoff, G.A.M., ed.
Minerals, Natural resources, Exploration, Economic development, Antarctica.

This volume is a collection of papers attempting to summarize current factual knowledge and scientific data related to issues of mineral resources in Antarctica. The first two papers provide an overview of the geologic setting and history of the antarctic continent. The next seven papers lead directly into differing aspects of various potential mineral resources in Antarctica. These are followed by papers discussing coal and hydrocarbons, freshwater resources and manganese. The current logistics program of the United States has been used as an example of the possibilities and difficulties facing operations on the icy continent. Tourism has also been included as a resource within the framework of environmental impact. Finally, the political questions have been addressed, and the report "The Antarctic Minerals Convention" by Lee Kimball (1988) has been reprinted in full and added to this volume. (Auth. mod.)

45-2802
Dufek intrusion of Antarctica.
Ford, A.B., *American Geophysical Union. Antarctic research series,* 1990, Vol.51, Mineral resources potential of Antarctica. Edited by J.F. Splettstoesser and G.A.M. Dreschhoff, p.15-32, 118 refs.
Minerals, Natural resources, Stratigraphy, Lithology, Magma, Antarctica—Pensacola Mountains.
The mostly ice-covered, stratiform mafic Dufek intrusion of the northern Pensacola Mountains is one of the world's largest igneous bodies of this type. It has many petrologic similarities with resource-rich intrusions such as the Bushveld Complex (South Africa) and the Stillwater Complex (Montana), but its potential for resources is poorly known. The occurrence in the Dufek intrusion of magmatic ore deposits similar to those of other layered mafic intrusions seems likely. Among possible resources, platinum group elements (PGE) would have greatest economic feasibility for exploitation. The Dufek intrusion is of Jurassic age and coeval with Ferrar magmatism of the Transantarctic Mountains. It was emplaced within a multiple-deformed mobile belt of Triassic and older age adjoining the craton of East Antarctica. Cumulates of earliest origin, presumably in part ultramafic, and those of a 2- to 3 km thick intermediate interval are not exposed. Mafic cumulates of nearly 2 km thick exposed sections in Dufek Massif and stratigraphically higher in the Forrestal Range show chemical and mineralogic differentiation trends of Fe enrichment comparable to those of other major stratiform intrusions. Sulfide minerals are markedly more abundant in the higher part of the intrusion, where highest PGE abundances are found. However, a possible comparison with the Bushveld's PGE-rich Merensky Reef suggests greatest resource potential in the Dufek's concealed basal section. (Auth. mod.)

45-2803
Economic potential of the Dufek Complex.
De Wit, M.J., et al, *American Geophysical Union. Antarctic research series,* 1990, Vol.51, Mineral resources potential of Antarctica. Edited by J.F. Splettstoesser and G.A.M. Dreschhoff, p.33-52, 94 refs.
Kruger, F.J.
Minerals, Natural resources, Economic development, Lithology, Geochemistry, Magma, Antarctica—Dufek Massif.
A geological and geochemical comparison of the Mesozoic Dufek and Proterozoic Bushveld complexes reveals substantial similarities between these two mega layered intrusions. In particular, their tectonic setting, isotopic characteristics, and history of differentiation, including the presence of "reversals" which are indicative of magma addition, can be closely matched. In the Bushveld Complex, magma addition and mixing are the primary causes for the large platinum group element (PGE) and chromite deposits, and this may well be the case in the Dufek Complex. Nevertheless, the Dufek magmas differed from those of the Bushveld Complex in that clinopyroxene was probably always an important liquidus phase and the precipitation of chromite was suppressed. The probable lack of chromite in the Dufek Complex would preclude the presence of chromite-hosted PGE deposits such as the UG2 of the Bushveld Complex. If chromite was essential for PGE precipitation, the Dufek would be a poor prospect. However, the Merensky Reef type of deposits are probably the product of large-scale magma mixing with concomitant immiscible sulfide precipitation. The probability of a Merensky Reef-type PGE deposit in the Dufek Complex is estimated to be about 75%. Should such a deposit be realized, then, given the present-day platinum price, economic models indicate that it could be profitably mined. (Auth. mod.)

45-2804
Engineering economic evaluation of mining in Antarctica: a case study of platinum.
Beike, D., *American Geophysical Union. Antarctic research series,* 1990, Vol.51, Mineral resources potential of Antarctica. Edited by J.F. Splettstoesser and G.A.M. Dreschhoff, p.53-67, 23 refs.
Minerals, Natural resources, Economic development, Mining, Cost analysis, Antarctica—Pensacola Mountains.
This study focuses on the engineering and economics of mining platinum group metals and gold from the Dufek intrusion, which is a Jurassic layered mafic intrusion. Except for the Bushveld Complex in South Africa, it is far larger than any other complex of this type. Chromium, copper, and platinum group metals are considered as speculative resources in this intrusion. There is special interest in the platinum group metals. These are expected mainly in the hidden lower portion of the Dufek intrusion. Possible mining activity could take place in this intrusion. Logistics, thickness of the ice cover, permafrost, and extremely low temperatures create problems for a hypothetical mining operation and impose hazards for transportation. Economic considerations show no reason to believe that in the near future extraction of minerals could be performed profitably under current cost and price regimes. However, with increasing commodity prices and a tightening of the market situation a favorable economic environment could develop. In 1991 the Antarctic Treaty will come up for review, and questions about a mineral development regime are of timely importance. The problem of mineral rights acquisition has to be solved before any mining can be legally performed. (Auth. mod.)

45-2805
Investigation of mineralization in the South Shetland Islands, Gerlache Strait, and Anvers Island, northern Antarctic Peninsula.
Pride, D.E., et al, *American Geophysical Union. Antarctic research series,* 1990, Vol.51, Mineral resources potential of Antarctica. Edited by J.F. Splettstoesser and G.A.M. Dreschhoff, p.69-94, 68 refs.
Cox, C.A., Moody, S.V., Conelea, R.R., Rosen, M.A.
Minerals, Natural resources, Exploration, Economic development, Geological surveys, Lithology, Geochemistry, Antarctica—Antarctic Peninsula.
Twenty localities in the South Shetland Is., the Gerlache Strait, and southern Anvers I. were examined for their potential as sites of "Andean-type" porphyry and related base and precious metal mineralization. Field studies consisted of geologic mapping and sampling for petrographic studies and trace element analysis (Cu, Pb, Zn, Au, Ag, Mo, W). Copper, lead, and zinc are present in most of the localities that were examined, and molybdenum, gold, and silver also may be important components of the mineralization. Four localities have been identified as possible sites of porphyry and related base and precious metal mineralization: east of Palmer Station, southwestern Anvers I.; along the coast north of Bahia Frei in the Gerlache Strait; northeast of False Bay, Livingston I.; and north of Johnsons Dock (Hurd Peninsula), Livingston I. Additional study will be required to define the resource potential of these localities. (Auth.)

45-2806
Uranium resource evaluation in Antarctica.
Zeller, E.J., et al, *American Geophysical Union. Antarctic research series,* 1990, Vol.51, Mineral resources potential of Antarctica. Edited by J.F. Splettstoesser and G.A.M. Dreschhoff, p.95-116, 48 refs.
Dreschhoff, G.A.M., Thoste, V.
Minerals, Radiometry, Natural resources, Exploration, Geological surveys, Aerial surveys, Antarctica.

45-2807
Geothermal resources of Antarctica.
Kyle, P.R., *American Geophysical Union. Antarctic research series,* 1990, Vol.51, Mineral resources potential of Antarctica. Edited by J.F. Splettstoesser and G.A.M. Dreschhoff, p.117-123, 58 refs.
Geothermal prospecting, Geothermy, Natural resources, Electric power, Antarctica.
The potential for geothermal resources in the ice-free areas of Antarctica is evaluated in five categories: conduction-dominated thermal regimes, igneous-related geothermal systems, hydrothermal convection systems, low-temperature geothermal waters, and geopressured-geothermal resources. Antarctica probably lacks major heat flow sources and large hydrothermal convective systems capable of developing conventional geothermal electric power stations. More heat flow measurements are necessary near active volcanoes such as Mount Erebus and along tectonically active areas such as the Transantarctic Mountains to completely exclude the possibility of hot dry rock resources. (Auth.)

45-2808
Banded iron formations in East Antarctica.
Tingey, R.J., *American Geophysical Union. Antarctic research series,* 1990, Vol.51, Mineral resources potential of Antarctica. Edited by J.F. Splettstoesser and G.A.M. Dreschhoff, p.125-131.
Minerals, Natural resources, Exploration, Economic development, Antarctica—East Antarctica.
Banded iron formations are common in the basement shield areas of several continents, and it is not surprising that they should be present in Antarctica. They have been recognized at a number of localities extending around the coast from Enderby Land to Wilkes Land in East Antarctica. The Mount Ruker exposures in the southern Prince Charles Mountains are regarded by some investigators as large enough to be classified as a potential ore deposit. However, exploitation of this resource is unlikely for a number of reasons. The iron content averages 33.5%, and ore of this grade would normally require beneficiation, most probably at the mine site. The high cost of mining and the expense of ocean transport from Antarctica to a steel mill would further inhibit exploitation. In addition, the phosphorus content of the ores is marginal for modern steelmaking methods. All of these factors combine to make it unlikely that commercial development of these resources will be possible in the foreseeable future. (Auth.)

45-2809
Coal geology, coal quality, and coal resources in Permian rocks of the Beacon Supergroup, Transantarctic Mountains, Antarctica.
Coates, D.A., et al, *American Geophysical Union. Antarctic research series,* 1990, Vol.51, Mineral resources potential of Antarctica. Edited by J.F. Splettstoesser and G.A.M. Dreschhoff, p.133-162, 79 refs.
Stricker, G.D., Landis, E.R.
Coal, Natural resources, Exploration, Geological surveys, Stratigraphy, Antarctica—Transantarctic Mountains.
Permian coal beds occur within a fluvial sedimentary sequence in the Victoria Group of the Beacon Supergroup from the Ohio Range to northern Victoria Land, a 200-km-long belt in the Transantarctic Mountains. Although coal beds as thick as 10.7 m have been reported, most beds are thinner than 2 m. In northern Victoria Land the Takrouna Formation contains coal in the small North Victoria Basin; in southern Victoria Land the larger South Victoria Basin contains the Weller Coal Measures, and the southernmost and largest basin, Nimrod-Ohio Basin, from the Nimrod Glacier to the Ohio Range, contains the Buckley Formation and its equivalents. One hundred forty-four published analyses of Permian coal from this region show that ash contents range from 3.2 to almost 50% with an arithmetic mean of 15.3%, and sulfur ranges from 0.0 to 4.8% with an arithmetic mean of 0.57%. Apparent rank of the coals ranges from high-volatile C bituminous coal to anthracite, but most of the coal samples have apparent ranks of low-volatile bituminous coal and semianthracite. Paucity of data on coal thickness and distribution dictates that coal resource estimates be assigned to the hypothetical classification. Calculations based on published geologic maps, geologic descriptions, and measured sections indicate hypothetical resources of 3 billion metric tons in the North Victoria Basin, 50 billion metric tons in the South Victoria Basin, and 100 billion metric tons in the Nimrod-Ohio Basin. (Auth. mod.)

45-2810
Recent geophysical and geological research in Antarctica related to the assessment of petroleum resources and potential environmental hazards to their development.
Behrendt, J.C., *American Geophysical Union. Antarctic research series,* 1990, Vol.51, Mineral resources potential of Antarctica. Edited by J.F. Splettstoesser and G.A.M. Dreschhoff p.163-174, 149 refs.
Crude oil, Natural resources, Exploration, Petroleum industry, Environmental impact, Antarctica.
During the 6-year negotiation of and adoption of the Convention on the Regulation of Antarctic Mineral Resources Activities on June 2, 1988, various countries increased their attention to the possibility of exploitation of Antarctica's petroleum resources, which are covered by this treaty. However, there are no known petroleum resources in Antarctica, and scientific information is lacking to adequately assess any undiscovered resources or the possible environmental hazards to their development. Scientific research carried out in Antarctica since the International Geophysical Year (1957-1958) has provided a great deal of information on the geological framework of this ice-covered continent and its margin and has found general indications of the types of hazards that must be considered. Antarctica covers a vast area, and likely supergiant oil fields of the type to be exploited would be tiny (e.g., a few tens of kilometers across) in comparison. Any petroleum resources located in Antarctica will be found by applying the knowledge, techniques, and experience gained developing oil fields in other parts of the world and would, therefore, be other examples of general cases, in contrast the antarctic environment and its associated hazards must be considered unique. (Auth.)

45-2811
Geology and hydrocarbon potential of the antarctic continental margin.
Anderson, J.B., *American Geophysical Union. Antarctic research series,* 1990, Vol.51, Mineral resources potential of Antarctica. Edited by J.F. Splettstoesser and G.A.M. Dreschhoff, p.175-201, 134 refs.
Petroleum industry, Hydrocarbons, Natural resources, Exploration, Seismic surveys, Antarctica.
Seismic surveys have been conducted on most of the seasonally ice-free portions of the antarctic continental margin, but drilling has been limited to only a few areas. These data, coupled with the results of geological studies of coastal outcrops and information from the conjugate Gondwana continents, are used to infer the subsurface geology of 5 different sectors of the antarctic continental margin and to assess their hydrocarbon potential. Potential source rocks are believed to exist on most portions of the continental margin and are buried deep enough, or are subjected to high enough geothermal heat, for hydrocarbon maturation to have occurred in these deposits. Suitable reservoir rocks are also considered to be widespread on the margin, with the possible exception of that portion of the Pacific-Antarctic margin situated north of the Tula Fracture Zone and including the Bransfield Basin. Structural traps are generally confined to the older sequences on the margin that fill early rift basins. Stratigraphic traps are probably common. (Auth.)

45-2812
Resource potential of antarctic icebergs.
Wadhams, P., *American Geophysical Union. Antarctic research series*, 1990, Vol.51, Mineral resources potential of Antarctica. Edited by J.F. Splettstoesser and G.A.M. Dreschhoff, p.203-215, 59 refs.
Icebergs, Iceberg towing, Natural resources, Ice (Water storage), Water supply, Electric power, Antarctica.
The possible use of antarctic icebergs as a source of water and electrical power is discussed. The history of the idea, the development of concepts of iceberg use from the 1950s onward, and the physical properties of icebergs which determine their susceptibility to decay and thus their likely survival time under tow, are reviewed. The elements of an iceberg utilization scheme are discussed, including potential destinations, iceberg detection and selection, propulsion, protection, and processing. An "Icetec" scheme which combines water utilization with power generation via ocean thermal energy conversion would seem to offer the best economic prospect for iceberg use, but many technical problems remain unsolved while fundamental physical processes affecting an iceberg tow have yet to be examined experimentally. (Auth.)

45-2813
Manganese nodule provinces of the southern ocean.
Frakes, L.A., et al, *American Geophysical Union. Antarctic research series*, 1990, Vol.51, Mineral resources potential of Antarctica. Edited by J.F. Splettstoesser and G.A.M. Dreschhoff, p.217-221, 15 refs.
Moreton, D.L.E.
Minerals, Natural resources, Ocean bottom, Exploration, Antarctica.
Manganese nodules known from bottom photographs and samples in dredges and cores occur in a belt as wide as 400 km on the seafloor around Antarctica. The majority of nodule fields appear to be of no economic potential in the foreseeable future, because the mean concentrations of Ni, Cu, and Co are low. However, it is emphasized that study of antarctic nodules is at the reconnaissance stage, and there could be large fields of high metal values yet undiscovered, as well as potential mine sites within known fields. (Auth.)

45-2814
Antarctic logistic support for the earth sciences.
Turner, M.D., et al, *American Geophysical Union. Antarctic research series*, 1990, Vol.51, Mineral resources potential of Antarctica. Edited by J.F. Splettstoesser and G.A.M. Dreschhoff, p.223-235, 35 refs.
Splettstoesser, J.F., McClelland, J.J., Jr.
Research projects, Exploration, Logistics, Antarctica.
This discussion of antarctic logistics deals primarily with the operations of the U.S. Antarctic Program. The program makes use of all aspects of logistics which are employed throughout the antarctic continent and surrounding oceans. In pursuing its research objectives, the U.S. program uses helicopters, Hercules (LC-130) ski-equipped aircraft, motor toboggans, tracked vehicles, hovercraft, research ships, and icebreakers. Large aircraft are universally used to transport personnel to and from Antarctica. Within Antarctica, the United States has also chosen to emphasize air transportation to carry scientific research to large parts of the continent. Antarctic conditions are closely comparable to those that will be encountered in future potential occupation and mining on the Moon and Mars. The U.S. approach to logistic support of Earth scientists has been remarkably successful in placing field parties of almost any size anywhere in Antarctica. These field parties have been able to work for periods of a few hours to an entire field season, with facilities and direct support that allow maximum time and effort for scientific research. Future efforts at commercial mineral evaluation and exploitation will need to look closely at the U.S. logistics effort as a possible pattern for their antarctic operations. (Auth. mod.)

45-2815
Environmental impacts of exploiting mineral resources and effects of tourism in Antarctica.
Parker, B.C., et al, *American Geophysical Union. Antarctic research series*, 1990, Vol.51, Mineral resources potential of Antarctica. Edited by J.F. Splettstoesser and G.A.M. Dreschhoff, p.237-258, 132 refs.
Angino, E.E.
Natural resources, Economic development, Environmental impact, Antarctica.
Whereas exploitation of nonrenewable resources of Antarctica awaits future exploration, discovery, and implementation of new technology, these developments are sufficiently near that a review of the environmental consequences is both justified and urgently needed. On the basis of present knowledge, there appears to be no compelling scientific reason for the banning of resource exploration, provided sufficient Specially Protected Areas are established and exploration, development, production, and exploitation are conducted with all necessary precautions to minimize or prevent environmental impacts. A careful and complete risk assessment for each mining operation projected and a meaningful program of risk management must be required. Presently, insufficient information on biologically important interactions is available to enable management and policy decisions to be made. This is of considerably less importance away from the coast (deep inland), where biological activity appears to be nonexistent. Nevertheless, unperturbed antarctic ecosystems are poorly understood, and how environmental impacts may affect the systems is largely unknown. It is possible that qualitative differences, not yet recognized, render the antarctic ecosystems more susceptible to permanent damage than ecosystems elsewhere. Recovery from environmental insult under antarctic conditions will be extremely slow. (Auth. mod.)

45-2816
Convention on the Regulation of Antarctic Mineral Resource Activities.
Auburn, F., *American Geophysical Union. Antarctic research series*, 1990, Vol.51, Mineral resources potential of Antarctica. Edited by J.F. Splettstoesser and G.A.M. Dreschhoff, p.259-271, 23 refs.
Natural resources, Economic development, Environmental protection, International cooperation, Exploration, Antarctica.
In June 1988, the Special Consultative Meeting on Antarctic Mineral Resources concluded more than 5 years of negotiations between the Consultative Parties to the Antarctic Treaty with agreement on the text of the Convention on the Regulation of Antarctic Mineral Resource Activities. The Convention provides an exclusive framework for the regulation of prospecting and the licensing of exploration and development in the area south of 60S. Licences can only be obtained by States Parties to the Convention or by Operators sponsored by such States. An outline is provided of the Convention, the negotiations, the Advisory Committee, and activities, including prospecting, exploration and development.

45-2817
Special report on the Antarctic Minerals Convention.
Kimball, L.A., *American Geophysical Union. Antarctic research series*, 1990, Vol.51, Mineral resources potential of Antarctica. Edited by J.F. Splettstoesser and G.A.M. Dreschhoff, p.273-310, 24 refs.
Natural resources, Economic development, Environmental protection, International cooperation, Antarctica.
On June 2, 1988, the Convention on the Regulation of Antarctic Mineral Resource Activities was adopted by consensus in Wellington, New Zealand. This report provides a description of the Convention; answers to some key questions, such as when could minerals development commence in Antarctica, for example; a commentary on how the treaty deals with ownership of Antarctica claims, the concerns of developing nations and environmental concerns; implementation considerations, and additional reading suggestions.

45-2818
Geological-geomorphological aspects of water supply problems in Siberia. [Geologo-geomorfologicheskie aspekty vodokhozialstvennykh problem Sibiri].
Zykina, V.S., ed, *Akademiia nauk SSSR. Sibirskoe otdelenie. Institut geologii i geofiziki. Trudy*, 1990, Vol.759, 137p., In Russian. For selected papers see 45-2819 through 45-2825.
Geology, Geomorphology, Hydrogeology, Geocryology, Slope processes, Tectonics, Water supply.

45-2819
Reflection of fractures in the foundation of recent relief in the West Siberian Plain, from the position of the Earth's thermal field. [Otrazhenie razlomov fundamenta v sovremennom rel'efe Zapadno-Sibirskoi Ravniny s pozitsii teplovogo polia Zemli].
Babushkin, A.E., *Akademiia nauk SSSR. Sibirskoe otdelenie. Institut geologii i geofiziki. Trudy*, 1990, Vol.759, p.66-70, In Russian. 9 refs.
Geocryology, Geomorphology, Fracture zones, Tectonics.

45-2820
Possible methods for the melioration of terraced slopes in the Altay Mountains. [Vozmozhnye puti melioratsii terrasirovannykh sklonov v Gornom Altae].
Chalko, A.V., et al, *Akademiia nauk SSSR. Sibirskoe otdelenie. Institut geologii i geofiziki. Trudy*, 1990, Vol.759, p.75-81, In Russian. 11 refs.
Namzalov, B.B.
Terraces, Slope processes, Slope protection, Slope stability, Geocryology, Permafrost.

45-2821
Slope denudation in the Altai highlands and its significance in solving melioration problems (in the example of the Aktru River basin). [Sklonovaia denudatsiia vysokogorii Altaia i ee znachenie dlia resheniia melioralivnykh problem (na primere basseina r. Aktru)].
Obyskalov, A.D., *Akademiia nauk SSSR. Sibirskoe otdelenie. Institut geologii i geofiziki. Trudy*, 1990, Vol.759, p.81-84, In Russian. 9 refs.
River basins, Slope processes, Erosion, Altitude, Glaciers, Air temperature.

45-2822
Geomorphology of the Kuray basin and the possibility of economic development of its lands. [Geomorfologii Kuraiskoi vpadiny i vozmozhnosti khoziaistvennogo ispol'zovanna ee zemel'].
Novikov, I.S., *Akademiia nauk SSSR. Sibirskoe otdelenie. Institut geologii i geofiziki. Trudy*, 1990, Vol.759, p.84-89, In Russian. 10 refs.
Geomorphology, Economic development, River basins, Mountain glaciers.

45-2823
River valleys in the area of the main watershed in Asia. [Rechnye doliny v zone glavnogo vodorazdela Azii].
Endrikhinskii, A.S., *Akademiia nauk SSSR. Sibirskoe otdelenie. Institut geologii i geofiziki. Trudy*, 1990, Vol.759, p.90-96, In Russian. 18 refs.
Valleys, Watersheds, Quaternary deposits, Glaciation.

45-2824
Effect of neotectonics on water and salt regimes in land reclamation areas in the Baykal and Transbaykal regions. [Vliianie neotektoniki na vodnyi i solevol rezhim melioriruemykh zemel' Pribaikal'ia i Zabaikal'ia].
Borisenko, I.M., et al, *Akademiia nauk SSSR. Sibirskoe otdelenie. Institut geologii i geofiziki. Trudy*, 1990, Vol.759, p.122-128, In Russian. 3 refs.
Rezanov, I.N.
Hydrogeology, Land reclamation, Tectonics, Saline soils, Subpermafrost ground water, Suprapermafrost ground water, Permafrost.

45-2825
Geological-geomorphological aspects of the cryomorphogenesis of subarctic lowlands. [Geologo-geomorfologicheskie aspekty kriomorfogeneza subarkticheskikh nizmennostei].
Lovchuk, V.V., *Akademiia nauk SSSR. Sibirskoe otdelenie. Institut geologii i geofiziki. Trudy*, 1990, Vol.759, p.128-135, In Russian. 10 refs.
Geology, Geomorphology, Geocryology, Subarctic landscapes.

45-2826
Comparison of headspace gas chromatography with EPA SW-846 Method 8240 for determination of volatile organic compounds in soil.
Hewitt, A.D., et al, *U.S. Army Cold Regions Research and Engineering Laboratory*, Feb. 1991, SR 91-04, 7p., ADA-235 497, 13 refs.
Miyares, P.H., Leggett, D.C., Jenkins, T.F.
Soil pollution, Soil chemistry, Chemical analysis, Waste treatment
This study compares the levels of volatile organic compounds (VOCs) in a laboratory-prepared soil as determined by headspace gas chromatography and the EPA SW-846 purge and trap gas chromatography mass spectrometry method (Method 8240). Vapor exposure was chosen as the method of contaminating the soil with trans-1,2-dichloroethylene, benzene, tricholoethylene and toluene. Preliminary results showed that the concentrations of the four compounds determined by the two analytical procedures were not significantly different at the 95% confidence interval for two levels of contamination. These findings indicate that headspace gas chromatography may have significant potential for hazardous waste assessment and cleanup programs.

45-2827
Volcanoes of North America: United States and Canada.
Wood, C.A., ed, Cambridge, Cambridge University Press, 1990, 354p., Refs. passim.
Kienle, J., ed.
Volcanoes, Geological surveys, Glaciation.

45-2828
Layered character of snow covers.
Colbeck, S.C., *Reviews of geophysics*, Feb. 1991, 29(1), MP 2871, p.81-96, 99 refs.
Snow stratigraphy, Snow cover structure, Metamorphism (snow), Snow hydrology, Snow mechanics
Snow studies have generally ignored the layered nature of snow covers. Having achieved a good understanding of the properties and processes in homogeneous snow, snow scientists should develop more insight into the evolution of the layers and their effects on overall snow response. Many of the outstanding problems in snow studies can only be solved by dealing with snow as a layered medium. The various mechanisms by which layers are generated, their effects, and some of the outstanding research problems are described here.

45-2829
Particle beam simulation.
Hopkins, M.A., MP 2873, Mechanics computing in 1990s and beyond, New York, American Society of Civil Engineers, 1991, p.1274-1278, 5 refs. Proceedings of the ASCE conference, Columbus, OH, May 2-22, 1991.
Ice jams, Pressure ridges, Computerized simulation, Mathematical models.

A two-dimensional beam simulation is developed in which the beam is composed of uniform rectangular blocks. Internal forces in the beam are caused by relative motion between adjoining blocks. A viscous-elastic-plastic force model is used. Tensile or compressive failure of the beam occurs when stresses in the top or bottom surfaces exceed the strength of the material. The simulation is numerically explicit and completely consistent with existing discrete particle simulations. For this reason, it is especially suited for modeling problems in which a beam undergoes periodic failure, creating a rubble accumulation as blocks are broken from the parent beam. Two such problems are ice jamming in northern rivers and sea ice ridging in the Arctic.

45-2830

Ultraviolet radiation environment of the Antarctic Peninsula.

Lubin, D., Chicago, University, Dec. 1989, 134p., Ph.D. thesis. 54 refs.

Ultraviolet radiation, Atmospheric composition, Photochemical reactions, Ozone, Solar radiation, Radiation measuring instruments, Environmental impact, Cloud cover, Analysis (mathematics), Antarctica --Palmer Station.

To investigate the effect of the springtime antarctic ozone depletion on the ultraviolet radiation environment of the Antarctic Peninsula, a scanning spectroradiometer was deployed at Palmer Station, Sep. 16-Dec. 21, 1988, to scan the ultraviolet solar spectrum from 290 to 400 nanometers (nm). Weather observations were recorded to describe the role of cloud cover in regulating the UV surface irradiance. At wavelengths shorter than 310 nm the influence of the ozone "hole" is apparent. The 1988 ozone "hole" was a modest event compared to 1987. The smallest ozone abundance measured during the spring of 1988 was 196 Dobson units on Oct. 14. The ozone abundance returned to unperturbed levels above 350 Dobson units in mid-Nov. At wavelengths longer than 310 nm, overcast skies offset the ozone depletion. (Auth. mod.)

45-2831

Potential for ozone depletion in the arctic polar stratosphere.

Brune, W.H., et al, *Science*, May 31, 1991, 252(5010), p.1260-1266, Numerous refs.

Ozone, Stratosphere, Atmospheric composition, Chemical properties, Clouds.

The nature of the arctic polar stratosphere is observed to be similar in many respects to that of the antarctic polar stratosphere, where an ozone hole has been identified. Most of the available chlorine (HCl and $ClONO_2$) was converted by reactions on polar stratospheric clouds to reactive ClO and Cl_2O_2 throughout the arctic polar vortex before midwinter. Reactive nitrogen was converted to HNO_3, and some, with spatial inhomogeneity, fell out of the stratosphere. These chemical changes ensured characteristic ozone losses of 10 to 15% at altitudes inside the polar vortex where polar stratospheric clouds had occurred. These local losses can translate into 5 to 8% losses in the vertical column abundance of ozone. As the amount of stratospheric chlorine inevitably increases by 50% over the next two decades, ozone losses recognizable as an ozone hole may well appear. (Auth.)

45-2832

Studies on, and underneath, the ice shelf Fimbulisen.

Orheim, O., et al, *Norsk Polarinstitutt. Meddelelser*, Dec. 1990, No.113, Norwegian Antarctic Research Expedition 1989-90, Report. Edited by O. Orheim, p.59-73, 11 refs.

Hagen, J.O., Österhus, S., Saetrang, A.C.

Ice shelves, Ice melting, Borehole instruments, Salinity, Temperature measurement, Antarctica, Fimbul Ice Shelf.

The objective of this NARE 1989-90 program was to measure and understand the processes taking place underneath an ice shelf. Fimbulisen, which is 140 km wide, was selected because it has a size similar to many of the ice shelves around Antarctica, and because it was centrally located. Fimbulisen is the ice shelf continuation of the ice stream Jutulstraumen, which drains an area of 124,000 sq km. It has a discharge of 12.5 cu km a and flows at about 700 m a at the grounding line. The main field work of this glaciology group was to drill through the inner part of Fimbulisen, conduct under-ice sampling, and deploy sub-ice instrumentation. Installing the instruments required a hole with a 0.2 m working diameter that could be guaranteed for many hours. Various other glaciologic and oceanographic studies done on the Fimbulisen Jutulstraumen ice shelf ice stream system are also described, including ice thickness, bottom saline ice and melt rates, changes of ice shelf thickness, position of grounding line, ice stream lateral boundary, and bed topography.

45-2833

Radio-echo investigations in Dronning Maud Land.

Kennett, M., *Norsk Polarinstitutt. Meddelelser*, Dec. 1990, No.113, Norwegian Antarctic Research Expedition 1989-90, Report. Edited by O. Orheim, p.75-79, 8 refs.

Radio echo soundings, Ice shelves, Bottom topography, Ice cover thickness, Measuring instruments, Antarctica, Fimbul Ice Shelf, Antarctica, Jutulstraumen Glacier, Antarctica, Queen Maud land.

Radio-echo measurements have been made during NARE 1989-90 over the Fimbulisen ice-shelf and the Jutulstraumen ice-stream, Dronning Maud Land, using a step-FM radar. The data will be used for information on the ice-sea interaction underneath Fimbulisen, and the conditions at the bed of Jutulstraumen, particularly in the grounding-line region. Both are important in assessing the stability of Dronning Maud Land ice with respect to possible climate changes. Data from a total of approximately 2500 km of helicopter profiles and 50 km of ice surface profiles were collected. Only a small fraction of the data has been analyzed to date, and the results presented here are preliminary. The echo from the bed of Jutulstraumen is certainly weaker than from the shelf bottom, and often difficult to identify in individual shots. The maximum observed ice thickness so far is approximately 800 m. A profile down the center of Jutulstraumen shows clearly the difference between the smooth shelf bottom echo and the rougher echo from the bed of Jutulstraumen. Bed elevation a few km upstream from the grounding line is quite variable. Within one 6 km section of the profile in particular, bed elevation appears to undergo a series of almost sinusoidal variations of period 1-2 km and amplitude up to 300 m. An example of a radar profile is given.

45-2834

Glaciological and meteorological measurements in Dronning Maud Land.

Winther, J.G., *Norsk Polarinstitutt. Meddelelser*, Dec. 1990, No.113, Norwegian Antarctic Research Expedition 1989-90, Report. Edited by O. Orheim, p.81-86, 5 refs.

Snow temperature, Snow density, Measuring instruments, Albedo, Antarctica, Fimbul Ice Shelf, Antarctica --Troll Station.

Interpretation of digital satellite images demand good understanding of the reflective properties of the snow. The reflection of solar radiation from a snow surface is linked to physical properties of the snow (metamorphism) and meteorological conditions (for example the amount, distribution and type of clouds and snowdrift because of wind and the formation of snow dunes). To find the snow albedo during different conditions a broad data base was collected in NARE 1989-90 through measurements of radiation, wind, temperature, humidity, heat transfer and several measurements related to metamorphosis of the snow. A second task of the project was to map the relation between meteorological parameters and the intensity of sublimation evaporation and snow melt. Estimates of extreme variations in sublimation evaporation and melting intensity can then be calculated using historical meteorological data. Preliminary snow temperature data at depths of 5 cm and 30 cm and air temperatures at Fimbul Glacier and Troll Station are displayed in graph form on accompanying figures.

45-2835

Chemical and glaciological studies.

Corr, H., Norsk Polarinstitutt. Meddelelser, Dec. 1990, No.113, Norwegian Antarctic Research Expedition 1989-90, Report. Edited by O. Orheim, p.87-89, 2 refs.

Ice cores, Radar echoes, Surface properties.

There were three main tasks to perform in this program: obtain accurate surface profiles of specific areas of the ice shelf; collect surface snow samples along a traverse from the ice front; and test and evaluate a ground-based impulse radar system. Unfortunately, the pressure transducer failed after only four hours. When repeated attempts to fix the unit failed, the first task was abandoned. In NARE 1989-90, a flagged traverse route was established from the ice front depot at 69.9S, 0.1W to the drill site at 71S, 0.2E, a distance of 120 km. Surface snow samples were collected at regular intervals along the traverse. On a return trip from the depot samples were taken every 4 km, giving a total of 30 sites. At each end of the traverse a shallow pit was dug and samples taken from the walls. All samples were obtained by scraping directly into containers. The transmitting and receiving dipoles for the impulse radar system were resistively loaded with a center frequency of 30 MHz. This makes the received echo from a plane reflector 30 ns long. The received waveform was digitized at 200 MHz in burst mode and stacked before displaying and saving to improve the signal to noise ratio. To cope with the large dynamic range in the received waveform from different reflecting layers within the ice, echos were recorded with different gain settings. At the drill camp a number of short profiles were obtained along the ice flow line. Profiling speed was 15 km/hr, resulting in a completed sounding being recorded every five meters.

45-2836

Geodetic measurements in Dronning Maud Land.

Eiken, T., et al, *Norsk Polarinstitutt. Meddelelser*, Dec. 1990, No.113, Norwegian Antarctic Research Expedition 1989-90, Report. Edited by O. Orheim, p.101-111, 1 ref.

Tuktvasslimo, B.Å., Tytskjold, B.

Geodetic surveys, Ice shelves, Mapping, Antarctica, Sverdrup Mountains, Antarctica, Queen Maud Mountains.

The geodetic topographic program of the NARE 1989-90 expedition had five main objectives: first, to extend the precise trigonometric network measured during NARE 1984-85 to the west, establishing a network of points measured with high accuracy in the H1 Sverdrupfjella area. If possible, similar measurements should be carried out eastwards from Svartha:maten. Second, to measure points identifiable in satellite images or pictures. The points should be used as fixed points in satellite image rectification or for compilation of maps based on satellite pictures images. Third, to measure a stake network established by the glaciological group on the Fimbulisen ice-shelf to determine the velocity and strain in the ice. The network should be measured twice, as early and as late in the season as possible. Fourth, to measure a detailed triangulation net in Jutulsessen with enough control points to map the area at a scale of 1:50,000, and fifth, to take oblique photographs from helicopter to cover Jutulsessen with photographs for map compilation at a scale of 1:50,000. Preliminary results achieved in this program are presented.

45-2837

Observations of ice shelf water at the southern Weddell Sea shelf break.

Foldvik, A., et al, *Norsk Polarinstitutt. Meddelelser*, Dec. 1990, No.113, Norwegian Antarctic Research Expedition 1989-90, Report. Edited by O. Orheim, p.125-130, 2 refs.

Gammelsrød, T.

Hydrography, Sea water, Salinity, Ice shelves, Antarctica, Weddell Sea, Antarctica --Filchner-Ronne Ice Shelf.

In the NARE 1989-90 expedition the ice conditions were difficult, with unusually large and thick floes which could not be negotiated. This situation hampered the planned program and led to substantial modifications. The CTD work on the shelf break went well and altogether 96 CTD stations were logged. A number of these are actually current profiling stations (yo-yo stations) at a fixed locality near the bottom. About 500 water samples were obtained for chemical analysis. A section of CTD stations at the slope is shown. At the bottom of the slope there is a very cold and shallow plume of Ice Shelf Water with strong gradients towards the overlying warmer water. The minimum temperature in this plume was -2.2 C. Simultaneous current meter measurements indicated maximum velocities of about 50 cm/s. The CTD station is located on the eastern side of a shallow submarine ridge which turns the current of Ice Shelf water towards the NNE. Here the temperature was -1.65 C at 2200 m depth, possibly the lowest temperature ever recorded at such a great depth. Selected, superimposed CTD profiles at the shelf break show that the temperature and the salinity stay remarkably constant down to approximately 2000 m. The implication is that very little mixing is taking place in the Ice Shelf water plume down to these depths.

45-2838

Marine biological studies in the Weddell Sea and north of Dronning Maud Land.

Gulliksen, B., et al, *Norsk Polarinstitutt. Meddelelser*, Dec. 1990, No.113, Norwegian Antarctic Research Expedition 1989-90, Report. Edited by O. Orheim, p.131-138, 5 refs.

Lönne, O.J., Hellum, C.

Marine biology, Algae, Sea ice, Antarctica, Weddell Sea.

More than 70 spp. have been identified from the material of collected ice algae during NARE 1989-90. About 18 spp. were common in most of the samples. Diatoms dinoflagellates and different types of small flagellates were recorded; diatoms were most abundant. High concentrations and diversity of algae occurred in the slush-like surface layers near the snow-ice-interface called the infiltration layer. This assemblage consisted of both ice algae and phytoplanktor. There were several types of ice algae assemblages on the underside of the ice. A network of the species *Berkleya rutilans* was recorded at some locations. However, long strands of algae, often dominated by the species *Amphiprora* sp. hanging into the water column from the underside of the ice were more common, especially early in the cruise. Of special interest were the swarms of krill occurring under the ice at localities north of Dronning Maud Land. Densities were estimated based upon observation and counting, the highest mean density at a diving station was approx. 70 individuals/sq.m. Mean values between 20 and 30 individuals/sq.m were observed at several localities.

45-2839

Evolution and differentiation of Earth's natural environment; collected works. [Evolutsiia i differentsiatsiia prirody Zemli; izbrannye trudy].

Gerasimov, I.P., Moscow, Nauka, 1990, 311p., In Russian. Refs. passim.

Soil science, Paleoclimatology, Periglacial processes, Loess, Glaciation, Soil mapping, Pleistocene.

45-2840

Algorithms to enhance radar image.

Kahloun, F., et al, *Transport Canada. Report*, Mar. 1991, TP 10807E, 47p. + append., With French summary. 14 refs.

Nilakantan, A.

Ice navigation, Ice detection, Radar, Data processing, Ice floes.

45-2841

Ultraviolet radiation environment of the Antarctic Peninsula: the roles of ozone and cloud cover.

Lubin, D., et al, *Journal of applied meteorology*, Apr. 1991, 30(4), p.478-493, 35 refs.

Frederick, J.E.

Ozone, Ultraviolet radiation, Cloud cover, Weather observations, Antarctica, Palmer Station.

Hourly measurements define the UV radiation environment of the region and, in conjunction with a daily record of sky conditions and radiative transfer modeling, permit a quantitative understanding of the role of cloud cover in regulating UV radiation levels at the antarctic surface, including the period of the springtime ozone depletion. The transmission properties of cloud types over the Antarctic Peninsula are quantified by taking the ratio of UV-A irradiances measured under them to UV-A irradiances calculated for clear skies and the same solar zenith angle, and the results are then generalized to the UV-B. Under the average overcast sky in the region, UV irradiance at all wavelengths is slightly greater than half of the value for clear skies.

Under the thickest overcast layers, UV irradiance at all wavelengths is roughly 20% what it would be if the sky were clear. In a seasonally averaged sense cloudiness has no effect on the percentage enhancement in UV-B surface irradiance that results from the springtime ozone depletion. However, when considering time scales of hours to several days, an increase in cloud cover can be discussed in terms of its ability to attenuate the solar irradiance, in some cases giving a surface UV-B level comparable to that found under an unperturbed ozone column and clear skies. Depending on the amount of ozone depletion and the type of cloud cover, there will always be a wavelength below which surface radiation levels are excessive during spring. (Auth.)

45-2842
Vernal atmospheric mixing in the Antarctic.
Murphey, B.B., et al, *Journal of applied meteorology*, Apr. 1991, 30(4), MP 2874, p.494-507, 54 refs.
Hare, T., Hogan, A.W., Lieser, K., Toman, J., Woodgates, T.
Aerosols, Storms, Clouds, Weather observations, Ozone, Antarctica—McMurdo Station, Antarctica—Amundsen-Scott Station.
Aerosol concentration, ozone concentration, and meteorological parameters were measured at McMurdo and South Pole Stations during a spring storm that reached the antarctic interior. Nacreous clouds were sighted preceding the storm, indicative of stratospheric flow from lower latitudes. These measurements and observations, along with upper-air and surface analyses, indicate that vigorous tropospheric/stratospheric exchange of air occurs near 75S during the spring. The elemental composition of collected aerosol changed coincidently with different stages of the storm. During the storm event in Sep. 1983, surface ozone concentration varied from 20 to more than 100 ppbv at McMurdo, but remained less than 20 ppbv at the South Pole indicating that deep mixing, which occurred at the periphery of Antarctica during the spring storm, did not continue over the interior of the continent. The warm marine air associated with the spring coastal storm infiltrated the interior of Antarctica including the Polar Plateau, producing a record surface temperature and an aerosol concentration twice the September mean. This system was unusual as the warm front apparently reached the surface of South Pole. Crustal material was transported to the periphery of Antarctica through the upper troposphere or lower stratosphere. Enhanced aerosol concentration was transported to the South Pole through the lower troposphere. Vigorous exchange occurred at latitudes of greater than 78S, which probably exchanged both marine aerosol and water vapor into the lower stratosphere. (Auth.)

45-2843
Results of an aquifer test for a proposed water supply at Anchor Point, Alaska.
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Munter, J.A.
Water supply, Ground water, Wells, United States—Alaska—Anchor Point.

45-2844
Summary of water-use data in Alaska, 1986.
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Water supply, Economic development, Ground water, Surface waters, United States—Alaska.

45-2845
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Snow water equivalent, Freezeup, Ice breakup, Ice cover thickness, Frost penetration, Water level, Runoff, Ice surveys, Snow surveys, Finland.

45-2846
Yukon Territory snow survey bulletin and water supply forecast, April 1, 1991.
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Snow surveys, Snow water equivalent, Runoff forecasting, Canada—Yukon Territory.

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Ocean waves, Ice loads, Computer programs, Offshore structures.

45-2848
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Ocean waves, Wind direction, Wind velocity, Beaufort Sea.

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Beaufort Sea hindcast update. Interim report. *Arctic Petroleum Operators Association. Report,* May 1983, APOA 203, 289p., 2 refs.
Wind velocity, Wind direction, Ocean waves, Meteorological data, Beaufort Sea.

45-2850
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Offshore landforms, Ice loads, Research projects, Cost analysis, Beaufort Sea.

45-2851
Multiyear floe and hummock field survey in the east Beaufort Sea.
Hudson, R.D., et al, *Arctic Petroleum Operators Association. Report,* July 1982, APOA 201, 15p. + appends., 4 refs.
Eley, F.J.
Ice floes, Sea ice distribution, Ice surveys, Beaufort Sea.

45-2852
Multi-year ice strength testing program.
Bawden, W., et al, *Arctic Petroleum Operators Association. Report,* [1983], APOA 200-1, n.p., 15 refs.
Masterson, D.
Offshore drilling, Ice cover strength, Ice loads, Beaufort Sea.

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Multi-year ice thickness distribution in the Beaufort Sea.
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Sea ice distribution, Ice cover thickness, Ice surveys, Beaufort Sea.

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Oceanographic and meteorological appendices Tarsiut Gulf 1982-83. *Arctic Petroleum Operators Association. Report,* [1984], APOA 198, Vol.7, n.p.
Artificial islands, Weather observations, Wind direction, Air temperature, Beaufort Sea.

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Artificial islands, Weather observations, Ice conditions, Beaufort Sea.

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Data results, Tarsiut Gulf 1982-83. *Arctic Petroleum Operators Association. Report,* [1984], APOA 198, Vol.3, 395p.
Artificial islands, Ice loads, Ice conditions, Beaufort Sea.

45-2857
Instrumentation and equipment, Tarsiut Gulf 1982-83. *Arctic Petroleum Operators Association. Report,* [1984], APOA 198, Vol.2, 202p.
Artificial islands, Ice loads, Measuring instruments, Recording instruments, Beaufort Sea.

45-2858
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Artificial islands, Offshore drilling, Ice loads, Beaufort Sea.

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Artificial islands, Offshore drilling, Ice loads, Beaufort Sea.

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Wards, R.D., *Arctic Petroleum Operators Association. Report,* June 1983, APOA 186, 363p. + appends., 6 refs.
Grounded ice, Artificial islands, Ice loads, Ice models, Ice cover strength, Ice pileup.

45-2861
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Artificial islands, Boreholes, Slope orientation, Seismic surveys, Soil temperature, Soil tests, Beaufort Sea.

45-2862
Ice appendices Tarsiut Gulf 1982-83. *Arctic Petroleum Operators Association. Report,* [1984], APOA 198, Vol.5, Var. p., For selected paper see 45-2863.
Artificial islands, Ice loads, Ice conditions, Ice surveys, Beaufort Sea.

45-2863
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Frederking, R., et al, *Arctic Petroleum Operators Association. Report,* Nov. 1983 (Pub. Aug. 84), APOA 198, Vol.5, Appendix 12, 22p. + appends., 18 refs.
Sayed, M., Timco, G.W.
Artificial islands, Ice loads, Ice cover strength, Ice surveys, Analysis (mathematics), Beaufort Sea.

45-2864
Hydrogeology and engineering geology of Siberia. [Gidrogeologiia i inzhenernaia geologiia Sibiri],
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Shores, Hydrogeology, Engineering geology, Geocryology, Reservoirs, Geologic processes, Permafrost, Snowmelt, Avalanches, Ground water.

45-2865
Hydrogeology and engineering geology of coastal zones of large reservoirs in Siberia. [Gidrogeologiia i inzhenernaia geologiia beregovykh zon krupnykh vodokhranilishch Sibiri],
Kuskovskiĭ, V.S., et al, *Akademiia nauk SSSR. Sibirskoe otdelenie. Institut geologii i geofiziki. Trudy*, 1990, Vol.760, p.5-10, In Russian. 3 refs.
Trzhtsinskiĭ, IU.B.
Hydrogeology, Engineering geology, Reservoirs, Shores, Ice melting, Geocryology.

45-2866
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Kuskovskiĭ, V.S., *Akademiia nauk SSSR. Sibirskoe otdelenie. Institut geologii i geofiziki. Trudy*, 1990, Vol.760, p.26-33, In Russian.
Shores, Reservoirs, Hydrogeology, Glacial deposits, Suprapermafrost ground water, Subpermafrost ground water.

45-2867
Effect of cryo-hydrogeological factors on the conditions for formation and disposition of sites of fresh ground water in the cryolithozone of Western Siberia. [Vliianie merzlotno-gidrogeologicheskikh faktorov na usloviia formirovaniia i razmeshcheniia mestorozhdeniĭ presnykh podzemnykh vod v kriolitozone Zapadnoĭ Sibiri],
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Geocryology, Hydrogeology, Ground water.

45-2868
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Engineering geology, Reservoirs, Geologic processes, Snow cover effect, Seasonal freeze thaw.

45-2869
Evaluating the intensity of exogenous geological processes in areas affected by the Bratsk reservoir. [Otsenka intensivnosti ekzogennykh geologicheskikh protsessov zony vliianiia Bratskogo vodokhranilishcha],
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Reservoirs, Geologic processes, Karst, Permafrost.

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Exodynamic processes in the basins of the left tributaries of the Angara River. [Ekzodinamicheskie protsessy v basseĭnakh levykh pritokov Angary],
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Rivers, Hydrogeology, Rain, Avalanches, Permafrost

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Exogenous processes in the southern Lake Baykal area. [Ekzogennye protsessy IUzhnogo Pribaĭkal'ia].
Imetkhenov, A.B., *Akademiia nauk SSSR. Sibirskoe otdelenie. Institut geologii i geofiziki. Trudy*, 1990, Vol.760, p.111-114, In Russian.
Lakes, Hydrogeology, Mudflows, Floods, Snowmelt, Seasonal freeze thaw.

45-2872
Calculating the critical washout rate of unfrozen and frozen deposits of the Yamal Peninsula and their relation to the dissected relief. [Raschet kriticheskikh skorosteĭ razmyva nemerzlykh i merzlykh otlozheniĭ p-ova IAmal i ikh sviaz' s raschleneniem rel'efa].
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Analysis (mathematics), Soil erosion, Frozen ground mechanics, Geomorphology.

45-2873
Synoptic conditions for the formation, preservation, and deterioration of ice-hoarfrost deposits of long duration. [Sinopticheskie usloviia obrazovaniia, sokhraneniia i razrusheniia gololedno-izmorozevykh otlozheniĭ bol'shoĭ prodolzhitel'nosti].
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Hoarfrost, Ice accretion, Ice formation, Ice deterioration, Synoptic meteorology, Atmospheric disturbances.

45-2874
Recent sedimentation processes on World Ocean shelves. [Sovremennye protsessy osadkonakopleniia na shel'fakh Mirovogo okeana].
Afbulatov, N.A., ed, Moscow, Nauka, 1990, 207p., In Russian. For selected papers see 45-2875 through 45-2879.
Sedimentation, Marine deposits, Sediment transport, Glaciation, Geomorphology, Moraines, Glacial deposits, Oceanography, Paleoclimatology, Cryogenic structures, Classifications.

45-2875
Morphogenetic classification of forms of relief on a World Ocean shelf. [Morfogeneticheskaia klassifikatsiia form rel'efa shel'fa Mirovogo okeana].
Ionin, A.S., et al, Sovremennye protsessy osadkonakopleniia na shel'fakh Mirovogo okeana (Recent sedimentation processes on World Ocean shelves). Edited by N.A. Afbulatov, Moscow, Nauka, 1990, p.24-50, In Russian. 46 refs.
Pavlidis, IU.A., IUrkevich, M.G.
Geomorphology, Classifications, Cryogenic structures, Oceanography.

45-2876
Current problems in Quaternary geology of the Barents Sea. [Aktual'nye problemy chetvertichnoĭ geologii Barentseva moria].
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Minerals, Quaternary deposits, Moraines, Paleoclimatology, Glaciation, Glacial deposits, Geomorphology, Oceanography, Barents Sea.

45-2877
Structure and development of western Novaya Zemlya bays in relation to the problem of Late Valdai glaciation. [Stroenie i razvitie zapadno-novozemel'skikh bukht v sviazi s problemoĭ pozdnevaldaĭskogo oledeneniia].
Dunaev, N.N., et al, Sovremennye protsessy osadkonakopleniia na shel'fakh Mirovogo okeana (Recent sedimentation processes on World Ocean shelves). Edited by N.A. Afbulatov, Moscow, Nauka, 1990, p.94-103, In Russian. 4 refs.
Ionin, A.S., Nikiforov, S.L., Pavlidis, IU.A.
Glaciation, Moraines, Pleistocene, Geomorphology, Oceanography.

45-2878
Transfer of terrigenous suspended material to the Barents Sea by current glaciers from Novaya Zemlya. [Vynos sovremennym lednikami Novoĭ Zemli terrigennogo vzveshennogo materiala v Barentsevo more].
Medvedev, V.S., et al, Sovremennye protsessy osadkonakopleniia na shel'fakh Mirovogo okeana (Recent sedimentation processes on World Ocean shelves). Edited by N.A. Afbulatov, Moscow, Nauka, 1990, p.103-110, In Russian. 13 refs.
Potekhina, E.M.
Glaciers, Sediment transport, Oceanography, Glacial deposits, Suspended sediments, Barents Sea.

45-2879
Quantitative distribution and dynamics of sediments in the southwestern part of the Kara Sea. [Kolichestvennoe raspredelenie i dinamika vzvesi v iugo-zapadnoĭ chasti Karskogo moria].
Medvedev, V.S., et al, Sovremennye protsessy osadkonakopleniia na shel'fakh Mirovogo okeana (Recent sedimentation processes on World Ocean shelves). Edited by N.A. Afbulatov, Moscow, Nauka, 1990, p.110-120, In Russian. 11 refs.
Potekhina, E.M.
Oceanography, Sediment transport, Sedimentation, Marine deposits, Sea ice, USSR—Kara Sea.

45-2880
West Antarctic Ice Sheet Initiative. Volume 1: Science and implementation plan.
Bindschadler, R.A., ed, *U.S. National Aeronautics and Space Administration. Conference publication.* Apr. 1991, NASA CP-3115, Vol.1, 53p., 12 refs. Proceedings of a workshop, Greenbelt, MD, Oct. 16-18, 1990.
Ice sheets, Ice shelves, Climatic changes, Sea level, Glacier melting, Research projects, Antarctica—West Antarctica.
This report describes the Science and Implementation Plan of the West Antarctic Ice Sheet Initiative (WAIS). The goal of the initiative is the prediction of the future behavior of this ice sheet and an assessment of its potential to collapse, rapidly raising global sea level. The multidisciplinary nature of WAIS reflects the complexity of the polar studies in many fields and meshes with future programs of both the U.S. and other countries. Important tasks in each discipline are described, and a coordinated schedule by which the majority of these tasks can be accomplished in 5 years is presented. (Auth. mod.)

45-2881
General ecology and paleogeography of the polar oceans. [Obshchaia ekologiia i paleogeografiia poliarnykh okeanov].
Matishov, G.G., et al, Leningrad, Nauka, 1990, 223p., In Russian. Refs. p.207-223.
Pavlova, L.G.
Oceans, Ecology, Paleoecology, Paleoclimatology, Sea ice, Marine biology, Subpolar regions, Polar regions.
An extensive literature review is presented of studies dealing with current and past features of polar marine ecosystems, climate and oceanography. The evolution of ecological conditions and living organisms of the world ocean is linked to the earth's geological past. Influences of various types of human activity such as fisheries, drilling for oil, and chemical pollution on marine flora and fauna are related to changes in the polar ecosystems. Although the emphasis is primarily on the Arctic basin, the oceanographic frontal structure, sea ice, and biological production of antarctic water masses are also considered.

45-2882
Saline frozen soils as a foundation for structures; collected scientific papers. [Zasolennye merzlye grunty kak osnovaniia sooruzheniĭ; sbornik nauchnykh trudov].
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Saline soils, Soil compaction, Loams, Frozen ground strength, Sands, Soil physics, Foundations, Frozen ground physics, Structures, Frozen ground mechanics, Thermodynamics, Frozen ground temperature, Salinity, Soil freezing, Rheology, Analysis (mathematics), Soil creep, Acoustics.

45-2883
Saline frozen soils and their distribution over USSR territory. [Zasolennye merzlye grunty i ikh rasprostranenie na territorii SSSR].
Dubikov, G.I., et al, Zasolennye merzlye grunty kak osnovaniia sooruzheniĭ; sbornik nauchnykh trudov (Saline frozen soils as a foundation for structures; collected scientific papers). Edited by S.S. Vialov, Moscow, Nauka, 1990, p.3-9, In Russian. 3 refs.
Ivanova, N.V.
Saline soils, Frozen ground, Soil surveys.

45-2884
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Velli, IU.IA., Zasolennye merzlye grunty kak osnovaniia sooruzheniĭ; sbornik nauchnykh trudov (Saline frozen soils as a foundation for structures; collected scientific papers). Edited by S.S. Vialov, Moscow, Nauka, 1990, p.9-20, In Russian. 79 refs.
Saline soils, Permafrost physics, Frozen ground strength, Frozen ground mechanics, Shores.

45-2885
Features of thermophysical properties of saline frozen soils. [Osobennosti teplofizicheskikh svoĭstv zasolennykh merzlykh gruntov].
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Saline soils, Frozen ground thermodynamics, Frozen ground physics, Heat transfer coefficient.

45-2886
Effect of salinity on the hydrophysical and thermophysical properties of soils. [Vliianie zasoleniia na vodno-fizicheskie i teplofizicheskie svoĭstva gruntov].
Loseva, S.G., et al, Zasolennye merzlye grunty kak osnovaniia sooruzheniĭ; sbornik nauchnykh trudov (Saline frozen soils as a foundation for structures; collected scientific papers). Edited by S.S. Vialov, Moscow, Nauka, 1990, p.24-33, In Russian. 3 refs.
Kharina, M.G., Kuleshova, V.IU.
Saline soils, Salinity, Soil physics, Soil freezing, Thermal properties, Hygroscopicity, Freezing points.

45-2887
Regularities governing the distribution of the synchronous content of unfrozen water in saline soils. [Zakonomernosti raspredeleniia ravnovesnogo soderzhaniia nezamerzsheĭ vody v zasolennykh gruntakh].
Bronfenbrener, L.E., Zasolennye merzlye grunty kak osnovaniia sooruzheniĭ; sbornik nauchnykh trudov (Saline frozen soils as a foundation for structures; collected scientific papers). Edited by S.S. Vialov, Moscow, Nauka, 1990, p.34-38, In Russian. 8 refs.
Saline soils, Unfrozen water content, Phase transformations, Salinity.

45-2888
Evaluating the suitability of traditional methods for determining the phase composition of saline frozen soils. [Otsenka prigodnosti traditsionnykh metodov opredeleniia fazovogo sostava dlia zasolennykh merzlykh gruntov].
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Saline soils, Soil freezing, Salinity, Soil water, Phase transformations, Soil water migration, Unfrozen water content.

45-2889
Transfer of salt in frozen dispersed soils under the action of a temperature gradient. [Perenos solei v merzlykh dispersnykh gruntakh pod deĭstviem gradienta temperatury].
Ostroumov, V.E., Zasolennye merzlye grunty kak osnovaniia sooruzheniĭ; sbornik nauchnykh trudov (Saline frozen soils as a foundation for structures; collected scientific papers). Edited by S.S. Vialov, Moscow, Nauka, 1990, p.45-55, In Russian. 10 refs.
Temperature gradients, Saline soils, Salinity, Frozen ground mechanics, Frozen ground thermodynamics, Soil water, Analysis (mathematics).

45-2890
Effect of the degree of salinity on the formation of the cryogenic structure of frozen soils. [Vliianie stepeni zasoleniia na formirovanie kriogennogo stroeniia merzlykh gruntov].
Khimenkov, A.N., et al, Zasolennye merzlye grunty kak osnovaniia sooruzheniĭ; sbornik nauchnykh trudov (Saline frozen soils as a foundation for structures; collected scientific papers). Edited by S.S. Vialov, Moscow, Nauka, 1990, p.55-62, In Russian. 4 refs.
Minaev, A.N.
Salinity, Saline soils, Cryogenic structures, Frozen ground, Soil freezing, Cryogenic textures.

45-2891
Effect of saline solutions on frozen soils and mortars. [Vozdeistvie solevykh rastvorov na merzlye grunty i stroitel'nye rastvory].
Gaidaenko, E.I., Zasolennye merzlye grunty kak osnovaniia sooruzhenii; sbornik nauchnykh trudov (Saline frozen soils as a foundation for structures; collected scientific papers). Edited by S.S. Vialov, Moscow, Nauka, 1990, p.62-70, In Russian. 5 refs.
Frozen ground physics, Salinity, Mortars, Loams, Sands.

45-2892
Physical-chemical approach to the classification of frozen soils according to salinity. [Fiziko-khimicheskii podkhod k klassifikatsii merzlykh gruntov po zasolennosti].
Panchenko, V.I., et al, Zasolennye merzlye grunty kak osnovaniia sooruzhenii; sbornik nauchnykh trudov (Saline frozen soils as a foundation for structures; collected scientific papers). Edited by S.S. Vialov, Moscow, Nauka, 1990, p.70-73, In Russian. 4 refs.
Aksenov, V.I.
Salinity, Saline soils, Frozen ground, Soil classification, Unfrozen water content, Soil water migration.

45-2893
Forecasting long-term deformation of frozen saline soils by using time analogy methods. [Prognoz dlitel'nykh deformatsii merzlykh zasolennykh gruntov metodami vremennykh analogii].
Roman, L.T., et al, Zasolennye merzlye grunty kak osnovaniia sooruzhenii; sbornik nauchnykh trudov (Saline frozen soils as a foundation for structures; collected scientific papers). Edited by S.S. Vialov, Moscow, Nauka, 1990, p.73-83, In Russian. 9 refs.
Kuleshov, IU.V.
Saline soils, Frozen ground mechanics, Rheology, Long range forecasting, Loams.

45-2894
Determining the creep properties of saline frozen soils from experiments with uniaxial compression. [Opredelenie kharakteristik polzuchesti zasolennykh merzlykh gruntov iz opytov na odnoosnoe szhatie].
Brushkov, A.V., et al, Zasolennye merzlye grunty kak osnovaniia sooruzhenii; sbornik nauchnykh trudov (Saline frozen soils as a foundation for structures; collected scientific papers). Edited by S.S. Vialov, Moscow, Nauka, 1990, p.83-90, In Russian. 8 refs.
Aksenov, V.I.
Saline soils, Soil creep, Frozen ground mechanics, Compressive properties, Deformation, Loams.

45-2895
Method of estimating the strength and rheological properties of saline frozen soils. [K metodike otsenki prochnosti i reologicheskikh svoistv zasolennykh merzlykh gruntov].
Mirenburg, IU.S., et al, Zasolennye merzlye grunty kak osnovaniia sooruzhenii; sbornik nauchnykh trudov (Saline frozen soils as a foundation for structures; collected scientific papers). Edited by S.S. Vialov, Moscow, Nauka, 1990, p.90-98, In Russian. 11 refs.
Kondrat'ev, S.D., Fokin, V.A.
Frozen ground strength, Rheology, Saline soils, Loams, Sands.

45-2896
Effect of testing methods on the measured strength properties of saline frozen soils. [O vliianii metodov ispytanii na velichiny prochnostnykh kharakteristik zasolennykh merzlykh gruntov].
Grishin, P.A., Zasolennye merzlye grunty kak osnovaniia sooruzhenii; sbornik nauchnykh trudov (Saline frozen soils as a foundation for structures; collected scientific papers). Edited by S.S. Vialov, Moscow, Nauka, 1990, p.99-103, In Russian. 2 refs.
Saline soils, Frozen ground strength, Dynamometers, Tests.

45-2897
Effect of the type of salinity on the strength and rheological properties of frozen soils. [Vliianie tipa zasoleniia na prochnostnye i reologicheskie svoistva merzlykh gruntov].
[Arkin, A.N., Zasolennye merzlye grunty kak osnovaniia sooruzhenii; sbornik nauchnykh trudov (Saline frozen soils as a foundation for structures; collected scientific papers). Edited by S.S. Vialov, Moscow, Nauka, 1990, p.103-107, In Russian. 2 refs.
Salinity, Saline soils, Frozen ground strength, Rheology, Frozen ground temperature, Sands, Loams.

45-2898
Method of determining the equivalent cohesion of saline frozen soils. [Metodika otsenki ekvivalentnogo stsepleniia zasolennykh merzlykh gruntov (ZMG)].
Aksenov, V.I., Zasolennye merzlye grunty kak osnovaniia sooruzhenii; sbornik nauchnykh trudov (Saline frozen soils as a foundation for structures; collected scientific papers). Edited by S.S. Vialov, Moscow, Nauka, 1990, p.107-115, In Russian. 6 refs.
Saline soils, Frozen ground mechanics, Soil compaction, Cohesion, Loams.

45-2899
Strength of frozen saline soils in the Yamal Peninsula. [O prochnosti merzlykh zasolennykh gruntov p-ova IAmal].
Brushkov, A.V., et al, Zasolennye merzlye grunty kak osnovaniia sooruzhenii; sbornik nauchnykh trudov (Saline frozen soils as a foundation for structures; collected scientific papers). Edited by S.S. Vialov, Moscow, Nauka, 1990, p.115-120, In Russian. 7 refs.
Lepinskikh, G.V., Nikolaev, A.A.
Saline soils, Frozen ground strength, Loams, Loads (forces), Frozen ground temperature.

45-2900
Short-term tests to determine long-term equivalent cohesion of frozen soils using the ball-die method. [Kratkovremennye ispytaniia dlia opredeleniia dlitel'nogo ekvivalentnogo stsepleniia merzlykh gruntov metodom sharikovogo shtampa].
Vorob'evskii, B.E., Zasolennye merzlye grunty kak osnovaniia sooruzhenii; sbornik nauchnykh trudov (Saline frozen soils as a foundation for structures; collected scientific papers). Edited by S.S. Vialov, Moscow, Nauka, 1990, p.121-123, In Russian. 4 refs.
Soil compaction, Cohesion, Frozen ground mechanics, Tests, Frozen ground temperature, Loams, Sands, Salinity, Saline soils.

45-2901
Problem of the effect of the cryogenic structure of saline frozen soils on their strength. [K voprosu o vliianii kriogennogo stroeniia zasolennykh merzlykh gruntov na ikh prochnost'].
Minaev, A.N., Zasolennye merzlye grunty kak osnovaniia sooruzhenii; sbornik nauchnykh trudov (Saline frozen soils as a foundation for structures; collected scientific papers). Edited by S.S. Vialov, Moscow, Nauka, 1990, p.124-128, In Russian.
Cryogenic structures, Saline soils, Frozen ground strength, Salinity, Deformation.

45-2902
Electrical and acoustic properties of saline frozen soils. [Elektricheskie i akusticheskie svoistva zasolennykh merzlykh gruntov].
Zykov, IU.D., et al, Zasolennye merzlye grunty kak osnovaniia sooruzhenii; sbornik nauchnykh trudov (Saline frozen soils as a foundation for structures; collected scientific papers). Edited by S.S. Vialov, Moscow, Nauka, 1990, p.128-136, In Russian. 3 refs.
Krasovskii, A.G., Mozganova, E.IA., Chervinskaia, O.P.
Saline soils, Frozen ground physics, Acoustics, Electrical properties, Loams, Sands.

45-2903
Sea ice observations from the Winter Weddell Gyre Study-'89.
Meese, D.A., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Feb. 1991, SR 91-02, 161p., ADA-236 036, With map notations in Russian.
Govoni, J.W., Churun, V., Ivanov, B., Komarovskii, V., Shilnikov, V., Zachek, A.
Maps, Sea ice, Ice cover thickness, Ice conditions, Icebergs, Antarctica Weddell Sea.
The data for this report were obtained during the Winter Weddell Gyre Study-'89 from the Soviet icebreaker *Akademik Fedorov*. This study took place between Sep. and Nov. 1989 in the Weddell Sea. Several times each day throughout the cruise, notes were taken on the ice conditions that the ship was passing through at that time. These notes included ice concentration, thickness, ice type, amount of ridging, number of icebergs in the area and other distinguishing characteristics. In addition, photos of the area were taken and are included in the next section. The following section includes detailed ice observations maps. These maps contain information for every mile of ice that was passed through during the cruise, including ice thickness, type and concentration, iceberg size, number and type, and the extent and size of leads. Every 30-60 miles during the cruise stops were made at ice stations where ice cores and water samples were taken for physical and chemical studies, ice thickness grids were drilled, and optical measurements were made. At each site an ice map of the station was compiled, including wind direction and speed, air temperature, ice type, ice thickness and other characteristics of the area. Copies of these maps are found in the *Ice Station Maps* section. Also presented here are daily satellite photos of the area the ship was traversing. Throughout the cruise these photos provided the ship's crew with information regarding ice conditions that the ship would be encountering. The final section consists of weekly ice extent maps of the Weddell Sea obtained from the National Oceanographic and Atmospheric Administration. This report contains a complete observational analysis of the ice conditions encountered during this study in the Weddell Sea. (Auth. mod.)

45-2904
Problems of soil science in Siberia; collected scientific papers. [Problemy pochvovedeniia v Sibiri; sbornik nauchnykh trudov].
Gadzhiev, I.M., ed, Novosibirsk, Nauka, 1990, 183p., In Russian with summary and table of contents in English. For selected papers see 45-2905 through 45-2910.
Soil science, Soil classification, Cryogenic soils, Taiga, Tundra, Ecology, Mountain soils, Forest soils, Soil composition, Ecosystems, Agriculture.

45-2905
Fundamental substance-based genetic classification of soils, basic principles, and their application. [Bazovaia substantivno-geneticheskaia klassifikatsiia pochv, osnovnye printsipy i opyt ikh realizatsii].
Sokolov, I.A., Problemy pochvovedeniia v Sibiri; sbornik nauchnykh trudov (Problems of soil science in Siberia; collected scientific papers). Edited by I.M. Gadzhiev, Novosibirsk, Nauka, 1990, p.4-13, In Russian.
Soil surveys, Soil classification, Cryoturbation, Cryogenic soils.

45-2906
Ecological soil petrography and mineralogy. [Ekologicheskaia petrografiia i mineralogiia pochv].
Gradusov, B.P., et al, Problemy pochvovedeniia v Sibiri; sbornik nauchnykh trudov (Problems of soil science in Siberia; collected scientific papers). Edited by I.M. Gadzhiev, Novosibirsk, Nauka, 1990, p.13-34, In Russian. 15 refs.
Cherniakhovskii, A.G., Chizhikova, N.P.
Rocks, Soil composition, Mineralogy, Forest ecosystems, Taiga, Phase transformations, Tundra, Soil science, Ecosystems, Steppes, Ecology.
Introducing a concept of ecological petrography and mineralogy, this paper covers the influence of phase composition, the crystal-chemistry of rock-forming minerals, mixed layer formations on characteristic features, and the composition, structure, and functions of main soil components. The tables included provide data for the ecosystems of arctic and antarctic deserts and tundra, taigas, deciduous boreal forests, steppes, and arid thin forests. (Auth. mod.)

45-2907
Current soil research problems in Siberia and the Far East. [Aktual'nye problemy izucheniia pochv Sibiri i Dal'nego Vostoka].
Gadzhiev, I.M., et al, Problemy pochvovedeniia v Sibiri; sbornik nauchnykh trudov (Problems of soil science in Siberia; collected scientific papers). Edited by I.M. Gadzhiev, Novosibirsk, Nauka, 1990, p.34-42, In Russian.
Soil science, Cryogenic soils.

45-2908
Ecological aspects of erosion processes in western Siberia. [Ekologicheskie aspekty erozionnykh protsessov v Zapadnoi Sibiri].
Tanasienko, A.A., et al, Problemy pochvovedeniia v Sibiri; sbornik nauchnykh trudov (Problems of soil science in Siberia; collected scientific papers). Edited by I.M. Gadzhiev, Novosibirsk, Nauka, 1990, p.95-100, In Russian. 13 refs.
Kovaleva, S.R., Reimkhe, V.V., Putilin, A.F.
Ecology, Soil erosion, Snowmelt.

45-2909
Soil cover of Siberia: formation characteristics, agricultural and ecological aspects of utilization. [Pochvennyi pokrov Sibiri: osobennosti formirovaniia, khozialstvennye i ekologicheskie aspekty ispol'zovaniia].
Volkovintser, V.I., et al, Problemy pochvovedeniia v Sibiri; sbornik nauchnykh trudov (Problems of soil science in Siberia; collected scientific papers). Edited by I.M. Gadzhiev, Novosibirsk, Nauka, 1990, p.143-151, In Russian.
Gadzhiev, I.M., Kovalev, R.V., Kurachev, V.M.
Cryogenic soils, Soil formation, Ecology, Agriculture, Forest soils, Tundra, Taiga, Mountain soils.

45-2910
Taiga soils in the northwestern part of the Yenisey mountain ridge. [Taezhnye pochvy severno-zapadnoĭ chasti Eniseĭskogo kriazhka],
Korsunov, V.M., et al, Problemy pochvovedeniia v Sibiri; sbornik nauchnykh trudov (Problems of soil science in Siberia; collected scientific papers). Edited by I.M. Gadzhiev, Novosibirsk, Nauka, 1990, p.152-163, In Russian. 5 refs.
Krasekha, E.N., Vedrova, E.F.
Taiga, Mountain soils, Cryogenic soils, Soil composition.

45-2911
Ice pattern recognition on space photos including drift.
Bashun, V.V., et al, *Soviet journal of remote sensing*, 1990, 8(3), p.386-391, 3 refs. Translated from Issledovanie zemli iz kosmosa.
Provorkin, A.V., Frolov, I.E., Shcherbakov, IU.A.
Mathematical models, Sea ice, Ice cover, Drift, Spaceborne photography.

45-2912
Operational maps of soil moisture of areas with and without snow cover using satellite radar images.
Nazirov, M., *Soviet journal of remote sensing*, 1990, 8(3), p.411-424, 4 refs. Translated from Issledovanie zemli iz kosmosa.
Soil water, Snow cover effect, Maps, Radar photography.

45-2913
Freeze crystallization leaves contaminants out in the cold.
Roy, K.A., *Hazmat world*, Dec. 1990, 3(12), p.56-61.
Water treatment, Waste treatment, Artificial freezing, Ice crystal growth.

45-2914
Geohydrology and ground-water geochemistry at a sub-arctic landfill, Fairbanks, Alaska.
Downey, J.S., et al, *U.S. Geological Survey. Water-resources investigations report*, 1990, No.90-4022, 25p., 11 refs.
Sinton, P.O.
Waste disposal, Ground water, Water pollution, Geochemistry, Water chemistry, Leaching, Discontinuous permafrost, United States—Alaska—Fairbanks.

45-2915
Phase-change numerical heat transfer analysis with applications to frost shielding.
Farag, I.H., et al, *Heat transfer engineering*, 1991, 12(2), MP 2876, p.29-36, 26 refs.
Virameteekul, N., Phetteplace, G.E.
Phase transformations, Heat transfer, Thermal insulation, Frost protection, Mathematical models, Freezing front, Underground pipelines.
A computer package has been developed to solve heat transfer problems with phase change and predict the temperature distribution and phase-front location variation with time. The fixed-mesh package incorporates latent heat effects. The time-domain solution uses a central-difference procedure. Published results on freezing of slab-shaped foodstuffs, solidification in an internal corner, a solidification outside a 270 deg wedge, and solidification of cast steel are used to demonstrate the validity of the numerical technique and the capabilities of the program. Underground freezing of pipelines with and without frost shields is studied using this package, and the results are discussed.

45-2916
McMurdo SAR Facility; report of the ad hoc science working team.
Jezek, K.C., ed, *Ohio State University. Byrd Polar Research Center. BPRC technical report*, 1991, No.91-01, 32p., 37 refs.
Carsey, F.D., ed.
Synthetic aperture radar, Remote sensing, Ice surveys, Glacier surveys, Air ice water interaction, Spaceborne photography, Sea ice, Antarctica - McMurdo Station.
It is recommended that a facility be implemented at McMurdo Station to receive synthetic aperture radar (SAR) data in the microwave range from satellites. The facility is designed mainly for the Canadian RADARSAT to be launched in 1994, but should also be able to receive data from the European Remote Sensing Satellite (ERS) in 1991, the Japanese Earth Resources Satellite (J-ERS) in 1992, and the U.S. Earth Observing System (EOS) in 1999, as well as previously launched satellites still functional. Observations of changes in the mass balance of the antarctic ice sheet and sea ice around Antarctica will be used to predict global climate change.

45-2917
Low-temperature effects on the design and performance of composting of explosives-contaminated soils.
Ayorinde, O.A., et al, *U.S. Army Cold Regions Research and Engineering Laboratory*, Mar. 1991, CR 91-04, 29p., ADA-236 420, 68 refs.
Reynolds, C.M.
Soil pollution, Waste treatment, Explosives, Microbiology, Decomposition, Cold weather operation, Military facilities, Analysis (mathematics).
It is well known that energy, in the form of heat, is released through microbial conversion of chemical species in a compost system. This heat energy is a major factor in the performance of the compost system and the effects of climate, especially subfreezing temperatures, may require engineering controls. This report reviews the literature on the effects of cold climates on composting. The suitability of current compost system designs for remediating explosives-contaminated soils in cold regions is discussed and a theoretical heat balance is performed. Results indicate that cold climate composting may be performed with appropriate controls; however, lack of operational data for analysis requires reliance on theoretical models that may be overly simplified. The complex relationships between physical parameters in compost systems are also discussed.

45-2918
Pre-conference abstracts.
Symposium on the Tropospheric Chemistry of the Antarctic Region, Boulder, CO, June 3-6, 1991, *U.S. Army Cold Regions Research and Engineering Laboratory*, June 1991, SR 91-10, 66p., ADA-236 274, Abstracts only.
Hogan, A.W., ed, Bowen, S.L., ed.
Atmospheric composition, Aerosols, Air pollution, Ozone, Snow impurities, Ice composition, Antarctica.

45-2919
Automotive and construction equipment for arctic use; heating and cold starting.
Diemand, D., *U.S. Army Cold Regions Research and Engineering Laboratory*, Apr. 1991, TD 91-03, 28p., ADA-236 039, 17 refs.
Motor vehicles, Engines, Heating, Engine starters, Cold weather performance.

45-2920
Automotive fuels at low temperatures.
Diemand, D., *U.S. Army Cold Regions Research and Engineering Laboratory*, Mar. 1991, TD 91-02, 25p., ADA-236 040, 21 refs.
Fuels, Automotive vehicles, Cold weather performance.

45-2921
Frazil ice blockage of intake trash racks.
Daly, S.F., *U.S. Army Cold Regions Research and Engineering Laboratory*, Mar. 1991, TD 91-01, 12p., ADA-235 724, 14 refs.
Frazil ice, Water intakes, Ice control.

45-2922
Structure of the planets.
Elder, J.W., London, Academic Press, 1987, 210p. (Pertinent p.100-105, 151-156), 35 refs.
Planetary environments, Extraterrestrial ice, Satellites (natural), Mars (planet), Geophysics, Geochronology, Geomorphology.

45-2923
Stress strain characteristics of fine-grained frozen soils.
Wijeweera, H., et al, *University of Calgary. Department of Civil Engineering. Research report*, May 1989, CE89-02, 93p., 25 refs.
Joshi, R.C.
Soil freezing, Frozen ground strength, Compressive properties, Stress strain diagrams, Foundations, Unfrozen water content.

45-2924
Applications and development of IR techniques for building research in Finland.
Kaasinen, H., et al, *International Society for Optical Engineering. Proceedings*, Apr. 1991, Vol.1467, Thermosense XIII. Edited by G.S. Baird, p.90-98, 4 refs.
Kauppi, A., Nykänen, E.
Buildings, Thermal insulation, Moisture detection, Infrared photography.

45-2925
Infrared thermographic analysis of snow ski tracks.
Roberts, C.C., Jr., *International Society for Optical Engineering. Proceedings*, Apr. 1991, Vol.1467, Thermosense XIII. Edited by G.S. Baird, p.207-218, 2 refs.
Skis, Infrared photography.

45-2926
Volcanoes of the antarctic plate and southern oceans.
LeMasurier, W.E., ed, *American Geophysical Union Antarctic research series*, 1990, Vol.48, 487p., Refs. passim.
Thomson, J.W., ed.
Volcanoes, Geological surveys, Lithology, Geochemistry, Tectonics, Geochronology, Antarctica.

45-2927
Theoretical analysis of the process of ice destruction using a rotating working organ with a freely suspended shearing element—1.
Sabatauskene, V.A., et al, *Vibration engineering*, 1989, 3(3), p.403-408, Translated from Vibrotekhnika, 1989 No.3. 4 refs.
Ragulskene, V.O., Veteris, V.Y.
Road icing, Ice removal, Machinery, Vibration, Analysis (mathematics), Ice cutting, Ice solid interface, Winter maintenance.

45-2928
Estimating soil surface temperature from meteorological data.
Pikul, J.L., Jr., *Soil science*, Mar. 1991, 151(3), p.187-195, 19 refs.
Soil temperature, Forecasting, Surface temperature, Meteorological data, Models, Heat flux, Soil science.

45-2929
Comments on "Laboratory and wind tunnel evaluations of the Rosemount icing detector".
Hill, G.E., *Journal of atmospheric and oceanic technology*, Apr. 1991, 8(2), p.305-306, 5 refs. For article being commented on see 44-1725.
Ice detection, Ice accretion, Sensors, Accuracy, Temperature effects.

45-2930
Four-photon polarization spectroscopy of a Rayleigh line wing in liquid water near 0 deg C.
Bunkin, A.F., et al, *Soviet physics - Lebedev Institute reports*, 1990, No.2, p.29-31, Translated from Kratkie soobshcheniia po fizike: Sbornik. AN SSSR. Fizicheskiĭ Institut im. P.N. Lebedeva, 1990, No.2. 7 refs.
Nurmatov, A.A.
Water structure, Liquid cooling, Supercooling, Anisotropy, Spectroscopy, Spectra, Temperature effects.

45-2931
New methods of influencing hail processes.
Burtsev, I.I., *Soviet meteorology and hydrology*, 1990, No.4, p.23-33, Translated from Meteorologiia i gidrologiia, 1990, No.4. 16 refs.
Hail clouds, Weather modification, Explosion effects, Hail prevention, Cloud seeding, Cloud dissipation, Cloud physics, Air flow, Ice crystal nucleation.

45-2932
Determination of roof bolting parameters for the space near the face in developing placer deposits with filling.
Kychkin, N.L., et al, *Soviet mining science*, Sep 1990, 25(6), p.569-572, Translated from Fiziko-tekhnicheskie problemy razrabotki poleznikh iskopaemikh, 1989, No.6. 4 refs.
Petrov, E.E., Izakson, V.IU., Sugarenko, G.G.
Placer mining, Roofs, Stability, Permafrost structure, Construction, Shear stress, Safety.

45-2933
Inward solidification of a superheated liquid in a cooled horizontal tube.
Viskanta, R., et al, *Wärme- und Stoffübertragung*, 1982, 17(1), p.39-46, With German summary. 19 refs.
Gau, C.
Phase transformations, Solidification, Liquid solid interfaces, Liquid cooling, Heat transfer, Stefan problem, Convection.

45-2934
Gazetteer of the Antarctic. Fourth edition.
[U.S. National Science Foundation], Washington, D.C., 1989, 145p., For earlier antarctic gazetteers see 12A-24692 and 13A-27794.
Gazetteers, Antarctica.
The gazetteer contains names of features in Antarctica and the area extending northward to the Antarctic Convergence that have been approved by the U.S. Board on Geographic Names as recently as mid-1989. It supersedes previous Board gazetteers for the area. For each geographic feature, the book contains the name, cross references if any, and latitude and longitude. Coverage corresponds to that of maps at the scale of 1:250,000 or larger for islands, coastal Antarctica, and mountains and ranges of the continent. Much of the interior of Antarctica, an ice plateau, has been mapped at a smaller scale and is nearly devoid of features and toponyms. All of the names are for natural features; scientific stations are not listed. For the

names of submarine features, reference should be made to the *Gazetteer of Undersea Features*, U.S. Board on Geographic Names (1981).

45-2935

Vertical fine structure of temperature profile in the subarctic front zone (Megapolygon). [Tonkaia vertikal'naia struktura temperatury v zone subarkticheskogo fronta (Megapoligon)].

Navrotskiĭ, V.V., et al. *Akademiia nauk SSSR. Doklady*, 1991, 316(2), p.468-474. In Russian. 3 refs.

Levenko, A.M., Pavlova, E.P.

Subpolar regions, Temperature distribution, Temperature gradients, Correlation, Ocean currents, Oceanography.

45-2936

Model of transition processes in the tundra-taiga system. [Model' perekhodnykh protsessov v sisteme tundra-taĭga].

Bogatyrev, B.G., *Akademiia nauk SSSR. Doklady*, 1991, 316(2), p.508-511. In Russian. 3 refs.

Tundra, Taiga, Mathematical models, Plant ecology.

45-2937

Glass transition of the amorphous phase in frozen aqueous systems.

Blond, G., et al. *Thermochimica acta*, 1991, Vol 175, p.239-247, 18 refs.

Simatos, D.

Phase transformations, Frozen liquids, Vitreous ice, Solutions, Enthalpy.

45-2938

Manuscript of Horace-Bénédict de Saussure on avalanches in the Swiss Alps (1795) and a comparison between 18th century and modern ideas on snow and avalanches.

Carozzi, A.V., *Archives des sciences*, Sep.-Dec. 1990, 43(3), p.371-399, With French summary. 16 refs.

Avalanches, Avalanche mechanics, History, Switzerland Alps.

45-2939

Modeling the reflectance spectrum of Ca[illegible] from 0.25 to 4.1 millimicrons.

Calvin, W.M., et al. *Icarus*, Feb. 1991, 89(2), p.305-317, 33 refs.

Clark, R.N.

Extraterrestrial ice, Satellites (natural), Regolith, Surface structure, Albedo, Spectra, Models, Mineralogy, Reflectivity.

45-2940

Dark-ray and dark-floor craters on Ganymede, and the provenance of large impactors in the Jovian system.

Schenk, P.M., et al. *Icarus*, Feb. 1991, 89(2), p.318-346, Refs. p.343-346.

McKinnon, W.B.

Extraterrestrial ice, Satellites (natural), Regolith, Albedo, Terrain identification, Ground ice, Surface properties, Spectra, Sublimation, Impact.

45-2941

Gas release from comets.

Notesco, G., et al. *Icarus*, Feb. 1991, 89(2), p.411-413, 16 refs.

Bleinfeld, I., Laufer, D., Bar-Nun, A.

Extraterrestrial ice, Simulation, Gases, Ice composition, Thickness, Phase transformations, Vapor transfer, Amorphous ice.

45-2942

Hydrologic processes in a southern Ontario wetland.

Gehrels, J., et al. *Hydrobiologia*, Dec. 10, 1990, 208(3), p.221-234, Refs. p.232-234.

Mulamoottil, G.

Wetlands, Water balance, Hydrologic cycle, Ground water, Chemical properties, Sampling, Seasonal variations, Ecosystems, Mass balance, Canada Ontario Kitchener.

45-2943

Comments on the so-called salt lakes of Greenland.

Williams, W.D., *Hydrobiologia*, Mar. 1, 1991, 210(1-2), p.67-74, 46 refs.

Salt lakes, Limnology, Salinity, Ice cover effect, Primary productivity, Water chemistry, Greenland.

45-2944

Temporal changes in zooplankton composition in a hypersaline, antarctic lake subject to periodic seawater incursions.

Eslake, D., et al. *Hydrobiologia*, Mar. 1, 1991, 210(1-2), p.93-99, 7 refs.

Kirkwood, R., Burton, H., Wang, Z.P.

Salt lakes, Limnology, Ice cover effect, Plankton, Sea water, Ecosystems, Flooding, Antarctica Vestfold Hills

In this paper, colonization of Lake Fletcher, a hypersaline, meromictic lake in the Vestfold Hills, by the calanoid copepod *Drepanopus bispinosus*, the cyclopoid copepod *Oncea curvata* and an undescribed cydippid ctenophore is discussed. In 1978, salinity directly under the ice was 66 per mill and repeated net hauls found no zooplankton. In 1983, adults of *D. bispinosus* were found, and in 1984, a reproductively active population of this species was identified. By winter 1986 three zooplankton species had established populations in the lake. In 1986-87, high tides caused nearby Taynaya Bay to flood into the lake, and three further species were found in the lake. It appears that periodic flooding after 1978 caused a salinity decrease in the lake from 66 to 54 per mill, which enabled some invertebrate species to maintain year-round populations, whereas others require marine incursions to re-establish summer only populations. (Auth. mod.)

45-2945

Vernal microstratification patterns in a meromictic saline lake: their causes and biological significance.

Northcote, T.G., et al. *Hydrobiologia*, May 31, 1990, Vol.197, International Symposium on Saline Lakes, Fourth, Banyoles, Spain, May 2-8, 1988. Proceedings. Edited by F.A. Comin and T.G. Northcote, p.105-114, 22 refs.

Hall, K.J.

Salt lakes, Limnology, Runoff, Stratification, Ice cover effect, Primary productivity, Layers, Meltwater, Canada—British Columbia—Mahoney Lake.

45-2946

IHS transform for the integration of radar imagery with other remotely sensed data.

Harris, J.R., et al. *Photogrammetric engineering & remote sensing*, Dec. 1990, 56(12), p.1631-1641, 30 refs.

Murray, R., Hirose, T.

Remote sensing, Radar photography, Image processing, Geophysical surveys, Sea ice, Surface structure, Resolution, Mapping, Data processing.

45-2947

SAR sea ice discrimination using texture statistics: a multivariate approach.

Barber, D.G., et al. *Photogrammetric engineering & remote sensing*, Apr. 1991, 57(4), p.385-395, 49 refs.

LeDrew, E.F.

Sea ice, Radar photography, Synthetic aperture radar, Surface structure, Image processing, Classifications, Resolution, Statistical analysis, Airborne radar, Backscattering, Side looking radar.

45-2948

Calculational aspects of the assessment of dielectric response function and energy loss in materials: applications to ice and polyacetylene.

Zaider, M., et al. *International journal of supercomputer applications*, 1990, 4(4), p.25-39, 34 refs.

Orr, D.E., Fry, J.L.

Solids, Dielectric properties, Polymers, Cubic ice, Computer applications, Charge transfer, Analysis (mathematics), Molecular energy levels, Ionization, Water structure.

45-2949

New geophysical results and preliminary interpretation of crustal structure between the Antarctic Peninsula and Ellsworth Land.

McGibbon, K.J., et al. International Symposium on Antarctic Earth Sciences, 5th, Cambridge, Aug. 1987, Proceedings. Edited by M.R.A. Thomson, J.A. Crame, and J.W. Thomson, Cambridge, University Press, 1991, p.475-479, 13 refs.

Smith, A.M.

Ice sheets, Ice cover thickness, Tectonics, Gravimetric prospecting, Antarctica Ellsworth Land.

New geophysical results from eastern Ellsworth Land have been combined with existing data to produce Bouguer-anomaly and bedrock maps of the region. The bedrock topography data confirm the morphological contrast between the Antarctic Peninsula and Haag Nunataks crustal blocks and the deep bedrock around Siple Station and Evans Ice Stream. Bouguer anomalies as low as -1300 gu characterize the Antarctic Peninsula as far south as a major bedrock scarp. To the southwest, Bouguer anomalies are dominantly positive with only gentle variations. Bedrock topography and Bouguer-anomaly data are used to draw preliminary conclusions about crustal structure in the area. They delimit the bedrock scarp at the southern end of the Antarctic Peninsula and distinguish areas of elevated bedrock from the Antarctic Peninsula crustal block. Farther southwest, previously proposed crustal fractures along deep subglacial troughs are not reflected on the Bouguer-anomaly map. Furthermore, elevated bedrock around Haag Nunataks and the Ellsworth Mountains shows little correlation with observed Bouguer anomalies. The reasons for the gently undulating positive Bouguer anomaly over this severe bedrock topography are briefly discussed, but clarification of crustal structure awaits further modelling. (Auth.)

45-2950

Snowsheds on the Baykal-Amur mainline. [Protivolavinnye galerei na Baĭkalo-Amurskoĭ magistrali].

[Adroshnikov, V.I., *Transportnoe stroitel'stvo*, Mar. 1991, No.3, p.4-6. In Russian. 3 refs.

Snowsheds, Countermeasures, Avalanches, Railroad tunnels.

45-2951

Frost protection on the Baykal-Amur mainline. [Protivomerzlotnaia zashchita BAMa].

Kondrat'ev, V.G., et al. *Transportnoe stroitel'stvo*, Mar. 1991, No.3, p.6-7. In Russian. 2 refs.

Naumov, M.S., Korolev, A.A., Leonov, P.V.

Countermeasures, Railroads, Frost protection.

45-2952

Laying pile foundations in northern regions. [Ustroĭstvo svaĭnykh fundamentov v severnykh rafonakh].

Zavizion, V.G., et al. *Stroitel'stvo truboprovodov*, Mar. 1991, No.3, p.20-22. In Russian.

Shevchenko, I.A., Rumyev, Z.R., Biashchak, L.B.

Pile structures, Foundations, Cold weather construction, Permafrost bases.

45-2953

Ice and snow—construction materials. [Led i sneg—stroitel'nye materialy].

Renkel', A.F., *Stroitel'stvo truboprovodov*, Feb. 1991, No.2, p.37-39. In Russian. For parts 1 and 2 see 45-2432 and 45-2433.

Ice (construction material), Snow (construction material), Construction equipment.

45-2954

Forming pit reservoirs in permafrost by contour blasting. [Obrazovanie transheĭnykh rezervuarov v vechnomerzlykh gruntakh metodom konturnogo vzryvaniia].

Tsurik, V.A., et al. *Transportnoe stroitel'stvo*, Feb. 1991, No.2, p.34-36. In Russian. 4 refs.

Serdiuk, D.A., Zaderiĭ, L.A.

Permafrost bases, Excavation, Ice blasting, Reservoirs.

45-2955

Impulse radar bathymetric profiling in weed-infested fresh water.

Kovacs, A., *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, Apr. 1991, CR 91-10, 19p., ADA-237 489, 20 refs.

Sounding, Radar, Underwater acoustics.

An evaluation of an impulse radar sounding system for profiling bottom topography in weed-infested waters is discussed. Field results are presented comparing radar profiles of water depth with those obtained with a conventional acoustic depth sounder. It was found that the impulse radar system could profile freshwater depths through dense vegetation, whereas the acoustic depth sounder could not.

45-2956

Performance of asphalt concrete airport pavements during thaw weakening periods; a field study.

Janoo, V.C., et al. *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, Apr. 1991, CR 91-07, 68p., ADA-237 441, 13 refs.

Berg, R.L.

Airports, Runways, Concrete pavements, Thaw weakening.

It is accepted that in the winter the load-carrying capacity of pavements increases dramatically because of freezing of the pavement structure. This is more striking in asphalt concrete pavements because of the stiffening of the asphalt at low temperatures. In the spring, the pavement structure below the asphalt layer thaws and can become saturated with water from the melting ice lenses, reducing the strength of the base, subbase and subgrade. In the spring of 1986, CRREL conducted Falling Weight Deflectometer (FWD) measurements at an airfield in Wisconsin, which had pavements that were primarily asphalt concrete, to determine the change in the load-bearing capacity of these pavement structures in a seasonal frost area during thaw weakening periods. In addition to FWD measurements, surface and subsurface pavement temperatures were measured at selected sites. This report gives a general description of the airfield and the pavement structure and a comprehensive analysis of the FWD measurements.

45-2957

Bank and channel changes near Dikes, Tanana River, Alaska.

Gatto, L.W., MP 2877, River meandering. Conference Rivers '83, New Orleans, LA, Oct. 24-26, 1983. Proceedings. Edited by C.M. Elliott, New York, American Society of Civil Engineers, 1983, p.212-222, 5 refs.

Banks (waterways), Channels (waterways), Erosion.

Two dikes on the Tanana River diverted river flow away from the north bank which stopped north bank erosion immediately downstream of the dike locations, and bank erosion increased along some of the southern channels. The river, however, appears to be reestablishing its preconstruction length by forming meanders at the ends of the dikes, and is eroding the north bank

downstream of the sites that were eroding prior to construction. Statistical analysis of erosion and discharge data showed that bank erosion increases the longer the discharge is above 30,000 cfs (840 cu.m./s). Although cross-sectional areas of the channels did not change substantially, major lateral shifts occurred in the northern channels. Most north channel changes occurred on the rising limb of the discharge hydrograph, while the south channel changed most as discharge receded. Data from this analysis and other studies will be used in selecting sites for additional dikes.

45-2958
Case study of bank erosion on the Kinak River, Alaska.
Kraeger-Rovey, C., River meandering. Conference Rivers '83, New Orleans, LA, Oct. 24-26, 1983. Proceedings. Edited by C.M. Elliott, New York, American Society of Civil Engineers, 1983, p.223-230.
Banks (waterways), Bank protection (waterways), Erosion, Tundra, Snow vehicles, Permafrost preservation, United States--Alaska--Kinak River.

45-2959
Tazlina River meander loop—a case history.
Swanson, J.E., River meandering. Conference Rivers '83, New Orleans, LA, Oct. 24-26, 1983. Proceedings. Edited by C.M. Elliott, New York, American Society of Civil Engineers, 1983, p.231-239, 13 refs.
Glacial rivers, Glacial lakes, Pipelines.

45-2960
Effects of river migration on pipelines in western Canada.
Demlow, T.C., et al, River meandering. Conference Rivers '83, New Orleans, LA, Oct. 24-26, 1983. Proceedings. Edited by C.M. Elliott, New York, American Society of Civil Engineers, 1983, p.240-249, 5 refs.
Edgeworth, A.L.
Rivers, Runoff, Pipelines.

45-2961
Recent insights on the role of cryoprotective agents in vitrification.
MacFarlane, D.R., et al, *Cryobiology*, Aug. 1990, 27(4), p.345-358, 27 refs.
Forsyth, M.
Cryobiology, Vitreous ice, Antifreezes, Ice formation, Phase transformations, Solutions, Frozen liquids, Water structure, Nucleation.

45-2962
Theoretical prediction of devitrification tendency: determination of critical warming rates without using finite expansions.
Boutron, P., et al, *Cryobiology*, Aug. 1990, 27(4), p.359-377, 40 refs.
Mehl, P.M.
Cryobiology, Antifreezes, Ice crystal growth, Vitreous ice, Cooling rate, Mathematical models, Phase transformations, Solutions.

45-2963
Experimental dissection of devitrification in aqueous solutions of 1,3-butanediol.
Mehl, P.M., *Cryobiology*, Aug. 1990, 27(4), p.378-400, 50 refs.
Cryobiology, Vitreous ice, Antifreezes, Ice crystal growth, Nucleation rate, Phase transformations, Mathematical models, Solutions.

45-2964
Distinction between living and dead plant tissue: viability tests in cold hardiness research.
Calkins, J.B., et al, *Cryobiology*, Apr. 1990, 27(2), p.194-211, 187 refs.
Swanson, B.T.
Plant tissues, Cold tolerance, Viability, Plant physiology.

45-2965
Quantitative analysis of the probability of intracellular ice formation during freezing of isolated protoplasts.
Pitt, R.E., et al, *Cryobiology*, Feb. 1989, 26(1), p.44-63, 23 refs.
Steponkus, P.L.
Cryobiology, Ice formation, Cooling rate, Mathematical models, Nucleation.

45-2966
Inhibition of recrystallization of ice by insect thermal hysteresis proteins: a possible cryoprotective role.
Knight, C.A., et al, *Cryobiology*, June 1986, 23(3), p.256-262, 15 refs.
Duman, J.G.
Cryobiology, Recrystallization, Antifreezes, Frost resistance, Physiological effects, Organic nuclei, Cold weather survival.

45-2967
Ice recrystallization in a model system and in frozen muscle tissue.
Martino, M.N., et al, *Cryobiology*, Apr. 1989, 26(2), p.138-148, 43 refs.
Zaritzky, N.E.
Recrystallization, Cryobiology, Ice crystal growth, Preserving, Ice models, Analysis (mathematics), Cold storage.

45-2968
Ice crystal patterns in artificial gels of extracellular matrix macromolecules after quick-freezing and freeze-substitution.
Allenspach, A.L., et al, *Cryobiology*, Apr. 1989, 26(2), p.170-179, 12 refs.
Kraemer, T.G.
Cryobiology, Ice crystal structure, Ice crystal replicas, Preserving, Artificial freezing.

45-2969
Accuracy of selected techniques for estimating ice-affected streamflow.
Walker, J.F., *Journal of hydraulic engineering*, June 1991, 117(6), p.697-712, 17 refs.
Stream flow, Forecasting, Accuracy, Flow measurement, Ice cover effect, Hydrography, River ice, Hydraulics, Climatic factors.

45-2970
Automatic construction of sea ice charts of the Antarctic Ocean from Kosmos 1500 along-track radiometer measurements.
Nikitin, P.A., et al, *Soviet journal of remote sensing*, 1987 (Pub. Aug. 1990), 7(5), p.926-936, Translated from *Issledovanie Zemli iz kosmosa*. 12 refs.
Spiridonov, IU.G., Trapeznikova, N.B.
Sea ice distribution, Mapping, Image processing, Radiometry.
A method has been developed to construct schematic maps of the spatial distribution of sea ice in the region of the South Pole, based on along-track microwave radiometer measurements from Kosmos 1500. The paper describes the stages in the processing of the satellite data, gives examples of the automatic construction of schematic maps, and compares the maps with data from other sources. (Auth.)

45-2971
Dynamics, transport and photochemistry in the middle atmosphere of the Southern Hemisphere. Proceedings.
O'Neill, A., ed, *North Atlantic Treaty Organization. ASI Series C: Mathematical and Physical Sciences*, 1989, Vol.321, 257p., Refs. passim. For selected papers see I-44202 through I-44212 or 45-2972 through 45-2982.
NATO Advanced Research Workshop on Dynamics, Transport and Photochemistry in the Middle Atmosphere of the Southern Hemisphere, San Francisco, CA, U.S.A., Apr. 15-17, 1989.
DLC QC881.2.M53N37
Ozone, Meetings, Atmospheric circulation, Atmospheric composition.
This volume is a collection of papers presented at the third workshop held as part of the Middle Atmosphere in the Southern Hemisphere (MASH) project, an international effort to learn more about the ozone depletion mechanism. To emphasize the interdisciplinary nature of the workshop, the volume has not been divided into the separate sections of dynamics, transport and photochemistry in the title. Most of the papers included in these proceedings are pertinent to Antarctica.

45-2972
Middle atmospheric dynamics and transport: some current challenges to our understanding.
McIntyre, M.E., *North Atlantic Treaty Organization. ASI Series C: Mathematical and Physical Sciences*, 1989, Vol.321, Dynamics, transport and photochemistry in the middle atmosphere of the Southern Hemisphere. Proceedings of the NATO Advanced Research Workshop on Dynamics, Transport and Photochemistry in the Middle Atmosphere of the Southern Hemisphere, San Francisco, CA, U.S.A., Apr. 15-17, 1989. Edited by A. O'Neill, p.1-18, Refs. p.15-18.
DLC QC881.2.M53N37
Atmospheric circulation, Atmospheric composition, Ozone, Models.
The fluid dynamics of wave propagation, wave breaking, and the resulting turbulence be it the fully three-dimensional small-scale turbulence due to breaking internal gravity waves, or the layerwise two-dimensional turbulence due to breaking Rossby waves poses three major challenges to research on middle atmospheric dynamics and chemical transport. These are, first, the unjustifiability of the eddy-diffusivity concept, under conditions often met with in the atmosphere; second, the ill-understood nature of the Rossby-wave-associated dynamical feedbacks on the global circulation and, third, an acute difficulty in parameterizing vertical mixing by convectively overturning gravity waves in the mesosphere and lower thermosphere. The antarctic ozone hole is suggested to provide one of the more conspicuous examples of the first of the three challenges discussed. (Auth. mod.)

45-2973
On data sources and quality for the Southern Hemisphere stratosphere.
Karoly, D.J., et al, *North Atlantic Treaty Organization. ASI Series C: Mathematical and Physical Sciences*, 1989, Vol.321, Dynamics, transport and photochemistry in the middle atmosphere of the Southern Hemisphere. Proceedings of the NATO Advanced Research Workshop on Dynamics, Transport and Photochemistry in the Middle Atmosphere of the Southern Hemisphere, San Francisco, CA, U.S.A., Apr. 15-17, 1989. Edited by A. O'Neill, p.19-32, 16 refs.
Graves, D.S.
DLC QC881.2.M53N37
Stratosphere, Atmospheric circulation, Data processing, Meteorological data, Models, Polar regions.
A brief review is presented of current operational analysis systems for the Southern Hemisphere stratosphere, concentrating on the systems used at the National Meteorological Center (USA) and the British Meteorological Office. An assessment is made of two major sources of error in these current analyses, the tropospheric analyses used at the base-level and the thickness analyses derived from satellite radiance data. Some results on the impact of different base-level analyses on derived stratospheric circulation statistics in the Southern Hemisphere are described. The reliability of analyses obtained from satellite data is assessed by sampling a numerical model simulation of the stratosphere as if by satellite and comparing the sampled statistics with those from the model. Both these areas are shown to lead to problems with the circulation statistics at high latitudes and for differentiated quantities. A possible improved stratospheric analysis system is described, based on modern data assimilation and analysis systems used in the troposphere and using the operational system at the European Centre for Medium Range Weather Forecasts as an example. (Auth.)

45-2974
Seasonal evolution of the extra-tropical stratosphere in the Southern and Northern Hemispheres: systematic changes in potential vorticity and the non-conservative effects of radiation.
O'Neill, A., et al, *North Atlantic Treaty Organization. ASI Series C: Mathematical and Physical Sciences*, 1989, Vol.321, Dynamics, transport and photochemistry in the middle atmosphere of the Southern Hemisphere. Proceedings of the NATO Advanced Research Workshop on Dynamics, Transport and Photochemistry in the Middle Atmosphere of the Southern Hemisphere, San Francisco, CA, U.S.A., Apr. 15-17, 1989. Edited by A. O'Neill, p.33-54, 14 refs.
Pope, V.D.
DLC QC881.2.M53N37
Stratosphere, Atmospheric circulation, Radiation, Polar regions.
Satellite data are used to summarize the main features of the seasonal cycle of the extra-tropical stratosphere in the two hemispheres during one year. Systematic changes in the overall structure of the circulation are identified, and the contribution of the non-conservative effects of radiation to these changes is outlined. (Auth.)

45-2975
Final warming of the stratosphere.
Mechoso, C.R., *North Atlantic Treaty Organization. ASI Series C: Mathematical and Physical Sciences*, 1989, Vol.321, Dynamics, transport and photochemistry in the middle atmosphere of the Southern Hemisphere. Proceedings of the NATO Advanced Research Workshop on Dynamics, Transport and Photochemistry in the Middle Atmosphere of the Southern Hemisphere, San Francisco, CA, U.S.A., Apr. 15-17, 1989. Edited by A. O'Neill, p.55-69, 25 refs.
DLC QC881.2.M53N37
Stratosphere, Temperature variations, Atmospheric circulation, Atmospheric disturbances, Ozone, Polar regions.
The dramatic changes during spring in the shape of the polar vortex in the stratosphere of the two hemispheres are illustrated, using perspective plots of the three-dimensional structure of the isotach and potential vorticity fields. There are also important interhemispheric differences in the location and magnitude of the largest temperature increases over the polar regions during spring. Those in the Southern Hemisphere are in the lower stratosphere whereas those in the Northern Hemisphere are in the upper stratosphere, the former being almost twice as large as the latter. The values of minimum temperatures in the lower stratosphere suggest that in early spring the conditions suitable for the formation of polar stratospheric clouds, thought to play a key role in ozone destruction, are the rule in the Southern Hemisphere and the exception in the Northern Hemisphere. (Auth. mod.)

45-2976
Comparison of the Southern Hemisphere springs of 1988 and 1987.
Newman, P.A., et al, *North Atlantic Treaty Organization. ASI Series C: Mathematical and Physical Sciences*, 1989, Vol.321, Dynamics, transport and photochemistry in the middle atmosphere of the Southern Hemisphere. Proceedings of the NATO Advanced Research Workshop on Dynamics, Transport and Photochemistry in the Middle Atmosphere of the Southern Hemisphere, San Francisco, CA, U.S.A., Apr. 15-17, 1989. Edited by A. O'Neill, p.71-89, 16 refs.
Schoeberl, M.R., Lait, L.R.
DLC QC881.2.M53N37
Stratosphere, Temperature variations, Atmospheric circulation, Ozone, Polar regions.
Differences between Southern Hemisphere (SH) springs of 1988 and 1987 in the stratosphere are discussed. The two years present a case study of opposite phases of the equatorial quasi-biennial oscillation (QBO) and the QBO's effect on SH spring stratospheric conditions. During 1988 (easterly QBO phase), mid-latitude temperatures were warmer than 1987 (westerly QBO phase) during July and Aug., while polar temperatures were similar. During Sep., Oct., and Nov., 1988 polar temperatures were substantially higher than in 1987. Total ozone values reflected these thermal differences, with record low ozone values in Oct. 1987 following the Sep. ozone hole depletion phase, and higher total ozone values in Oct. 1988. The large temperature differences result from a larger warming rate in 1988 than in 1987. Similarly, the higher total ozone amounts in Oct. 1988 resulted from a weaker depletion during Sep. 1988. The faster warming rate of temperature, and slower depletion rate for ozone in 1988, do not occur in a smooth linear fashion, but occur as a series of events which result from strong planetary wave one events. (Auth.)

45-2977
Traveling planetary waves in the middle atmosphere.
Hirota, I., *North Atlantic Treaty Organization. ASI Series C: Mathematical and Physical Sciences*, 1989, Vol.321, Dynamics, transport and photochemistry in the middle atmosphere of the Southern Hemisphere. Proceedings of the NATO Advanced Research Workshop on Dynamics, Transport and Photochemistry in the Middle Atmosphere of the Southern Hemisphere, San Francisco, CA, U.S.A., Apr. 15-17, 1989. Edited by A. O'Neill, p.111-116, 9 refs.
DLC QC881.2.M53N37
Atmospheric circulation, Ozone, Polar regions.
Recent progress in the study of free traveling planetary waves in the middle atmosphere is briefly reviewed, by paying special attention to interhemispheric differences in connection with the seasonal variation of mean flows. Observational evidence is presented for various westward traveling modes (normal mode Rossby waves), and for the eastward traveling waves in the Southern Hemisphere, a process which is related to the intense sudden warming over Antarctica during mid-winter. (Auth. mod.)

45-2978
Dynamical properties of the antarctic circumpolar vortex inferred from aircraft observations.
Hartmann, D.L., *North Atlantic Treaty Organization. ASI Series C: Mathematical and Physical Sciences*, 1989, Vol.321, Dynamics, transport and photochemistry in the middle atmosphere of the Southern Hemisphere. Proceedings of the NATO Advanced Research Workshop on Dynamics, Transport and Photochemistry in the Middle Atmosphere of the Southern Hemisphere, San Francisco, CA, U.S.A., Apr. 15-17, 1989. Edited by A. O'Neill, p.117-134, 31 refs.
DLC QC881.2.M53N37
Stratosphere, Ozone, Atmospheric circulation, Polar regions.
The amount of dynamical mixing and transport during winter and spring plays a key role in the seasonal evolution of total ozone in the middle atmosphere of the Southern Hemisphere. Too much mixing and heat transport will shut off the ozone-destroying chemistry. A small amount of transport can actually enhance the amount of ozone destroyed photochemically in the lower stratosphere. Aircraft observations taken during the Airborne Antarctic Ozone Experiment in Aug. and Sep. 1987 allow the estimation of the amount of mixing and transport of ozone during the time that the ozone hole developed in that year. Estimates based on conservative tracer data indicate that ozone was transported into the region where the ozone hole developed, thus requiring a photochemical sink for ozone that is at least as large as the observed rate of decline of ozone. By assuming a mean radiative cooling of 0.2 K/day, it is estimated that the net transport of ozone was relatively small, only 20% +/- 10% of the observed trend and of the opposite sign. (Auth. mod.)

45-2979
Large stratospheric sudden warming in antarctic late winter and shallow ozone hole in 1988: observation by Japanese Antarctic Research Expedition.
Kanzawa, H., et al, *North Atlantic Treaty Organization. ASI Series C: Mathematical and Physical Sciences*, 1989, Vol.321, Dynamics, transport and photochemistry in the middle atmosphere of the Southern Hemisphere. Proceedings of the NATO Advanced Research Workshop on Dynamics, Transport and Photochemistry in the Middle Atmosphere of the Southern Hemisphere, San Francisco, CA, U.S.A., Apr. 15-17, 1989. Edited by A. O'Neill, p.135-148, Refs. p.146-148.
Kawaguchi, S.
DLC QC881.2.M53N37
Ozone, Stratosphere, Air temperature, Antarctica—Showa Station.
There occurred a large stratospheric sudden warming in the Southern Hemisphere in late winter of 1988 which competes in suddenness and size with major mid-winter warmings in the Northern Hemisphere. Associated with the dynamical phenomenon of the sudden warming, total ozone increased over the eastern hemispheric part of Antarctica. The sudden warming as well as other warmings which followed it made the 1988 ozone hole shallow in depth and small in area. Long-term observation at Showa Station depict well the characteristics of the 1988 event. (Auth.)

45-2980
Nitrogen chemistry in Antarctica: a brief review.
Solomon, S., *North Atlantic Treaty Organization. ASI Series C: Mathematical and Physical Sciences*, 1989, Vol.321, Dynamics, transport and photochemistry in the middle atmosphere of the Southern Hemisphere. Proceedings of the NATO Advanced Research Workshop on Dynamics, Transport and Photochemistry in the Middle Atmosphere of the Southern Hemisphere, San Francisco, CA, U.S.A., Apr. 15-17, 1989. Edited by A. O'Neill, p.191-201, Refs. p.198-199.
DLC QC881.2.M53N37
Ozone, Stratosphere, Atmospheric composition, Clouds, Polar regions.
Measurements of reactive nitrogen species in Antarctica are briefly reviewed and their links to ozone depletion are summarized. Observations of NO, NO2, HNO3, particulate nitrate, and total NOy demonstrate that the composition of the antarctic stratosphere is greatly perturbed by the presence of clouds. Further, measurements have shown that the clouds themselves are composed in part of HNO3, and that sedimentation of cloud particles apparently can remove reactive nitrogen from the gas phase altogether. These processes reduce the abundance of stratospheric NO2, a primary requirement for elevated ClO densities and attendant ozone loss. (Auth.)

45-2981
Potential role of HOx and ClOx interactions in the ozone hole photochemistry.
Crutzen, P.J., et al, *North Atlantic Treaty Organization. ASI Series C: Mathematical and Physical Sciences*, 1989, Vol.321, Dynamics, transport and photochemistry in the middle atmosphere of the Southern Hemisphere. Proceedings of the NATO Advanced Research Workshop on Dynamics, Transport and Photochemistry in the Middle Atmosphere of the Southern Hemisphere, San Francisco, CA, U.S.A., Apr. 15-17, 1989. Edited by A. O'Neill, p.203-212, 7 refs.
Brühl, C.
DLC QC881.2.M53N37
Ozone, Stratosphere, Ultraviolet radiation, Photochemical reactions, Atmospheric composition, Polar regions.
It is demonstrated by model calculations that odd hydrogen can play a significant role in ozone destruction in the polar lower stratosphere whenever nitric acid vapor volume mixing ratios are below about 1 ppbv. The production of odd hydrogen after sunrise is significantly enhanced by a newly discovered reaction involving ClO and the methyl peroxy radical. Decrease of overhead ozone in the Southern Hemisphere leads to an increase in OH and hydrogen peroxy radical concentrations and a reduction in tropospheric ozone because of increasing penetration of UV radiation. (Auth.)

45-2982
Antarctic ozone depletion and potential effects on the global ozone budget.
Grose, W.L., et al, *North Atlantic Treaty Organization. ASI Series C: Mathematical and Physical Sciences*, 1989, Vol.321, Dynamics, transport and photochemistry in the middle atmosphere of the Southern Hemisphere. Proceedings of the NATO Advanced Research Workshop on Dynamics, Transport and Photochemistry in the Middle Atmosphere of the Southern Hemisphere, San Francisco, CA, U.S.A., Apr. 15-17, 1989. Edited by A. O'Neill, p.237-251, Refs. p.249-251.
Eckman, R.S., Turner, R.E., Blackshear, W.T.
DLC QC881.2.M53N37
Ozone, Atmospheric composition, Simulation, Stratosphere.
In addition to the dramatic reductions in polar ozone observed in the springtime antarctic stratosphere during the past decade, data from the Total Ozone Mapping Spectrometer (TOMS) instrument also provide evidence of a reduction in total column ozone extending into middle latitudes of the Southern Hemisphere. It has been suggested that dilution of the mid-latitude air by export of ozone-poor air from polar regions following breakup of the vortex would create a deficit which might persist for a long period because of the slow chemical replacement time (months to a year in the lower stratosphere) for ozone. If the deficit is maintained until the next springtime depletion episode, the effect might be cumulative, with a permanent reduction in the global ozone budget and, hence, a possible explanation for the mid-latitude reductions of ozone seen in the TOMS data. A study of the so-called "dilution effect" has been conducted using a three-dimensional chemistry transport model. The results of the model simulations reveal a small but significant residual deficit in the total ozone in the Southern Hemisphere 1 year following the formation of an ozone hole in the polar regions.

45-2983
Holocene climates of the Vestfold Hills, Antarctica, and Macquarie Island.
Pickard, J., et al, Late Cenozoic paleoclimates of the Southern Hemisphere. Edited by J.C. Vogel, Rotterdam, A.A. Balkema, 1984, p.173-182, Refs. p.181-182.
Selkirk, P.M., Selkirk, D.R.
DLC QC884.L38
Paleoclimatology, Ice cover thickness, Ice sheets, Glaciation, Antarctica—Vestfold Hills, Macquarie Island.
The Vestfold Hills are a 400 sq km ice-free oasis on the coast of East Antarctica. Mean daily temperatures are >0 C for <2 months annually. The terminal Pleistocene ice sheet advance (Vestfold Glaciation) covered the hills. The fossil and geomorphic evidence shows no substantial climatic change in the Holocene. Subantarctic Macquarie I. supports fjaeldmark, herbfield and grassland vegetation with c. 40 vascular and c. 110 bryophyte species. Its hyperoceanic climate has a mean annual temperature of 4.5 C and rainfall of 926 mm. The Antarctic Convergence lies south of the island but during the Last Glacial Maximum lay north of it. Palynological studies of peat from three sites show that plant remains had begun accumulating by 9500 BP, and suggest that there was no major climatic fluctuation during the Holocene on Macquarie I. The apparent lack of major climatic change during the Holocene in both the Vestfold Hills and on Macquarie I. is similar to interpretations from elsewhere in Antarctica, Marion I. and South Georgia. Possible reasons for the apparently constant climate are that it was only relatively constant, or that the ecological amplitudes of the fossil species are so wide that minor climatic changes are not reflected. (Auth. mod.)

45-2984
Features of the ultrastructural organization of yeast isolated from the ice sheet of an antarctic glacier.
[Ob osobennostiakh ul'trastrukturnoĭ organizatsii drozhzhevykh kletok iz tolshchi antarkticheskogo lednika].
Abyzov, S.S., et al, *Akademiia nauk SSSR. Izvestiia. Seriia biologicheskaia*, Nov.-Dec. 1983, No.6, p.914-922, In Russian with English summary. 35 refs.
Fungi, Ecology, Cryobiology, Marine biology, Ice sheets, Glaciers.
Vital yeasts *Rhodotorula glutinis* and *Cryptococcus albidus* were isolated from the ice sheet of the Central Antarctic Glacier near Vostok Station. The age of the glacier layers in which these organisms were found was estimated to be 700-3250 years old. On the basis of the comparative electron-microscopy studies of ultra-thin sections of the yeast, isolated from the ice sheet of the Antarctic Glacier, and the strains of the same species of the collection, the changes in the cellular structures (mitochondria, nuclei) of the glacier cultures were established. (Auth.)

45-2985
Algorithm to estimate the heating budget from vertical hydrometeor profiles.
Tao, W.K., et al, *Journal of applied meteorology*, Dec. 1990, 29(12), p.1232-1244, 40 refs.
Clouds (meteorology), Precipitation (meteorology), Heat transfer, Mathematical models, Cloud physics, Ice melting, Ice crystals, Boundary layer, Remote sensing.

45-2986
Deep optically thin cirrus clouds in the polar regions. Part 1: infrared extinction characteristics.
Prabhakara, C., et al, *Journal of applied meteorology*, Dec. 1990, 29(12), p.1313-1329, 31 refs.
Yoo, J.-M., Dalu, G., Fraser, R.S.
Clouds (meteorology), Polar atmospheres, Ice crystal optics, Spectrometers, Attenuation, Infrared radiation, Spectra, Radiation absorption.

45-2987
Modelling of ship penetration into a mush ice field.
Shih, L.Y., *International journal of non-linear mechanics*, 1991, 26(3-4), p.293-300, 4 refs.
Floating ice, Ice mechanics, Ice solid interface, Ships, Mathematical models, Rheology, Dynamic properties, Ice navigation, Ice cover strength, Icebreakers.

45-2988
Comparison of parametric and non-parametric methods for runoff forecasting.
Galeati, G., *Hydrological sciences journal*, Feb. 1990, 35(1), p.79-94, With French summary. 16 refs.
Runoff forecasting, Snowmelt, Simulation, Reservoirs, Electric power, Watersheds.

45-2989
Effects of climate change on discharges and snow cover in Finland.
Vehviläinen, B., et al, *Hydrological sciences journal*, Apr. 1991, 36(2), p.109-121, With French summary. 6 refs.
Lohvansuu, J.
Climatic changes, Watersheds, Snowmelt, Runoff, Periodic variations, Simulation, Carbon dioxide, Precipitation (meteorology), Snow water equivalent, Finland.

45-2990
Dynamic-stochastic models of rainfall and snowmelt runoff formation.
Kuchment, L.S., et al, *Hydrological sciences journal*, Apr. 1991, 36(2), p.153-169, With French summary. 13 refs.
Gelfan, A.N.
Precipitation (meteorology), Snowmelt, Runoff forecasting, Mathematical models, Watersheds, River basins, Hydrology.

45-2991
Mathematical models for long-term prediction of mountainous river runoff: methods, information and results.
Shentzis, I.D., *Hydrological sciences journal*, Oct. 1990, 35(5), p.487-500, With French summary. 6 refs.
River basins, Snowmelt, Surface drainage, Runoff forecasting, Mathematical models, Seasonal variations, Precipitation (meteorology).

45-2992
Effects of CO2-induced climatic changes on snowpack and streamflow.
Cooley, K.R., *Hydrological sciences journal*, Oct. 1990, 35(5), p.511-522, With French summary. 26 refs.
Climatic changes, Carbon dioxide, Snowmelt, Stream flow, Watersheds, Simulation, Air temperature, Snow water equivalent, Temperature effects.

45-2993
Comparison of different structures for a monthly water yield model in seasonally snow-covered mountainous watersheds of Iran.
Moussavi, M., et al, *Hydrological sciences journal*, Oct. 1990, 35(5), p.535-546, With French summary. 10 refs.
Feyen, J., Wyseure, G.
Watersheds, Snowmelt, Precipitation (meteorology), Water balance, Runoff forecasting, Water reserves, Models, Seasonal variations.

45-2994
Seasonal description of the quality and quantity of snowmelt in a mountainous region using an integrated model.
Babiaková, G., et al, *Hydrological sciences journal*, Aug. 1990, 35(4), p.383-393, With French summary. 9 refs.
Palkovič, D., Bodiš, D.
Snowmelt, Snow accumulation, Stream flow, Runoff forecasting, Mathematical models, Water chemistry, Surface waters, Snow hydrology, Chemical properties.

45-2995
Effects of suburbanization upon snowmelt runoff.
Buttle, J.M., *Hydrological sciences journal*, June 1990, 35(3), p.285-302, With French summary. 30 refs.
Snowmelt, Runoff, Environmental impact, Landscape development, Surface drainage, Snow hydrology, Precipitation (meteorology).

45-2996
Analysis of temperature regime of permafrost bases of structures with cold cellars taking into account their preliminary cooling.
Gokhman, M.R., et al, *Soil mechanics and foundation engineering*, Mar. 1991, 27(5), p.189-194, Translated from Osnovaniia, fundamenty i mekhanika gruntov, Sep.-Oct. 1990. 8 refs.
Ivanov, M.M.
Permafrost bases, Permafrost beneath structures, Thermal regime, Bearing strength, Temperature control, Subsurface structures, Design criteria, Temperature gradients, Cold weather construction.

45-2997
Deeply dissected tundra polygons on a glacio-fluvial outwash plain, northern Ungava Peninsula, Quebec.
Gray, J.T., et al, *Géographie physique et Quaternaire*, 1991, 45(1), p.111-117, With French summary. 23 refs.
Seppälä, M.
Continuous permafrost, Polygonal topography, Periglacial processes, Patterned ground, Tundra, Cryoturbation, Geomorphology, Ground ice.

45-2998
Research, design, and construction of roads in permafrost regions. [Izyskaniia, proektirovanie i stroitel'stvo avtomobil'nykh dorog v raionakh rasprostraneniia vechnoĭ merzloty],
Popov, B.I., et al, *Vedomstvennye stroitel'nye normy*, 1990, VSN 84-89, 271p., In Russian.
Roads, Cold weather construction, Permafrost beneath roads, Design, Design criteria.

45-2999
Data obtained from snow cover and atmospheric precipitation in mountains (traverse, airborne remote sensing snow surveys and total precipitation data) for 1988-89; Tadzhik SSR. [Materialy nabliudeniĭ nad snezhnym pokrovom i osadkami v gorakh (marshrutnye, aviadistantsionnye snegomernye s"emki i nabliudeniia po summarnym osadkomeram) za 1988-89 gg.: Tadzhikskaia SSR],
Popova, L.V., ed, Obninsk, VNIIGMI-MTsD, 1990, 110p., In Russian.
Snow surveys, Snow cover distribution, Snow depth, Snow water content, Precipitation (meteorology), Remote sensing, Mountains.

45-3000
Improving the underground development of thawed and frozen placers. [Sovershenstvovanie podzemnoĭ razrabotki talykh i merzlykh rossypeĭ],
Sherstov, V.A., et al, Yakutsk, IANTs SO AN SSSR, 1989, 162p., In Russian. 91 refs.
Sigaev, A.I., Kivileva, N.M., Khor, I.A.M.
Placer mining, Frozen ground mechanics, Analysis (mathematics).

45-3001
Shore-marine tin placers in the arctic part of Asia and regional methods for studying and exploring them. [Pribrezhno-morskie rossypi olova arkticheskoĭ chasti Azii i regional'nye metody ikh izucheniia i poiskov],
Kashcheev, L.P., et al, *Regional'naia i morskaia geofizika; geofizicheskie metody poiskov i razvedka mestorozhdeniĭ poleznykh iskopaemykh. Obzornaia informatsiia*, Feb. 1990, Vol.2, 45p., In Russian. 38 refs.
Terent'ev, V.B.
Shores, Placer mining, Marine geology, Polar regions.

45-3002
Using waste products from soda production containing calcium chloride for lowering the freezing temperature of crude-ground limestone meal. [Ispol'zovanie otkhodov sodovogo proizvodstva, soderzhashchikh khlorid kal'tsiia, dlia snizheniia temperatury smerzaniia syromolotoĭ izvestniakovoĭ muki],
Tseĭtlin, N.A., et al, *Voprosy tekhnologii khimicheskikh proizvodstv i okhrany okruzhaiushcheĭ sredy*, 1990, Vol.70, p.55-64, In Russian. 7 refs.
Freezing points, Phase transformations, Salting, Wastes, Analysis (mathematics).

45-3003
Glaciers-Ocean-Atmosphere Interactions; International Symposium, Leningrad, September 24-29, 1990. Abstracts.
Akademiia nauk SSSR. Mezhduvedomstvennyĭ geofizicheskiĭ komitet, Moscow, MGK AN SSSR, 1990, 131p., 82 abstracts.
Atmosphere, Ice shelves, Global warming, Air ice water interaction, Sea ice, Glaciers, Climatic changes, Oceans, Ice cover, Ice sheets, Global change, Antarctica.
This compilation of 82 abstracts of papers includes at least 18 items that deal with Antarctica. The topics range from global changes over the last climatic cycle based on ice core records, to flow mechanics of ice streams, to the dynamics of glaciers.

45-3004
Problems in the optimum repair and maintenance of railroads in Siberia and the Far East; interuniversity collected scientific papers. [Voprosy optimizatsii pereustroĭstva i soderzhaniia zheleznykh dorog v Sibiri i na Dal'nem Vostoke; mezhvuzovskiĭ sbornik nauchnykh trudov],
Diunin, A.K., ed, Novosibirsk, Institut inzhenerov zheleznodorozhnogo transporta, 1990, 78p., In Russian. Refs. passim. For selected papers see 45-3005 through 45-3012.
Snow fences, Snow mechanics, Structures, Countermeasures, Snowdrifts, Roads, Railroads, Velocity, Avalanches, Avalanche mechanics, Analysis (mathematics), Electric heating, Railroad equipment, Snow melting.

45-3005
Experience using a handbook on climate to evaluate snow transfer volumes using the "balance" method in northern regions of Western Siberia. [Opyt ispol'zovaniia spravochnikov po klimatu dlia otsenki ob"emov snegoperenosa metodom "balansov" v severnykh raionakh zapadnoĭ Sibiri],
Matvienko, V.S., et al, Voprosy optimizatsii pereustroĭstva i soderzhaniia zheleznykh dorog v Sibiri i na Dal'nem Vostoke; mezhvuzovskiĭ sbornik nauchnykh trudov (Problems in the optimum repair and maintenance of railroads in Siberia and the Far East; interuniversity collected scientific papers). Edited by A.K. Diunin, Novosibirsk, Institut inzhenerov zheleznodorozhnogo transporta, 1990, p.17-23, In Russian. 5 refs.
Gerber, A.R.
Snow mechanics, Climatic factors, Snowdrifts.

45-3006
Results of experiments on the interaction between a snow layer and retaining structures. [O rezul'tatakh eksperimentov vzaimodeĭstviia snezhnogo plasta s uderzhivaiushchimi sooruzheniiami],
Shevchuk, S.S., Voprosy optimizatsii pereustroĭstva i soderzhaniia zheleznykh dorog v Sibiri i na Dal'nem Vostoke; mezhvuzovskiĭ sbornik nauchnykh trudov (Problems in the optimum repair and maintenance of railroads in Siberia and the Far East; interuniversity collected scientific papers). Edited by A.K. Diunin, Novosibirsk, Institut inzhenerov zheleznodorozhnogo transporta, 1990, p.26-31, In Russian. 4 refs.
Countermeasures, Snow cover, Snow mechanics, Structures, Snow fences, Analysis (mathematics).

45-3007
Using electric heating devices to protect railroad switches from snowdrifts. [Ispol'zovanie elektroobogrevaiushchikh ustroĭstv dlia zashchity strelochnykh perevodov ot snezhnykh zanosov],
Kvon, I.A.D., et al, Voprosy optimizatsii pereustroĭstva i soderzhaniia zheleznykh dorog v Sibiri i na Dal'nem Vostoke; mezhvuzovskiĭ sbornik nauchnykh trudov (Problems in the optimum repair and maintenance of railroads in Siberia and the Far East; interuniversity collected scientific papers). Edited by A.K. Diunin, Novosibirsk, Institut inzhenerov zheleznodorozhnogo transporta, 1990, p.31-36, In Russian. 3 refs.
Setiushkina, N.A., Astapenkov, A.A.
Snowdrifts, Countermeasures, Railroad equipment, Electric heating, Snow melting, Analysis (mathematics).

45-3008
Characteristics of snow transport and the protection of roads from snowdrifts in regions of the Far North. [Osobennosti snegoperenosa i zashchity dorog ot snezhnykh zanosov v raĭonakh Kraĭnego Severa].
Komarov, A.A., et al, Voprosy optimizatsii pereustroĭstva i soderzhaniia zheleznykh dorog v Sibiri i na Dal'nem Vostoke; mezhvuzovskiĭ sbornik nauchnykh trudov (Problems in the optimum repair and maintenance of railroads in Siberia and the Far East; interuniversity collected scientific papers). Edited by A.K. Diunin, Novosibirsk, Institut inzhenerov zheleznodorozhnogo transporta, 1990, p.36-40, In Russian. 5 refs.
Martynenko, A.A., Nikolaeva, L.V.
Roads, Snowdrifts, Countermeasures, Snow mechanics.

45-3009
Using avalanche protection walls of lightweight construction for protecting sections of the Mezhdurechensk-Abakan Line from avalanches. [Primenenie protivolavinnoĭ stenki oblegchennoĭ konstruktsii dlia zashchity uchastkov linii Mezhdurechensk-Abakan ot lavin].
Vetoshkina, N.A., et al, Voprosy optimizatsii pereustroĭstva i soderzhaniia zheleznykh dorog v Sibiri i na Dal'nem Vostoke; mezhvuzovskiĭ sbornik nauchnykh trudov (Problems in the optimum repair and maintenance of railroads in Siberia and the Far East; interuniversity collected scientific papers). Edited by A.K. Diunin, Novosibirsk, Institut inzhenerov zheleznodorozhnogo transporta, 1990, p.41-46, In Russian. 5 refs.
Astapenkov, A.A., Kvon, IA.D.
Snow fences, Countermeasures, Railroads, Walls, Avalanches, Analysis (mathematics).

45-3010
Effect of braking structures on the velocity and range of avalanches on a horizontal surface. [Vliianie tormoziashchikh sooruzheniĭ na skorost' dvizheniia i dlinu probega laviny na gorizont'noĭ poverkhnosti].
Kozlov, IU.V., et al, Voprosy optimizatsii pereustroĭstva i soderzhaniia zheleznykh dorog v Sibiri i na Dal'nem Vostoke; mezhvuzovskiĭ sbornik nauchnykh trudov (Problems in the optimum repair and maintenance of railroads in Siberia and the Far East; interuniversity collected scientific papers). Edited by A.K. Diunin, Novosibirsk, Institut inzhenerov zheleznodorozhnogo transporta, 1990, p.46-52, In Russian. 4 refs.
Mogilevich, A.P.
Countermeasures, Avalanche mechanics, Velocity, Structures.

45-3011
Descent of a catastrophic avalanche on the western part of the Baykal Amur Railroad area. [Skhod katastroficheskoĭ laviny na zapadnom uchastke trassy BAM].
Kozlov, IU.V., Voprosy optimizatsii pereustroĭstva i soderzhaniia zheleznykh dorog v Sibiri i na Dal'nem Vostoke; mezhvuzovskiĭ sbornik nauchnykh trudov (Problems in the optimum repair and maintenance of railroads in Siberia and the Far East; interuniversity collected scientific papers). Edited by A.K. Diunin, Novosibirsk, Institut inzhenerov zheleznodorozhnogo transporta, 1990, p.52-59, In Russian. 4 refs.
Avalanches, Railroads, Velocity, Analysis (mathematics).

45-3012
Protecting mountainous sections of the Frunze-Osh highway from snowdrifts. [O zashchite gornykh uchastkov avtodorogi Frunze-Osh ot snezhnykh zanosov].
Avdeev, L.M., et al, Voprosy optimizatsii pereustroĭstva i soderzhaniia zheleznykh dorog v Sibiri i na Dal'nem Vostoke; mezhvuzovskiĭ sbornik nauchnykh trudov (Problems in the optimum repair and maintenance of railroads in Siberia and the Far East; interuniversity collected scientific papers). Edited by A.K. Diunin, Novosibirsk, Institut inzhenerov zheleznodorozhnogo transporta, 1990, p.60-63, In Russian. 2 refs.
Mad'iarov, T.M., Ustiuzhanin, V.V., Tiulegenov, N.K.
Snowdrifts, Countermeasures, Roads, Mountains, Analysis (mathematics).

45-3013
Seasonal variability of physical-mechanical characteristics of sea ice.
Gavrilo, V.P., et al, *International journal of offshore and polar engineering*, Mar. 1991, 1(1), p.53-57, 16 refs.
Lebedev, G.A., Fedotov, V.I., Cherepanov, N.V.
Sea ice, Ice mechanics, Flexural strength, Seasonal variations.

45-3014
C-rich micrometeorites on the early Earth and icy planetary bodies.
Maurette, M., et al, Formation of stars and planets, and the evolution of the solar system, edited by B. Battrick, Paris, European Space Agency, 1990, p.167-172, N91-18947, 7 refs.
Ice floes, Ice composition, Polar regions.
The analysis of about 200 mg of 50 to 100 mg size dust particles extracted from 100 tons of antarctic blue ice is reported. This dust constitutes the purest and the best preserved source of giant Unmelted Chondritic Micrometeorites (UMCs) recovered from terrestrial sediments. Both the bulk composition of UMCs and their crystal chemistry indicate that at least 95% of them are relative to primitive unequilibrated meteorites. They are mostly composed of porous aggregates of submicron size grains, that contain substituted aromatic organic compounds. UMCs might have functioned as minicenters of prebiotic synthesis on the early Earth. (Auth.)

45-3015
Photosynthesis-irradiance relationships in microalgae associated with antarctic pack ice: evidence for in situ activity.
Lizotte, M.P., et al, *Marine ecology progress series*, Apr. 11, 1991, 71(2), p.175-184, Refs. p.183-184.
Sullivan, C.W.
Ice cover effect, Algae, Photosynthesis, Pack ice.
Microalgae associated with a broad range of pack ice microhabitats were examined for photosynthesis-irradiance characteristics in relation to light availability. Pack ice was sampled from the Weddell-Scotia Sea and west of the Antarctic Peninsula during the austral autumn and winter. Microalgae from pack ice exhibited lower photosynthetic capacity and Ik values at greater depths within profiles of annual ice, and lower predicted irradiance levels. Proportional relationships between photosynthetic characteristics and irradiance are interpreted to represent photoadaptation by microalgae following their incorporation into a vertically growing ice sheet; this interpretation provides the first evidence of in situ physiological activity of microalgae within pack ice. Relative to the fast ice microalgae previously studied, pack ice microalgae had photosynthetic capacity and Ik values, and inhabited microenvironments exposed to higher irradiances. It is concluded that rates of primary production by pack ice microalgae could be much higher than previously estimated from studies in fast ice regions, and that sea ice microalgae have the potential to make a significant contribution to the primary production of the southern ocean, particularly during the winter and early spring when maximal ice cover significantly reduces the productivity of phytoplankton. (Auth. mod.)

45-3016
Microphysical and radiative characteristics of convective clouds during COHMEX.
Fulton, R., et al, *Journal of applied meteorology*, Jan. 1991, 30(1), p.98-116, 52 refs.
Heymsfield, G.M.
Thunderstorms, Convection, Clouds (meteorology), Ice crystals, Radiometry, Radar echoes, Precipitation (meteorology), Physical properties, Microwaves, Aerial surveys.

45-3017
Springtime visibility in the Arctic.
Meyer, F.G., et al, *Journal of applied meteorology*, Mar. 1991, 30(3), p.342-357, 60 refs.
Curry, J.A., Brock, C.A., Radke, L.F.
Polar atmospheres, Visible light, Light scattering, Visibility, Ice crystal optics, Aerosols, Atmospheric composition, Aerial surveys.

45-3018
Snow depth required to mask the underlying surface.
Baker, D.G., et al, *Journal of applied meteorology*, Mar. 1991, 30(3), p.387-392, 18 refs.
Skaggs, R.H., Ruschy, D.L.
Snow cover effect, Subsurface structures, Visibility, Albedo, Radiometry, Snow depth, Solar radiation, Correlation, Detection.

45-3019
Waves in frazil and pancake ice and their detection in Seasat synthetic aperture radar imagery.
Wadhams, P., et al, *Journal of geophysical research*, May 15, 1991, 96(C5), p.8835-8852, 33 refs.
Holt, B.
Sea ice, Frazil ice, Ocean waves, Synthetic aperture radar, Detection, Ice cover thickness, Models, Image processing, Wave propagation, Scattering, Radar photography.
In this paper, a theoretical model of waves propagating into an ice cover composed of frazil and pancake ice is developed and compared with measurements of wavelength and direction derived from synthetic aperture radar (SAR) imagery. The theoretical model is based on the concept that ice of these types, which consists of small crystals or cakes, has only a mass-loading effect on the water surface. From the reflection coefficient at the ice edge, the wave radiation pressure exerted on the ice is derived, showing that it will cause a slick of frazil ice backed by thicker floes to become more dense or thick with increasing penetration. The implications for radar scattering enabling detection on SAR are that the Bragg resonant wavelength corresponds to waves above the frequency limit for propagation so that a frazil slick appears dark on an SAR image. When the frazil ice becomes transformed into pancake ice, through slick compression or other means, the raised edges of the pancakes cause the ice to appear bright despite the fact that there are no waves present at the Bragg wavelength. These results are applied to a Seasat SAR image obtained from the Chukchi Sea. The appearance of the ice in the image corresponds to expectations for frazil ice gradually transforming itself into pancake ice, backed by thicker floes. Mean ice thicknesses extracted from the theory correspond to thicknesses expected for such slicks. The technique offers a possible means of extracting the thickness of fields of frazil and pancake ice from SAR imagery, this may be of considerable utility when ERS 1 SAR is used to study the advancing winter ice edge in the Antarctic, which consists of vast areas of these ice types. (Auth. mod.)

45-3020
Saharan dust deposition over Mont Blanc (French Alps) during the last 30 years.
De Angelis, M., et al, *Tellus*, Feb. 1991, 43(B1), p.61-75, 36 refs.
Gaudichet, A.
Mountains, Ice cores, Drill core analysis, Dust, Atmospheric circulation, Chemical properties, Aerosols, Periodic variations, France—Mont Blanc.

45-3021
Radar detection of ice wedges in Alaska.
Arcone, S.A., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, Dec. 1982, CR 82-43, 15p., ADA-124 571, 27 refs.
Sellmann, P.V., Delaney, A.J.
Ice wedges, Land ice, Radar, Radio echo soundings, Reflectivity.
The radar signatures of ice wedges and wedge-like structures have been investigated for a variety of soil conditions. The radar used for this study emitted short sinusoidal pulses of about 10-ns duration with an approximate center frequency of 150MHz. Most of the ice wedges existed at depths of about 1 m in a variety of silty and sandy soils with both frozen and thawed active layers. The position of the wedges was usually identified from corresponding surface features. An artificial ice wedge in coarse-grained alluvium was also profiled as well as wedge-like structures of fine silt in a coarse-grained glacial outwash. All wedges and wedge-like structures produced a hyperbolic reflection profile except when an active layer of thawed, saturated silt was present which eliminated returns from the wedges. The peaks of the hyperbolas were sometimes masked by reflections from the permafrost table or other material interfaces, and multiple hyperbolas occurred at some sites. The dielectric constant of the host medium was often calculated from the linear portions of the hyperbolas and the results were verified by laboratory time domain reflectometry measurements performed on field samples. In some cases, hyperbolic profiles originated at several meters depth suggesting that deep ice wedges could be detected in areas of cold permafrost.

45-3022
Frost growth parameters in a forced air stream.
Östin, R., et al, *International journal of heat and mass transf...*, Apr.-May 1991, 34(4-5), p.1009-1017, With French, German and Russian summaries. 23 refs.
Andersson, S.
Frost, Ice formation, Surface temperature, Water vapor, Air flow, Thermal conductivity, Thickness, Ice melting.

45-3023
Enthalpy formulation for phase change problems with a large thermal diffusivity jump across the interface.
Lee, S.L., et al, *International journal of heat and mass transfer*, June 1991, 34(6), p.1491-1502, With French, German and Russian summaries. 20 refs.
Tzong, R.Y.
Phase transformations, Liquid solid interfaces, Enthalpy, Freezing points, Thermal diffusion, Analysis (mathematics), Thermodynamics.

45-3024
Cloud condensation nuclei as a source of ice-forming nuclei in clouds.
Rosinski, J., et al, *Journal of aerosol science*, 1991, 22(2), p.123-133, 14 refs.
Morgan, G.
Condensation nuclei, Ice nuclei, Aerosols, Cloud droplets, Clouds (meteorology), Heterogeneous nucleation.

45-3025
Cathodic protection in Cook Inlet arctic waters.
Hedborg, C.E., *Materials performance*, Feb. 1991, 30(2), p.24-28, 11 refs.
Offshore structures, Ocean environments, Corrosion, Protection, Electric equipment, Design, Electric fields, Protective coatings.

45-3026
Brown snow: a long-range transport event in the Canadian Arctic.
Welch, H.E., et al, *Environmental science & technology*, Feb. 1991, 25(2), p.280-286, 37 refs.
Snow impurities, Atmospheric circulation, Air pollution, Sampling, Soil analysis, Lacustrine deposits, Chemical analysis, Canada—Keewatin

45-3027
Variation of air temperature and atmospheric precipitation in the region of Svalbard and of Jan Mayen.
Brázdil, R., Recent climatic change—a regional approach. Edited by S. Gregory, London, England, Belhaven Press, 1988, p.53-68, 21 refs.
DLC QC981.8 C5R4 1988
Climatic changes, Climatic factors, Air temperature, Precipitation (meteorology), Variations, Meteorological observations, Glacier oscillation, Norway—Svalbard.

45-3028
Treatment of wastewater in polar environments—status and future trends in Scandinavia.
Rusten, B., et al, *Vatten*, June 25, 1990, 46(2), p.99-106, With Swedish summary. 10 refs.
Paulsrud, B.
Water treatment, Wastes, Cold weather operation, Utilities, Design, Performance, Water temperature.

45-3029
Refrigeration systems based on short-term storage by means of ice banks.
Bisio, G., et al, *Energy and buildings*, 1991, 17(1), p.1-6, 9 refs.
Rubatto, G.
Ice makers, Performance, Air conditioning, Refrigeration, Electric power, Temperature variations.

45-3030
Fluid mixing during melting.
Woods, A.W., *Physics of fluids A*, May 1991, 3(5-pt.2), p.1393-1404, 14 refs.
Melting, Ice melting, Phase transformations, Liquid solid interfaces, Convection, Magma, Solid phases, Thermodynamics, Fluid dynamics.

45-3031
Experience in and problems of agroindustrial use of lacustrine thermokarst in the Chukotskiy Peninsula; collected scientific papers. [Opyt i problemy agropromyshlennogo ispol'zovaniia ozernogo termokarsta na Chukotke; sbornik nauchnykh trudov],
Tishin, M.I., ed, Magadan, SVKNII DVO AN SSSR, 1990, 116p., In Russian. For selected papers see 45-3032 through 45-3042.
Agriculture, Lake effects, Cryogenic soils, Lacustrine deposits, Thermokarst, Thermokarst lakes, Meadow soils, Snow cover, Forecasting, Taliks beneath lakes, Geothermometry.

45-3032
Results of and problems in the development of thermokarst lakes in the Arctic. [Rezul'taty i problemy osvoeniia termokarstvoykh ozer v Arktike],
Shumilov, IU.V., Opyt i problemy agropromyshlennogo ispol'zovaniia ozernogo termokarsta na Chukotke; sbornik nauchnykh trudov (Experience in and problems of agroindustrial use of lacustrine thermokarst in the Chukotskiy Peninsula; collected scientific papers). Edited by M.I. Tishin, Magadan, SVKNII DVO AN SSSR, 1990, p.20-26, In Russian.
Thermokarst lakes, Thermokarst development, Lake effects.

45-3033
Hydro-thermobalanced and microclimatic investigations in the Syagannakhskiy meadow-improving plot in the Abyysk region of arctic Yakutia. [Vodno-teplobalansovye i mikroklimaticheskie issledovaniia na Syagannakhskom lugomeliorativnom poligone v Abyiskom raione Zapoliarnoi IAkutii],
Gavrilova, M.K., Opyt i problemy agropromyshlennogo ispol'zovaniia ozernogo termokarsta na Chukotke; sbornik nauchnykh trudov (Experience in and problems of agroindustrial use of lacustrine thermokarst in the Chukotskiy Peninsula; collected scientific papers). Edited by M.I. Tishin, Magadan, SVKNII DVO AN SSSR, 1990, p.36-45, In Russian. 5 refs.
Microclimatology, Heat balance, Water balance, Meadow soils, Cryogenic soils.

45-3034
Problems of geocryological investigations in meliorative and agricultural development of land in the Chukotka autonomous district. [Problemy geokriologicheskikh issledovanii pri meliorativnom i sel'skokhozialstvennom osvoenii zemel' v Chukotskom avtonomnom okruge],
Krivoshchekov, V.S., Opyt i problemy agropromyshlennogo ispol'zovaniia ozernogo termokarsta na Chukotke; sbornik nauchnykh trudov (Experience in and problems of agroindustrial use of lacustrine thermokarst in the Chukotskiy Peninsula; collected scientific papers). Edited by M.I. Tishin, Magadan, SVKNII DVO AN SSSR, 1990, p.51-58, In Russian. 3 refs.
Geocryology, Agriculture, Land reclamation.

45-3035
Formation of the alassy complex of deposits in the Mayn River basin (Chukotskiy Peninsula). [Formirovanie alasnogo kompleksa otlozhenii v doline r. Maĭn (Chukotka)],
Kotov, A.N., Opyt i problemy agropromyshlennogo ispol'zovaniia ozernogo termokarsta na Chukotke; sbornik nauchnykh trudov (Experience in and problems of agroindustrial use of lacustrine thermokarst in the Chukotskiy Peninsula; collected scientific papers). Edited by M.I. Tishin, Magadan, SVKNII DVO AN SSSR, 1990, p.59-64, In Russian. 10 refs.
River basins, Alassy, Lacustrine deposits, Thermokarst, Unfrozen water content, Cryogenic structures, Cryogenic textures.

45-3036
Formation of snow cover in the vicinity of the city of Anadyr. [Formirovanie snezhnogo pokrova v okrestnostiakh g. Anadyria],
Maslov, V.IA., Opyt i problemy agropromyshlennogo ispol'zovaniia ozernogo termokarsta na Chukotke; sbornik nauchnykh trudov (Experience in and problems of agroindustrial use of lacustrine thermokarst in the Chukotskiy Peninsula; collected scientific papers). Edited by M.I. Tishin, Magadan, SVKNII DVO AN SSSR, 1990, p.65-72, In Russian. 7 refs.
Snow cover, Snow crystal growth, Snow cover structure.

45-3037
Role of atmospheric precipitation in the formation of the chemical composition of surface waters in the Lower Anadyr lowlands. [Rol' atmosfernykh osadkov v formirovanii khimicheskogo sostava poverkhnostnykh vod Nizhneanadyrskoĭ nizmennosti],
Brazhnik, S.N., Opyt i problemy agropromyshlennogo ispol'zovaniia ozernogo termokarsta na Chukotke; sbornik nauchnykh trudov (Experience in and problems of agroindustrial use of lacustrine thermokarst in the Chukotskiy Peninsula; collected scientific papers). Edited by M.I. Tishin, Magadan, SVKNII DVO AN SSSR, 1990, p.73-77, In Russian. 3 refs.
Surface waters, Water chemistry, Precipitation (meteorology), Suprapermafrost ground water.

45-3038
Evaluation of agroclimatic and geothermophysical characteristics of developing northern meadows in the Chukotskiy Peninsula. [Otsenka agroklimaticheskikh i geoteplofizicheskikh kharakteristik severnogo lugovodstva na Chukotke],
Krivoshchekov, V.S., et al, Opyt i problemy agropromyshlennogo ispol'zovaniia ozernogo termokarsta na Chukotke; sbornik nauchnykh trudov (Experience in and problems of agroindustrial use of lacustrine thermokarst in the Chukotskiy Peninsula; collected scientific papers). Edited by M.I. Tishin, Magadan, SVKNII DVO AN SSSR, 1990, p.78-87, In Russian. 4 refs.
Aleksandrova, E.A.
Agriculture, Meadow soils, Air temperature, Cryogenic soils.

45-3039
Some questions on the evolution of basins of dry lakes in the Lower Anadyr lowlands. [Nekotorye voprosy evoliutsii kotlovin spushchennykh ozer v Nizhneanadyrskoĭ nizmennosti],
Maslov, V.IA., et al, Opyt i problemy agropromyshlennogo ispol'zovaniia ozernogo termokarsta na Chukotke; sbornik nauchnykh trudov (Experience in and problems of agroindustrial use of lacustrine thermokarst in the Chukotskiy Peninsula; collected scientific papers). Edited by M.I. Tishin, Magadan, SVKNII DVO AN SSSR, 1990, p.88-95, In Russian. 3 refs.
Maslova, G.L.
Thermokarst lakes, Glacial lakes.

45-3040
Problems in forecasting lacustrine thermokarst in the Chukotskiy Peninsula. [Problemy prognoza ozernogo termokarsta na Chukotke],
Tishin, M.I., Opyt i problemy agropromyshlennogo ispol'zovaniia ozernogo termokarsta na Chukotke; sbornik nauchnykh trudov (Experience in and problems of agroindustrial use of lacustrine thermokarst in the Chukotskiy Peninsula; collected scientific papers). Edited by M.I. Tishin, Magadan, SVKNII DVO AN SSSR, 1990, p.96-99, In Russian.
Lacustrine deposits, Thermokarst lakes, Forecasting, Taliks beneath lakes, Lake ice.

45-3041
Using the direct current transfer bridge R 3043 in geothermal measurement. [Ispol'zovanie perenosnogo mosta postoiannogo toka R 3043 v praktike geotermicheskikh izmerenii],
Kukolev, S.V., Opyt i problemy agropromyshlennogo ispol'zovaniia ozernogo termokarsta na Chukotke; sbornik nauchnykh trudov (Experience in and problems of agroindustrial use of lacustrine thermokarst in the Chukotskiy Peninsula; collected scientific papers). Edited by M.I. Tishin, Magadan, SVKNII DVO AN SSSR, 1990, p.100-106, In Russian. 3 refs.
Geocryology, Geothermometry, Analysis (mathematics).

45-3042
Forecasting midyear temperatures of coarsely dispersed soils in the territory of Chukotskiy Peninsula. [Prognozirovanie sredneletnikh temperatur grubodispersnykh gruntov na territorii Chukotki],
Stepanova, I.V., et al, Opyt i problemy agropromyshlennogo ispol'zovaniia ozernogo termokarsta na Chukotke; sbornik nauchnykh trudov (Experience in and problems of agroindustrial use of lacustrine thermokarst in the Chukotskiy Peninsula; collected scientific papers). Edited by M.I. Tishin, Magadan, SVKNII DVO AN SSSR, 1990, p.112-115, In Russian. 5 refs.
Stepanov, R.V.
Forecasting, Soil temperature, Cryogenic soils, Lake effects, Thaw depth.

45-3043
Modeling acoustic propagation beneath ice using the finite element technique.
Clark, J.H., et al, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.1, Pt.A. Edited by S.K. Chakrabarti et al, New York, American Society of Mechanical Engineers, 1991, p.327-329, 5 refs.
Lafreniere, R.
Models, Underwater acoustics, Subglacial observations, Wave propagation.

45-3044
Millimeter-wave radar scattering from snow: 1. Radiative transfer model.
Kuga, Y., et al, *Radio science*, Mar.-Apr. 1991, 26(2), p.329-341, 23 refs.
Ulaby, F.T., Haddock, T.F., DeRoo, R.D.
Snow water content, Radar echoes, Backscattering, Snow density, Mathematical models, Microwaves, Remote sensing, Wave propagation.

45-3045
Millimeter-wave radar scattering from snow: 2. Comparison of theory with experimental observations.
Ulaby, F.T., et al, *Radio science*, Mar.-Apr. 1991, 26(2), p.343-351, 6 refs.
Haddock, T.F., Austin, R.T., Kuga, Y.
Snow water content, Radar echoes, Backscattering, Snow density, Microwaves, Remote sensing, Wave propagation, Diurnal variations.

45-3046
Biological interactions.
Schell, D., *Cold regions science and technology*, Apr. 1980, Vol.2, p.336-341, 15 refs.
Sea ice, Marine biology, Algae.

45-3047
Chemical components of lower tropospheric aerosols in the High Arctic: six years of observations.
Barrie, L.A., et al, *Journal of atmospheric chemistry*, Oct. 1990, 11(3), p.211-226, 25 refs.
Barrie, M.J.
Polar atmospheres, Air pollution, Aerosols, Atmospheric composition, Chemical analysis, Seasonal variations, Canada—Northwest Territories.

45-3048
Alkylbenzyldimethylammonium salts as inhibitors for the ice nucleating activity of *Erwinia ananas*.
Watanabe, M., et al, *Agricultural and biological chemistry*, Jan. 1988, 52(1), p.201-206, 18 refs.
Bacteria, Ice formation, Heterogeneous nucleation, Frost protection, Chemicals, Damage, Plants.

45-3049
Analysis and prognosis of low temperatures adverse to plants using Markov chains.
Liakatas, A., et al, *Mausam*, July 1990, 41(3), p.381-384, With Hindi summary. 16 refs.
Charantonis, T.
Air temperature, Freezing points, Plants, Cold tolerance, Forecasting, Mathematical models.

45-3050
Hailstorm over Telangana.
Pandharinath, N., et al, *Mausam*, July 1990, 41(3), p.433-438, With Hindi summary. 11 refs.
Bhavanarayana, V.
Storms, Hail, Synoptic meteorology, Wind direction, Air masses.

45-3051
Investigation of heat and mass transport during freezing in peat soils.
Gamaiunov, N.I., et al, *Soviet soil science*, 1990, 22(8), p.88-97, Translated from Pochvovedenie, 1990. 21 refs.
Stotland, D.M., Agafonova, O.N., Tovbin, I.B.
Peat, Soil freezing, Soil water migration, Cryogenic soils, Heat transfer, Temperature distribution, Mass transfer.

45-3052
Microbial transformation of polychlorinated biphenyls in polar marine regions.
Izrael', IU.A., et al, *Akademiia nauk SSSR. Doklady. Biological sciences*, July 1990, 310(1-6), p.4-7, Translated from Doklady Akademii Nauk SSSR, Jan.-Feb. 1990. 13 refs.
Tsyban', A.V., Panov, G.V., Cherniak, S.M.
Ocean environments, Water pollution, Hydrocarbons, Microbiology, Decomposition, Temperature effects, Marine biology.

45-3053
Polar class icebreaker oceanographic mission upgrade.
Tilyou, M., et al, *Naval engineers journal*, May 1991, 103(3), p.218-230, 7 refs.
Thayer, N., Zimmermann, R.P.
Icebreakers, Design, Research projects, Oceanography, Construction.
The retirement in recent years of *CGC Glacier* and the last two Wind class icebreakers has left the Coast Guard with just two Polar class icebreakers to conduct missions in the Arctic and Antarctic. It has become clear in recent years that the research community needed enhanced scientific facilities available on board the two remaining Coast Guard icebreakers. After conducting a survey of the polar research community and holding a series of meetings with users of the vessels to ascertain the needs of the user community, the Coast Guard has undertaken to upgrade the research support capability of the two existing Polar class vessels. Improved research support capabilities were designed with ongoing consultation with the polar research community. The upgrade of facilities on the two vessels was divided into two phases. Phase I, an upgrade of geological facilities and Phase II, an upgrade of the general oceanographic facilities. This paper focuses on the design work for the Phase II upgrades on *CGC Polar Sea* consisting of construction of oceanographic and geological lab spaces, construction of a new oceanographic winch room, the addition of over-the-side weight handling equipment, the addition of topside support services for scientific vans, and the acquisition of new science winches. (Auth. mod.)

45-3054
Problem of cryoplanation terraces. (Zum Problem der Kryoplanationsterrassen).
Czudek, T., *Petermanns geographische Mitteilungen*, 1990, 134(4), p.225-238, In German with English and Russian summaries. 28 refs.
Altiplanation, Landforms, Frost weathering, Nivation, Geocryology, Cryogenic structures.

45-3055
ISTORE—a model to simulate and optimise the operation of ice-storage air-conditioning systems.
Musgrove, A.R., *International journal of energy research*, Feb.-Mar. 1990, 14(2), p.199-208, 16 refs.
Ice (water storage), Air conditioning, Computerized simulation, Computer programs, Performance, Ice makers.

45-3056
Iterative solution of a nonlinear system arising in phase-change problems.
Williams, M.A., et al, *SIAM journal on scientific and statistical computing*, Nov. 1990, 11(6), p.1087-1101, 13 refs.
Wilson, D.G.
Phase transformations, Stefan problem, Enthalpy, Analysis (mathematics), Computerized simulation.

45-3057
Estimated solutions of the one-dimensional Stefan problem.
Aksenov, B.G., *High temperature*, Mar. 1990, 27(5), p.710-716, Translated from Teplofizika vysokikh temperatur. 10 refs.
Stefan problem, Soil freezing, Phase transformations, Analysis (mathematics).

45-3058
Sound absorption and winter performance of porous asphalt pavement.
Camomilla, G., et al, *Transportation research record*, 1990, No.1265, p.1-8, 6 refs.
Malgarini, M., Gervasio, S.
DLC TE7.H5
Pavements, Bitumens, Noise (sound), Attenuation, Cold weather performance, Ice solid interface, Winter maintenance, Porous materials, Salting.

45-3059
Sea ice fauna of Frobisher Bay, arctic Canada.
Grainger, E.H., et al, *Arctic*, Mar. 1985, 38(1), p.23-30, With French summary. 52 refs.
Mohammed, A.A., Lovrity, J.E.
Sea ice, Marine biology, Cryobiology, Ecosystems, Biogeography, Plankton, Canada—Northwest Territories—Frobisher Bay.

45-3060
Proceedings of the NIPR Symposium on Polar Meteorology and Glaciology, No.4.
Kawaguchi, S., ed, Tokyo, National Institute of Polar Research, 1991, 143p., Refs. passim. For individual papers see E-44278, F-44273, F-44275, F-44276, G-44277, I-44268 through I-44272 and J-44274 or 45-3061 through 45-3068.
NIPR Symposium on Polar Meteorology and Glaciology, 12th, Tokyo, July 18-19, 1989.
Snow, Meetings, Ozone, Atmospheric composition, Sea ice, Ice cores.
This is a collection of papers presented at the 12th Symposium on Polar Meteorology and Glaciology held on July 18-19, 1989, in Tokyo. It consists of 12 full length papers and 29 abstracts; the former are arranged in areas of meteorology, glaciology, and physical oceanography. They include studies of atmospheric constituents and aerosols, ozone, atmospheric circulation and instrumentation, snow cover, sea ice, ice sheet, and ice core studies as part of the research programs of the Antarctic Climate Research, 1987-1991, East Queen Maud Land Glaciological Project, 1982-1986, and Middle Atmosphere Program, 1982-1985.

45-3061
Nitric acid transport from the stratosphere to the troposphere and ice sheet in Antarctica through polar stratosphere.
Iwasaka, Y., et al, NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.4, Tokyo, National Institute of Polar Research, 1991, p.12-21, 17 refs.
Hayashi, M.
Aerosols, Ice composition, Clouds, Stratosphere, Polar regions.
Growth and sedimentation of polar stratospheric clouds (PSCs) particles are examined using the Test Particle Sedimentation Model. PSCs particles transport stratospheric nitric acid (HNO3) to the troposphere. The amounts of HNO3 and H2O removed by a particle depends on the trajectory of the particle (length of path and residence time). Usually the removed amount is larger in the upper portion of the PSCs layer than in the lower portion. The features of HNO3 transport are consistent with the results of chemical analyses of the antarctic ice sheet and of aerosols sampled at the surface of the ice sheet. (Auth.)

45-3062
Report on the first MOS-1 data received at Syowa Station, Antarctica.
Yamanouchi, T., et al, NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.4, Tokyo, National Institute of Polar Research, 1991, p.22-30, 6 refs.
Kanzawa, H., Ariyoshi, H., Ejiri, M.
Imaging, Spaceborne photography, Meteorological data, Meteorological instruments, Data processing, Antarctica—Showa Station.
Data from Marine Observation Satellite 1 (MOS-1) have been received since Feb. 1989 at Showa Station, by the newly installed Multi Purpose Satellite Data Receiving System (11 m antenna). The data of more than 200 paths are to be received per year to study polar atmosphere, ice sheet and sea ice, using three sensors, MESSR, VTIR and MSR. Two HDDTs were brought back to Japan; they are composed of 13 paths acquired at the beginning of the system operation. Quick look films of these data were made, and some typical scenes of MESSR, VTIR and MSR were processed at NASDA EOC. Interesting features, such as a giant iceberg, are found among these processed images. Some limits of practical use of MESSR, depending on the gain and solar elevation angle, are discussed. (Auth.)

45-3063
Recent secular trends of surface air temperatures in high latitudes of the Northern Hemisphere.
Tsuchiya, I., NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.4, Tokyo, National Institute of Polar Research, 1991, p.43-51, 20 refs.
Surface temperature, Air temperature, Temperature variations, Climatic changes, Polar regions.

45-3064
Fluctuations of sea ice extent in the Antarctic.
Enomoto, H., et al, NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.4, Tokyo, National Institute of Polar Research, 1991, p.58-73, 27 refs.
Ohmura, A.
Sea ice distribution, Seasonal variations, Ice volume.
The sea ice in the Antarctic covers a large area in winter, while most of the ice melts in summer. In this study, characteristics of normal seasonal changes of sea ice area, such as seasonal asymmetric behavior of ice extent and change of sea ice concentration, are investigated using a 12 year-long weekly sea ice data set for the Antarctic. The week-to-week fluctuations of open water areas in the sea ice are large in spring. These open water areas play an important role in the movement of sea ice. Drastic changes are observed at the beginning and end of the freezing period. The characteristic scales in time and space for sea ice movements are obtained from spectral analyses. Some conditions of synoptic scale could be important for the movement of sea ice. (Auth. mod.)

45-3065
Note on water exchange under fast ice in Lützow-Holm Bay, Antarctica.
Ohshima, K.I., et al, NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.4, Tokyo, National Institute of Polar Research, 1991, p.74-80, 15 refs.
Ono, N., Takizawa, T., Ushio, S.
Fast ice, Ice growth, Oceanographic surveys, Water temperature, Sea ice distribution, Heat flux, Antarctica—Lützow-Holm Bay.
Under coastal fast ice in the Ongul Strait near Showa Station, warmer, more saline, and oxygen-poorer water appears in mid-depth and deep layers from winter to spring every year. This water is explained as a result of mixing between Circumpolar Deep Water (CDW) and Winter Water (WW). This water becomes more like CDW and more homogenized with time from winter to spring, and in Dec. a mixing ratio of 1:3-1:4 for CDW to WW is required to explain the properties of the homogenized water. It is inferred that the CDW comes along the glacial troughs. Transport of CDW results in a significant amount of heat supply into the water under fast ice. (Auth.)

45-3066
Application of the dielectric profiling technique to ice core studies.
Moore, J., et al, *NIPR Symposium on Polar* Meteorology and Glaciology, Proceedings. No.4, Tokyo, National Institute of Polar Research, 1991, p.81-92, 30 refs.
Maeno, N.
Dielectric properties, Ice cores, Ice composition, Electrical resistivity, Measuring instruments, Antarctica—Dolleman Island, Antarctica—Mizuho Station.
The dielectric profiling (DEP) technique is described and some of the differences between it and standard electrical tools used in ice core analysis are discussed. The results of DEP analysis on two cores from different regions of Antarctica, Dolleman I. and Mizuho Station, are described. DEP measurements on the Dolleman core are related to the chemical composition of the core, showing that DEP can provide a high accuracy measure of total ionic content of the ice. The measurements on the Mizuho core are compared with earlier dielectric measurements on the same core which show dramatic changes over the 15 year period between the measurements. A mechanism which can explain the changes and other effects noted from d.c. conductivity (ECM) experiments, is suggested. The mechanism is based on the theory of d.c. conduction via liquid acid veins at triple junctions in the ice. (Auth.)

45-3067
Subglacial water layer and grounding line derived from backscattering coefficients of radio echo sounding in the Shirase Glacier and Roi Baudouin Ice Shelf, East Antarctica.
Nishio, F., et al, NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.4, Tokyo, National Institute of Polar Research, 1991, p.93-102, 10 refs.
Uratsuka, S.
Glacier surveys, Radio echo soundings, Bedrock, Subglacial drainage, Ice surface, Antarctica—Shirase Glacier, Antarctica - Princess Ragnhild Coast.
In the 1986-87 summer, ice thickness measurements using a newly designed airborne radio echo sounding system were carried out in the Shirase Glacier drainage basin and Roi Baudouin Ice Shelf area. The accurate determination of ice thickness was supported by measurements of surface elevation calibrated over the open sea, at the beginning and end of each flight, with radar altimetry. Location was determined by an OMEGA system and satellite Global Positioning System (GPS). The ice sheet profiles along the flow line of the Shirase Glacier, and the ice shelf along the flight line from Asuka Camp to the Roi Baudouin Ice Shelf, were determined. Bottom features, such as subglacier water layer and grounding line, were clarified by finding the radio backscattering coefficients. The water layer thickness is estimated to be 0-30 cm at the interface between the base of the ice sheet and the bedrock in the regions downstream of Shirase Glacier. (Auth. mod.)

45-3068
Very short pulse C-band radar for crevasse detection.
Suitz, T., et al, *NIPR Symposium on Polar Meteorology and Glaciology, Proceedings.* No.4, Tokyo, National Institute of Polar Research, 1991, p.103-107, 3 refs.
Data processing, Crevasse detection, Portable equipment, Radar echoes, Snow vehicles.
A very short pulse C-band radar system to detect hidden crevasses in *Antarctica* has been developed. The characteristics of the new radar system are shown. A preliminary experiment to measure the distances of four targets made of plywood board was done in a laboratory to confirm the fundamental characteristics of the radar. Another preliminary experiment to detect the walls of a pit dug in a snow pile was performed by the radar to determine the usefulness of this radar for crevasse detection. (Auth.)

45-3069
Growth and decay of ice.
Lock, G.S.H., Cambridge, UK, Cambridge University Press, 1990, 434p., Refs. p.394-421.
Ice growth, Ice thermal properties, Thermodynamics, Stefan problem, Ice air interface, Ice water interface, Ice cover.

45-3070
Epontic algal community of the ice edge zone and its significance to the Davis Strait ecosystem.
Booth, J.A., *Arctic*, Sep. 1984, 37(3), p.234-243, With French summary. 40 refs.
Ice edge, Algae, Biomass, Ecosystems, Cryobiology, Marine biology, Davis Strait.

45-3071
Phytoplankton in coastal waters of the Arctic Ocean at Point Barrow, Alaska.
Bursa, A., *Arctic*, Dec. 1963, 16(4), p.239-262, 42 refs.
Plankton, Cryobiology, Marine biology, Biogeography, Littoral zone, Sea ice, United States—Alaska—Point Barrow.

45-3072
Trophic relationships at high arctic ice edges.
Bradstreet, M.S.W., et al, *Arctic*, Mar. 1982, 35(1), p.1-12, With French summary. 44 refs.
Cross, W.E.
Ice edge, Marine biology, Biomass, Ecosystems.

45-3073
Occurrence, habitat use, and behavior of seabirds, marine mammals, and arctic cod at the Pond Inlet ice edge.
Bradstreet, M.S.W., *Arctic*, Mar. 1982, 35(1), p.28-40, With French summary. 38 refs.
Ice edge, Marine biology, Ecosystems, Biogeography.

45-3074
Satellite information on ice conditions in the southern ocean and its scientific and operational application to navigation. [Informatsiia ISZ o ledovykh usloviiakh v IUzhnom okeane i ee ispol'zovanie v nauchno-operativnom obespechenii sudokhodstva],
Provorkin, A.V., et al, *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionyĭ biulleten'*, 1990, No.114, p.13-16, In Russian.
Romanov, A.A.
Sea ice distribution, Spaceborne photography, Image processing, Ice navigation, Mapping, Polar regions.
For better quality information on sea ice distribution at all antarctic automatic ground receiving stations, it is suggested that the reception of radar satellite images be organized so that surveys of all antarctic seas are provided routinely. The stages in the processing of satellite data are described, and examples of the automatic construction of schematic maps are given.

45-3075
Hydrometeorological conditions and characteristics of ship icing in antarctic waters. [Gidrometeorologicheskie usloviia i kharakteristika obledeneniia sudov v antarkticheskikh vodakh],
Panov, V.V., et al, *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionyĭ biulleten'*, 1990, No.114, p.17-20, In Russian. 4 refs.
Romanov, A.A.
Ice navigation, Sea ice distribution, Ship icing.
Hydrometeorological conditions are described which threaten navigation in antarctic waters. One of the threats considered in detail is the icing of ships, which endangers their stability. Recommendations for dealing with such a danger include, as an example, the analysis of charts obtained during Dec.-Apr., 1960-1980, which indicate the percentage of probability of slow, fast or very fast icing of ships of various types.

45-3076
General principles of accounting for ice conditions and estimating ice navigation difficulties. [Obshchie printsipy ucheta ledovykh uslovĭ i otsenka trudnostei plavaniia sudov vo l'dakh],
Buzuev, A.IA., et al, *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionyĭ biulleten'*, 1990, No.114, p.20-25, In Russian.
Romanov, A.A.
Sea ice distribution, Ice navigation, Ice conditions, Polar regions.
The formation and development of sea ice, including the dynamics of drifts, fast ice, icebergs and polynyas, and the structural and physico-mechanical properties of antarctic ice are discussed. The effects of prevailing conditions on navigation in the Antarctic are considered, and recommended routes through the frequently travelled runs, optimum speed of ships, best time of the year, etc., are outlined. Also recommended are methods of forecasting ice conditions as part of the planning of supply and relief voyages.

45-3077
Regularities of spatial-temporal variability of antarctic stationary polynyas. [Zakonomernosti prostranstvenno-vremmenoĭ izmenchivosti antarkticheskikh statsionarnykh polyneĭ],
Korotkov, A.I., *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionyĭ biulleten'*, 1990, No.114, p.25-32, In Russian. 8 refs.
Polynyas, Sea ice, Ice physics, Ice air interface, Polar regions.
Data obtained by the Meteor satellite on the spatial-temporal structure of antarctic polynyas show 122 independent polynyas, 110 of which are stationary. The string of the latter begins to form in the month of Sep., over an area of 0.05 mill. sq. km. reaching its maximum in the month of Jan., when it covers an average of 1.1 mill. sq. km. It begins to disappear at the onset of winter. The main physical and geographic factors responsible for the distribution of polynyas in the Southern Hemisphere are found in the meteorological and oceanographic (especially circulatory) regimes in the antarctic coastal zones. The dynamics of shore ice cover, in relation to the development of polynyas, and the seasonal and interannual variations of the dimensions and occurrence of polynyas, are discussed. Illustrations are provided with a classification of stationary polynyas according to the seasonal regularity of their development, and seasonal variations showing the developmental stages of basic types and subtypes of stationary polynyas.

45-3078
Operations at Bellingshausen Station in 1986 of the regional center for hydrometeorological information distribution to ships. [Ob opyte raboty regional'nogo tsentra na stantsii Bellinsgauzen po gidrometeorologicheskomu obespecheniiu navigatsii v 1986 g.],
Leont'ev, E.B., *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionyĭ biulleten'*, 1990, No.114, p.32-36, In Russian.
Ice navigation, Meteorological data, Ice conditions, Weather forecasting, Antarctica—Bellingshausen Station.
The geographic location of Bellingshausen Station allows the hydrometerological center it houses to observe in detail the synoptic processes and the distribution of drifting ice in the region of the South Orkney Is., South Georgia, Falkland Is., and the seas north and west of the Antarctic Peninsula. Thus, in cooperation with other stations in the area, the Bellingshausen Station center is part of an international system providing information to expeditionary ships which is vital for safe navigation in the area. Operational details of gathering and distributing the information are described. In weather forecasting, the criteria used for defining dangerous weather conditions are outlined. Based on the center's activities in 1986, certain recommendations for improving the efficiency of the international effort are made.

45-3079
Use of different types of vessels in Soviet antarctic expeditions and their supply of hydrometeorological information. [Ispol'zovanie transportnykh sudov razlichnikh tipov v SAE i ikh gidrometeorologicheskoe obespechenie],
Kornilov, N.A., et al, *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionyĭ biulleten'*, 1990, No.114, p.36-40, In Russian.
Kozlovskiĭ, A.M.
Ice navigation, Marine transportation, Sea ice distribution, Polar regions.
The distribution of information on weather and ice conditions to various SAE cargo ships, carried out over the years from Molodezhnaya, Bellingshausen and Leningradskaya Stations—equipped to receive satellite information—is reviewed. Ships serviced are listed by name, and their dimensions, speed and other characteristics, as well as their equipment and facilities to transport and deliver cargo in antarctic waters, are individually described.

45-3080
SAE cargo operations using icebergs. [Provedenie gruzovykh operatsiĭ SAE s ispol'zovaniem aĭsbergov],
Kornilov, N.A., et al, *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionyĭ biulleten'*, 1990, No.114, p.40-44, In Russian.
Kozlovskiĭ, A.M.
Icebergs, Unloading, Ice surface, Polar regions.
The use of icebergs for delivering cargo from ship to station in areas where the ice barrier itself is not accessible is discussed. The types of operations possible by the use of icebergs are outlined. Specifications regarding the iceberg's morphological features, thickness, length, height and other characteristics required for a successful unloading are provided. An illustration shows 3 differently shaped icebergs on the surface of which unloading operations were carried out by SAE ships. Another feature considered is one of the great dangers to the ship during such operations: iceberg drift, or the approach of another iceberg threatening collision, as happened during the unloading of SAE 31 in the vicinity of Leningradskaya Station. The way to deal with such situations is discussed.

45-3081
Safety measures for operations on antarctic fast ice. [Obespechenie bezopasnosti rabot na antarkticheskom pripae],
Grigor'ev, IU.A., et al, *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionyĭ biulleten'*, 1990, No.114, p.44-51, In Russian. 18 refs.
Korotkov, A.I., Romanov, A.A., Spichkin, V.A.
Ice edge, Fast ice, Ice navigation, Sea ice, Polar regions.
Considerations regarding the variability of seasonal pack ice dynamics and meteorological conditions which affect the safety of research and cargo operations in the Antarctic are presented. In describing the general characteristics of fast ice, the outlined dangers to ships, particularly in summer and fall, include strand cracks, decreased ice cover thickness, water on offshore ice, breakups at the fast ice edge, and transition from fast ice to drifting ice. The rules to follow to foresee and deal with such dangers are discussed in detail.

45-3082
Regularities of spatial-temporal variability of antarctic sea ice and navigation conditions. [Zakonomernosti prostranstvenno-vremennoĭ izmenchivosti morskikh antarkticheskikh l'dov i usloviia sudokhodstva],
Romanov, A.A., *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionyĭ biulleten'*, 1990, No.114, p.62-70, In Russian. 10 refs.
Sea ice distribution, Ice air interface, Ice navigation.
Regularities of sea ice distribution, formation, development and decay are discussed. Space and time variations in the distribution area, the volume of drifting ice, location of polynyas, fast ice and ice edge are described in relation to navigation. This covers ice propagation in antarctic waters; mean, maximum and minimum monthly extent of drift ice in the southern ocean; and ice areas during maximum, mean and minimum ice cover development in the Atlantic, Pacific and Balleny regions. Also briefly considered is the interrelationship of atmospheric circulation and ice cover formation.

45-3083
Predictability of seasonal ice cover variations in the southern ocean. [K voprosu o predskazuemosti sezonnykh izmenenĭ ledovitosti IUzhnogo okeana],
Romanov, A.A., et al, *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionyĭ biulleten'*, 1990, No.114, p.82-86, In Russian. 6 refs.
Chepurina, M.A.
Sea ice distribution, Ice models, Seasonal variations, Statistical analysis.
Various models for statistical study of seasonal and interannual variations of sea ice volume and distribution, based on the division of the southern ocean into 36 sectors of 10 deg. each, are described and shown in tables.

45-3084
Fine thermohaline structure of water near antarctic icebergs. [Tonkaia termokhalinnaia struktura vod vblizi antarkticheskikh aĭsbergov],
Popov, I.K., et al, *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionyĭ biulleten'*, 1990, No.114, p.87-92, In Russian. 1 ref.
Pisarevskaia, L.G.
Icebergs, Ice water interface, Temperature gradients, Meltwater, Sea water.
A study of the fine thermohaline structure of surface water around 5 separate icebergs, occurring under different hydrological conditions, was carried out on the *Akademik Fedorov* during the SAE-33 summer season of 1987-1988. The principal findings are discussed and presented in tables. The interaction between melting icebergs and cold surrounding waters, where the meltwater spreads out in a series of horizontal layers, is explained.

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Combellick, R.A., *Alaska. Department of Natural Resources. Division of Geological and Geophysical Surveys. Public-data file*, Nov. 1990, No.90-29, 67p., 35 refs.
Subsidence, Earthquakes, Boreholes, Drilling, Radioactive age determination.

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Stokke, O.S., *Tampere Peace Research Institute. Occasional papers*, 1990, No.41, p.22-41, 30 refs.
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45-3091
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An analysis of the National Science Foundation's surface vehicle fleet in Antarctica is reported on here. Surface vehicle needs have been determined through interviews of vehicle users, managers and maintainers, and from direct on-site observation. An ideal grouping of vehicle categories is proposed that will address current needs and provide flexibility for the future. Recommendations for streamlining and modernizing the NSF antarctic vehicle fleet are made. Cargo transportation over snow was identified as being in a crisis state. Personnel movement functions for all but traversing are performed adequately at this time, although there is much room for improvement. Brands and models must be selected for some categories of recommended vehicle types. This will naturally follow a more in-depth analysis of candidates and discussions with NSF vehicle managers. A purchasing plan, including a timetable, budget, and desired sequence of replacement, must then be formulated and executed. (Auth.)

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45-3144
PEIST—an in situ ice strength testing device.
Johnson, R.C., et al, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.23-28, 3 refs.
Sangolt, A.
Ice strength, Measuring instruments, Offshore structures.

45-3145
Ice island simulator.
Wang, A.T., et al, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.29-37, 24 refs.
Egging, D.E.
Ice islands, Offshore structures, Ice solid interface, Computerized simulation, Drift, Ice shelves, Ice loads.

45-3146
New creep damage relationship for ice.
Marcellus, R.W., et al, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.39-45, 14 refs.
Heuff, D.N.
Ice creep, Stress strain diagrams, Ice strength, Mathematical models, Sea ice.

45-3147
Creep of circular ice plates: analysis and experiment.
Mahrenholtz, O., et al, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.47-53, 17 refs.
Wu, Z.
Ice creep, Compressive properties, Analysis (mathematics), Ice (construction material).

45-3148
Nonlinear analysis of stress distribution in an ice floe.
Evgin, E., et al, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.55-62, 6 refs.
Zhan, C., Frederking, R.M.W.
Ice floes, Pack ice, Time factor, Ice creep, Ice elasticity, Stresses.

45-3149
Field strength values of multi-year ice off Herschel Island.
Iyer, S.H., et al, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.63-70, 8 refs.
Masterson, D.M.
Ice strength, Ice deformation, Ice solid interface, Borehole instruments, Ice pressure, Compressive properties, Analysis (mathematics).

45-3150
Frequency response of fluid-displacement urethane-button ice pressure panels.
Spencer, P.A., International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.71-74, 7 refs.
Ice pressure, Ice loads, Ice solid interface, Offshore structures, Analysis (mathematics).

45-3151
Appraisal of a multisurface plasticity model for soils.
Derradji-Aouat, A., et al, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.75-82, 7 refs.
Evgin, E.
Stress strain diagrams, Mathematical models, Computer programs, Soil mechanics, Plasticity tests, Sands.

45-3152
Experimental creep behaviors of the sea ice in a harbour of Liaodong Gulf.
Li, Z.J., et al, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.83-86, 9 refs.
Zhang, J.Y., Sui, J.X., Li, F.C., Zhang, T.
Sea ice, Ice creep, Ice salinity, Ice loads.

45-3153
Approximate analysis of the temperature distribution *in composting material in a cold environment.*
Ayorinde, O.A., et al, MP 2879, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.87-92, 25 refs.
Lunardini, V.J.
Temperature distribution, Analysis (mathematics), Cold weather tests.
An approximate analytical solution method was developed to quantify the distribution of temperatures in a compost pile at different low temperatures. Since composting is a temperature self-limiting process, the analysis of the temperature distribution of a compost pile in a cold environment is essential and desirable. The theoretical temperature distribution within the compost pile was calculated using an approximate analytical solution of the conductive heat transfer equation with a term for heat generated by microbial activity. For the analysis the composting material was considered to be homogeneous, which is a reasonable assumption since thorough mixing is always required for composting systems. In addition an idealized cylindrical shape was assumed, which is a good approximation for most reactor-type compost piles. Effects of ambient temperature, compost initial temperature and thermal diffusivity were also determined. Forced and free convective heat transfer effects were also evaluated. Published data on the heat production rate for different composting materials were used to estimate temperature distributions. The approximate analytical solution helps to identify significant parameters and to evaluate their influence on the performance of the composting system. The exact solution also provides a means of quantifying the distribution of microbially produced heat in the composting material. This type of solution, coupled with information on the effects of the environment on by-product fate and toxicity, could be used to guide optimal designs for cost-effective compost systems.

45-3154
Laboratory tests with a hybrid thermosyphon.
Haynes, F.D., et al, MP 2880, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.93-99, 10 refs.
Zarling, J.P., Quinn, W.F., Gooch, G.E.
Pipes (tubes), Soil stabilization, Fluid flow, Heat transfer, Foundations, Performance, Design, Thermal conductivity, Thaw depth.
A passive-active thermosyphon, equipped with an internal condensate return device that delivered 70% of the condensate to the far end of the horizontal evaporator section, was tested in the laboratory. In the passive mode, the test variable was the wind speed across the vertical condenser section as the air temperature was held constant at -8 C. In the active mode, mechanical refrigeration lines were connected to a heat exchanger built into the standard commercial thermosyphon. The test variables in the active mode were air temperature and the mass flow rate of the refrigerant. A hybrid thermosyphon has the advantages of both a passive unit and an active unit.

45-3155
Quantifying the effect of spatial variability in insulation moisture content profiles using a nondestructive technique.
Ayorinde, O.A., et al, MP 2881, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.101-105, 6 refs.
Pidgeon, D.
Thermal insulation, Moisture transfer, Cold weather construction.
A nondestructive technique using a dual-energy gamma-ray (DEGR) device was successfully applied to accurately measure the moisture profiles across the thicknesses of three types of insulation material exposed to water and subjected to a constant temperature gradient. The three types of insulation were expanded-bead polystyrene, urethane and perlite. The nondestructive method has also been used to continuously track and measure moisture migration and distribution in the insulating materials under prolonged exposure to moisture and thermal gradients. Similar measurements cannot be done by current destructive methods of determining insulation moisture profiles by a post-test slicing or cutting of the insulation. For this study a DEGR device was also used to evaluate the spatial variability in the across-thickness moisture profiles at three locations along the length of each insulation slab. The moisture profiles were measured at the midpoint (center) and at the quarter points (three inches left and right of the midpoint) along the insulation length. The average moisture contents at the three locations were also determined by calculating the across-thickness statistical mean values at these locations. The average of the mean values at the three locations was compared with the gravimetrically determined average moisture content for each type of insulation. The experimental results and analysis indicated that, for all the types of insulation tested, there were noticeable changes in the moisture profiles and average moisture contents at the three locations along the insulation length, showing the effect of spatial variability. The results also showed that the spatial variability in the moisture content profile depends on the type of insulation. Compared with the four-week gravimetric average volumetric moisture content of 0.115 cu cm/cu cm for polystyrene, the average volumetric moisture content was 0.137 cu cm/cu cm at the left quarter point, 0.129 cu cm/cu cm at the midpoint and 0.101 cu cm/cu cm at the right quarter point along the insulation length. For urethane the gravimetric value was 0.071 cu cm/cu cm compared to 0.081 cu cm/cu cm, 0.079 cu cm/cu cm and 0.067 cu cm/cu cm, respectively, at similar locations. However, for perlite the average volumetric moisture content was 0.274 cu cm/cu cm, 0.294 cu cm/cu cm and 0.285 cu cm/cu cm, respectively, at these locations compared to the gravimetric value of 0.306 cu cm/cu cm. This type of evaluation can be achieved only by a nondestructive technique.

45-3156
Influence of first phase change on the rheological behavior of clay between 0 and -5 C.
Thimus, J.F., et al, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.107-111, 4 refs.
Henriet, G.
Rheology, Soil freezing, Soil mechanics, Soil creep, Soil temperature, Phase transformations, Clay, Clay soils.

45-3157
Numerical study of the right angled thermosyphon.
Lock, G.S.H., et al, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.113-117, 13 refs.
Park, S.
Heat transfer, Thermal conductivity, Pipes (tubes), Temperature measurement, Thermodynamics, Fluid flow.

45-3158
Bearing capacity of shallow foundation on layered clay.
Das, B.M., International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.119-124, 10 refs.
Bearing strength, Foundations, Clay, Analysis (mathematics), Models, Offshore structures.

45-3159
Environmental conditions in the Southern Barents Sea.
Kvitrud, A., et al, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.125-130, 33 refs.
Nilsson, K.L.
Sea ice, Offshore structures, Icebergs, Water waves, Ice conditions, Ice loads, Wind velocity, Ice forecasting, Barents Sea.

45-3160
Icebergs in the Norwegian Continental Shelf in 1880-1881.
Kvitrud, A., et al, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.131-136, 18 refs.
Honsi, I.
Icebergs, Sea ice, Ice conditions, Norwegian Sea, Barents Sea.

45-3161
Effect of internal waves on sea ice drift.
Bruno, M.S., International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.137-141, 15 refs.
Sea ice, Drift, Water waves, Ice floes, Ice water interface, Roughness coefficient, Analysis (mathematics).

45-3162
Field investigation of ice in the Barents Sea.
Hoseth, K.A., et al, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.143-148, 11 refs.
Horrigmoe, G.
Sea ice, Compressive properties, Salinity, Ice cover thickness, Ice density, Ice conditions, Brines, Barents Sea.

45-3163
Ice tank tests on circular and sidewall air cushion icebreaker bows.
Hinchey, M.J., et al, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.149-156, 16 refs.
Mak, L.M., Colbourne, D.B.
Icebreakers, Air cushion vehicles, Models.

45-3164
Energy dissipation through melting in large scale indentation experiments on multi-year sea ice.
Gagnon, R.E., et al, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.157-161, 11 refs.
Sinha, N.K.
Sea ice, Ice solid interface, Ice mechanics, Ice melting, Thermodynamics.

45-3165
Model ice ridge forces on a downward breaking cone.
Lau, M., et al, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.163-170, 10 refs.
Williams, F.M.
Pressure ridges, Ice cover, Sea ice, Ice models.

45-3166
Small-scale experiments on splitting of ice floes.
Sodhi, D.S., MP 2882, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.171-175, 13 refs.
Ice floes, Ice solid interface, Ice cracks, Velocity, Ice cover thickness.
When small-scale indentation tests were conducted by pushing a flat, vertical indentor against the edges of floating freshwater ice sheets at low velocities, a macrocrack always formed in front of the indentor. When the indentor was made to impact against free-floating ice floes at high velocities, the floes did not split. The difference in these results is attributed to the different modes of ice deformation at different indentor velocities relative to ice. For low velocity tests, the ratio of crack opening force to ice pushing force is estimated from experimental data and existing theoretical results in the literature.

45-3167
Design of sealed fluid-filled in situ ice stress sensors.
Spencer, P.A., et al, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.177-185, 20 refs.
Masterson, D.M.
Ice cover, Sea ice, Sensors, Stresses, Ice mechanics, Design.

45-3168
Experimental study of ice expanding pressure.
Li, H.S., et al, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.187-190, 5 refs.
Zhang, X.P., Shen, W.
Ice cover effect, Ice solid interface, Ice cover thickness, Ice pressure, Ice temperature.

45-3169
Field observations of stresses in young ice.
Perovich, D.K., et al, MP 2883, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.191-198, 17 refs.
Tucker, W.B.
Pack ice, Young ice, Stresses, Sea ice.
An accurate understanding of in-situ pack ice forces is of critical importance in improving ice forecasting models and in generating estimates of loads on offshore structures. Young ice plays an important but poorly understood role in determining the internal stress field in sea ice. For one month, in-situ ice stress measurements were obtained in young first-year ice in the eastern Arctic during the fall of 1988. Sensors were also placed in an adjacent multi-year floe. During extreme deformation events, peak stresses briefly reached 400 kPa in both the young ice and in multi-year ice. During periods of dynamic activity, stresses in young ice and in multi-year ice were well correlated. Typically, stresses were largest in the young ice and were rapidly attenuated with distance from the edge of the multi-year floe. From day 314 to 320, twice daily oscillations of about 50 kPa due to tides or inertial oscillations were apparent in the stress data.

45-3170
Impact probabilities between large ice features and offshore structures in the Canadian Beaufort Sea.
Morrison, T.B., et al, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.199-206, 6 refs.
Marcellus, R.W.
Sea ice, Offshore structures, Ice solid interface, Ice islands, Hummocks.

45-3171
Brittle compressive failure of freshwater columnar ice under biaxial loading.
Smith, T.R., et al, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.207-214, 20 refs.
Schulson, E.M.
Brittleness, Compressive properties, Ice loads, Ice mechanics, Ice strength, Ice microstructure.

45-3172
Evaluation of an impact test for measuring ice adhesion strength.
Andersson, L.O., et al, MP 2884, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.215-220, 19 refs.
Lever, J.H., Mulherin, N.D., Rand, J.H.
Ice adhesion, Impact tests, Impact strength.
Lack of standardized testing has hampered efforts to understand ice adhesion and develop low-adhesion materials. However, the American Society for Testing and Materials (ASTM) specifies numerous standards for testing adhesive joints. The authors plan to adopt one of these standards for ice-adhesion tests, with ice substituted for the adhesive. Here, the authors describe the first effort in this program: adaptation of ASTM D950 (Impact strength of adhesive bonds). Basically, the authors installed ice-bonded test specimens in an Izod impact machine and measured the energy needed to debond the specimens. The main advantage of this test is its simplicity; many samples can be inexpensively prepared and tested. Its disadvantages include a restriction on specimen size and the generation of a nonuniform stress field. This paper describes the test procedures and results, and discusses their implications for standardized ice-adhesion testing.

45-3173
Measuring the effectiveness of deicing fluids for reducing ice adhesion to rough surfaces.
Lever, J.H., et al, MP 2885, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.221-227, 15 refs.
Rand, J.H., McGilvary, W.R.
Ice adhesion, Aircraft landing areas, Ice prevention.
Through a series of laboratory, the effectiveness of eight different deicing fluids was examined for reducing ice adhesion to the rough, nonskid surfaces used on aircraft-landing areas of ships. The nonskid samples consisted of 46 x 46 cm coated steel plates having roughness peaks of 2-3 mm. On each sample, a light coating of deicer was first sprayed and then a uniform layer of freshwater glaze ice was accreted. The very rough, nonskid surfaces and the ice-deteriorating effect of deicing chemicals dictated a novel approach to measuring adhesion strength: the ice was loaded inertially by bouncing the iced samples off a stiff spring. The average shear adhesion strength was calculated by measuring the acceleration required to shed the ice. A relatively small amount of deicer (similar to 70 mL/sq m) applied in advance of ice accretion was found to be extremely effective in reducing ice adhesion to nonskid surfaces. Without deicer, cohesive failure occurs within the ice (at shearing stresses of about 2,000 kPa for the test temperature of -4 C), whereas all deicer-treated samples shed ice, on average, at 130 kPa or less. Furthermore, the best results (similar to 70 kPa) qualify the deiced nonskid surface as a practical, low-adhesion surface for freshwater ice accretions. Such results suggest that advance application of deicing chemicals would significantly assist ice removal from other rough surfaces (asphalt, concrete, etc.). The inertial-load apparatus developed here is well suited for ice adhesion studies of rough surfaces and yielded very low scatter for identically prepared samples. (Auth. mod.)

45-3174
***In situ* multi-year sea ice strength using NRCC borehole indentor.**
Sinha, N.K., International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.229-236, 8 refs.
Sea ice, Ice strength, Borehole instruments, Ice microstructure, Ice mechanics.

45-3175
Measurement of volumetric strain in the triaxial testing of ice samples.
Spencer, P.A., et al, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.237-244, 6 refs.
Masterson, D.M., Dorris, J.F.
Ice strength, Stress strain diagrams, Ice density, Ice salinity.

45-3176
Crack opening and propagation in S2 freshwater ice.
Weber, L.J., et al, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.245-252, 11 refs.
Nixon, W.A.
Ice cracks, Crack propagation, Ice loads.

45-3177
Two and three dimensional response of nonlinear soil under gravity structures.
Prasad, K.S.R., et al, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.253-260, 15 refs.
Swamidas, A.S.J.
Bearing strength, Loads (forces), Settlement (structural), Offshore structures, Design, Foundations.

45-3178
Heat transfer in a right-angled thermosyphon.
Lock, G.S.H., et al, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.261-265, 9 refs.
Ladoon, D.
Pipes (tubes), Heat transfer, Thermodynamics, Fluid flow, Temperature measurement, Thermal conductivity.

45-3179
Interpretation of pile load tests at the Haga site.
Whittle, A.J., International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.267-274, 29 refs.
Pile load tests, Clay, Soil profiles, Offshore structures, Shear stress, Models.

45-3180
Significance of a cap yield surface in earth pressure calculations.
Evgin, E., et al, International Conference on Offshore Mechanics and Arctic Engineering, 10th, Stavanger, Norway, June 23-28, 1991. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, W.A. Nixon, and D.S. Sodhi, New York, American Society of Mechanical Engineers, 1991, p.275-281, 6 refs.
Medeiros, L.
Mathematical models, Soil mechanics, Stress strain diagrams, Soil strength, Offshore structures.

45-3181
Ecological-geographical aspects of the distribution of heterotrophic bacteria in the Atlantic Ocean. [Ekologo-geograficheskie zakonomernosti raspredeleniia geterotrofnykh bakterii v Atlanticheskom okeane],
Kriss, A.E., *Microbiologiia*, Mar.-Apr. 1970, 39(2), p.362-371, In Russian with English summary. 11 refs.
Bacteria, Ecology, Marine biology, Microbiology, Ocean currents, Cryobiology.
Heterotrophic bacteria, assimilating unstable organic matter, were uniformly distributed in water of the Atlantic Ocean between the Greenland and the Antarctic (along 30W). The lowest content (0-9 bacteria per 40 ml water) was registered in the subarctic, southern subtropical and subantarctic zones. Waters of the equatorial-tropical zone contained relatively high concentration of heterotrophic bacteria: dozens and even over 100 bacteria per 40 ml water were found in 65% of all samples taken from this zone. Vertical distribution of heterotrophic bacteria along 60N-60S revealed alternation of water layers with high and low content of the bacteria. These layers, 7-11 from the ocean surface to the bottom, reflected stratification of waters of the equatorial-tropical and arctic-antarctic origin, respectively. Considerable similarity in the topography of waters layers of the equatorial-tropical and arctic-antarctic origin in 1959 and 1969 suggests relative stability of the structure of the Atlantic Ocean (along 30W) revealed by the method of microbiological indication. (Auth.)

45-3182
Hydrobiological studies in the Arctic Ocean (SP-22, December 1979-April 1980). [Gidrobiologicheskie issledovaniia v Severnom Ledovitom okeane (SP-22, dekabr' 1979 g.-aprel' 1980 g.)],
Mel'nikov, I.A., *Okeanologiia*, Mar.-Apr. 1981, 21(2), p.397, In Russian.
Marine biology, Ecology, Cryobiology, Drift stations.

45-3183
***Hydrobiological studies at SP-22 in the Arctic Ocean* (Spring 1981).** [Gidrobiologicheskie issledovaniia na SP-22 v Severnom Ledovitom okeane (vesna 1981 g.)],
Mel'nikov, I.A., *Okeanologiia*, Jan.-Feb. 1982, 22(1), p.158, In Russian.
Cryobiology, Marine biology, Ecology, Drift stations.

45-3184
Hydrobiological studies in the central part of the Arctic Ocean (Spring 1976). [Gidrobiologicheskie issledovaniia v tsentral'noi chasti Severnogo Ledovitogo okeana (vesna 1976 g.)],
Mel'nikov, I.A., *Okeanologiia*, Nov.-Dec. 1976, 16(6), p.1134-1135, In Russian.
Marine biology, Ecology, Cryobiology, Drift stations.

45-3185
Hydrobiological studies in the central part of the Arctic Ocean. [Gidrobiologicheskie issledovaniia v tsentral'noi chasti Severnogo Ledovitogo okeana],
Mel'nikov, I.A., *Okeanologiia*, May-June 1976, 16(3), p.547-550, In Russian.
Marine biology, Ecology, Cryobiology, Drift stations.

45-3186
Cryobiological observations in the central Arctic Basin (methods and some results of the studies). [Kriobiologicheskie nabliudeniia v Tsentral'nom Arkticheskom basseine (metod i nekotorye rezul'taty issledovanii)],
Mel'nikov, I.A., *Okeanologiia*, Jan.-Feb. 1979, 19(1), p.150-155, In Russian with English summary. 17 refs.
Ecosystems, Cryobiology, Marine biology, Ecology, Drift stations.

45-3187
***History and pattern of disturbance in* Alaskan arctic terrestrial ecosystems: a hierarchical approach to analysing landscape change.**
Walker, D.A., et al, *Journal of applied ecology*, Apr. 1991, 28(1), p.244-276, Refs. p.267-276.
Walker, M.D.
Arctic landscapes, Landscape development, Ecosystems, Environmental impact, Tundra, Classifications, Geography, Plant ecology, Vegetation patterns, Environmental models.

45-3188
Detection of objects buried in wet snowpack by an FM-CW radar.
Yamaguchi, Y., et al, *IEEE transactions on geoscience and remote sensing*, Mar. 1991, 29(2), p.201-208, 11 refs.
Radar echoes, Indicating instruments, Snow cover effect, Subsurface structures, Detection, Remote sensing, Data processing.

45-3189
Texture analysis of radiometric signatures of new sea ice forming in arctic leads.
Eppler, D.T., et al, *IEEE transactions on geoscience and remote sensing*, Mar. 1991, 29(2), p.233-241, 17 refs.
Farmer, L.D.
Radiometry, Sea ice, Ice formation, Imaging, Classifications, Aerial surveys, Detection, Image processing, Ice surface.

45-3190
Modified beta density function as a model for synthetic aperture radar clutter statistics.
Maffett, A.L., et al, *IEEE transactions on geoscience and remote sensing*, Mar. 1991, 29(2), p.277-283, 17 refs.
Wackerman, C.C.
Sea ice, Classifications, Synthetic aperture radar, Image processing, Backscattering, Mathematical models, Airborne radar, Statistical analysis, Imaging.

45-3191
Time-delayed reflections in L-band synthetic aperture radar imagery of icebergs.
Gray, A.L., et al, *IEEE transactions on geoscience and remote sensing*, Mar. 1991, 29(2), p.284-291, 18 refs.
Arsenault, L.D.
Icebergs, Imaging, Synthetic aperture radar, Resolution, Radar echoes, Scattering, Airborne radar, Attenuation, Ice water interface.

45-3192
Duration of liquid water habitats on early Mars.
McKay, C.P., et al, *Icarus*, Apr. 1991, 90(2), p.214-221, 45 refs.
Davis, W.L.
Mars (planet), Extraterrestrial ice, Surface waters, Ice cover effect, Lakes, Atmospheric composition, Surface temperature, Planetary environments.
A simple climate model of early Mars is employed in order to estimate the duration of ice-covered lakes after the onset of freezing conditions on Mars. The critical parameter determining the existence of ice-covered lakes is the existence of peak seasonal temperatures above freezing. The peak temperature occurs at the subsolar point at perihelion. If there was a source of ice to provide meltwater, liquid water habitats could have been maintained under relatively thin ice covers for up to 700 million years after mean global temperatures fell below the freezing point. At this point, the mean annual temperature is 227 K, and the pressure of atmospheric CO2 is about 0.5 bar. Without the presence of stable bodies of liquid water, it is not clear what mechanisms were responsible for the removal of this remaining CO2. From a biological point of view, it is found that the duration of liquid water habitats on early Mars exceeds the upper limit on the time required for the origin of life on Earth. In modeling such lakes, experimental data derived from the investigation of dry valley lakes in Antarctica is utilized. (Auth. mod.)

45-3193
Effect of alternate freezing and thawing on aggregate stability and aggregate size distribution of some Prince Edward Island soils.
Edwards, L.M., *Journal of soil science*, June 1991, 42(2), p.193-204, 25 refs.
Soil aggregates, Soil freezing, Freeze thaw cycles, Stability, Loams, Noncohesive soils, Soil tests, Soil erosion.

45-3194
Ice cover melting under turbulent flow conditions.
Sarraf, S., et al, ASME International Computers in Engineering Conference and Exposition, Boston, MA, Aug. 5-9, 1990. Proceedings, Vol.2. Computers in engineering 1990. Edited by G.L. Kinzel and S.M. Rohde, New York, NY, American Society of Mechanical Engineers, 1990, p.313-316, 6 refs.
Saade, R.
DLC TA345.I5485a 1990
River ice, Ice cover thickness, Ice melting, Heat transfer, Water flow, Computerized simulation, Turbulent diffusion, Hydrodynamics.

45-3195
Basis for ice formation design.
LaFleur, R.S., ASME International Computers in Engineering Conference and Exposition, Boston, MA, Aug. 5-9, 1990. Proceedings, Vol.2. Computers in engineering 1990. Edited by G.L. Kinzel and S.M. Rohde, New York, NY, American Society of Mechanical Engineers, 1990, p.393-401, 17 refs.
DLC TA345.I5485a 1990
Fluid dynamics, Turbulent flow, Design, Computerized simulation, Surface structure, Ice formation, Ice water interface, Mathematical models.

45-3196
Determination of some heavy metals in antarctic snow and coastal sea water.
Saini, G., et al, Italy. Programma Nazionale di Ricerche in Antartide. Comitato Nazionale per la Ricerca. Progetto Antartide: impatto ambientale. Convegno, Roma, 8-9 giugno, 1990. (Environmental impact in Antarctica. Meeting, Rome, Italy, June 8-9, 1990), Rome, 1990, p.27-30, 6 refs.
Baiocchi, C., Giacosa, D.
Snow composition, Sea water, Chemical analysis, Polar regions, Antarctica--Ross Sea, Antarctica--Victoria Land.
Samples of seawater and snow collected by the Italian expedition in Antarctica in 1988-89 have been analyzed for Cu, Ni, Cr, Cd and Mn. Preconcentration of the samples has been made by reductive precipitation for seawater and by lyophilisation for snow. Determinations have been made by GF AAS. The results are discussed. (Auth.)

45-3197
Characterization of snow in the area surrounding Terra Nova Bay (Antarctica).
Piccardi, G., et al, Italy. Programma Nazionale di Ricerche in Antartide. Comitato Nazionale per la Ricerca. Progetto Antartide: impatto ambientale. Convegno, Roma, 8-9 giugno, 1990. (Environmental impact in Antarctica. Meeting, Rome, Italy, June 8-9, 1990), Rome, 1990, p.55-61, 6 refs.
Udisti, R., Bellandi, S., Barbolani, E.
Snow composition, Polar regions, Antarctica--Terra Nova Bay.
Snow samples collected during the antarctic summer Italian expedition of 1987-88 and 1988-89 are analyzed for the determination of the main and some trace components. The study of the composition of antarctic atmospheric precipitation is

easily carried out by analyzing snow samples collected on the continent. The aim is to identify the various contributions to the aerosol composition: atmospheric, marine and crustal. The distance from great sources of unnatural pollutants limits their contribution and thereby allows a better characterization of different local situations. (Auth. mod.)

45-3198

Organic compounds in antarctic matrices: sea water, particulate, pack and sediments.

Desideri, P., et al, Italy. Programma Nazionale di Ricerche in Antartide. Comitato Nazionale per la Ricerca. Progetto Antartide: impatto ambientale. Convegno, Roma, 8-9 giugno, 1990. (Environmental impact in Antarctica. Meeting, Rome, Italy, June 8-9, 1990), Rome, 1990, p.63-70, 3 refs.

Lepri, L., Checchini, L.

Ice composition, Impurities, Meltwater, Antarctica—Terra Nova Bay.

Biogenic and anthropogenic organic compounds present in sea sediments taken from Terra Nova Bay during the 1987/88 expedition were identified. Sea water, pack-ice, sea water under the pack and melted pack water samples were taken from the bay during the 1988/89 expedition and were analyzed for these compounds. Results show the presence of several biogenic and anthropogenic organic compounds in the sea water. (Auth. mod.)

45-3199

Study of humic components of soils and sediments from Antarctica.

Campanella, L., et al, Italy. Programma Nazionale di Ricerche in Antartide. Comitato Nazionale per la Ricerca. Progetto Antartide: impatto ambientale. Convegno, Roma, 8-9 giugno, 1990. (Environmental impact in Antarctica. Meeting, Rome, Italy, June 8-9, 1990), Rome, 1990, p.89-93, 3 refs.

Ferri, T., Petronio, B.M., Pupella, A.

Soil chemistry, Marine deposits, Lacustrine deposits, Polar regions.

Humic and fulvic acids extracted from marine sediments, lacustrine sediments and soils from Antarctica have been characterized using different techniques. The results obtained have been compared with those reported in the literature and the differences found are pointed out. (Auth.)

45-3200

Selective transport phenomena at the air-water interface in coastal antarctic surface water: time variability.

Loglio, G., et al, Italy. Programma Nazionale di Ricerche in Antartide. Comitato Nazionale per la Ricerca. Progetto Antartide: impatto ambientale. Convegno, Roma, 8-9 giugno, 1990. (Environmental impact in Antarctica. Meeting, Rome, Italy, June 8-9, 1990), Rome, 1990, p.95-102, 5 refs.

Snow composition, Sea water, Chemical analysis.

In the limits imposed by the thermal treatment of the samples, some differences in the mean physico-chemical parameters appear between the mean values found in the surface coastal waters in Terra Nova Bay and the samples taken in the previous campaign *at a greater distance from the coast. Snow sampled* at non-polluted sites shows traces of marine aerosols with highly surface-active matter that could justify an anomalous enrichment of some particular component. (Auth.)

45-3201

Radionuclide analysis in antarctic coastal samples: methods and procedures.

Battiston, G., et al, Italy. Programma Nazionale di Ricerche in Antartide. Comitato Nazionale per la Ricerca. Progetto Antartide: impatto ambientale. Convegno, Roma, 8-9 giugno, 1990. (Environmental impact in Antarctica. Meeting, Rome, Italy, June 8-9, 1990), Rome, 1990, p.143-147.

Degetto, S., Gerbasi, R., Sbrignadello, G.

Snow composition, Radioactivity, Antarctica—Terra Nova Bay Station.

Preliminary results are given of radiochemical analyses performed on snow, lichen (Umbilicaria Decussata) and moss (Bryum Algens Card.) samples collected near the Terra Nova Bay Station during the 1988-89 Italian expedition. Data on Pb-210 and Cs-137 for the analyzed samples, and some preliminary results on multielemental characterization of snow water, are presented. (Auth.)

45-3202

Effect of sea salts in the major anion distribution in an ice core of the Fildes Peninsula ice field: a preliminary study result.

Han, M.W., et al, *Korean journal of polar research*, Dec. 1990, 1(2), p.17-23, In Korean with English summary. 11 refs.

Yoon, H.I.

Ice cores, Ice composition, Salt ice, Polar regions, Antarctica—Fildes Peninsula.

Preliminary results are reported from anion analyses (sulfate, chloride, nitrate) of a 2 m ice core from the Fildes Peninsula ice field on King George I. The sulfate and chloride data are characterized as follows: concentrations of sulfate and chloride in the ice core are 30 to 40 times higher than those reported from a South Pole ice core. The characteristics of sulfate and chloride strongly suggest that the Fildes Peninsula ice field is under the direct influence of sea salts originating from the surrounding seas: Drake Passage and Maxwell Bay. The influence of sea salts in the ice is further substantiated by the fact that strong winds are very common in the area due to frequent marine cyclones. (Auth. mod.)

45-3203

Construction report on Sejong Station.

Kim, D.W., *Korean journal of polar research*, Dec. 1990, 1(2), p.51-67, In Korean with English summary.

Cold weather construction, Permafrost beneath structures, Site surveys, Polar regions, Antarctica—King Sejong Station.

The Korean Antarctic Expedition party landed on King George I. in Dec. 1985 and selected the site for King Sejong Station after meticulous land and aerial surveys. The final selection of the site was based on the following advantages: the average annual temperature is relatively high, -5 C in winter; the landing on the adjacent pier is facilitated by minimum amounts of drifting ice in the area; there is abundance of water, and easy information exchange with 7 other bases in the vicinity. The construction began in 1987 and was completed, with many difficulties, in 400 days, one of the drawbacks being the presence of irregular high winds. Design, construction operations, and equipment used and installed are described in detail.

45-3204

Monthly meteorological data at King Sejong Station (June-Dec. 1990).

Lee, B.Y., et al, *Korean journal of polar research*, Dec. 1990, 1(2), p.75.

Nam, J.C.

Meteorological data, Antarctica—King Sejong Station.

Results of the June-Dec., 1990 monthly meteorological observations at King Sejong Station are presented in a table. Data include atmospheric pressure and temperature mean, maximum and minimum values; mean and maximum speed and predominant direction of wind; mean and minimum relative humidity values; cloudiness; mean dewpoint temperature; total precipitation; snowfall total and maximum depth values; and number of blizzard-, rain-, snow-, and fog-days.

45-3205

Tire snow traction performance.

Ohoyama, K., et al, *Japan Society of Automotive Engineers. Review*, Jan. 1990, 11(1), p.86-88, 3 refs.

Nishina, S.

Tires, Design, Rubber snow friction, Traction, Performance, Cold weather tests, Ice solid interface.

45-3206

Autumn freeze testing of one-year reciprocal families of *Pinus sylvestris* (L.).

Nilsson, J.E., et al, *Scandinavian journal of forest research*, 1990, 5(4), p.501-511, 21 refs.

Walfridsson, E.A.

Trees (plants), Acclimatization, Cold tolerance, Low temperature tests, Frost resistance, Forestry, Growth.

45-3207

Growth and survival of seedlings of various *Picea* species under northern climatic conditions.

Junttila, O., et al, *Scandinavian journal of forest research*, 1990, 5(1), p.69-81, 33 refs.

Skaret, G.

Trees (plants), Cold tolerance, Acclimatization, Cold weather tests, Temperature effects, Growth, Forestry, Plants (botany).

45-3208

Comparison of Laplace transform and finite difference solutions for an evolving permafrost region.

Morland, L.W., et al, *International journal for numerical and analytical methods in geomechanics*, Dec. 1990, 14(9), p.631-648, 6 refs.

Kelly, R.J.

Permafrost transformation, Soil freezing, Freezing front, Ice water interface, Temperature distribution, Boundary value problem, Analysis (mathematics), Permafrost mass transfer, Permafrost heat balance.

45-3209

Aircraft-produced ice particles in a highly supercooled altocumulus cloud.

Sassen, K., *Journal of applied meteorology*, June 1991, 30(6), p.765-775, 13 refs.

Condensation trails, Supercooled clouds, Aircraft, Ice crystals, Ice formation, Homogeneous nucleation, Weather modification, Cloud physics, Aerial surveys.

45-3210

Transport equations during ice segregation in a dispersed medium.

Horiguchi, K., *Journal of colloid and interface science*, June 1991, 144(1), p.297-298, 13 refs.

Soil freezing, Frost heave, Freezing front, Ice formation, Mathematical models, Soil water migration, Soil colloids.

45-3211

Sediment concentration of interrill runoff under varying soil, ground cover, soil compaction, and freezing regimes.

Edwards, L.M., et al, *Journal of environmental quality*, Apr.-June 1991, 20(2), p.403-407, 10 refs.

Burney, J.R.

Sediment transport, Runoff, Soil erosion, Vegetation factors, Soil freezing, Soil tests, Soil stabilization, Simulation, Freeze thaw cycles.

45-3212

Fermentative activity of microbial-antagonists, isolated from the White and Barents Seas. [Fermentativnaia aktivnost' mikrobov-antagonistov, vydelennykh iz Belogo i Barentseva morei].

Trunova, O.N., Biologiia severnykh morei evropeiskoi chasti SSSR (Biology of the northern seas in the European part of the USSR). Edited by I.B. Tokin, Apatity, Kol'skii filial AN SSSR, 1977, p.91-97, In Russian. 7 refs.

Cryobiology, Microbiology, Marine biology, Ecology, Bacteria.

45-3213

Dissolved and suspended organic carbon in ice of the arctic basin. [Rastvorennyi i vzveshennyi organicheskii uglerod vo l'dakh Arkticheskogo basseina].

Mel'nikov, I.A., Gidrokhimicheskie protsessy v okeane (Hydrochemical processes in the ocean). Edited by O.K. Bordovskii and V.N. Ivanenkov, Moscow, IOAN, 1985, p.86-89, In Russian. 20 refs.

Sea ice, Ecology, Microbiology, Ice composition.

45-3214

Content and dynamics of the nutrients and organic matter in snow and ice cover of the arctic basin. [Soderzhanie i dinamika biogennykh elementov v snezhno-ledianom pokrove Arkticheskogo basseina].

Mel'nikov, I.A., et al, Gidrokhimicheskie protsessy v okeane (Hydrochemical processes in the ocean). Edited by O.K. Bordovskii and V.N. Ivanenkov, Moscow, IOAN, 1985, p.90-93, In Russian. 25 refs.

Korzhikova, L.I., Nalbandov, IU.R.

Sea ice, Ice cover, Ecology, Microbiology, Ice composition, Snow composition, Snow cover.

45-3215

Performance of triangular spine fins under frosting conditions.

Kondepudi, S.N., et al, *Heat recovery systems & CHP*, 1988, 8(1), p.1-7, 4 refs.

O'Neal, D.L.

Ice formation, Frost, Transition heating, Performance, Heat transfer, Temperature distribution, Surface temperature, Ice solid interface.

45-3216

Heat pipes for ground heating and cooling.

Vasiliev, L.L., *Heat recovery systems & CHP*, 1988, 8(2), p.125-138, 21 refs. For another version see 42-4311.

Heat pipes, Heating, Heat recovery, Temperature control, Soil freezing, Ground thawing, Design, Heat transfer.

45-3217

Faunal assemblage inhabiting seasonal sea ice in the nearshore arctic ocean with emphasis on copepods.

Kern, J.C., et al, *Marine ecology progress series*, Jan. 1983, 10(2), p.159-167, 38 refs.

Carey, A.G., Jr.

Marine biology, Cryobiology, Ecology, Sea ice, Seasonal variations.

45-3218

Convenient apparatus for *in situ* primary production studies.

Watt, W.D., *Limnology and oceanography*, Apr. 1965, 10(2), p.298-300, 1 ref.

Marine biology, Biomass, Measuring instruments.

45-3219

Diatoms as hydrographic tracers: example from Bering Sea sediments.

Sancetta, C., *Science*, Jan. 16, 1981, 211(4479), p.279-281, 16 refs.

Plankton, Paleoclimatology, Fossils, Bottom sediment, Marine biology, Bering Sea.

45-3220

Present and planned marine ecological activities in Greenland.

Petersen, G.H., Circumpolar Conference on Northern Ecology, Ottawa, Sep. 15-18, 1975. Proceedings, Ottawa, National Research Council, Canada, 1975, p.II/1-II/12, With French summary. 4 refs.

Marine biology, Cryobiology, Ecology, Environmental impact, Greenland.

45-3221
Origin and evolution of the arctic marine ecosystems.
Menzies, R.J., Circumpolar Conference on Northern Ecology, Ottawa, Sep. 15-18, 1975. Proceedings, Ottawa, National Research Council, Canada, 1975, p.II/13-II/26, With French summary. 6 refs.
Marine biology, Paleoecology, Paleoclimatology, Biogeography, Cryobiology.

45-3222
Marine ecology in arctic Canada.
Mansfield, A.W., Circumpolar Conference on Northern Ecology, Ottawa, Sep. 15-18, 1975. Proceedings, Ottawa, National Research Council, Canada, 1975, p.II/27-II/47, With French summary. 81 refs.
Marine biology, Cryobiology, Ecology, Biogeography, Environmental protection, Canada.

45-3223
Ecology of the marine fishes of arctic Canada.
McAllister, D.E., Circumpolar Conference on Northern Ecology, Ottawa, Sep. 15-18, 1975. Proceedings, Ottawa, National Research Council, Canada, 1975, p.II/49-II/65, With French summary. 38 refs.
Marine biology, Ecology, Cryobiology, Biogeography, Animals, Canada.

45-3224
Arctic marine ecosystems and oil pollution.
Percy, J.A., Circumpolar Conference on Northern Ecology, Ottawa, Sep. 15-18, 1975. Proceedings, Ottawa, National Research Council, Canada, 1975, p.II/87-II/98, With French summary. 9 refs.
Marine biology, Oil spills, Ecosystems, Environmental impact.

45-3225
Projected ecosystem consequences arising from the discharge of mine-tailing to the sea.
Ellis, D.V., et al, Circumpolar Conference on Northern Ecology, Ottawa, Sep. 15-18, 1975. Proceedings, Ottawa, National Research Council, Canada, 1975, p.II/99-II/107, With French summary. 4 refs.
Littlepage, J.L.
Tailings, Marine biology, Environmental impact, Mining, Wastes.

45-3226
Problems in management oriented studies of birds and mammals in European high Arctic.
Larsen, T., Circumpolar Conference on Northern Ecology, Ottawa, Sep. 15-18, 1975. Proceedings, Ottawa, National Research Council, Canada, 1975, p.II/109-II/117, With French summary. 14 refs.
Marine biology, Cryobiology, Ecology, Biogeography, Animals.

45-3227
Interrelationships of Arctic Ocean mammals in the sea ice habitat.
Stirling, I., et al, Circumpolar Conference on Northern Ecology, Ottawa, Sep. 15-18, 1975. Proceedings, Ottawa, National Research Council, Canada, 1975, p.II/129-II/136, With French summary. 19 refs.
Smith, T.G.
Marine biology, Cryobiology, Sea ice, Ecology, Animals.

45-3228
Role of marine mammals in the arctic ecosystems: research objectives, needs and direction.
Smith, T.G., et al, Circumpolar Conference on Northern Ecology, Ottawa, Sep. 15-18, 1975. Proceedings, Ottawa, National Research Council, Canada, 1975, II/137-II/145, With French summary. 10 refs.
Geraci, J.R.
Marine biology, Ecology, Animals, Environmental impact.

45-3229
Chrysochromulina (Haptophyceae) bloom under the ice in the Tvärminne archipelago, southern coast of Finland.
Hällfors, G., et al, *Societas pro fauna et flora fennica. Memoranda*, 1974, Vol.50, p.89-104, 23 refs.
Niemi, A.
Algae, Cryobiology, Marine biology, Sea ice, Finland.

45-3230
Primary production in Frobisher Bay, arctic Canada.
Grainger, E.H., Marine production mechanisms. International Biological Programme 20. Edited by M.J. Dunbar, Cambridge, England, Cambridge University Press, 1979, p.9-30, 46 refs.
DLC QH91.8.M34M37
Marine biology, Cryobiology, Biomass, Sea ice, Canada—Northwest Territories—Baffin Island.

45-3231
Biological production in the Gulf of St. Lawrence.
Dunbar, M.J., Marine production mechanisms. International Biological Programme 20. Edited by M.J. Dunbar, Cambridge, England, Cambridge University Press, 1979, p.151-171, 45 refs.
DLC QH91.8.M34M37
Marine biology, Biomass, Cryobiology, Sea ice, Canada—Saint Lawrence, Gulf.

45-3232
Ultramicroscopic forms in the Barents Sea littoral mud. [Ul'tramikroskopicheskie formy v ilakh litorali Barentseva moria],
Mishustina, I.E., et al, *Akademiia nauk SSSR. Izvestiia. Seriia biologicheskaia*, Jan.-Feb. 1973, No.1, p.138-140, In Russian with English summary. 9 refs.
Smirnova, E.I.
Littoral zone, Mud, Microbiology, Ecology, Cryobiology.

45-3233
Studies of primary production in the eastern Bering Sea.
McRoy, C.P., et al, Biological oceanography of the northern North Pacific Ocean. Edited by A.Y. Takenouti, Tokyo, Idemitsu Shoten, 1972, p.199-216, 29 refs.
Goering, J.J., Shiels, W.E.
DLC QH95.1.B56
Biomass, Marine biology, Sea ice, Cryobiology, Bering Sea.

45-3234
Freezing of a binary alloy saturating a packed bed of spheres.
Cao, W.Z., et al, *Journal of thermophysics and heat transfer*, Jan. 1991, 5(1), p.46-53, 21 refs.
Poulikakos, D.
Solutions, Freezing, Solidification, Porous materials, Phase transformations, Heat transfer, Liquid solid interfaces, Convection.

45-3235
Modeling of surface roughness effects on glaze ice accretion.
Hansman, R.J., Jr., et al, *Journal of thermophysics and heat transfer*, Jan. 1991, 5(1), p.54-60, 9 refs. For another version see 45-599.
Yamaguchi, K., Berkowitz, B., Potapczuk, M.
Glaze, Ice accretion, Surface roughness, Ice surface, Ice models, Ice air interface, Heat transfer, Wind tunnels, Turbulent boundary layer, Aircraft icing.

45-3236
Long-range prediction of regional sea ice anomalies in the Arctic.
Chapman, W.L., et al, *Weather and forecasting*, June 1991, 6(2), p.271-288, 24 refs.
Walsh, J.E.
Sea ice distribution, Ice forecasting, Seasonal variations, Statistical analysis, Accuracy, Ice edge, Meteorological data.

45-3237
Water and ice resources of the Issyk Kul-Chu region, their current and future state.
Dikikh, A.N., et al, *Water resources*, May 1991, 17(4), p.390-396, Translated from Vodnye resursy, July-Aug. 1990. 20 refs.
Dikikh, L.L.
Water reserves, River basins, Glacier melting, Meltwater, Runoff forecasting, Hydrology, Ice (water storage), Climatic factors.

45-3238
Ice-cover climatology for Lake Erie and Lake Superior for the winter seasons 1897-1898 to 1982-1983.
Assel, R.A., *International journal of climatology*, Nov. 1990, 10(7), p.731-748, 33 refs.
Lake ice, Ice cover, Ice formation, Periodic variations, Climatology, Ice models, Statistical analysis, United States—Erie, Lake.

45-3239
Occurrence and characteristics of lower tropospheric ice crystals in the Arctic.
Curry, J.A., et al, *International journal of climatology*, Nov. 1990, 10(7), p.749-764, 60 refs.
Polar atmospheres, Atmospheric composition, Ice crystal growth, Ice crystal optics, Visibility, Clouds (meteorology), Radiation balance, Optical phenomena.

45-3240
Distribution of heterotrophic microorganisms in the Greenland Sea. [Rasprostranenie geterotrofnykh mikroorganizmov v Grenlandskom more],
Mishustina, I.E., et al, *Akademiia nauk SSSR. Izvestiia. Seriia biologicheskaia*, Nov.-Dec. 1963, No.6, p.914-921, In Russian with English summary. 7 refs.
Mitskevich, I.N.
Marine biology, Ecology, Microbiology, Cryobiology, Distribution.

45-3241
Fractionating of O-18 in the snow-ice cover of the central Arctic Basin. [Fraktsionirovanie O-18 v snezhno-ledianom pokrove Tsentral'nogo Arkticheskogo basseina],
Mel'nikov, I.A., et al, *Okeanologiia*, Mar.-Apr. 1985, 25(2), p.237-241, In Russian with English summary. 8 refs.
Lobyshev, V.I.
Ice cover effect, Snow cover effect, Oxygen isotopes, Ice melting, Chemical composition, Ice composition.

45-3242
Photosynthetic and pigment responses of sea-ice microalgae to changes in light intensity and quality.
Rochet, M., et al, *Journal of experimental marine biology and ecology*, Nov. 1986, 101(3), p.211-226, 64 refs.
Legendre, L., Demers, S.
Algae, Marine biology, Cryobiology, Photosynthesis, Sea ice, Chlorophylls.

45-3243
Responses of sea-ice microalgae to climatic and fortnightly tidal energy inputs (Manitounuk Sound, Hudson Bay).
Gosselin, M., et al, *Canadian journal of fisheries and aquatic sciences*, May 1985, 42(5), p.999-1006, With French summary. 64 refs.
Legendre, L., Demers, S., Ingram, R.G.
Algae, Cryobiology, Marine biology, Sea ice, Solar radiation, Tides, Ecology.

45-3244
Nitrogen, phosphorus, and organic carbon cycling in an arctic lake.
Whalen, S.C., et al, *Canadian journal of fisheries and aquatic sciences*, Apr. 1985, 42(4), p.797-808, With French summary. 45 refs.
Cornwell, J.C.
Lakes, Nutrient cycle, Tundra, Ice cover effect, Plankton.

45-3245
Improved chamber for in situ measurement of primary productivity by sea ice algae.
Schrader, G.C., et al, *Canadian journal of fisheries and aquatic sciences*, Mar. 1982, 39(3), p.522-524, With French summary. 7 refs.
Horner, R., Smith, G.F.
Algae, Biomass, Cryobiology, Sea ice.

45-3246
Primary production and nutrient assimilation by natural phytoplankton of the eastern Canadian Arctic.
Harrison, W.G., et al, *Canadian journal of fisheries and aquatic sciences*, Feb. 1982, 39(2), p.335-345, With French summary. 59 refs.
Platt, T., Irwin, B.
Biomass, Plankton, Marine biology, Cryobiology, Sea ice, Canada—Baffin Bay.

45-3247
Primary productivity of the benthic microalgae in the Chukchi Sea near Barrow, Alaska.
Matheke, G.E.M., et al, *Canada. Fisheries Research Board. Journal*, Nov. 1974, 31(11), p.1779-1786, With French summary. 29 refs.
Horner, R.
Algae, Biomass, Marine biology, Cryobiology, Sea ice, United States—Alaska—Barrow.

45-3248
Small volume, short-incubation-time method for measurement of photosynthesis as a function of incident irradiance.
Lewis, M.R., et al, *Marine ecology progress series*, July 1983, 13(1), p.99-102, 24 refs.
Smith, J.C.
Algae, Photosynthesis, Marine biology.

45-3249
Hydrobiological studies in the Arctic Ocean at SP-23 (May-October 1977). [Gidrobiologicheskie issledovaniia v Severnom Ledovitom okeane na SP-23 (mai-oktiabr' 1977g.)],
Mel'nikov, I.A., et al, *Okeanologiia*, Mar.-Apr. 1978, 18(2), p.378-379, In Russian. 1 ref.
Tsinovskii, V.D.
Cryobiology, Marine biology, Ecology, Ice composition, Drift stations.

45-3250
Some data on the numbers and production of bacterioplankton in the southwestern part of the Barents Sea. [Nekotorye dannye o chislennosti i produktsii bakterioplanktona v iugo-zapadnoi chasti Barentseva moria],
Rossova, E.IA., *Okeanologiia*, Sep.-Oct. 1977, 17(5), p.878-882, In Russian with English summary. 9 refs.
Bacteria, Plankton, Microbiology, Marine biology, Ecology, Cryobiology.

45-3251
Estimation of standard error of impedance-estimated frost resistance.
Kepo, T., et al, *Scandinavian journal of forest research*, 1989, 4(1), p.67-74, 14 refs.
Lappi, J.
Plants (botany), Plant tissues, Frost resistance, Electrical measurement, Electrical resistivity, Accuracy, Damage, Temperature effects.

45-3252
Polar stratospheric clouds and ozone depletion.
Toon, O.B., et al, *Scientific American*, June 1991, 264(6), p.68-74, 3 refs.
Turco, R.P.
Polar atmospheres, Atmospheric composition, Decomposition, Clouds (meteorology), Chemical composition, Air pollution, Climatic changes, Aerosols, Solar radiation.
During the antarctic winter, strange and often invisible clouds form in the stratosphere over the pole. These clouds of ice and frozen nitric acid play a crucial role in the chemical cycle responsible for the recent appearance of the annual "ozone hole." Their chemistry removes compounds that would normally trap ozone-destroying free chlorine produced by the breakdown of CFCs. This paper describes the discovery, formation, composition and atmospheric effects of such clouds, and elaborates on their influential contribution to mechanisms of atmospheric ozone depletion over Antarctica. (Auth. mod.)

45-3253
Cryogenic heaving in conjunction with seasonal and long-term freezing of rocks.
Nevecheria, V.L., *Soviet engineering geology*, 1989, No.3, p.44-49, 8 refs. For Russian original see 43-4613.
Frost heave, Frozen rocks, Frozen ground mechanics, Active layer, Engineering geology, Soil freezing, Distribution, Geocryology.

45-3254
Thermodynamic properties of ice, water, and a mixture of the two at high pressures.
Nagornov, O.V., et al, *Journal of applied mechanics and technical physics*, Nov. 1990, 31(3), p.378-385, Translated from Zhurnal prikladnoi mekhaniki i tekhnicheskoi fiziki, 1990, No.3. 33 refs.
Chizhov, V.E.
High pressure tests, High pressure ice, Water temperature, Thermodynamic properties, Phase transformations, Ice melting, Shock waves, Thermal expansion, Temperature effects.

45-3255
Hydrobiological studies in the central Arctic Basin (Spring 1978). [Gidrobiologicheskie issledovaniia v Tsentral'nom Arkticheskom basseine (vesna 1978 g.)],
Mel'nikov, I.A., *Okeanologiia*, Nov.-Dec. 1978, 18(6), p.1132, In Russian.
Marine biology, Cryobiology, Ecology.

45-3256
Arctic slope protection methods.
Leidersdorf, C.B., et al, International Coastal Engineering Conference, 22nd, Delft, The Netherlands, July 2-6, 1990. Proceedings. Vol.2. Edited by B.L. Edge, New York, American Society of Civil Engineers, 1991, p.1687-1701, 16 refs.
Gadd, P.E., McDougal, W.G.
Slope protection, Geotextiles, Water waves, Ice solid interface, Ice loads.

45-3257
Recent performance of linked concrete mat armor under wave and ice impact.
Gadd, P.E., et al, International Coastal Engineering Conference, 22nd, Delft, The Netherlands, July 2-6, 1990. Proceedings. Vol.3. Edited by B.L. Edge, New York, American Society of Civil Engineers, 1991, p.2768-2781, 6 refs.
Leidersdorf, C.B.
Ice solid interface, Slope protection, Water waves, Ice loads, Geotextiles.

45-3258
Radar altimeter ground truth measurements in Antarctica; 90 deg South Expedition. *Earth observation quarterly*, June 1989, No.26, p.1-3.
Height finding, Radio waves, Snow cover effect, Ice cover effect, Radio echo soundings, Radar echoes, Reflectivity, Ice sheets, Mapping.

45-3259
Remote sensing of snow covers using the gamma-ray technique.
Offenbacher, E.L., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, Apr. 1991, CR 91-09, 19p., ADA-238 016, 28 refs.
Colbeck, S.C.
Remote sensing, Snow water equivalent, Snow cover, Snow surveys, Aerial surveys.
This report reviews various aspects of the use of natural gamma-ray emissions to determine the mass of snow covering the ground. The interactions of gamma rays with water mass are described, along with the various sources of gamma radiation from the ground. Different possible techniques for measuring gamma radiation are described. Each has advantages and disadvantages in obtaining the desired result. The source of error and the use of this method are described.

45-3260
Low temperature decontamination with DS2: studies with chemical agent simulants.
Parker, L.V., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, Apr. 1991, CR 91-08, 23p., ADB-156 188, 19 refs.
Walsh, M.E.
Military research, Low temperature research, Cold weather performance, Icing.
Experiments were performed to determine factors that significantly influence the efficiency of DS2 for decontamination using chemical agent simulants. Several surface types and conditions that may be encountered on a winter battlefield were tested. The three simulants used in this study were: BIS, tDEM, and DMMP. Generally, decontamination was reduced at lower temperatures. At -29 C, the DS2 was extremely viscous, and scrubbing was required to spread the DS2 evenly over the contaminated area. The presence of dirt and oil significantly reduced decontamination efficiency in the cold, while the presence of ice did not adversely affect decontamination. Following decontamination, removal of the simulant was not enhanced by rinsing surfaces with 100 C water, as opposed to 0 C water, but icing of the sample surfaces was reduced when hot water was used. As an alternative to an aqueous rinse, DS2 may be removed by wiping with a paper towel without decreasing removal efficiency. For the experiments performed on painted (alkyd and CARC) surfaces, two major differences were observed between the 22 C and -29 C tests: alkyd paint was not damaged by the DS2 at the low temperature and while decontamination efficiencies were equal on alkyd- and CARC-covered and unpainted metal surfaces at -29 C, they varied dramatically at 22 C. Based on the information available in the literature and from this study with simulants, decontamination with DS2 and a water rinse is not practical at temperatures much below -30 C. At these low temperatures, the logistics of dispensing the DS2 and rinsing it away with water become unreasonable.

45-3261
Glacier atlas of Canada.
Ommanney, C.S.L., Saskatoon, Saskatchewan, National Hydrology Research Institute, Mar. 1989, 54 leaves, 3 refs.
Glacier surveys, Maps, Glaciers, Canada.

45-3262
***Comparative life histories in the genera Calanus and Neocalanus* in high latitudes of the Northern Hemisphere.**
Conover, R.J., International Conference on Copepoda, 3rd, London, Aug. 10-14, 1987. Proceedings. Edited by G.A. Boxshall and H.K. Schminke. Biology of copepods, Dordrecht, Netherlands, Kluwer Academic Publishers, 1988, p.127-142, 59 refs. Reprinted from Hydrobiologia, 1988, Vols.167/168.
DLC QL444.C7I57
Marine biology, Cryobiology, Plankton, Sea ice, Biogeography, Ecology.

45-3263
Productivity of phytocenoses in mountain tundra of the Khibini Mountains.
Luk'ianova, L.M., et al, *Soviet journal of ecology*, Mar. 1991, 21(4), p.181-187, Translated from Ekologiia, 1990, No.4. 21 refs.
Tundra, Ecosystems, Primary productivity, Photosynthesis, Gases, Sampling, Vegetation patterns.

45-3264
Physicochemical processes in the cryolithozone.
Mel'nikov, P.I., et al, *Soviet geology and geophysics*, 1989, 30(7), p.1-6, 15 refs. For Russian original see 44-2052.
Mel'nikov, V.P., Tsarev, V.P.
Hydrates, Geocryology, Polarization (charge separation), Phase transformations, Ice water interface, Frozen ground chemistry, Minerals.

45-3265
Study of indenter friction against an ice sheet.
Igoshin, V.A., et al, *Soviet journal of friction and wear*, 1990, 11(5), p.71-74, Translated from Trenie i iznos, 1990, No.5. 5 refs.
Aitov, A.I., Egorov, E.N.
Ice solid interface, Metal ice friction, Dynamic loads, Ice cover strength, Sliding, Vehicles, Mechanical tests.

45-3266
On the ski-snow sliding mechanism.
Aparin, V.I., et al, *Soviet journal of friction and wear*, 1990, 11(4), p.57-59, Translated from Trenie i iznos, 1990, No.4. 10 refs.
Bezrukov, A.P., Dukhovskoi, E.A.
Skis, Sliding, Plastics snow friction, Water films, Ice solid interface, Snow temperature, Lubricants, Mechanical tests.

45-3267
Parameterization of broad band radiative transfer properties of water, ice and mixed clouds.
Rockel, B., et al, *Contributions to atmospheric physics*, Feb. 1991, 64(1), p.1-13, With German summary. 32 refs.
Raschke, E., Weyres, B.
Clouds (meteorology), Scattering, Radiation absorption, Albedo, Ice crystal optics, Solar radiation, Cloud droplets, Physical properties.

45-3268
Mathematical modeling of the dynamics of the edge of the ice cover in the tail race of the Krasnoyarsk hydroelectric power plant.
Belolipetskii, V.M., et al, *Soviet meteorology and hydrology*, 1990, No.9, p.78-82, Translated from Meteorologiia i gidrologiia, 1990, No.9. 13 refs.
Tugovikov, V.B.
Channels (waterways), Ice cover thickness, Ice edge, Dams, Ice formation, Thermal regime, Mathematical models, Water temperature, Polynyas.

45-3269
Dynamics of arctic ice in seasonal energy balance model of the climate with regional resolution.
Kolomeev, M.P., et al, *Soviet meteorology and hydrology*, 1990, No.8, p.22-27, Translated from Meteorologiia i gidrologiia, 1990, No.8. 25 refs.
Malyshev, S.L., Nikonov, S.A.
Ice models, Sea ice distribution, Ice cover effect, Climatic factors, Heat balance, Surface temperature, Seasonal variations.

45-3270
Engineering geology of nearshore areas off Richards Island, N.W.T.: a comparison of stable and actively eroding coastlines.
Kurfurst, P.J., et al, *Canadian geotechnical journal*, Apr. 1991, 28(2), p.179-188, With French summary. 16 refs.
Dallimore, S.R.
Littoral zone, Shore erosion, Subsea permafrost, Grounded ice, Engineering geology, Bottom sediments, Stratigraphy, Geophysical surveys, Design criteria.

45-3271
Observational evaluation of the snow breeze.
Segal, M., et al, *Monthly weather review*, Feb. 1991, 119(2), p.412-424, 14 refs.
Wind (meteorology), Snow cover effect, Boundary layer, Surface temperature, Aerial surveys, Air flow, Heat flux, Wind direction.

45-3272
Polar lows over the Gulf of Alaska in conditions of reverse shear.
Bond, N.A., et al, *Monthly weather review*, Feb. 1991, 119(2), p.551-572, 41 refs.
Shapiro, M.A.
Fronts (meteorology), Atmospheric pressure, Atmospheric circulation, Air masses, Boundary layer, Wind direction, Synoptic meteorology, Weather forecasting.

45-3273
Explanation for the existence of supercooled water at the top of cold clouds.
Rauber, R.M., et al, *Journal of the atmospheric sciences*, Apr. 15, 1991, 48(8), p.1005-1023, 50 refs.
Tokay, A.
Supercooled clouds, Cloud droplets, Ice crystal growth, Wind factors, Cloud physics, Condensation, Temperature distribution, Layers.

45-3274
Scaling and numerical model evaluation of snow-cover effects on the generation and modification of daytime mesoscale circulations.
Segal, M., et al, *Journal of the atmospheric sciences*, Apr. 15, 1991, 48(8), p.1024-1042, 43 refs.
Garratt, J.R., Pielke, R.A., Ye, Z.
Snow cover effect, Atmospheric circulation, Snow heat flux, Snow air interface, Boundary layer, Air flow, Air temperature, Mathematical models, Weather forecasting.

45-3275
Freezing stress response in woody tissues observed using low-temperature scanning electron microscopy and freeze substitution techniques.
Malone, S.R., et al, *Plant physiology*, Mar. 1991, 95(3), p.871-881, 25 refs.
Ashworth, E.N.
Plant tissues, Supercooling, Freezing, Cold tolerance, Cold stress, Scanning electron microscopy, Cold weather tests, Laboratory techniques.

45-3276
Water content during abscisic acid induced freezing in bromegrass cells.
Tanino, K., et al, *Plant physiology*, June 1990, 93(2), p.460-464, 19 refs.
Weiser, C.J., Fuchigami, L.H., Chen, T.H.H.
Grasses, Freezing, Cold tolerance, Acclimatization, Water content, Plant physiology, Cold weather tests, Temperature effects.

45-3277
West Antarctic Ice Sheet Initiative. Discipline reviews.
Bindschadler, R.A., ed, *U.S. National Aeronautics and Space Administration. Scientific and Technical Information Program. NASA conference publication*, May 1991, 2(3115), 143p., Proceedings of the workshop held at Goddard Space Flight Center, Greenbelt, MD, Oct. 16-18, 1990. Refs. passim. For individual papers see 43-3164 or F17-39661, and F-44354 through F-44359 or 45-3278 through 45-3283.
Climatic changes, Ice sheets, Low temperature research, Sea level, Antarctica—West Antarctica.
This report contains seven discipline review papers on the state of our knowledge of West Antarctica and opinions on how that knowledge must be increased to predict the future behavior of this ice sheet, and to assess its potential for collapse, rapidly raising global sea level. The papers were prepared to accompany lectures given at the second SeaRISE workshop. The purpose of the workshop was to draft a Science and Implementation Plan of what was once called SeaRISE but is now called the West Antarctic Ice Sheet Initiative (WAIS). The plan appears as Vol 1 of this proceedings series. (Auth. mod.)

45-3278
Review of precipitation-related aspects of west antarctic meteorology.
Bromwich, D.H., et al, *U.S. National Aeronautics and Space Administration. Scientific and Technical Information Program. NASA conference publication*, May 1991, 2(3115), p.1-22, Refs. p.10-15.
Carleton, A.M., Parish, T.R.
Meteorological factors, Snowfall, Ice sheets, Moisture transfer, Antarctica—West Antarctica.
An overview is presented of the factors associated with snowfall over the West Antarctic Ice Sheet. The flux of atmospheric moisture across the coast, the synoptic processes over the South Pacific Ocean, the large-scale atmospheric controls, and numerical modeling of the west antarctic environment are all discussed. Suggestions are made for research needed to substantially upgrade the status of knowledge in these closely-interrelated topic areas. (Auth.)

45-3279
Sea-level response to ice sheet evolution: an ocean perspective.
Jacobs, S.S., *U.S. National Aeronautics and Space Administration. Scientific and Technical Information Program. NASA conference publication*, May 1991, 2(3115), p.23-47, Refs. p.35-39.
Ice sheets, Mass balance, Ice water interface, Sea level, Icebergs, Calving, Antarctica—West Antarctica.
The ocean's influence upon and response to antarctic ice sheet changes is considered in relation to sea level rise over recent and future decades. Assuming present-day ice fronts are in approximate equilibrium, a preliminary budget for the ice sheet is estimated from accumulation vs. iceberg calving and the basal melting that occurs beneath floating ice shelves. Iceberg calving is derived from the volume of large bergs identified and tracked by the Navy/NOAA Joint Ice Center and from shipboard observations. Basal melting exceeds 600 cu km yr and is concentrated near the ice fronts and ice shelf grounding lines. An apparent negative mass balance for the antarctic ice sheet may result from an anomalous calving rate during the past decade, but there are large uncertainties associated with all components of the ice budget. The results from general circulation models are noted in the context of projected precipitation increases and ocean temperature changes on and near the continent. (Auth. mod.)

45-3280
Terrestrial geophysics in the SeaRISE Project.
Bentley, C.R., *U.S. National Aeronautics and Space Administration. Scientific and Technical Information Program. NASA conference publication*, May 1991, 2(3115), p.49-54.
Ice sheets, Radar echoes, Mapping, Seismic surveys, Electrical resistivity, Antarctica—West Antarctica.
The multiple purposes of radar sounding, in addition to mapping ice thickness and the surface and bedrock topography of the ice sheet -- and its specific applications to the problems of the grounded and floating parts of the West Antarctic Ice Sheet -- are described. Also considered from the same point of interest are seismic shooting, passive seismic studies, electrical resistivity, and gravity.

45-3281
Marine record of Late Quaternary glacial-interglacial fluctuations in the Ross Sea and evidence for rapid, episodic sea level change due to marine ice sheet collapse.
Anderson, J.B., *U.S. National Aeronautics and Space Administration. Scientific and Technical Information Program. NASA conference publication*, May 1991, 2(3115), p.87-100, Refs. p.107-110.
Glacial geology, Glaciation, Sea level, Ice volume, Ice sheets, Ice deformation, Antarctica—Ross Sea.
Some of the questions to be addressed by SeaRISE include: what was the configuration of the West Antarctic Ice Sheet during the last glacial maximum; what is its configuration during a glacial minimum; and has it, or any marine ice sheet, undergone episodic rapid mass wasting? This paper addresses these question in terms of what is known about the history of the marine ice sheet, specifically in the Ross Sea, and what further studies are required to resolve these problems. A second question concerns the extent to which disintegration of marine ice sheets may result in rises in sea level that are episodic in nature and extremely rapid. Evidence that rapid, episodic sea-level changes occurred during the Holocene is also reviewed. (Auth. mod.)

45-3282
Ice cores and SeaRISE—what we do (and don't) know.
Alley, R.B., *U.S. National Aeronautics and Space Administration. Scientific and Technical Information Program. NASA conference publication*, May 1991, 2(3115), p.111-130, Refs. p.123-127.
Ice sheets, Ice cores, Climatic changes, Antarctica—West Antarctica.
Ice-core analyses are needed in SeaRISE to learn what the West Antarctic Ice Sheet and other marine ice sheets were like in the past, what climate changes led to their present states, and how they behave. The major results of interest to SeaRISE from previous ice-core analyses in West Antarctica are that the end of the last ice age caused temperature and accumulation-rate increases in inland regions, leading to ice-sheet thickening followed by thinning to the present. (Auth.)

45-3283
Glacial dynamics (glaciology).
Whillans, I., *U.S. National Aeronautics and Space Administration. Scientific and Technical Information Program. NASA conference publication*, May 1991, 2(3115), p.131-143.
Sea level, Ice sheets, Mass balance, Flow rate, Antarctica—West Antarctica.
This report reviews recent results from studies of ice dynamics that relate to the objectives of the WAIS initiative. The best evidence shows that the ice sheet in West Antarctica is the most rapidly changing ice sheet on earth today. Its rate of change is much faster than most glaciologists had expected, and it is changing in a manner much more complex than foreseen. The changes have two broad causes, a delayed but ongoing response to the termination of the last glaciation about 10,000 years ago, and automatic, internally caused flow adjustments. The flow styles are listed in order of slowest to fastest speed.

45-3284
Phytoplankton communities in the Bering Sea and adjacent seas. II. Spring and summer communities in seasonally ice-covered areas.
Saito, K., et al, *Astarte*, 1978, 11(1), p.27-35, 12 refs.
Taniguchi, A.
Plankton, Cryobiology, Marine biology, Sea ice, Bering Sea.

45-3285
Nitrogenous nutrition of sea-ice microalgae.
Demers, S., et al, *Polar biology*, June 1989, 9(6), p.377-383, 44 refs.
Legendre, L., Maestrini, S.Y., Rochet, M., Ingram, R.G.
Algae, Cryobiology, Nutrient cycle, Sea ice, Marine biology, Biomass.

45-3286
Osmotic responses to hyposmotic stress in the amphipods *Gammarus wilkitzkii*, *Onisimus glacialis* and *Parathemisto libellula* from arctic waters.
Aarset, A.V., et al, *Polar biology*, June 1987, 7(4), p.189-193, 28 refs.
Aunaas, T.
Marine biology, Cryobiology, Sea ice, Ecology.

45-3287
Feeding ecology of *Pseudalibrotus (=Onismus) litoralis* Kröyer (Crustacea: Amphipoda) on the Beaufort Sea inner continental shelf.
Carey, A.G., Jr., et al, *Polar biology*, Oct. 1987, 8(1), p.29-33, 22 refs.
Boudrias, M.A.
Marine biology, Cryobiology, Sea ice, Ecology.

45-3288
Physiological adaptations to low temperature and brine exposure in the circumpolar amphipod *Gammarus wilkitzkii*.
Aarset, A.V., et al, *Polar biology*, Dec. 1987, 8(2), p.129-133, 28 refs.
Aunaas, T.
Marine biology, Cryobiology, Sea ice, Ecology, Cold tolerance.

45-3289
Effects of temperature on metabolic rates of different life stages of *Calanus glacialis* in the Barents Sea.
Tande, K.S., *Polar biology*, July 1988, 8(6), p.457-461, 25 refs.
Marine biology, Cryobiology, Sea ice, Ecology, Physiological effects.

45-3290
Analysis of oil-oxidizing and heterotrophic microflora on the coast of Eastern Murman.
Dermicheva, S.G., *Soviet journal of marine biology*, May-June 1985(Pub. Mar. 86), 11(3), p.139-143, 14 refs. Translation from Biologiia moria.
Marine biology, Microbiology, Cryobiology, Water pollution, Oil spills, Bacteria.

45-3291
Greenland ice sheet and greenhouse warming.
Huybrechts, P., et al, *Global and planetary change*, Mar. 1991, 3(4), p.399-412, 34 refs.
Letreguilly, A., Reeh, N.
Global warming, Ice sheets, Glacier melting, Climatic changes, Air temperature, Sea level, Computerized simulation, Glacier mass balance, Greenland.

45-3292
Thermoluminescence properties of fiord sediments from Engelskbutka, western Spitsbergen, Svalbard: a new tool for deciphering depositional environment?.
Forman, S.L., *Sedimentology*, Apr 1990, 37(2), p.377-384, 18 refs.
Marine deposits, Glacial deposits, Sedimentation, Littoral zone, Luminescence, Age determination, Glacier melting, Ice shelves, Photochemical reactions.

45-3293
Biophysical surface energy budget analysis of soil temperature in the boreal forests of interior Alaska.
Bonan, G.B., *Water resources research*, May 1991, 27(5), p.767-781, 79 refs.
Forest soils, Soil-air interface, Soil temperature, Thermal regime, Surface energy, Discontinuous permafrost, Climatic factors, Temperature gradients, Surface temperature.

45-3294
Climate change; implications for water and ecological resources.
Wall, G., ed, *University of Waterloo. Department of Geography. Publication series. Occasional paper,* 1990, No.11, 342p., Refs. passim. Proceedings of an International Symposium/Workshop. For selected papers see 45-3295 through 45-3302.
Sanderson, M., ed.
Climatic changes, Forest ecosystems, Global warming, Environmental impact, Carbon dioxide, Global change, Hydrology, Hydrologic cycle, Snowmelt, Lake ice, River ice.

45-3295
***Results from a 2xCO2 simulation with the* Canadian Climate Centre general circulation model.**
Boer, G.J., *University of Waterloo. Department of Geography. Publication series. Occasional paper,* 1990, No.11, p.45-49, 2 refs.
Atmospheric circulation, Global change, Global warming, Carbon dioxide, Climatic changes, Models, Sea ice.

45-3296
Potential effects of global climate change on the United States.
Smith, J.B., *University of Waterloo. Department of Geography. Publication series. Occasional paper,* 1990, No.11, p.79-123.
Global change, Climatic changes, Carbon dioxide, Global warming, Ozone, Environmental impact.

45-3297
Implications of climate change for water resources in the Great Lakes basin.
Clamen, M., *University of Waterloo. Department of Geography. Publication series. Occasional paper,* 1990, No.11, p.179-186, 4 refs.
Climatic changes, Water reserves, Global warming, Lake ice, Snowmelt, Great Lakes.

45-3298
Climate change and water supply and demand in western Canada.
Lawford, R.G., *University of Waterloo. Department of Geography. Publication series. Occasional paper,* 1990, No.11, p.193-200, 10 refs.
Climatic changes, Environmental impact, Global warming, Water supply, Hydrologic cycle, Carbon dioxide, Snowmelt.

45-3299
Climatic change and variability: the effects of an altered water regime on Great Lakes coastal wetlands.
Mortsch, L., *University of Waterloo. Department of Geography. Publication series. Occasional paper,* 1990, No.11, p.217-224, 15 refs.
Water level, Climatic changes, Global warming, Wetlands, Hydrology, Ecosystems, Snowmelt, Runoff, Ice cover, Great Lakes.

45-3300
Stochastic simulation of climate change impacts on ice road operations, MacKenzie River, Northwest Territories.
Woo, M.K., et al, *University of Waterloo. Department of Geography. Publication series. Occasional paper,* 1990, No.11, p.259-264, 6 refs.
Lonergan, S.
Climatic changes, Global warming, Ice roads, River ice, Ice cover thickness, Simulation.

45-3301
Climate change moisture stresses on northern coniferous forests.
Wein, R.W., et al, *University of Waterloo. Department of Geography. Publication series. Occasional paper,* 1990, No.11, p.285-289, 11 refs.
Hogg, E.H.
Climatic changes, Moisture, Forest ecosystems, Forest fires, Permafrost, Carbon dioxide.

45-3302
Forestry Canada's perspectives on climate change.
Hall, J.P., et al, *University of Waterloo. Department of Geography. Publication series. Occasional paper,* 1990, No.11, p.291-294.
Carlson, L.W.
Climatic changes, Forest ecosystems, Tundra.

45-3303
Temperature potential for artificial snow-making. [Potentialités thermiques de l'enneigement artificiel].
Mainguy, J., *Revue de Géographie Alpine,* 1990, 78(4), p.22-28, In French with English summary.
Snow manufacturing, Artificial snow, Humidity, Temperature effects, Air temperature, Topographic effects.

45-3304
Acidic snowmelt event in a New Jersey stream: evidence of effects on an indigenous trout population.
Stansley, W., et al, *Water, air, and soil pollution,* Oct. 1990, 53(3-4), p.227-237, 44 refs.
Cooper, G.
Streams, Snowmelt, Snow impurities, Chemical properties, Animals, Environmental impact, Water pollution, Runoff.

45-3305
Freezing-point of mixtures of H2O-16 and H2O-18.
Kiyosawa, K., *Journal of solution chemistry,* June 1991, 20(6), p.583-588, 28 refs.
Heavy water, Solutions, Freezing points, Vapor pressure, Oxygen isotopes, Chemical composition, Molecular structure, Thermodynamics.

45-3306
Overwinter soil temperature patterns under six tillage-residue combinations.
Benoit, G.R., et al, *American Society of Agricultural Engineers. Transactions,* Jan.-Feb. 1991, 34(1), p.86-90, 16 refs.
Van Sickle, K.A.
Soil temperature, Temperature control, Seasonal variations, Snow cover effect, Temperature measurement, Freeze thaw cycles, Soil microbiology, Agriculture.

45-3307
Observations of short-period ice floe accelerations during leg II of the *Polarbjörn* drift.
Martin, S., et al, *Journal of geophysical research,* June 15, 1991, 96(C6), p.10,567-10,580, 16 refs.
Drucker, R.
Sea ice, Drift, Velocity measurement, Ice floes, Pressure ridges, Ice deformation, Oceanographic surveys, Ice cover strength, Ice mechanics.

45-3308
Bio-optical model of antarctic sea ice.
Arrigo, K.R., et al, *Journal of geophysical research,* June 15, 1991, 96(C6), p.10,581-10,592, 47 refs.
Sullivan, C.W., Kremer, J.N.
Sea ice, Ice optics, Solar radiation, Radiance, Ice models, Primary productivity, Radiation absorption, Subglacial observations, Snow cover effect, Attenuation.
Biogenic particulate material in sea ice can substantially influence the spectral irradiance within the ice sheet and underlying seawater. In order to simulate accurately seasonal changes in light conditions *in situ*, the biomass changes of the sea ice microbial community must be considered. This paper attempts to provide an improved description of the optical regime within sea ice by combining information provided by models of radiative transfer in sea ice and snow and models of solar spectral irradiance with formulations describing the attenuation of spectral irradiance by particulates observed in sea ice in McMurdo Sound. Emphasis has been placed on the role of biogenic particles in visible light attenuation with the intent of developing a bio-optical model that more rigorously describes their influence on radiative transfer processes as they occur in nature. Model results simulating seasonal changes in both photosynthetically active radiation and its spectral distribution agree well with measured under-ice spectral irradiance. Results reveal how changes in microalgal concentrations, as well as their photophysiological characteristics, influence both the quantity and quality of downwelled light in sea ice and in the upper layers of the ice-covered oceans. (Auth. mod.)

45-3309
Mesoscale ocean feature study using synthetic aperture radar imagery in the Labrador Ice Margin Experiment: 1989.
Ikeda, M., et al, *Journal of geophysical research,* June 15, 1991, 96(C6), p.10,593-10,602, 18 refs.
Livingstone, C.E., Peterson, I.
Sea ice distribution, Ice edge, Drift, Detection, Radar photography, Ocean currents, Ice cover effect, Synthetic aperture radar, Airborne radar.

45-3310
Spatial variability of sea-ice properties in the northwestern Weddell Sea.
Eicken, H., et al, *Journal of geophysical research,* June 15, 1991, 96(C6), p.10,603-10,615, 38 refs.
Lange, M.A., Dieckmann, G.S.
Sea ice, Physical properties, Ice composition, Drill core analysis, Variations, Primary productivity, Ice cover thickness, Salinity, Porosity, Chlorophylls, Antarctica—Weddell Sea.
Arrays of sea-ice cores were taken from three floes in the northwestern Weddell Sea. Texture, salinity, chlorophyll *a*, and nutrient concentrations were determined in order to study the small-scale variability of these properties. Their vertical distribution patterns are similar among core samples from a specific floe. Mean salinity exhibits generally low standard deviations between cores. At specific depth levels, very high differences may occur, such as maximum salinity differences of more than 10 ppt at the top of floes. Mean chlorophyll concentrations vary up to one order of magnitude on small scales, which is as high as the regional variability exhibited by cores from the entire study area. Excepting ammonium, concentrations of nutrients vary much less than chlorophyll. Individual profiles and variability of nutrients are tied to chlorophyll concentrations. The variability of salinity and chlorophyll seem linked to the distribution of large-scale secondary pores within the ice (Auth. mod.)

45-3311
Ice motions fo[illegible] boundary layer turbulence.
DiMarzio, J.L., et al, *Journal of geophysical research* June 15, 1991, 96(C6), p.10,617-10,624, 34 refs.
Dugan, J.P., Martin, W.W.
Sea ice, Flexural strength, Wind factors, Ice deformation, Wave propagation, Turbulent boundary layer, Ice models, Surface energy, Dynamic loads, Ice air interface.

45-3312
Evaluation of second-order texture parameters for sea ice classification from radar images.
Shokr, M.E., *Journal of geophysical research,* June 15, 1991, 96(C6), p.10,625-10,640, 20 refs.
Sea ice, Synthetic aperture radar, Airborne radar, Surface structure, Radar photography, Classifications, Image processing, Resolution, Ice conditions.

45-3313
Light conditions and photosynthetic productivity of ice algal assemblages in Lake Saroma, Hokkaido.
Satoh, H., et al, *Japanese journal of phycology,* Dec. 1989, 37(4), p.274-278, With Japanese summary. 25 refs.
Yamaguchi, Y., Watanabe, K., Aruga, Y.
Algae, Photosynthesis, Cryobiology, Marine biology, Sea ice, Biomass, Japan—Hokkaido.

45-3314
Sub-ice microalgal strands in the antarctic coastal fast ice near Syowa Station.
Watanabe, K., *Japanese journal of phycology,* Sep. 1988, 36(3), p.221-229, With Japanese summary. 16 refs.
Algae, Cryobiology, Marine biology, Sea ice, Antarctica—Showa Station.
Sub-ice microalgal strands, collected in the fast ice area near Showa Station, are reported and described floristically. In mid-July, no strands were seen on the bottom of the ice. Strands 10-15 cm in length were observed hanging from the sea ice in early Nov. which grew up to 50-60 cm by early Dec. The strands were mainly pennate diatoms, especially those that form long colonies, including *Amphiprora kufferathii, Berkeleya rutilans, Nitzschia lecointei, Nitzschia stellata, Nitzschia turgiduloides,* and several species of *Nitzschia* in a section *Fragilariopsis* with a small abundance of a solitary cell species of *Navicula glaciei.* Cluster analysis performed on samples collected from a 10 m long sweep with a net under the ice suggests that the seasonal succession of the organisms composing strands from Nov. to Dec. was not significant. (Auth.)

45-3315
Primary productivity in the fast ice area near Syowa Station, Antarctica, during spring and summer 1983/84.
Satoh, H., et al, *Oceanographical Society of Japan. Journal,* Dec. 1988, 44(6), p.287-292, With Japanese summary. 23 refs.
Watanabe, K.
Biomass, Cryobiology, Fast ice, Marine biology, Algae, Antarctica—Showa Station.
In situ measurements of the primary productivity of ice algae and phytoplankton were carried out in the fast ice area near Showa Station during the austral spring and summer of 1983/84. Standing stock of ice algae reached a maximum of 45.1 mg chl *a*/sq m in late Oct. Phytoplankton standing stock attained a value of 3.57 mg chl *a* sq m in mid-Jan. Primary production of ice algae in late Oct. (7.64 mgC sq m hr) was 14 times greater than that in mid-Jan. (0.54 mgC sq m hr). Production in the water column in mid-Jan. (3.46 mgC sq m hr) was 50 times greater than that in late Oct. (0.07 mgC sq m hr). These results indicate a substantial production by ice algae in the spring and by phytoplankton in the summer period. (Auth. mod.)

45-3316
Observation of the plankton in drift ice.
Tamura, T., *Hokkaido University. Faculty of Fisheries. Bulletin,* Mar. 1951, 1(3/4), p.134-138, In Japanese with English summary. 5 refs.
Plankton, Cryobiology, Sea ice, Marine biology, Japan—Hokkaido.

45-3317
Size, age and diet of polar cod, *Boreogadus saida* (Lepechin 1773), in ice covered waters.
Lönne, O.J., et al, *Polar biology,* Jan. 1989, 9(3), p.187-191, 28 refs.
Gulliksen, B.
Marine biology, Cryobiology, Sea ice, Ecology, Animals.

45-3318
Effects of environmental variation on sinking rates of marine phytoplankton.
Culver, M.E., et al, *Journal of phycology*, June 1989, 25(2), p.262-270, 44 refs.
Smith, W.O., Jr.
Plankton, Biomass, Marine biology, Ice edge, Light effects.

45-3319
Fluorescence induction and photosynthetic responses of arctic ice algae to sample treatment and salinity.
Bates, S.S., et al, *Journal of phycology*, Dec. 1986, 22(4), p.421-429, 44 refs.
Cota, G.F.
Algae, Cryobiology, Photosynthesis, Sea ice, Salinity, Marine biology.

45-3320
Physiology of sea ice diatoms. I. Response of three polar diatoms to a simulated summer-winter transition.
Palmisano, A.C., et al, *Journal of phycology*, Dec. 1982, 18(4), p.489-498, 54 refs.
Sullivan, C.W.
Algae, Cryobiology, Marine biology, Sea ice, Cold weather survival.

45-3321
Exploratory studies on the physiology and ecology of a psychrophilic marine diatom.
Bunt, J.S., et al, *Journal of phycology*, Sep. 1966, 2(3), p.96-100, 13 refs.
Owens, O.V.H., Hoch, G.
Plankton, Cryobiology, Marine biology, Ecology, Sea ice.

45-3322
Copepods in arctic sea ice.
Grainger, E.H., et al, International Conference on Copepoda, 2nd, Ottawa, Aug. 13-17, 1984. Proceedings. Edited by G. Schriever, H.K. Schminke, and C.T. Shih. Syllogeus, No.58, Ottawa, National Museums of Canada, 1986, p.303-310, 20 refs.
Mohammed, A.A.
DLC QL444.C71157
Marine biology, Cryobiology, Plankton, Sea ice, Ecology.

45-3323
Soviet maritime arctic.
Brigham, L.W., ed, London, Belhaven Press, 1991, 336p., Refs. passim. For selected papers see 45-3324 through 45-3338.
International cooperation, Expeditions, Marine transportation, Environmental protection, Ice navigation, Legislation, Research projects, History, Military operation, Northern Sea Route, Arctic Ocean, Barents Sea, USSR—Kara Sea.

45-3324
Arctic Ocean in Russian history to 1945.
Barr, W., Soviet maritime arctic. Edited by L.W. Brigham, London, Belhaven Press, 1991, p.11-12, 44 refs.
History, Expeditions, Arctic Ocean.

45-3325
1987 expedition of the icebreaker *Sibir'* to the North Pole.
Frolov, I., Soviet maritime arctic. Edited by L.W. Brigham, London, Belhaven Press, 1991, p.33-44, 3 refs.
Expeditions, Icebreakers.

45-3326
Sea ice distribution in the Soviet arctic.
Barnett, D., Soviet maritime arctic. Edited by L.W. Brigham, London, Belhaven Press, 1991, p.47-62, 9 refs.
Sea ice distribution, Ice edge, Ice cover.

45-3327
Environmental protection in the Soviet arctic seas.
Roginko, A., Soviet maritime arctic. Edited by L.W. Brigham, London, Belhaven Press, 1991, p.63-82, 33 refs.
Environmental protection, Hydrocarbons, Water pollution, International cooperation, Legislation.

45-3328
Oil and gas resources in the offshore Soviet arctic.
Clarke, J.W., Soviet maritime arctic. Edited by L.W. Brigham, London, Belhaven Press, 1991, p.108-122, 5 refs.
Marine geology, Natural resources, Gas production, Stratigraphy, USSR—Kara Sea, Barents Sea, Arctic Ocean.

45-3329
Technical developments and the future of Soviet arctic marine transportation.
Brigham, L.W., Soviet maritime arctic. Edited by L.W. Brigham, London, Belhaven Press, 1991, p.125-139, 12 refs.
Marine transportation, Icebreakers, Ice navigation, Design.

45-3330
Management of the Northern Sea Route: stages and problems of development.
Arikainen, A.I., Soviet maritime arctic. Edited by L.W. Brigham, London, Belhaven Press, 1991, p.140-149, 4 refs.
Marine transportation, Ice navigation, Northern Sea Route.

45-3331
Northern Sea Route operations in the 1986-7 season.
Armstrong, T., Soviet maritime arctic. Edited by L.W. Brigham, London, Belhaven Press, 1991, p.150-157, 12 refs.
Marine transportation, Ice navigation, Icebreakers, Ice conditions, Northern Sea Route.

45-3332
Technical aspects of ice navigation and port construction in Soviet arctic.
Watson, G.G., Soviet maritime arctic. Edited by L.W. Brigham, London, Belhaven Press, 1991, p.158-176, 15 refs.
Ice navigation, Marine transportation, Icebreakers, Permafrost beneath structures, Ice (construction material), Ports, Construction.

45-3333
Siberian river as a transport system.
North, R.N., Soviet maritime arctic. Edited by L.W. Brigham, London, Belhaven Press, 1991, p.177-197, 36 refs.
Marine transportation, Rivers, River ice.

45-3334
Geostrategic conditions of deterrence in the Barents Sea.
Östreng, W., Soviet maritime arctic. Edited by L.W. Brigham, London, Belhaven Press, 1991, p.201-214, 15 refs.
Military operation, Submarines, Subglacial navigation, Ice conditions, Barents Sea.

45-3335
Legal regime of Soviet arctic marine areas.
Butler, W.E., Soviet maritime arctic. Edited by L.W. Brigham, London, Belhaven Press, 1991, p.215-234, 18 refs.
Legislation, Environmental protection.

45-3336
Canada-USSR Arctic Science Exchange Programme: an historical perspective of arctic cooperation.
Slipchenko, W., Soviet maritime arctic. Edited by L.W. Brigham, London, Belhaven Press, 1991, p.235-257, 14 refs.
International cooperation, History, Research projects.

45-3337
International cooperation in the Arctic: Soviet attitudes and actions.
Young, O.R., et al, Soviet maritime arctic. Edited by L.W. Brigham, London, Belhaven Press, 1991, p.258-283, 73 refs.
Osherenko, G.
International cooperation, Environmental protection, Ozone.

45-3338
Comparison of Soviet arctic and antarctic policies.
Joyner, C.C., Soviet maritime arctic. Edited by L.W. Brigham, London, Belhaven Press, 1991, p.284-299, 27 refs.
Research projects, Natural resources, Legislation, USSR, Antarctica.
Three issues lend particular insight into the Soviet government's perception of its national interest priorities for the respective poles, the evolution of policies formulated to attain those priorities, and the geostrategic importance which subsequently has become affixed to them. First, there is the Soviet Union's legal attitude towards territorial claims and sovereignty considerations in both polar regions. Second, there is the process and means of conducting scientific research activities and the respective rationale for undertaking those activities in each pole. Third, there is the package of policies formulated to deal with managing and exploiting both living and non-living natural resources in the polar regions. When taken together, these issues indicate that certain geostrategic and geopolitical objectives are implicit in the Soviet Union's disparate polar policy. The nature of those policies and the implications they pose for international relations are addressed here. (Auth.)

45-3339
Low temperature tolerance and osmotic regulation in the amphipod *Gammarus oceanicus* from Spitsbergen waters.
Aarset, A.V., et al, *Polar research*, June 1988, 6(1), p.35-41, 23 refs.
Zachariassen, K.E.
Marine biology, Cryobiology, Sea ice, Cold tolerance.

45-3340
Diver-operated electric suction sampler for sympagic (=under-ice).
Lönne, O.J., *Polar research*, June 1988, 6(1), p.135-136, 6 refs.
Marine biology, Cryobiology, Sea ice, Samplers.

45-3341
***Grazing rate and particle size selection by the choanoflagellate Diaphanoeca grandis* from the sea ice of lagoon Saroma Ko, Hokkaido.**
Marchant, H.J., NIPR Symposium on Polar Biology. Proceedings, No.3, Tokyo, National Institute of Polar Research, Mar. 1990, p.1-7, 30 refs.
Plankton, Cryobiology, Biomass, Sea ice, Ecology, Marine biology, Japan—Hokkaido.

45-3342
Variability in sterol flux in the ice-covered lagoon Saroma Ko, Hokkaido, Japan.
Sasaki, H., et al, NIPR Symposium on Polar Biology. Proceedings, No.3, Tokyo, National Institute of Polar Research, Mar. 1990, p.8-15, 19 refs.
Yamaguchi, T., Watanabe, K., Tanimura, A., Fukuchi, M.
Cryobiology, Bottom sediment, Marine biology, Suspended sediments, Sea ice, Nutrient cycle, Japan—Hokkaido.

45-3343
Photosynthetic nature of ice algae and their contribution to the primary production in lagoon Saroma Ko, Hokkaido, Japan.
Satoh, H., et al, NIPR Symposium on Polar Biology. Proceedings, No.2, Tokyo, National Institute of Polar Research, Sep. 1989, p.1-8, 26 refs.
Yamaguchi, Y., Watanabe, K., Tanimura, A., Fukuchi, M., Aruga, Y.
Algae, Cryobiology, Biomass, Photosynthesis, Marine biology, Sea ice, Ecology, Japan—Hokkaido.

45-3344
Phytoplankton bloom under sea ice recorded with a moored system in lagoon Saroma Ko, Hokkaido, Japan.
Fukuchi, M., et al, NIPR Symposium on Polar Biology. Proceedings, No.2, Tokyo, National Institute of Polar Research, Sep. 1989, p.9-15, 8 refs.
Watanabe, K., Tanimura, A., Hoshiai, T., Sasaki, H., Satoh, H., Yamaguchi, Y.
Plankton, Cryobiology, Biomass, Algae, Marine biology, Japan—Hokkaido.

45-3345
Comparison of zooplankton abundance under sea ice between NIPR net and Norpac net samplings, in lagoon Saroma Ko, Hokkaido.
Nishiyama, T., et al, NIPR Symposium on Polar Biology. Proceedings, No.1, Tokyo, National Institute of Polar Research, Dec. 1987, p.123-137, 19 refs.
Tanimura, A., Watanabe, K., Fukuchi, M., Aota, M.
Plankton, Cryobiology, Marine biology, Sea ice, Ecology, Japan—Hokkaido.

45-3346
Abundance and vertical distribution of the chaetognath *Parasagitta elegans* (Verrill) under the sea ice in Saroma Ko, a lagoon on Hokkaido, Japan.
Kotori, M., et al, NIPR Symposium on Polar Biology. Proceedings, No.1, Tokyo, National Institute of Polar Research, Dec. 1987, p.138-144, 24 refs.
Nishiyama, T., Tanimura, A., Watanabe, K.
Plankton, Cryobiology, Marine biology, Sea ice, Ecology, Japan—Hokkaido.

45-3347
Rates of photoadaptation in sea ice diatoms from McMurdo Sound, Antarctica.
Lizotte, M.P., et al, *Journal of phycology*, June 1991, 27(3), p.367-373, 42 refs.
Sullivan, C.W.
Algae, Cryobiology, Photosynthesis, Plankton, Marine biology, Sea ice, Antarctica—McMurdo Sound.
Sea ice microalgae are released from their relatively stable light environment to the water column seasonally, and any subsequent growth in a vertically mixed water column may depend, in part, on their photoadaptation rates. In this study the time course of photoadaptation in natural sea ice algal communities was followed from bottom ice and surface ice by measuring their photophysiological response to an artificial shift in the ambient irradiance field. Microalgae from under-ice habitats were incubated under full sunlight LL-HL (low light to high light) and microalgae from surface ice habitats were incubated under ar-

tificial light to mimic under-ice irradiance HL-LL (high light to low light). During 3- to 4-day time course studies, opposite shifts in chlorophyll were observed, depending on the direction of the irradiance change. First-order rate constants (k) ranged from 0.0067 to 0.29/hr for photosynthetic parameters. Rates of photoadaptation for ice algae are comparable to k values reported for temperate photoplankton, suggesting that sea ice algae may be equally capable of adapting to the light conditions experienced in a vertically mixed water column. This study presents the first evidence that sea ice microalgae are physiologically capable of adapting to a planktonic life and thus could serve as a seed population for polar marine phytoplankton blooms. (Auth. mod.)

45-3348
Light and nutrient limitation of sea-ice microalgae (Hudson Bay, Canadian Arctic).
Gosselin, M., et al, *Journal of phycology*, June 1990, 26(2), p.220-232, 123 refs.
Therriault, J.C., Legendre, L., Demers, S.
Algae, Cryobiology, Photosynthesis, Sea ice, Marine biology, Nutrient cycle, Ecology, Canada—Hudson Bay.

45-3349
Ecology of sea colony birds of the Barents Sea.
Belopol'skiĭ, L.O., Jerusalem, Israel Program for Scientific Translations, 1961, 346p., Translated from Ekologiia morskikh kolonial'nykh ptits Barentsova moria. 302 refs.
Marine biology, Ecology, Animals, Cryobiology, Sea ice.

45-3350
Microbiological investigations in the Central Arctic in 1956. [Mikrobiologicheskie issledovaniia v Tsentral'noĭ Arktike v 1956 g.],
Kriss, A.E., *Akademiia nauk SSSR. Doklady*, May-June 1957, 114(1), p.199-202, In Russian. 5 refs.
Microbiology, Ecology, Cryobiology.

45-3351
Botanical results from the voyage of the *Ermak* to the Arctic Ocean, summer 1901. IV. Microflora of the Barents Sea and adjacent seas. 1. Historical review of the microflora in the Barents Sea and adjacent seas. [Botanicheskie rezul'taty plavaniia ledokola *Ermak* v Severnom Ledovitom okeane, letom 1901 g. IV. Mikroflora Barentsova moria i ego l'dov. 1. Istoricheskiĭ obzor issledovaniĭ mikroflory Barentsova i prilegaiushchikh k nemu morei],
Palibin, I.V., *Leningrad. Botanicheskiĭ sad. Izvestiia*, June 1904, Vol.4, p.71-80, In Russian with French summary. Refs. passim.
Ecology, Marine biology, Microbiology, Plants (botany), Cryobiology, Barents Sea.

45-3352
Effect of ice on habitat conditions in the littoral zone of the White Sea. [O vliianii l'dov na usloviia obitaniia v litoral'noĭ zone Belogo moria],
Savos'kin, IU.M., *Akademiia nauk SSSR. Zoologicheskiĭ institut. Issledovaniia fauny morei*, 1967, Vol.7(15), p.197-202, In Russian. 16 refs.
Ecology, Cryobiology, Littoral zone.

45-3353
Highway deicing salts and the mobilization of selected heavy metals from stream sediments.
Cole, H.D., Kalamazoo, Western Michigan University, Aug. 1990. 126p., University Microfilms order No.9101305, Ph.D. thesis. Refs. p.116-126.
Ice removal, Sediment transport, Chemical ice prevention, Water pollution, Salting.

45-3354
Fishes of the northern seas of the U.S.S.R.
Andriiashev, A.P., Jerusalem, Israel Program for Scientific Translations, 1964, 617p., Translated from Ryby severnykh morei SSSR. Refs. passim.
Ecology, Marine biology, Animals, Cryobiology, Sea ice.

45-3355
Quantitative distribution of heterotrophic microorganisms in the Indian Ocean and adjacent antarctic seas. [Kolichestvennoe raspredelenie geterotrofnykh mikroorganizmov v Indiĭskom okeane i v prilegaiushchikh moriakh Antarktiki],
Lebedeva, M.N., *Akademiia nauk SSSR. Doklady*, 1958, 121(3), p.557-560, In Russian. 14 refs.
Marine biology, Ecology, Cryobiology, Microbiology.

45-3356
Primary production of ice algae on a seasonally-ice-covered, continental shelf.
Irwin, B.D., *Polar biology*, Feb. 1990, 10(4), p.247-254, 41 refs.
Algae, Cryobiology, Biomass, Marine biology, Sea ice, Photosynthesis, Ecology.

45-3357
Salinity tolerance and osmoregulation of the arctic marine amphipods *Onisimus litoralis* (Kroyer) and *Anonyx nugax* (Phipps).
Shea, J.R., et al, *Polar biology*, Feb. 1990, 10(4), p.275-281, 44 refs.
Percy, J.A.
Marine biology, Cryobiology, Sea ice, Salinity, Physiological effects, Ecology.

45-3358
Trophic relationships of the sea ice meiofauna in Frobisher Bay, arctic Canada.
Grainger, E.H., et al, *Polar biology*, Feb. 1990, 10(4), p.283-292, 49 refs.
Hsiao, S.I.C.
Marine biology, Cryobiology, Biomass, Ecology, Sea ice, Canada—Northwest Territories—Baffin Island.

45-3359
Sea ice diatoms (Bacillariophyceae) of the Canadian Arctic. I. The genus *Stenoaeis*.
Poulin, M., *Journal of phycology*, Mar. 1990, 26(1), p.156-167, 46 refs.
Algae, Cryobiology, Marine biology, Sea ice, Ecology.

45-3360
Diatoms in water column and sea ice in Lützow-Holm Bay, Antarctica, and their preservation in the underlying sediments.
Tanimura, Y., et al, *Tokyo. National Science Museum. Bulletin. Series C: Geology and paleontology (Kokuritsu kagaku hakubutsukan kenkyu hokoku)*, Mar. 1990, 16(1), p.15-39, 55 refs.
Fukuchi, M., Watanabe, K., Moriwaki, K.
Algae, Cryobiology, Marine biology, Sea ice, Bottom sediment, Antarctica—Lützow-Holm Bay.
Quantitative floral analyses have been performed on seawater and sea-ice samples collected from two sites near East Ongul I. in Lützow-Holm Bay. Fifty-nine diatom species and varieties belonging to 28 genera were identified in the samples. Nine species dominate the sea water assemblage: *Chaetoceros neglectum, Chaetoceros tortissimus, Fragilaria(?)* sp. a, *Nitzschia curta, Nitzschia cylindrus, Nitzschia lecointei, Nitzschia turgiduloides, Nitzschia vanheurckii* and *Porosira pseudodenticulata*. High abundance of the following 10 species characterize the sea-ice assemblage; *Berkeleya* sp. a, *Eucampia balaustium, Nitzschia closterium, Nitzschia curta, Nitzschia cylindrus, Nitzschia lecointeri, Nitzschia stellata, Nitzschia turgiduloides, Pinnularia quadratarea, Pleurosigma* sp. a, *Rhizosolenia alata* and *Tropidoneis* sp. a. Flora composition of the seawater and sea-ice samples are reflected in those of the underlying surface sediments of the bay, while diatoms with poorly silicified valves are less common in the sediment flora compared to the water column and/or sea-ice floras. Two important species associated with sea-ice and the underlying water, *N. curta* and *N. cylindrus*, occur commonly in the sediments after allowing for dissolution, and the predominance of these two forms may be a good indicator of the environment covered and/or strongly influenced by sea-ice. Other corrosion resistant ice forms, resting spore of *Eucampia balaustium* and *Pinnularia quadratarea*, have also been discriminated as supplementary guide taxa for near ice environment. (Auth.)

45-3361
Heterotrophic activity and bacterial productivity in assemblages of microbes from sea ice in the high Arctic.
Smith, R.E.H., et al, *Polar biology*, May 1990, 10(5), p.351-357, 43 refs.
Clement, P.
Bacteria, Cryobiology, Biomass, Marine biology, Sea ice, Ecology, Microbiology.

45-3362
Measuring the heat of sublimation of dry ice with a polystyrene foam cup calorimeter.
Burgstahler, A.W., et al, *Journal of chemical education*, Apr. 1991, 68(4), p.332-333, 7 refs.
Bricker, C.E.
Dry ice (trademark), Cryogenics, Ice sublimation, Temperature measurement, Education, Experimentation, Carbon dioxide.

45-3363
Tailings management in the Canadian Arctic: Echo Bay's Lupin Mine.
Wilson, H.R., *Mining engineer*, Feb. 1991, 43(2), p.213-214, For another version see 45-341.
Tailings, Waste treatment, Placer mining, Environmental protection, Cold weather operation.

45-3364
Unsteady heat and mass transfer with phase changes in an insulation slab: frosting effects.
Tao, Y.X., et al, *International journal of heat and mass transfer*, July 1991, 34(7), p.1593-1603, With French, German and Russian summaries. 11 refs.
Besant, R.W., Rezkallah, K.S.
Insulation, Porous materials, Ice formation, Phase transformations, Heat transfer, Frost, Freezing front, Thermal conductivity, Moisture transfer.

45-3365
Holographic interferometry experiments on the growth of ice from a horizontal pipe.
Spatz, T.L., et al, *International journal of heat and mass transfer*, July 1991, 34(7), p.1847-1859, With French, German and Russian summaries. 22 refs.
Poulikakos, D.
Pipes (tubes), Ice growth, Holography, Heat transfer, Liquid solid interfaces, Surface temperature, Temperature gradients, Solidification.

45-3366
Infrared transmission through cirrus clouds: a radiative model for target detection.
Liou, K.N., et al, *Applied optics*, May 1, 1990, 29(13), p.1886-1896, 11 refs.
Infrared radiation, Remote sensing, Light transmission, Clouds (meteorology), Ice crystal optics, Attenuation, Radiance, Mathematical models, Scattering, Detection.

45-3367
Seasonal frost mounds.
Pollard, W.H., *Canadian geographer*, 1991, 35(2), p.214-218, 13 refs. For another version see 43-328.
Landforms, Frost mounds, Classifications, Ice structure, Permafrost hydrology, Seasonal variations, Ground water, Frozen ground mechanics.

45-3368
On the algae found during the Arctic Expedition.
Dickie, G., *Linnean Society of London. Journal. Botany*, July 31, 1880, 17(98), 6-12.
DLC QH1.L53
Algae, Cryobiology, Marine biology, Sea ice.

45-3369
Development of ice periphyton of the Amur River under different light conditions. [Razvitie ledovogo perifitona r. Amur v sviazi so svetovym faktorom],
IUr'ev, D.N., et al, *Botanicheskiĭ zhurnal*, Nov. 1988, 73(11), p.1546-1551, In Russian. 27 refs.
Lebedev, IU.M.
River ice, Marine biology, Cryobiology, Ecology, Ecosystems, Light effects, Microbiology, Algae.

45-3370
Geographical regularities in the distribution of a microbial population (heterotrophic organisms) in the world ocean. [Geograficheskie zakonomernosti raspredeleniia mikrobnogo naseleniia (geterotrofov) v Mirovom okeane],
Kriss, A.E., et al, *Akademiia nauk SSSR. Izvestiia. Seriia geograficheskaia*, Sep.-Oct. 1960, No.5, p.34-41, In Russian. 8 refs.
Ecology, Marine biology, Cryobiology, Microbiology, Distribution.

45-3371
Biological seasons in the plankton of different seas.
Bogorov, B.G., *Akademiia nauk SSSR. Comptes rendus (Doklady). Nouvelle série*, 1941, 31(4), p.404-407, 22 refs.
Marine biology, Cryobiology, Ecology, Plankton.

45-3372
Late austral spring diatom distribution between New Zealand and the Ross Ice Shelf, Antarctica: hydrographic and sediment correlations.
Burckle, L.H., et al, *Micropaleontology*, 1987, 33(1), p.74-81, Refs. p.80-81.
Jacobs, S.S., McLaughlin, R.B.
Algae, Ice cover effect, Sea ice distribution, Ice shelves, Polar regions, Antarctica—Ross Ice Shelf.
Six diatom assemblages were identified in 10 surface water samples taken along a north-south track in Dec. 1976, between New Zealand and the Ross Ice Shelf. These were further divided into two groups, whose boundary is approximately marked by: the 0 C sea surface isotherm; a surface salinity minimum; the northward limit of high-silicate surface water; and the presence of sea-ice to the south. The northern group (two assemblages) is characterized by open ocean forms while the southern group (four assemblages) is characterized by ice-edge and near-ice forms. Diatom abundance along this track appears to be dictated by temperature and nutrients and the damping effects of sea-ice on surface water productivity. Other factors, such as differing nutrient concentrations and proportions and water column stability, are also considered. A number of surface water assemblages could also be observed in the underlying surface sediments after allowing for dissolution in the water column and the homogenizing effects of deep and bottom water currents. (Auth. mod.)

45-3373
Investigations of a winter mountain storm in Utah. Part 3: single-Doppler radar measurements of turbulence.
Campistron, B., et al, *Journal of the atmospheric sciences*, May 15, 1991, 48(10), p.1306-1318, 17 refs.
Huggins, A.W., Long, A.B.
Snowstorms, Fronts (meteorology), Air flow, Turbulent flow, Radar echoes, Topographic effects, Winter, Turbulent boundary layer, Meteorological data.

45-3374
Freezing point depressions of dilute potassium chloride solutions.
Partanen, J.I., *Acta Chemica Scandinavica*, Apr. 1990, 44(4), p.317-320, 26 refs.
Solutions, Freezing points, Temperature measurement, Accuracy, Forecasting, Temperature effects, Analysis (mathematics).

45-3375
Polycyclic aromatic and organochlorine compounds in the atmosphere of northern Ellesmere Island, Canada.
Patton, G.W., et al, *Journal of geophysical research*, June 20, 1991, 96(D6), p.10,867-10,877. Refs. p.10,875-10,877.
Walla, M.D., Bidleman, T.F., Barrie, L.A.
Polar atmospheres, Air pollution, Aerosols, Sampling, Atmospheric composition, Chemical analysis, Hydrocarbons, Canada—Northwest Territories—Ellesmere Island.

45-3376
Model simulation of chemical depletion of arctic ozone during the winter of 1989.
McConnell, J.C., et al, *Journal of geophysical research*, June 20, 1991, 96(D6), p.10,923-10,930, 39 refs.
Evans, W.F.J., Templeton, E.M.J.
Polar atmospheres, Ozone, Atmospheric composition, Air pollution, Decomposition, Atmospheric density, Chemical analysis, Chemical properties, Photochemical reactions, Simulation.

45-3377
Ozone trend in the Northern Hemisphere: a numerical study.
Pitari, G., et al, *Journal of geophysical research*, June 20, 1991, 96(D6), p.10,931-10,940, 44 refs.
Visconti, G.
Polar atmospheres, Ozone, Atmospheric circulation, Atmospheric composition, Chemical properties, Atmospheric density, Decomposition, Mathematical models, Air temperature, Chemical analysis, Photochemical reactions.

45-3378
Effect of liquid water on thunderstorm charging.
Saunders, C.P.R., et al, *Journal of geophysical research*, June 20, 1991, 96(D6), p.11,007-11,017, 62 refs.
Keith, W.D., Mitzeva, R.P.
Thunderstorms, Snow pellets, Cloud electrification, Charge transfer, Cloud droplets, Ice surface, Cloud physics, Water content, Polarization (charge separation).

45-3379
Acoustic propagation in the western Greenland Sea frontal zone.
Mellberg, L.E., et al, *Acoustical Society of America. Journal*, May 1991, 89(5), p.2144-2156, 21 refs.
Underwater acoustics, Ocean currents, Wave propagation, Ice cover effect, Ice edge, Sound transmission, Oceanography, Acoustic measurement, Water temperature.

45-3380
Acoustical radiation from thermally stressed sea ice.
Xie, Y., et al, *Acoustical Society of America. Journal*, May 1991, 89(5), p.2215-2231, 17 refs.
Farmer, D.M.
Sea ice, Thermal stresses, Ice cracks, Ice acoustics, Cracking (fracturing), Acoustic measurement, Wave propagation, Air temperature, Synthetic aperture radar, Analysis (mathematics), Detection.

45-3381
Model for the complex permittivity of ice at frequencies below 1 THz.
Hufford, G., *International journal of infrared and millimeter waves*, July 1991, 12(7), p.677-682, 15 refs.
Ice electrical properties, Dielectric properties, Radio waves, Radiation absorption, Wave propagation, Polarization (charge separation), Analysis (mathematics), Temperature effects, Telecommunications.

45-3382
Mathematical model for river ice processes.
Lal, A.M.W., et al, *Journal of hydraulic engineering*, July 1991, 117(7), p.851-867, 22 refs. For another version see 44-970.
Shen, H.T.
River ice, River flow, Ice formation, Ice cover effect, Mathematical models, Hydraulics, Ice jams, Snow cover effect, Computerized simulation.

45-3383
Response of an Alaskan wetland to nutrient enrichment.
Sanville, W., *Aquatic botany*, Mar. 1988, Vol.30, p.231-243, PB89-103543, 15 refs.
Swamps, Nutrient cycle, Sewage treatment, Plant ecology.

45-3384
Physiology of sea ice diatoms. II. Dark survival of three polar diatoms.
Palmisano, A.C., et al, *Canadian journal of microbiology*, Jan. 1983, 29(1), p.157-160, With French summary. 24 refs.
Sullivan, C.W.
DLC QR1.C25
Algae, Cryobiology, Marine biology, Sea ice, Photosynthesis.

45-3385
Association of an ice-nucleating pseudomonad with cultures of the marine dinoflagellate, Heterocapsa niei.
Fall, R., et al, *Journal of marine research*, Feb. 1985, 43(1), p.257-265, 29 refs.
Schnell, R.C.
DLC GC1.J6
Bacteria, Organic nuclei, Marine biology, Ice nuclei, Nucleation.

45-3386
High-latitude phytoplankton.
Allen, M.B., *Annual review of ecology and systematics*, 1971, Vol.2, p.261-276, 71 refs.
DLC QH540.A53
Plankton, Cryobiology, Marine biology, Sea ice, Ecology.

45-3387
Exchange of energy, nitrogen and phosphorus between water, bottom and ice in a near-shore ecosystem of the Sea of Japan.
Propp, M.V., *Helgoländer wissenschaftliche Meeresuntersuchungen*, Aug. 1977, 30(1-4), p.598-610, 25 refs.
DLC QH301.H4
Nutrient cycle, Marine biology, Cryobiology, Sea ice, Ecology.

45-3388
Planktological and hydrographic-chemical investigations in the Eckernförder Bucht (western Baltic Sea) during and after the ice covering in the extreme cold winter of 1962/1963. [Planktologische und hydrographisch-chemische Untersuchungen in der Eckernförder Bucht (westliche Ostsee) während und nach der Vereisung im extrem kalten Winter 1962/1963].
Hickel, W., *Helgoländer wissenschaftliche Meeresuntersuchungen*, May 1969, 19(2), p.318-331, In German with English summary. 22 refs.
DLC QH301.H4
Plankton, Cryobiology, Marine biology, Sea ice, Baltic Sea.

45-3389
Comparative characteristics of some ecosystems of the upper regions of the shelf in tropical, temperate and arctic waters.
Golikov, A.N., et al, *Helgoländer wissenschaftliche Meeresuntersuchungen*, Mar. 1973, 24(1-4), p.219-234, With German summary. 15 refs.
Skarlato, O.A.
DLC QH301.H4
Marine biology, Cryobiology, Sea ice, Ecology, Biogeography.

45-3390
Can plankton production proceed during winter darkness in subarctic lakes.
Rodhe, W., *International Association of Theoretical and Applied Limnology. Proceedings (Internationale Vereinigung für Theoretische und Angewandte Limnologie. Verhandlungen)*, Aug. 1953(Pub. 1955), Vol.12, p.117-122, 2 refs.
DLC QH98.I5
Plankton, Cryobiology, Lakes, Photosynthesis.

45-3391
Ecological bases for controlling the productivity of agrophytocenoses in the eastern European tundra. [Ekologicheskie osnovy upravleniia produktivnost'iu agrofitotsenozov Vostochnoevropeiskoĭ tundry],
Archegova, I.B., ed, Leningrad, Nauka, 1991, 152p., In Russian. Refs. p.146-152.
Getsen, M.V., ed.
Tundra, Plant ecology, Vegetation, Meadow soils, Ecosystems.

45-3392
Numerical estimation of 10,000 years later equilibrium ice sheet profile in the Shirase Glacier drainage basin, East Antarctica.
Fujita, S., et al, *Antarctic record*, Mar. 1991, 35(1), p.12-29, 22 refs.
Ikeda, N., Azuma, N., Hondoh, T., Mae, S.
Glacier mass balance, Drainage, Sliding, Ice models, Glacier thickness, Antarctica—Shirase Glacier.
Recent observations show that the ice sheet in the Shirase Glacier drainage basin is thinning. If the observed thinning is assumed to be a transitional process in which the ice sheet is adjusting to the present climate, an equilibrium ice sheet profile which adjusts to the present climate would provide information for understanding the present behavior of the ice sheet. The equilibrium ice sheet profile was estimated by using a three-dimensional non-steady state ice sheet model. Results of the calculation showed that an almost stationary state of the ice sheet was achieved after 10,000 model years when started from the present profile of the ice sheet. The equilibrium ice sheet profile depended on bedrock topography and tested parameters sensitively, but the calculations indicated that ice thickness tends to decrease in the middle-stream region in general. It was also revealed that the ice sheet in the vicinity of the Yamato Mountains was relatively stable even if the parameters were changed. (Auth. mod.)

45-3393
Estimates of primary production by ice algae and phytoplankton in the coastal ice-covered area near Syowa Station, Antarctica.
Satoh, H., et al, *Antarctic record*, Mar. 1991, 35(1), p.30-38, Refs. p.37-38.
Watanabe, K., Hoshiai, T.
Algae, Biomass, Ice cover effect, Ice cover thickness, Solar radiation, Attenuation, Antarctica—Showa Station.
Annual primary production of ice algae and phytoplankton under fast ice near Showa Station was estimated. Mean daily production from Feb. 1983 to Jan. 1984 was calculated with a mathematical model based on measured parameters of solar radiation, day length, attenuation coefficients of snow, ice and water, chlorophyll *a* standing stock, quantum yield for photosynthesis etc. Relative light intensity estimated at the bottom of sea ice during the year ranged from 0.1 to 6.5% of incident solar radiation, due to attenuation by snow and ice. Maximum daily production of ice algae (34 mgC/sq m/d) and phytoplankton (450 mgC/sq m/d) was reached in Dec. and in Feb., respectively. The estimated annual production of ice algae and phytoplankton was 3.5 and 17 gC/sq m, respectively. These results indicate that summer phytoplankton production contributed remarkably to the primary production in the coastal ice-covered area near Showa Station. (Auth. mod.)

45-3394
Oxygen isotope profiles of deposited snow in different depositional environments of the antarctic ice sheet.
Ageta, Y., et al, *Antarctic record*, Mar. 1991, 35(1), p.39-46, In Japanese with English summary. 9 refs.
Kamiyama, K., Narita, H., Satow, K.
Snow composition, Oxygen isotopes, Snow air interface, Temperature effects, Wind erosion, Antarctica—Mizuho Station.
Vertical profiles of oxygen isotopic contents in deposited snow were obtained in the region where katabatic winds prevail. Mizuho Station, the inland dome-like plateau, and the transitional zone between them. At Mizuho Station, the deltaO-18 contents have high values around the hiatus layers. However, synchronous relations cannot be found between the neighboring profiles, since snow was exchanged due to deposition and erosion by strong winds. Inter-annual variations of oxygen isotopic contents in snow have been preserved best in the inner parts of the ice sheet. The profile at the plateau has good correlation with the inter-annual variation of summer temperature at 5000 gpm above the South Pole. This result suggests that the temperature at this level above the South Pole is representative of air temperature conditions over the inland ice sheet, and the meteorological conditions in summer have a strong effect on the transition of the oxygen isotopic content of snow after deposition due to evaporation-sublimation. (Auth. mod.)

45-3395
Dirt bands in the bare ice area around the Sör Rondane Mountains in Queen Maud Land, Antarctica.
Naraoka, H., et al, *Antarctic record*, Mar. 1991, 35(1), p.47-55, In Japanese with English summary. 11 refs.
Yanai, K., Fujita, S.
Volcanic ash, Ice sheets, Antarctica—Sör Rondane Mountains.
Dirt bands were observed on the surface of the bare ice fields around the Sör Rondane Mountains during the search for antarctic meteorites in 1988-1989. Dirt bands were commonly distributed on the bare ice around the mountains, especially in Nansenisen. Dirt bands were collected and filtered after melting. Microscopic observation revealed that dust materials were composed mainly of volcanic glass shards. Five types of volcanic ash were preliminarily clarified with respect to the colors (black, dark gray, gray, reddish brown and pale gray) and sizes (5-50 microns) of the particles. The EPMA chemical analyses indicated that the volcanic glass shards contained 50-70% SiO2 and belonged to the non-alkaline region of the SiO2-(Na2O + K2O) diagram. (Auth.)

45-3396
Three-dimensional topographic and gravity anomaly maps in the vicinity of Mizuho Plateau, East Antarctica.
Nagao, T., et al, *Antarctic record,* Mar. 1991, 35(1), p.56-69, In Japanese with English summary. 24 refs.
Awara, M., Kaminuma, K.
Subglacial observations, Gravity anomalies, Ice cover thickness, Mapping, Antarctica—Showa Station, Antarctica—Mizuho Plateau.
A re-compilation of gravity data around Showa Station was made to obtain three-dimensional contour maps of gravity anomalies and of ice sheet and bedrock topography. All gravity anomalies were re-calculated using the geoid height. The results are as follows: accuracy of gravity value determination is within 3 mgal; accuracy of free air anomaly is about 10 mgal; the result of bedrock elevation determination observed with radio echo sounding and that estimated from gravity data show good coincidence. However, a detailed comparison reveals many local discrepancies between the two results. Accurate determination of bedrock topography is one of the most significant factors for understanding the region. (Auth. mod.)

45-3397
Status report for the development of the antarctic penetrator: No.1. 1989-year program.
Shibuya, K., et al, *Antarctic record,* Mar. 1991, 35(1), p.92-117, In Japanese with English summary. 15 refs.
Experimentation, Penetration tests, Seismic surveys, Data transmission, Antarctica—Sör Rondane Mountains, Antarctica—Asuka Station.
The development of the antarctic penetrator, applicable to future seismic explosion experiments in the Sör Rondane Mountains region, is discussed. The planned observation system consists of the expendable ground system segment (GSS: penetrator) and the data collection segment (DCS) on the helicopter. In the 1989 program, 6 vertical-component seismometers (type V241-M), were made, and shock tests (acceleration ranging from -5000 G to 5000 G) were conducted. The sensors were proven to suffer no damage, with negligible change of the frequency characteristics. An IFP (Instantaneous Floating Point) amplifier and the digital recording program were designed, and the laboratory experiments with the above seismometers were made. Shock tests of the electronics parts such as quartz oscillator circuit, chemical battery, CPU, ROM, etc. were made to select appropriate units and to obtain the know-how of potting. Dummy penetrators were deployed from the hovering helicopter (AS 350B) 600 m above the glazed snow surface around Asuka Station; the parameter value of snow hardness was obtained. The telemetry method and the necessary commands for data acquisition and system diagnostics were examined. Direct transmitting VHF waves with 4-valued FM coded data may be applied as an aerial link. (Auth. mod.)

45-3398
Core processing, analysis and transportation procedures at Site J, Greenland (JAGE-89).
Shoji, H., et al, *Antarctic record,* Mar. 1991, 35(1), p.129-141, In Japanese with English summary. 7 refs.
Narita, H., Kamiyama, K.
Ice cores, Ice physics, Electrical resistivity, Ice composition, Drill core analysis, Transportation, Greenland.

45-3399
Mechanism of expansion of concrete aggregate due to frost action.
Rusin, Z., *Cement and concrete research,* July 1991, 21(4), p.614-624, 13 refs.
Concrete aggregates, Concrete freezing, Frost action, Thermal expansion, Damage, Water pressure, Resins, Temperature effects.

45-3400
Approximate predictions of ice accretion along conductors of finite torsional stiffness and control of rotation using counterweights.
Skelton, P.L.I., et al, *International journal for numerical methods in engineering,* Oct. 5, 1990, 30(5), p.965-980, 12 refs.
Poots, G.
Transmission lines, Ice accretion, Ice loads, Stability, Countermeasures, Ice forecasting, Mathematical models, Mechanical properties.

45-3401
Cryogenic properties of soils and rocks: 1. Anomalous behaviour of water.
Quinn, F.X., et al, *Géotechnique,* June 1991, 41(2), p.195-209, With French summary. 30 refs.
Geocryology, Rock properties, Cryogenics, Underground storage, Soil freezing, Unfrozen water content, Hygroscopic water, Nuclear magnetic resonance, Design criteria, Liquified gases, Frozen ground mechanics, Subsurface structures.

45-3402
***Cryogenic properties of soils and rocks: 2.* The influence of water types on the uniaxial mechanical behaviour of clays.**
Unsworth, J.F., et al, *Géotechnique,* June 1991, 41(2), p.211-225, With French summary. 25 refs.
Sheppard, R.P.
Geocryology, Cryogenics, Clays, Underground storage, Hygroscopic water, Unfrozen water content, Frozen ground mechanics, Soil freezing, Design criteria, Liquified gases, Subsurface structures.

45-3403
Freezing point depression of dilute aqueous sodium chloride solutions.
Partanen, J.I., et al, *Acta Chemica Scandinavica,* Feb. 1991, 45(2), p.172-176, 19 refs.
Lindström, M.J.
Solutions, Freezing points, Forecasting, Standards, Accuracy, Temperature measurement, Salt water, Analysis (mathematics).

45-3404
Marine diatoms from East Greenland. [Marine diatoméer fra Östgrönland],
Östrup, E., *Meddelelser om Grönland,* 1896, Vol.18, p.395-476, In Danish. 25 refs.
DLC Q115.D39
Algae, Marine biology, Cryobiology, Plankton, Greenland.

45-3405
Benthic marine diatoms.
Round, F.E., *Oceanography and marine biology. Annual review,* 1971, Vol.9, p.83-139, Refs. p.130-139.
DLC GC1.O32
Algae, Marine biology, Cryobiology, Sea ice, Biogeography.

45-3406
Phytoplankton studies. 1. *Nitzschia frigida* Grun., an arctic-inner-Baltic diatom found in Danish waters.
Gröntved, J., *Det Kongelige Danske Videnskabernes Selskab. Biologiske meddelelser,* 1950, 18(12), 19p., 35 refs.
DLC AS281.D212
Algae, Marine biology, Cryobiology, Sea ice, Plankton, Biogeography.

45-3407
Observation on young specimens of *Ammodytes dubius.*
Holmquist, C., *Meddelelser om Grönland,* 1958, 159(2), p.10-14, 4 refs.
DLC Q115.D39
Marine biology, Cryobiology, Sea ice, Animals, Greenland.

45-3408
On the food of seals in the Canadian eastern Arctic.
Dunbar, M.J., *Canadian journal of research. Section D,* May 1941, 19(5), p.150-155, 13 refs.
DLC QL1.N1532
Marine biology, Cryobiology, Sea ice, Biogeography, Ecology.

45-3409
Ice scavenging and nucleation: two mechanisms for incorporation of algae into newly-forming sea ice.
Ackley, S.F., *Eos. American Geophysical Union. Transactions,* Jan. 19, 1982, 63(3), MP 2886, p.54-55, Abstract only.
Algae, Cryobiology, Sea ice, Scavenging, Nucleation, Marine biology.

45-3410
Algal and foram incorporation into new sea ice.
Ackley, S.F., et al, *Eos. American Geophysical Union. Transactions,* Dec. 15, 1987, 68(50), MP 2887, p.1736, Abstract only.
Dieckmann, C., Shen, H.
Algae, Cryobiology, Marine biology, Sea ice.

45-3411
Ecological aspects of developing oil and gas resources in non-Soviet arctic regions. [Ekologicheskie aspekty osvoeniia neftegazovykh resursov v zarubezhnykh arkticheskikh raĭonakh],
Epifanov, A.A., et al, Resursy nefty i gaza i effektivnoe ikh osvoenie (Oil and gas resources and their effective development). Edited by E.M. Khalimov, V.I. Azamatov, and IU.N. Baturin, Moscow, Institut geologii i razrabotki goriuchikh iskopaemykh, 1990, p.150-160, In Russian. 13 refs.
Nesterov, V.A.
Gas production, Natural resources, Petroleum industry, Environmental impact, Environmental protection.

45-3412
Upper limit for sea ice albedo feedback contribution to global warming.
Covey, C., et al, *Journal of geophysical research,* May 20, 1991, 96(D5), p.9169-9174, 20 refs.
Taylor, K.E., Dickinson, R.E.
Sea ice, Albedo, Global warming, Mathematical models, Carbon dioxide.

45-3413
Simulations of continental ice sheet growth over the last glacial-interglacial cycle: experiments with a one-level seasonal energy balance model including realistic geography.
Deblonde, G., et al, *Journal of geophysical research,* May 20, 1991, 96(D5), p.9189-9215, Refs. p.9213-9215.
Peltier, W.R.
Mathematical models, Simulation, Sea ice distribution, Ice models, Ice sheets, Pleistocene, Ice growth, Heat balance.

45-3414
Climate model comparison of Gondwanan and Laurentide glaciations.
Crowley, T.J., et al, *Journal of geophysical research,* May 20, 1991, 96(D5), p.9217-9226, Refs. p.9225-9226.
Baum, S.K., Hyde, W.T.
Paleoclimatology, Glaciation, Ice cover thickness, Climatic factors, Simulation, Ice sheets.
Geologic studies indicate that the Carboniferous glaciation on Gondwanaland was approximately as extensive as the ice sheets during the Pleistocene. However, there is one major difference between the climate boundary conditions for the two ice sheets: the Gondwanan ice sheet was located on a supercontinent. Three different levels of sensitivity experiments were conducted to examine the effect of the large landmass on the magnitude of summer warming over the ice sheets. Results suggest that conditions necessary to explain Gondwanan ice sheet stability may be known, but required boundary conditions would be more extreme than in the Pleistocene. Although a number of uncertainties remain in these calculations, they help to better define critical conditions for glaciation for one of the most prolonged periods of continuous glaciation in Earth history. (Auth. mod.)

45-3415
Arctic and sub-arctic soil emissions: possible implications for global climate change.
Christensen, T., *Polar record,* July 1991, 27(162), p.205-210, Refs. p.209-210.
Cryogenic soils, Tundra, Climatic changes, Soil chemistry, Soil air interface, Atmospheric composition.

45-3416
Life in the antarctic sea ice zone.
Hempel, G., *Polar record,* July 1991, 27(162), p.249-254, 29 refs.
Sea ice, Algae, Ice cover effect, Ecology.
Seasonal ice of the southern ocean, occupying some 15 million sq km, supports a distinctive biota based on algae that live on, within, and immediately beneath the ice floes. How this annually-forming habitat recruits its biota, and the fate of the biota after the ice thaws in late summer, are little known. Studies in the Weddell Sea in 1984-88 have shown that the seasonal ice is important as the wintering substrate of krill *Euphausia superba* which, together with other zooplankton and fish, supports a large breeding population of seals and penguins. Clearly a key habitat in the economy of the southern ocean, this seasonal ice is likely to be vulnerable to small climatic changes. (Auth.)

45-3417
Hydrologic and thermal properties of the active layer in the Alaskan Arctic.
Hinzman, L.D., et al, *Cold regions science and technology,* May 1991, 19(2), p.95-110, 37 refs.
Kane, D.L., Gieck, R.E., Everett, K.R.
Active layer, Wetlands, Organic soils, Thermal regime, Water balance, Soil water migration, Permafrost hydrology, Soil temperature, Thermal conductivity.

45-3418
Thermal response of the active layer to climatic warming in a permafrost environment.
Kane, D.L., et al, *Cold regions science and technology,* May 1991, 19(2), p.111-122, 22 refs.
Hinzman, L.D., Zarling, J.P.
Active layer, Permafrost transformation, Global warming, Thermal regime, Ground thawing, Soil temperature, Forecasting, Climatic changes, Surface temperature, Mathematical models.

45-3419
Remote monitoring of thermal structure and growth of shore-fast ice off the Labrador coast.
Peterson, I., et al, *Cold regions science and technology*, May 1991, 19(2), p.123-130, 9 refs.
Smith, S.D., Prinsenberg, S., Orton, R.H.
Sea ice, Fast ice, Measuring instruments, Offshore structures, Ice heat flux, Ice growth, Ice forecasting, Ice water interface, Telemetering equipment, Monitors.

45-3420
Chaos in continuous-mode icebreaking.
Ettema, R., et al, *Cold regions science and technology*, May 1991, 19(2), p.131-144, 20 refs.
Sharifi, M.B., Georgakakos, K.P., Stern, F.
Icebreakers, Ice solid interface, Ice breaking, Mechanical tests, Mathematical models, Design criteria, Theory.

45-3421
Model for attenuating creep of frozen sand.
Domaschuk, L., et al, *Cold regions science and technology*, May 1991, 19(2), p.145-161, 8 refs.
Shields, D.H., Rahman, M.
Soil creep, Sands, Frozen ground mechanics, Deformation, Mathematical models, Soil tests, Rheology, Attenuation.

45-3422
Extreme value prediction of snow avalanche runout.
McClung, D.M., et al, *Cold regions science and technology*, May 1991, 19(2), p.163-175, 16 refs.
Mears, A.I.
Avalanche tracks, Avalanche deposits, Avalanche forecasting, Statistical analysis, Topographic effects, Analysis (Mathematics).

45-3423
Design of a high-pressure low-temperature triaxial deformation cell for ice.
Sammonds, P.R., et al, *Cold regions science and technology*, May 1991, 19(2), p.177-188, 38 refs.
Murrell, S.A.F., Rist, M.A., Butler, D.
Strain measuring instruments, Ice strength, Ice deformation, Design, Loading, Low temperature tests, Compressive properties.

45-3424
***Strain rate control during deformation* of ice: an assessment of the performance of a new servo-controlled triaxial testing system.**
Rist, M.A., et al, *Cold regions science and technology*, May 1991, 19(2), p.189-200, 17 refs.
Sammonds, P.R., Murrell, S.A.F.
Strain measuring instruments, Ice strength, Ice deformation, Design, Performance, Mechanical tests, Accuracy.

45-3425
On the shear strength of geophysical scale ice rubble.
Hopkins, M.A., et al, *Cold regions science and technology*, May 1991, 19(2), p.201-212, 9 refs.
Hibler, W.D., III.
Sea ice, Ice cover strength, Shear strength, Pack ice, Simulation, Mathematical models, Pressure ridges, Ice breaking, Rheology, Ice friction.

45-3426
New model of frost heave prediction for clayey soils.
Chen, X.B., et al, *Cold regions science and technology*, May 1991, 19(2), p.213-214, 1 ref.
Wang, Y.Q.
Clay soils, Frost heave, Forecasting, Mathematical models.

45-3427
Real permittivity of snow at 1 MHz and 0 C.
Perla, R., *Cold regions science and technology*, May 1991, 19(2), p.215-219, 14 refs.
Snow electrical properties, Dielectric properties, Electrical measurement, Microstructure, Snow water content.

45-3428
Tensile strength of cracked ice by E.M. Schulson, S.G. Hoxie, W.A. Nixon.
Parsons, B.L., *Cold regions science and technology*, May 1991, 19(2), p.221-222, 13 refs. For paper being discussed see 43-2242.
Ice strength, Ice cracks, Tensile properties, Ice creep.

45-3429
Living ice. [*Zhivoĭ led*].
Mel'nikov, I.A., *Priroda*, Jan. 1984, No.1, p.68-77, In Russian. Refs. passim.
Algae, Ecology, Marine biology, Cryobiology, Sea ice, Ice cover thickness.

45-3430
Polar cod *Boreogadus saida* (Leresn.) and its importance for certain life processes in the Arctic. [Saĭka *Boreogadus saida* (Leresn.) i ee znachenie dlia nekotorykh zhiznennykh protsessov Arktiki].
Klumov, S.K., *Akademiia nauk SSSR. Izvestiia. Seriia biologicheskaia*, 1937, No.1, p.175-188, In Russian with French summary. 24 refs.
Marine biology, Cryobiology, Ecology, Animals.

45-3431
Microorganisms as indicators of hydrological phenomena in seas and oceans. [*Mikroorganizmy* kak indikatory gidrologicheskikh iavleniĭ v moria i okeanakh].
Kriss, A.E., et al, *Zhurnal obshcheĭ biologii*, Sep.-Oct. 1958, 19(5), p.397-413, In Russian with English summary. 14 refs.
Lebedeva, M.N., Abyzov, S.S., Mitskevich, I.N.
Microbiology, Marine biology, Ecology, Cryobiology, Hydrology.

45-3432
Response of a community of ice diatoms to a salinity gradient (Hudson Bay). [Réponse d'une communauté de diatomées de glace à un gradient de salinité (baie d'Hudson)].
Poulin, M., et al, *Marine biology*, Nov. 1983, 76(2), p.191-202, In French with English summary. 40 refs.
Cardinal, A., Legendre, L.
DLC QH91.A1M35
Algae, Cryobiology, Marine biology, Salinity, Ecology, Sea ice, Canada—Hudson Bay.

45-3433
Dark survival of autotrophic, planktonic marine diatoms.
Smayda, T.J., et al, *Marine biology*, June 1974, 25(3), p.195-202, 21 refs.
Mitchell-Innes, B.
DLC QH91.A1M35
Algae, Cryobiology, Photosynthesis, Plankton, Marine biology, Ecology, Sea ice.

45-3434
Ice algae in the East Siberian Sea in May 1987. [*Vodorosli l'dov Vostochno-Sibirskogo moria v mae* 1987 g.].
Okolodkov, IU.B., *Novosti sistematiki nizshikh rasteniĭ*, 1989, Vol.26, p.36-41, In Russian. Refs. p.40-41.
Ecology, Algae, Marine biology, Cryobiology.

45-3435
Problems in Pleistocene paleogeography of the Great Kurile ridge. [Problemy paleogeografii Pleistotsena Bol'shoĭ Kuril'skoĭ griady].
Bulgakov, R.F., Aktual'nye voprosy geologii, geofiziki i biologii (materialy XVI konferentsii molodykh uchenykh IMGiG) (Current questions in geology, geophysics, and biology (Proceedings of the 16th Conference of Young Scientists of the Institute of Marine Geology and Geophysics)). Edited by V.V. Erokhov, IUzhno-Sakhalinsk, IMGiG DVO AN SSSR, 1990, p.31-40, In Russian. 23 refs.
Pleistocene, Quaternary deposits, Paleoclimatology, Terraces.

45-3436
Stratigraphy and correlation of *Quaternary deposits* in Asia and the Pacific Ocean region. [Stratigrafiia i korreliatsiia chetvertichnykh otlozheniĭ Azii i Tikhookeanskogo regiona].
Khudiakov, G.I., ed, Moscow, Nauka, 1991, 208p., In Russian. For selected papers see 45-3437 through 45-3442
Quaternary deposits, Correlation, Stratigraphy, Moraines, Pleistocene, Geocryology.

45-3437
Quaternary glaciation in the Yenisey region in Siberia: general composition of moraines and paleogeographic reconstruction. [Chetvertichnye oledeneniia prieniseĭskoĭ Sibiri: obshchiĭ sostav moren i paleogeograficheskie rekonstruktsii].
Sukhorukova, S.S., Stratigrafiia i korreliatsiia chetvertichnykh otlozheniĭ Azii i Tikhookeanskogo regiona (Stratigraphy and correlation of Quaternary deposits in Asia and the Pacific Ocean region). Edited by G.I. Khudiakov, Moscow, Nauka, 1991, p.80-84, In Russian. 3 refs.
Quaternary deposits, Glaciation, Moraines

45-3438
History of the Darkhat paleolake in light of the correlation of Pleistocene events in Asia. [Istoriia Darkhatskogo *paleoozera* v svete korreliatsii sobytiĭ pleistotsena Azii].
Lukina, N.V., Stratigrafiia i korreliatsiia chetvertichnykh otlozheniĭ Azii i Tikhookeanskogo regiona (Stratigraphy and correlation of Quaternary deposits in Asia and the Pacific Ocean region). Edited by G.I. Khudiakov, Moscow, Nauka, 1991, p.85-90, In Russian. 30 refs.
Pleistocene, Glacial lakes, Correlation.

45-3439
Principles for correlating Quaternary events in southern USSR. [*K voprosu o printsipakh korreliatsii* chetvertichnykh sobytiĭ IUga SSSR].
Sgibnev, V.V., et al, Stratigrafiia i korreliatsiia chetvertichnykh otlozheniĭ Azii i Tikhookeanskogo regiona (Stratigraphy and correlation of Quaternary deposits in Asia and the Pacific Ocean region). Edited by G.I. Khudiakov, Moscow, Nauka, 1991, p.96-100, In Russian. 14 refs.
Talipov, M.A.
Quaternary deposits, Correlation, Moraines, Glacial deposits.

45-3440
Holocene climatology-stratigraphy of the ice domes in Severnaya Zemlya. [Klimatostratigrafiia golotsena lednikovykh kupolov Severnoĭ Zemli].
Kotliakov, V.M., et al, Stratigrafiia i korreliatsiia chetvertichnykh otlozheniĭ Azii i Tikhookeanskogo regiona (Stratigraphy and correlation of Quaternary deposits in Asia and the Pacific Ocean region). Edited by G.I. Khudiakov, Moscow, Nauka, 1991, p.100-112, In Russian. 34 refs.
Nikolaev, V.I., Korotkov, I.M., Klement'ev, O.L.
Glaciers, Climatology, Stratigraphy, USSR—Severnaya Zemlya.

45-3441
Microbiological approach to paleoreconstruction of major events in the Quaternary period in the cryolithozone of the northern Pacific Ocean region. [Mikrobiologicheskiĭ podkhod k paleorekonstruktsiiam vazhneĭshikh sobytiĭ chetvertichnogo perioda v kriolitozone severnoĭ chasti Tikhookeanskogo regiona].
Gilichinskiĭ, D.A., et al, Stratigrafiia i korreliatsiia chetvertichnykh otlozheniĭ Azii i Tikhookeanskogo regiona (Stratigraphy and correlation of Quaternary deposits in Asia and the Pacific Ocean region). Edited by G.I. Khudiakov, Moscow, Nauka, 1991, p.112-116, In Russian. 2 refs.
Fedorov-Davydov, D.G., Khlebnikova, G.M., Chalkovskaia, N.R.
Quaternary deposits, Geocryology, Microbiology.

45-3442
Facial-genetic varieties of Pleistocene mictites in the paleoglacial zone of northern Western Siberia. [Fatsial'no-geneticheskie raznovidnosti pleistotsenovykh miktitov v paleogliatsiozone severa Zapadnoĭ Sibiri].
Zol'nikov, I.D., Stratigrafiia i korreliatsiia chetvertichnykh otlozheniĭ Azii i Tikhookeanskogo regiona (Stratigraphy and correlation of Quaternary deposits in Asia and the Pacific Ocean region). Edited by G.I. Khudiakov, Moscow, Nauka, 1991, p.167-173, In Russian. 28 refs.
Pleistocene, Quaternary deposits, Paleoclimatology, Moraines.

45-3443
Resolving power and accuracy of the telemetry channel of the radio echo sounding system "Meteorit-2—MARZ". [Razreshaiushchaia sposobnost' i pogreshnosti telemetricheskogo kanala sistemy radiozondirovaniia "Meteorit-2 MARZ"].
Gorbatova, E.S., et al, *Moscow Tsentral'naia aerologicheskaia observatoriia. Trudy*, 1990, Vol.168, p.42-48, In Russian with English summary 7 refs.
Zatchikov, B.P., Fridzon, M.B.
Accuracy, Radio echo soundings, Cold weather performance, Analysis (mathematics), Humidity

45-3444
Regional climate change impacts: I. Impacts on water resources.
Mimikou, M.A., et al, *Hydrological sciences journal*, June 1991, 36(3), p.247-258, With French summary 8 refs.
Kouvopoulos, Y.S.
Water reserves, Runoff forecasting, Climatic changes, Precipitation (meteorology), Snow melting, Watersheds, Snow cover effect, Global warming.

45-3445
Calculations of millimeter wave depolarization due to melting layer and rain.
Zhang, W., et al, *International journal of infrared and millimeter waves*, May 1991, 12(5), p.543-556, 13 refs.
Salonen, E., Karhu, S.
Precipitation (meteorology), Radio waves, Attenuation, Polarization (waves), Ice melting, Analysis (mathematics), Dielectric properties, Scattering.

45-3446
U.S. Army wheeled versus tracked vehicle mobility performance test program—report 2: mobility in shallow snow.
Green, C.E., et al, *U.S. Army Engineer Waterways Experiment Station. Geotechnical laboratory. Technical report*, May 1991, GL-91-7, MP 2888, 48p. + appends., 2 refs.
Blaisdell, G.L.
Snow vehicles, Models, Tracked vehicles, Performance, Traction, Snow cover effect, Mechanical tests, Military research, Military transportation, Velocity measurement, Tires, Accuracy.
This study evaluates the mobility performance of four wheeled and five tracked vehicles. Mobility tests were conducted on snow by the US Army Engineer Waterways Experiment Station and the US Army Cold Regions Research and Engineering Laboratory (CRREL) at the Keweenaw Research Center near Houghton, MI, to determine traction (drawbar pull/motion resistance), slope negotiation, GO/NOGO, braking, and traverse negotiation. *The vehicles were tested to develop fundamental* mobility relations between vehicle characteristics and snow properties, validate specific snow relations in CRREL's snow mobility model, and modify the model as necessary to improve its prediction accuracy and adapt it for use in the NATO Reference Mobility Model, Army Mobility Model, and the Condensed Army Mobility Model System.

45-3447
Nonevaporative preconcentration technique for volatile and semivolatile solutes in certain polar solvents.
Jenkins, T.F., et al, *Analytical chemistry*, July 1, 1991, 63(13), MP 2889, p.1341-1343, 11 refs.
Miyares, P.H.
Chemical analysis, Sampling, Solubility, Laboratory techniques, Salt water, Soil analysis, Soil pollution, Phase transformations.
In this paper, a simple nonevaporative preconcentration technique has been developed that is useful for miscible solvents that can be salted-out of aqueous solution. The procedure requires only the use of sodium chloride and deionized water, accurate volumetric measurements, and a magnetic stirrer. The method has been successfully demonstrated to preconcentrate both volatile and semivolatile organic solutes with a wide range of polarity. If a suitable solvent is used for extraction, this procedure gives the analyst an alternative to evaporative preconcentration. This has obvious implications for preconcentration of *thermally labile compounds*. If the preconcentrated extract is used in conjunction with purge-and-trap technology, at least an order of magnitude improvement in detection capability is possible. If the selected solvent is suitable for direct injection, analysts may be able to avoid the use of purge-and-trap technology for certain applications, thereby increasing throughput and decreasing analytical costs.

45-3448
Observations of ship performance and the structure of fast ice channels in the northern Baltic Sea.
Veitch, B., et al, *Finland. Helsinki University of Technology. Laboratory of Naval Architecture and Marine Engineering. Report*, Jan. 31, 1991, M-106, 35p., 13 refs.
Leppäranta, M., Kujala, P., Kosloff, P.
Sea ice, Ice cover effect, Ships, Channels (waterways), Performance, Ice conditions, Ice navigation, Fast ice, Marine transportation, Ice cover strength.

45-3449
Review of ship-ice interaction mechanics. Report from Finnish-Canadian Joint Research Project No.5: "Ship Interaction with Actual Ice Conditions." Interim report on Task 1A.
Daley, C., et al, *Finland. Helsinki University of Technology. Laboratory of Naval Architecture and Marine Engineering. Report*, Feb. 14, 1991, M-102, 121p., Refs. p.100-120.
Riska, K.
Ships, Icebreakers, Ice navigation, Sea ice, Ice solid interface, Ice conditions, Ice mechanics, Ice breaking, Impact, Ice edge, Ice cover strength.

45-3450
Ecological role of bacteria in detritus and aggregates in the southwest Pacific Ocean. [Ekologicheskaia rol' bakterii na detrite i v agregatakh v vodakh iugo-zapadnot chasti Tikhogo okeana].
Sazhin, A.F., et al, *Zhurnal obshchei biologii*, Sep.-Oct. 1989, 50(5), p.682-692, In Russian with English summary. 24 refs.
Kopylov, A.I.
Bacteria, Plankton, Microbiology, Marine biology, Cryobiology, Ecology, Aggregates.
The abundance of bacteria on detritus and aggregates changes significantly in the southwest of the Pacific Ocean on the border between antarctic, subantarctic, and subtropic waters. The share of associated bacteria increases from 1.4% total mass of bacterioplankton in the Antarctic to 3.6-4.6% in subantarctic and to 5.6% in subtropic waters. Maximal values of numbers and biomass of detrite-associated and aggregated bacteria are observed in border areas of different communities (10-30% total biomass). (Auth. mod.)

45-3451
Recent progress in snow and ice research.
Richter-Menge, J.A., et al, *Reviews of geophysics. Supplement*, Apr. 1991, MP 2890, p.218-226, Refs. p.222-226.
Colbeck, S.C., Jezek, K.C.
Ice sheets, Ice mechanics, Snow cover, Research projects, Bibliographies.
Snow and ice research during the past quadrennial covers a wide range of topics varying from the climatic effects of large ice sheets and sea ice covers to applied problems such as the icing of power lines and communication facilities. This review focuses in more detail on three topics of the many subjects investigated to provide a more coherent look at the advances achieved and prospects for the future. These are: the influences of layers in seasonal snow covers; research in ice mechanics on freshwater and sea ice; and remote sensing of polar ice sheets. These topics provide useful examples of the general needs in snow and ice research applicable to most areas, e.g. better representation in models of detailed processes, carefully controlled laboratory experiments to quantify processes, and field studies to provide the appropriate context for interpretation of processes from remote sensing.

45-3452
Heat and mass transfer in frozen porous media.
Van Loon, W.K.P., Wageningen, Netherlands, Agricultural University, 1991, 204p., Ph.D. thesis. 119 refs.
Heat transfer, Mass transfer, Soil freezing, Frost heave, Ice lenses, Porous materials, Unfrozen water content, Analysis (mathematics).

45-3453
Finnish building; construction technology developed for cold climates. Espoo, Finland, Technical Research Centre, 1991, 219p.
Cold weather construction, Municipal engineering.

45-3454
Ship propulsion/ice interaction study; Robert *Lemeur versus Jarvsaar comparison.*
Keinonen, A.J., et al, *Transport Canada. Report*, Jan. 1988, TP 8904E, 123p., With French summary. 8 refs.
Laskow, V., Revill, C.
Ice loads, Propellers, Ice navigation, Ice solid interface, Ships, Icebreakers.

45-3455
White phosphorous linked as *cause of waterfowl* deaths at Alaskan firing range.
U.S. Army Cold Regions Research and Engineering Laboratory, *Environmental update*, July 1991, MP 2893, p.5.
Pollution, Environmental impact, Wetlands, Military facilities, Animals.

45-3456
***R*-strategist in antarctic pack ice.**
Bergmans, M., et al, *Oecologia*, May 1991, 86(3), p.305-309, 43 refs.
Dahms, Y.U., Schminke, H.K.
Sea ice, Animals, Acclimatization, Antarctica—Weddell Sea.
The antarctic copepod *Drescherella glacialis*, an inhabitant of sea ice, is the first polar invertebrate metazoan to have been *cultured throughout its life cycle*. The authors describe its demographic characteristics on the basis of a laboratory cohort study and correlative field data. When compared to its closest temperate-zone relatives, *D. glacialis* shows temperature compensation of developmental and reproductive rates. A genuine *r*-strategist in every respect, it does not fit established trends for antarctic invertebrates but appears well adapted to the peculiar spatio-temporal variability of the sea ice habitat. (Auth.)

45-3457
Lake Hoare, Antarctica: *sedimentation through a* thick perennial ice cover.
Squyres, S.W., et al, *Sedimentology*, Apr. 1991, 38(2), p.363-379, Refs. p.378-379.
Andersen, D.W., Nedell, S.S., Wharton, R.A., Jr.
Lake ice, Sedimentation, Lacustrine deposits, Bottom topography, Cryobiology, Antarctica—Hoare, Lake.
Lake Hoare in the Dry Valleys of Antarctica is covered with a *perennial ice cover more than 3 m thick, yet there is a complex* record of sedimentation and of growth of microbial mats on the lake bottom. Rough topography on the ice covering the lake surface traps sand that is transported by the wind. In late summer, vertical conduits form by melting and fracturing, making the ice permeable to both liquid water and gases. Cross-sections of the ice cover show that sand is able to penetrate into and apparently through it by descending through these conduits. This is the primary sedimentation mechanism in the lake. Sediment traps retrieved from the lake bottom indicate the rates of deposition can vary by large amounts over lateral scales as small as 1 m. In some locations on the lake bottom, distinctive sand mounds have been formed by this process. They are primary sedimentary structures and appear unique to the perennially ice-covered lacustrine environment. Rapid colonization and stabilization of fresh sand surfaces by microbial mats composed of cyanobacteria, eukaryotic algae, and heterotrophic bacteria produces a complex intercalation of organic and sandy layers that are a distinctive form of modern stromatolites. (Auth. mod.)

45-3458
High-resolution magnetostratigraphy of late-Quaternary arctic marine sediments. [Hochausflösende Magnetostratigraphie spätquatärer Sedimente arktischer Meeresgebiete].
Nowaczyk, N.R., *Berichte zur Polarforschung*, 1991, No.78, 187p., In German with English summary. Refs. p.122-132.
Rock magnetism, Geomagnetism, Sediments, Coring, Greenland Sea, Fram Strait, Arctic Ocean.

45-3459
Numerical modelling of ice shelf dynamics.
Determann, J., *Antarctic science*, June 1991, 3(2), p.187-195, 31 refs.
Glacier mass balance, Flow measurement, Ice models, Ice creep, Ice shelves, Basal sliding, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
By considering the basic stress equations for a unit volume of ice, the author derives a set of differential equations describing ice shelf flow. In view of the lack of basal shear stresses at the bottom of ice shelf, a model simulation which is restricted to the *horizontal dimensions will not imply substantial errors*. The model is applied to the Filchner-Ronne Ice Shelf, and model equations are solved in terms of finite differences on a 10 x 10 km grid. Present ice thickness data and boundary conditions, i.e. the balance velocities at the grounding line and strain rates at the ice front, are entered as input. Using a non-linear Glen-type flow law ($n=3$) and a constant depth-averaged flow law parameter, representing an ice temperature of -17 C, a convincing velocity field is derived as a solution of the model equations. The model takes into account restrained flow across ice rumples where sufficient field data are available. A diagnostic run reproducing present velocity magnitudes is followed by two prognostic runs, each representing 2000 years of simulation. Transient ice thickness changes are obtained from solving the mass *conservation equation*. (Auth. mod.)

45-3460
Food webs and primary production in the Barents Sea.
Sakshaug, E., NIPR Symposium on Polar Biology, Proceedings, No.4, Tokyo, National Institute of Polar Research, 1991, p.1-8, 7 refs.
Biomass, Seasonal variations, Plankton, Algae, Barents Sea.

45-3461
Effects of incubation temperature on distribution of C-14 in lipids in a psychrophilic marine diatom.
Katahira, R., et al, NIPR Symposium on Polar Biology, Proceedings, No.4, Tokyo, National Institute of Polar Research, 1991, p.9-16, 22 refs.
Tominaga, H., Tominaga, N.
Algae, Physiological effects, Low temperature research, Polar regions.
The incorporation of [C-14] bicarbonate into cells and the lipid fractions was determined at 6, 16 and 26 C using the *psychrophilic marine diatom, Navicula sp. strain D grown* at 3 C and 13 C. The intramolecular distribution of C-14 in both total lipids and three lipid classes (phospholipids, glycolipids and neutral lipids) was also estimated. The rates of C-14 incorporation into cells and the total lipid fraction were highest at 16 C, followed in order by those at 6 C and 16 C. The percentage of total incorporated C-14 present as total lipids was significantly low at 26 C compared with those at 6 C and 16 C. Among the three lipid classes, neutral lipids were predominantly labeled (50-80%) under the conditions employed. Relative radioactivity of total lipids localized in fatty acid methyl esters was significantly lower at 26 C than at 6 C and 16 C. This was attributable to a relative decrease of phospholipids and neutral lipids, the radioactivities of which were heavily presented in acyl *moieties*. *These changes at 26 C were more* marked with cells grown at 3 C than with those grown at 13 C. (Auth.)

45-3462
Evidence for a frozen bed, Byrd Glacier, Antarctica.
Scofield, J.P., et al, *Journal of geophysical research*, July 10, 1991, 96(B7), p.11,649-11,655, 24 refs.
Fastook, J.L., Hughes, T.J.
Glacier flow, Subsurface investigations, Glacier thickness, Glacier beds, Glacier mass balance, Basal sliding, Shear stress, Velocity measurement, Glacier melting, Antarctica—Byrd Glacier.
Ice thickness, computed within the fjord region of Byrd Glacier on the assumptions that Byrd Glacier is in mass-balance equilibrium and that ice velocity is entirely due to basal sliding, is on average 400 m less than measured ice thicknesses along a radio-echo profile. In this paper, four explanations for these differences are considered: (1) active glacier ice is separated from a zone of stagnant ice near the base of the glacier by a shear zone at depth; (2) basal melting rates are some 8 m/yr; (3) internal shear occurs with no basal sliding in much of the region above the grounding zone; or (4) internal creep and basal sliding contribute to the flow velocity in varying proportions above the grounding zone. Large gradients of surface strain rate seem to

invalidate the first explanation. Computed values of basal shear stress (140 to 200 kPa) provide insufficient frictional heat to melt the ice as demanded by the second explanation. Both the third and fourth explanations were examined by making simplifying assumptions that prevent a truly quantitative evaluation of their merit. Nevertheless, there is no escaping the qualitative conclusion that internal shear contributes strongly to surface velocities measured on Byrd Glacier, as is postulated in both these explanations. (Auth. mod.)

45-3463
Natural convection in the subarctic snow cover.
Sturm, M., et al, *Journal of geophysical research*, July 10, 1991, 96(B7), MP 2892, p.11,657-11,671, 58 refs.
Johnson, J.B.
Snow cover, Snow permeability, Air flow, Convection, Snow temperature, Temperature measurement, Soil temperature, Metamorphism (snow), Mass transfer, Snow air interface.
The purpose of this study was to determine if air convects in a natural snow cover. To detect convection, the temperature field in the subarctic snow cover in Fairbanks, AK, was measured hourly during three winters using thermistors which were suspended on threads and allowed to be buried by snowfall. The results indicate that convection occurred both sporadically in 1984-1985 and almost continuously in 1985-1986 and 1986-1987. The evidence was (1) simultaneous warming and cooling at different locations in a horizontal plane in the snow, and (2) horizontal temperature gradients of up to 16 C/m. During the winter, warm and cold zones developed in the snow and remained relatively fixed in space. These zones appear to be the result of a diffuse plumelike convection pattern linked to spatial variations in the temperature of the snow-soil interface. Air flow was inferred to have been primarily horizontal near the base of the snow and vertical elsewhere. The convective circulation was time-dependent, with perturbations such as high wind or rapid changes in air temperature triggering periods when horizontal temperature gradients were strongest, suggesting that these were also periods when the air flow was fastest. The coincidence of depth hoar crystals with horizontal c axes and the horizontal flow lines at the base of the snow suggests that convection may have affected crystal growth directions.

45-3464
Recharge processes during snowmelt: an isotopic and hydrometric investigation.
Buttle, J.M., et al, *Hydrological processes*, Oct.-Dec. 1990, 4(4), p.343-360, 33 refs.
Sami, K.
Snowmelt, Meltwater, Snow hydrology, Isotope analysis, Soil analysis, Seepage, Soil water migration, Water table, Sampling.

45-3465
Bioremediation of petroleum spills in arctic and subarctic environments.
Travis, M.D., *Northern engineer*, 1990, 22(2), p.4-12, 25 refs.
Oil spills, Cold weather performance, Soil pollution, Countermeasures, Soil microbiology, Environmental impact.

45-3466
Ice-rink roof structures and the "stalagmite" effect.
Bloudek, K., *Building services engineering research and technology*, 1989, 10(4), p.151-153, 7 refs.
Wooden structures, Performance, Roofs, Indoor climates, Ice fog, Condensation, Transition heating, Ice air interface, Analysis (mathematics).

45-3467
Simplified analysis for cold storage in porous capsules with solidification.
Chen, S.L., et al, *Journal of energy resources technology*, June 1991, 113(2), p.108-116, 5 refs.
Yue, J.S.
Cold storage, Porous materials, Performance, Ice formation, Phase transformations, Heat transfer, Solidification, Ice water interface, Coolants, Mathematical models.

45-3468
Withstand voltage characteristics of insulator string covered with snow or ice.
Matsuda, H., et al, *IEEE transactions on power delivery*, July 1991, 6(3), p.1243-1250, 8 refs.
Komuro, H., Takasu, K.
Transmission lines, Snow cover effect, Power line icing, Electrical resistivity, Performance, Electrical insulation, Electrical properties, Countermeasures, Design.

45-3469
Scene identification and its effect on cloud radiative forcing in the Arctic.
Li, Z.Q., et al, *Journal of geophysical research*, May 20, 1991, 96(D5), p.9175-9188, 36 refs.
Leighton, H.G.
Cloud cover, Terrain identification, Remote sensing, Radiometry, Radiation balance, Reflectivity, Sea ice distribution, Detection, Radiance.

45-3470
Winter maintenance.
Pearson, D., *Highway maintenance handbook*. Edited by K. Atkinson, London, UK, Thomas Telford Ltd 1990, p.337-379, 16 refs.
Road maintenance, Winter maintenance, Cost analysis, Cold weather operation, Snow removal.

45-3471
Antarctica and global change.
Budd, W.F., *Climatic change*, Apr. 1991, 18(2-3), p.271-299, Refs. p.296-299.
Climatic changes, Sea level, Sea ice, Seasonal variations, Glacier mass balance, Air ice water interaction, Paleoclimatology.
Changes in the mass balance of the antarctic ice sheet impact on global sea level. A unique historic record of past climate and global environmental changes is being obtained from deep core drilling in the antarctic ice sheet. Decreases of stratospheric ozone are most pronounced over the Antarctic in spring. The impact of increases in ultraviolet radiation on the biosphere can be studied in the Antarctic as a precursor to possible changes developing elsewhere around the globe. Changes in the atmosphere and ocean circulations resulting from the decrease in antarctic sea ice cover can have important effects on ocean surface temperatures, which impact on the climates of the continents. These topics are discussed briefly and a number of antarctic research areas are highlighted which build on existing or planned international programs and which can make critical contributions to multidisciplinary studies of global change. (Auth. mod.)

45-3472
Sea-level changes: consequences for the Southern Hemisphere.
Lutjeharms, J.R.E., et al, *Climatic change*, Apr. 1991, 18(2-3), p.317-337, Refs. p.335-337.
Valentine, H.R.
Sea level, Sea ice, Climatic changes, Air ice water interaction, Ice melting, Data processing.
One of the measurable symptoms of man-induced climatic change is a global rise in mean sea-level. A review of the suggested mechanisms for sea-level rise is given, supported by a critical discussion of present predictions and predictive models. The data base on which these predictions are based is geographically inhomogeneous and particularly sparse in the Southern Hemisphere. It is suggested that since the Southern Hemisphere has particular observational requirements because of a higher ratio of ocean to terrestrial areas, particular attention in international monitoring programs be given to it. This has special relevance to sea-level measurements in hostile environments such as off Antarctica. (Auth. mod.)

45-3473
Orbital forcing of low-frequency glacioeustasy.
Matthews, R.K., et al, *Journal of geophysical research*, Apr. 10, 1991, 96(B4), p.6797-6803, 25 refs.
Frohlich, C.
Glacier oscillation, Sea level, Glaciation.
This paper proposes a geologic mechanism and realistic quantitative construct to explain how antarctic ice volume varies as a function of orbital forcing in the Tertiary. It is demonstrated that this mechanism, which has a nonlinear response to long-period modulation of the orbital-forcing time series, can produce major glacioeustatic events with quasi-periodicities of the order of 2 my. A FORTRAN program, STRATA-various, is used to construct a two-dimensional forward model demonstrating that this proposed mechanism can produce a synthetic sequence stratigraphy which bears strong resemblance to the generalizations of seismic sequence stratigraphy. It is proposed that the seismic sequence stratigraphy concepts of long-term and short-term eustatic curves be replaced by independent estimates of tectonoeustasy and glacioeustasy, based upon data sets which are, wherever possible, independent of seismic sequence stratigraphy. It is also proposed that qualitative generalizations be replaced with explicit forward models as the targets for model data convergence. (Auth. mod.)

45-3474
Crystallization of supercooled water drops, induced by infrared radiation at the resonant frequency of ice.
Dubrovich, N.A., *Akademiia nauk SSSR. Doklady. Earth science sections*, Mar. 1991, 307(1-6), p.38-39, Translated from Akademii nauk SSSR. Doklady 1989 Vol.307, No.3. 2 refs.
Supercooled fog, Cloud seeding, Infrared radiation, Ice crystal growth, Radiation absorption, Cloud droplets, Phase transformations, Resonance.

45-3475
Cold weather construction materials part 2: field validation of laboratory tests on regulated-set cement for cold weather concreting.
Houston, B.J., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1982, SR 82-29, 27p., ADA-124 526, 6 refs. For another version see 36-1028.
Hoff, G.C., Sayles, F.H.
Cold weather construction, Concrete placing, Construction materials, Cements, Concrete admixtures, Cold weather tests, Concrete curing, Concrete strength, Chemical composition.
The Army carries on construction projects in localities where the concrete placing season is shortened considerably by the cold climate. This study evaluates "regulated-set" cement, which is a fast setting, rapid strength gain cement, that appeared to have great promise and would allow concrete to be placed at ambient temperatures as low as 15 F. Both mortars and concretes made with regulated-set cement were studied in the laboratory with favorable results, so the laboratory results were validated with field testing. Two test slabs were cast when the ambient temperature was approximately 15 F. The only differences in the two slabs were the concrete mixture temperature and air entrainment, and the slabs received no special protection from the ambient temperatures. Neither slab obtained any appreciable compressive strength at 1 day but slab 1 had approximately 1200 and 2000 psi at 7 and 28 days, respectively, while slab 2 had 2200 and 3300 psi, respectively. Since there was no strength gain at day 1, whereas there had been in laboratory tests of approximately the same concrete mixture but with an earlier shipment of regulated-set cement, a sample of the cement from the field test was brought to the laboratory for comparison with the cement used in the laboratory tests. Chemical and physical tests indicated that there was a difference in chemical composition; the laboratory shipment had a higher sulfate content. This difference points out the need for a responsive purchase specification, which is presently not available.

45-3476
Catalog of smoke/obscurant characterization instruments.
O'Brien, H.W., ed, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, June 1984, SR 84-16, 184p., For another version see 39-2950.
Bowen, S.L., ed.
Military research, Test equipment, Radiation measuring instruments, Recording instruments, Light transmission, Aerosols, Scattering, Atmospheric composition, Meteorological data, Radiometry, Snow crystal structure, Snow composition.
A survey of field test instrumentation that is currently used by DOD agencies and their civilian contractors to characterize smokes, dust and debris, and natural obscurants has been carried out by the U.S. Army Cold Regions Research and Engineering Laboratory for the Project Manager for Smoke Obscurants. The results of the survey are compiled in this catalog. The catalog includes instruments that directly measure, or through some computation lead to the generation of data relating to: 1) luminance and radiance, 2) transmittance or attenuation, 3) airborne-obscurant particle size and concentration, 4) cloud mechanics, and 5) meteorological parameters. It also provides information concerning instrumentation for appropriate 6) data acquisition and processing, and 7) documentation or other special-purpose information.

45-3477
Plastic highway bridges.
Plecnik, J., et al, *Civil engineering*, July 1991, 61(7), p.64-65.
Henriques, O., Deshpande, R.
Bridges, Composite materials, Cold weather performance, Construction materials, Plastics, Synthetic materials, Design, Corrosion, Countermeasures.

45-3478
Calculation of geopotential and the pressure gradient in the ECMWF atmospheric model: influence on the simulation of the polar atmosphere and on temperature analyses.
Simmons, A.J., et al, *Royal Meteorological Society. Quarterly journal A*, Jan. 1991, 117(497), p.29-58, 35 refs.
Chen, J.
Atmospheric circulation, Polar atmospheres, Topographic effects, Atmospheric pressure, Mathematical models, Weather forecasting, Air temperature.
In this paper, the spectral atmospheric model used for prediction at the European Centre for Medium Range Weather Forecasts (ECMWF) is modified to change the spectrally-represented thermodynamic variable from temperature to the deviation of temperature from a reference profile which depends analytically on pressure. The revised scheme significantly improves southern hemispheric forecasts, with differences originating over Antarctica, and with a small improvement over the Arctic. The improvement seen at high latitudes is also captured by a simpler revision which retains temperature as the spectrally-represented variable, and uses a reference temperature only in the computation of the pressure-gradient terms in gridpoint space. Results indicate that much of the systematic difference in behavior between simulations at high latitudes can be removed by changing the pressure-gradient calculation. In particular, the new schemes correct a systematic tendency for erroneously high pressures east of the Ross Ice Shelf over Antarctica in lower resolution simulations at medium and longer time ranges. The reference temperature profile has also been used in data assimilation to reduce a systematic error in the calculation of first-guess geopotential heights at standard pressure levels. The resulting height analyses agree slightly better with radiosonde measurements, and initialization causes less of a degradation of the fit with observed data. Temperatures are systematically warmer in the upper troposphere and cooler in the lower troposphere, and are closer to observed values. Results from forecasts carried out after one and two days of assimilation show small improvements in the short and early medium range, but are inconclusive at longer time ranges. (Auth. mod.)

45-3479
Papal Front of 3 May 1987: a remarkable example of frontogenesis near the Alps.
Volkert, H., et al, *Royal Meteorological Society. Quarterly journal A*, Jan. 1991, 117(497), p.125-150, 41 refs.
Weickmann, L., Tafferner, A.
Fronts (meteorology), Synoptic meteorology, Atmospheric disturbances, Topographic effects, Atmospheric circulation, Convection, Turbulent flow, Meteorological data, Mountains.

45-3480
Ice particle concentrations and precipitation development in small polar maritime cumuliform clouds.
Rangno, A.L., et al, *Royal Meteorological Society. Quarterly journal A*, Jan. 1991, 117(497), p.207-241, 70 refs.
Hobbs, P.V.
Clouds (meteorology), Ice nuclei, Ice formation, Heterogeneous nucleation, Atmospheric composition, Aerial surveys, Cloud physics, Ice crystal structure, Sampling.

45-3481
Environmental effects on CO2 efflux from water track and tussock tundra in arctic Alaska, U.S.A.
Oberbauer, S.F., et al, *Arctic and alpine research*, May 1991, 23(2), p.162-169, 26 refs.
Tenhunen, J.D., Reynolds, J.F.
Tundra, Soil analysis, Carbon dioxide, Vapor diffusion, Environmental impact, Ecosystems, Sampling, Atmospheric composition, Soil water.

45-3482
Steppe vegetation on south-facing slopes of pingos, central arctic coastal plain, Alaska, U.S.A.
Walker, M.D., et al, *Arctic and alpine research*, May 1991, 23(2), p.170-188, Refs. p.186-188.
Walker, D.A., Everett, K.R., Short, S.K.
Pingos, Steppes, Vegetation patterns, Climatic factors, Plant ecology, Arctic landscapes, Pleistocene, Tundra, Sampling, Classifications.

45-3483
Experiments on lichen growth 2. Effects of a seasonal snow cover.
Benedict, J.B., *Arctic and alpine research*, May 1991, 23(2), p.189-199, 37 refs.
Lichens, Cold tolerance, Growth, Snow cover effect, Cold weather survival, Sampling, Seasonal variations, Plant ecology, Snow depth.

45-3484
Subsurface movement on solifluction slopes in the Ruby Range, Yukon Territory, Canada—a 20-year study.
Price, L.W., *Arctic and alpine research*, May 1991, 23(2), p.200-205, 27 refs.
Alpine tundra, Solifluction, Slope processes, Subsurface investigations, Ground thawing, Soil analysis, Soil profiles, Mountain soils, Soil mechanics, Canada—Yukon Territory, Ruby Range.

45-3485
Pergelic soils of the western contiguous United States: distribution and taxonomy.
Bockheim, J.G., et al, *Arctic and alpine research*, May 1991, 23(2), p.206-212, 36 refs.
Burns, S.F.
Soil classification, Permafrost distribution, Periglacial processes, Alpine landscapes, Soil temperature, Geocryology.

45-3486
Mapping surface albedo in the east slope of the Colorado Front Range, U.S.A., with Landsat Thermatic Mapper.
Duguay, C.R., et al, *Arctic and alpine research*, May 1991, 23(2), p.213-223, 46 refs.
LeDrew, E.F.
LANDSAT, Tundra, Spaceborne photography, Albedo, Mountains, Radiation balance, Snow cover effect, Sensor mapping, Radiometry, Runoff forecasting.

45-3487
Dynamical explanation for the asymmetry in zonally averaged column abundances of ozone between northern and southern springs.
Hou, A.Y., et al, *Journal of the atmospheric sciences*, Feb. 15, 1991, 48(4), p.547-556, 34 refs.
Schneider, H.R., Ko, M.K.W.
Ozone, Atmospheric circulation, Atmospheric composition.
The observed zonally averaged column ozone shows a maximum at 90N during the northern winter and spring and at 60S throughout the southern winter and spring. This asymmetry is explained in the context of a zonally averaged model with coupled radiation, dynamics, and chemistry, together with consistently parameterized planetary wave driving and wave transport. It is shown that in the presence of weak wave driving, the penetration of the tropospheric circulation into the lower stratosphere and the characteristics of ozone chemistry are such that they produce a column ozone maximum at subpolar latitudes. The effect of increased wave driving is to intensify the residual circulation and extend it farther poleward, resulting in an ozone maximum at the pole. The role of the mesospheric drag is to further enhance these column ozone maxima. Model calculations show that the positions of the observed column ozone maxima are consistent with intensities of wave driving in the two hemispheres derived from data. (Auth.)

45-3488
Arctic as a bellwether.
Walsh, J.E., *Nature*, July 4, 1991, 352(6330), p.19-20, 13 refs.
Sea ice, Air temperature, Carbon dioxide.

45-3489
Recent variations in arctic and antarctic sea-ice covers.
Gloersen, P., et al, *Nature*, July 4, 1991, 352(6330), p.33-36, 23 refs.
Campbell, W.J.
Sea ice distribution, Variations, Measuring instruments, Radiometry.
Variations in the extents of sea-ice cover at the poles and the areas of open water enclosed within them were observed every other day during the interval 1978-1987 by a satellite-borne scanning multispectral microwave radiometer. A band-limited regression technique shows that the trends in coverage of the arctic and antarctic sea-ice packs are not the same. During these nine years, there are significant decreases in ice extent and open-water areas within the ice cover in the Arctic, whereas in the Antarctic there are no significant trends. (Auth.)

45-3490
Proceedings.
Workshop on Paving in Cold Areas, 4th, Sapporo, Japan, Sep. 4-6, 1990, Tsukuba, Japan, Ministry of Construction, Public Works Research Institute, 1990, 2 vols., Refs. passim. Held under the Canada/Japan Science and Technology Agreement of Sep. 1990. Vol.1 is Technical memorandum No.2896 and Vol.2 is Technical memorandum No.2897 of the Public Works Research Institute. For individual papers see 45-3491 through 45-3520.
Pavements, Road maintenance, Cold weather performance, Bitumens, Cracking (fracturing), Frost resistance, Thermal stresses.

45-3491
Evaluation of some polymer modified asphalts in Alberta.
Anderson, K.O., et al, Workshop on Paving in Cold Areas, 4th, Sapporo, Japan, Sep. 4-6, 1990. Proceedings. Vol.1, Tsukuba, Japan, Ministry of Construction, Public Works Research Institute, 1990, p.3-40, 11 refs.
Hussain, S.R.
Pavements, Bitumens, Frost protection, Polymers, Cracking (fracturing), Cement admixtures, Cold weather tests, Road maintenance.

45-3492
Investigative study on production of modified asphalts in Japan.
Himeno, K., et al, Workshop on Paving in Cold Areas, 4th, Sapporo, Japan, Sep. 4-6, 1990. Proceedings. Vol.1, Tsukuba, Japan, Ministry of Construction, Public Works Research Institute, 1990, p.43-67, 8 refs. For another version as an appendix to Vol.1, see 45-3526.
Sakamoto, H., Hashimoto, K.
Pavements, Bitumens, Road maintenance.

45-3493
Cold temperature properties of polymer-modified asphalt mixtures.
Ali, N., et al, Workshop on Paving in Cold Areas, 4th, Sapporo, Japan, Sep. 4-6, 1990. Proceedings. Vol.1, Tsukuba, Japan, Ministry of Construction, Public Works Research Institute, 1990, p.71-94, 5 refs.
Chan, J.S.S., Papagiannakis, A.T., Bergan, A.T.
Pavements, Bitumens, Frost resistance, Cold weather tests, Road maintenance.

45-3494
On adhesive layer of thin concrete block overlay.
Inuzuka, M., Workshop on Paving in Cold Areas, 4th, Sapporo, Japan, Sep. 4-6, 1990. Proceedings. Vol.1, Tsukuba, Japan, Ministry of Construction, Public Works Research Institute, 1990, p.97-112, 4 refs.
Concrete pavements, Frost protection, Bitumens, Road maintenance, Cold weather performance.

45-3495
Silane coupling agents to reduce moisture susceptibility of asphalt concrete.
Stolle, D.F.E., et al, Workshop on Paving in Cold Areas, 4th, Sapporo, Japan, Sep. 4-6, 1990. Proceedings. Vol.1, Tsukuba, Japan, Ministry of Construction, Public Works Research Institute, 1990, p.115-145, 27 refs.
Kennepohl, G., Emery, J.J.
Concrete pavements, Waterproofing, Road maintenance, Bituminous concretes, Moisture.

45-3496
Thermal stresses development in pavements during wintertime.
Laforte, M.A., Workshop on Paving in Cold Areas, 4th, Sapporo, Japan, Sep. 4-6, 1990. Proceedings. Vol.1, Tsukuba, Japan, Ministry of Construction, Public Works Research Institute, 1990, p.149-179, 18 refs.
Pavements, Frost heave, Thermal stresses, Mathematical models.

45-3497
Low temperature fracture mechanics of viscoelastic pavement structures.
Selvadurai, A.P.S., et al, Workshop on Paving in Cold Areas, 4th, Sapporo, Japan, Sep. 4-6, 1990. Proceedings. Vol.1, Tsukuba, Japan, Ministry of Construction, Public Works Research Institute, 1990, p.183-212, 33 refs.
Au, M.C., Joseph, P.
Pavements, Cracking (fracturing), Cold stress, Analysis (mathematics), Viscoelasticity, Thermal stresses.

45-3498
Ste. Anne Test Road revisited twenty years later.
Deme, I.J., et al, Workshop on Paving in Cold Areas, 4th, Sapporo, Japan, Sep. 4-6, 1990. Proceedings. Vol.1, Tsukuba, Japan, Ministry of Construction, Public Works Research Institute, 1990, p.215-233, 9 refs.
Young, F.D.
Pavements, Cracking (fracturing), Cold weather tests, Frost resistance.

45-3499
Testing of softening point and brittle point of asphalt mixtures for the evaluation of their rheological properties.
Yamada, M., Workshop on Paving in Cold Areas, 4th, Sapporo, Japan, Sep. 4-6, 1990. Proceedings. Vol.1, Tsukuba, Japan, Ministry of Construction, Public Works Research Institute, 1990, p.237-253, 1 ref.
Pavements, Bitumens, Brittleness, Rheology.

45-3500
Test methods to characterize low temperature cracking.
Janoo, V.C., et al, MP 2891, Workshop on Paving in Cold Areas, 4th, Sapporo, Japan, Sep. 4-6, 1990. Proceedings. Vol.1, Tsukuba, Japan, Ministry of Construction, Public Works Research Institute, 1990, p.257-287, 52 refs.
Vinson, T.S., Haas, R., Bayer, J., Jr.
Pavements, Cracking (fracturing), Thermal stresses, Cold stress, Analysis (mathematics), Tensile properties, Strain tests.
Thermal cracking of asphalt concrete pavements is a serious problem in the northern tier states of the coterminous U.S. and in Alaska, Canada, Japan and parts of Europe. One theory on the cause of thermal cracking is that the thermally induced tensile stress in the asphalt concrete exceeds its tensile strength. Cracks that result from this condition are called low temperature cracks. Another theory is that thermal cracks occur when the pavement structure is thermally fatigued by daily temperature cycles. As part of a cooperative study by CRREL and U.S. Strategic Highway Research Program A003, a research project was established to investigate thermal cracking. Prior to starting the project, a literature review was conducted on current test methods for characterizing asphalt concrete behavior at low temperatures and/or under thermal cycling. The objective of the survey was to determine the types of tests and equipment currently used, the properties measured by the respective tests, and the degree to which the tests simulate actual field conditions. The purpose of this paper is to present the results of this review.

45-3501
Estimation of road wear using spike ravelling test.
Itoh, M., et al, Workshop on Paving in Cold Areas, 4th, Sapporo, Japan, Sep. 4-6, 1990. Proceedings. Vol.1, Tsukuba, Japan, Ministry of Construction, Public Works Research Institute, 1990, p.291-316.
Anzaki, Y.
Pavements, Road maintenance, Tires, Damage.

45-3502
Snow and ice detection by a dielectric pavement freezing-detector (DPF).
Takeichi, K., et al, Workshop on Paving in Cold Areas, 4th, Sapporo, Japan, Sep. 4-6, 1990. Proceedings. Vol.1, Tsukuba, Japan, Ministry of Construction, Public Works Research Institute, 1990, p.319-337, 7 refs.
Kubo, H.
Road icing, Ice detection, Pavements, Road maintenance, Dielectric properties, Monitors.

45-3503
Survey of measures against pavement rutting in cold regions.
Sawada, S., et al, Workshop on Paving in Cold Areas, 4th, Sapporo, Japan, Sep. 4-6, 1990. Proceedings. Vol.1, Tsukuba, Japan, Ministry of Construction, Public Works Research Institute, 1990, p.341-369, 16 refs.
Kubo, H., Kawamura, K., Mizushima, T.
Pavements, Road maintenance, Tires, Damage.

45-3504
Asphalt pavement rutting experience in Canada.
Emery, J., Workshop on Paving in Cold Areas, 4th, Sapporo, Japan, Sep. 4-6, 1990. Proceedings. Vol.1, Tsukuba, Japan, Ministry of Construction, Public Works Research Institute, 1990, p.373-383.
Pavements, Road maintenance, Bituminous concretes.

45-3505
Statistical study of factors causing rutting of expressway pavements in cold areas in Japan.
Kaneda, K., et al, Workshop on Paving in Cold Areas, 4th, Sapporo, Japan, Sep. 4-6, 1990. Proceedings. Vol.1, Tsukuba, Japan, Ministry of Construction, Public Works Research Institute, 1990, p.387-416, 3 refs.
Sakate, T., Takayanagi, Y., Kamiya, K.
Pavements, Road maintenance, Damage, Statistical analysis.

45-3506
Comparative study on performances of asphalt pavements in cold area.
Wen, Z.M., et al, Workshop on Paving in Cold Areas, 4th, Sapporo, Japan, Sep. 4-6, 1990. Proceedings. Vol.2, Tsukuba, Japan, Ministry of Construction, Public Works Research Institute, 1990, p.3-16, 2 refs.
Takeyama, Y., Fukuda, T.
Pavements, Road maintenance, Bituminous concretes, Damage, Cold weather performance.

45-3507
Design of asphalt concrete mixtures in cold climates using soft asphalts.
Palsat, D.P., et al, Workshop on Paving in Cold Areas, 4th, Sapporo, Japan, Sep. 4-6, 1990. Proceedings. Vol.2, Tsukuba, Japan, Ministry of Construction, Public Works Research Institute, 1990, p.19-49, 10 refs.
McMillan, C.
Pavements, Bituminous concretes, Road maintenance, Cold weather performance.

45-3508
Damage to expressway pavement in Hokkaido and solutions required.
Ogawa, Y., et al, Workshop on Paving in Cold Areas, 4th, Sapporo, Japan, Sep. 4-6, 1990. Proceedings. Vol.2, Tsukuba, Japan, Ministry of Construction, Public Works Research Institute, 1990, p.53-73, 6 refs.
Murahashi, T.
Pavements, Road maintenance, Cold weather performance, Cracking (fracturing).

45-3509
Asphalt technology for hot in-place surface recycling.
Emery, J., et al, Workshop on Paving in Cold Areas, 4th, Sapporo, Japan, Sep. 4-6, 1990. Proceedings. Vol.2, Tsukuba, Japan, Ministry of Construction, Public Works Research Institute, 1990, p.77-104, 22 refs.
Terao, M.
Pavements, Road maintenance, Paving, Bituminous concretes, Heating.

45-3510
Influence of field compaction on the resistance to stripping of asphalt pavement in cold areas.
Abd El Halim, A.O., et al, Workshop on Paving in Cold Areas, 4th, Sapporo, Japan, Sep. 4-6, 1990. Proceedings. Vol.2, Tsukuba, Japan, Ministry of Construction, Public Works Research Institute, 1990, p.107-131, 14 refs.
El Hussein, H.M., Kennepohl, G.
Pavements, Road maintenance, Bitumens, Cold weather performance, Waterproofing.

45-3511
Applicability of RCCP in cold areas.
Hagiwara, T., et al, Workshop on Paving in Cold Areas, 4th, Sapporo, Japan, Sep. 4-6, 1990. Proceedings. Vol.2, Tsukuba, Japan, Ministry of Construction, Public Works Research Institute, 1990, p.135-154.
Nagasaki, K., Onojima, M., Noda, E.
Concrete pavements, Road maintenance, Cold weather performance.

45-3512
Present status and subject of roller compacted concrete pavement in Japan.
Tada, H., et al, Workshop on Paving in Cold Areas, 4th, Sapporo, Japan, Sep. 4-6, 1990. Proceedings. Vol.2, Tsukuba, Japan, Ministry of Construction, Public Works Research Institute, 1990, p.157-175.
Mori, H., Anzaki, Y., Sawada, Y.
Concrete pavements, Road maintenance.

45-3513
Twenty-five year report on the continuously reinforced concrete pavement in Koriyama.
Ohta, H., et al, Workshop on Paving in Cold Areas, 4th, Sapporo, Japan, Sep. 4-6, 1990. Proceedings. Vol.2, Tsukuba, Japan, Ministry of Construction, Public Works Research Institute, 1990, p.179-201, 12 refs.
Obara, T.
Concrete pavements, Road maintenance, Cold weather performance.

45-3514
Concrete pavement rehabilitation and overlay: Ontario's experience.
Kazmierowski, T.J., et al, Workshop on Paving in Cold Areas, 4th, Sapporo, Japan, Sep. 4-6, 1990. Proceedings. Vol.2, Tsukuba, Japan, Ministry of Construction, Public Works Research Institute, 1990, p.205-230, 8 refs.
Sturm, H.J.
Concrete pavements, Road maintenance.

45-3515
Evaluation system of airport concrete pavements.
Hachiya, Y., et al, Workshop on Paving in Cold Areas, 4th, Sapporo, Japan, Sep. 4-6, 1990. Proceedings. Vol.2, Tsukuba, Japan, Ministry of Construction, Public Works Research Institute, 1990, p.233-258, 11 refs.
Sato, K., Umeno, S., Yokota, H., Okano, K.
Concrete pavements, Runways, Road maintenance.

45-3516
Rapid monitoring of flexible pavement deflections, moduli and roughness.
Hein, D., et al, Workshop on Paving in Cold Areas, 4th, Sapporo, Japan, Sep. 4-6, 1990. Proceedings. Vol.2, Tsukuba, Japan, Ministry of Construction, Public Works Research Institute, 1990, p.261-277, 5 refs.
Emery, J.
Pavements, Road maintenance.

45-3517
Seasonal variations in bearing capacity of asphalt pavements.
Kasahara, A., et al, Workshop on Paving in Cold Areas, 4th, Sapporo, Japan, Sep. 4-6, 1990. Proceedings. Vol.2, Tsukuba, Japan, Ministry of Construction, Public Works Research Institute, 1990, p.281-298, 5 refs.
Himeno, K., Igarashi, M.
Pavements, Frost resistance, Bitumens, Freeze thaw cycles, Bearing strength.

45-3518
Integration of rehabilitation, maintenance and upgrading in Saskatchewan's Pavement Management Information System.
Heiman, G.H., et al, Workshop on Paving in Cold Areas, 4th, Sapporo, Japan, Sep 4-6, 1990. Proceedings. Vol.2, Tsukuba, Japan, Ministry of Construction, Public Works Research Institute, 1990, p.301-319, 2 refs.
Chursinoff, R.W., Deighton, R., Hassan, M.U.
Pavements, Road maintenance, Cost analysis.

45-3519
Evaluation of the performance of asphalt pavement in consideration of reliability.
Takeyama, Y., et al, Workshop on Paving in Cold Areas, 4th, Sapporo, Japan, Sep. 4-6, 1990. Proceedings. Vol.2, Tsukuba, Japan, Ministry of Construction, Public Works Research Institute, 1990, p.323-337, 2 refs.
Fukuda, T., Obara, T.
Pavements, Road maintenance, Mathematical models.

45-3520
Generic framework for pavement management and staging modules for implementation.
Haas, R., Workshop on Paving in Cold Areas, 4th, Sapporo, Japan, Sep. 4-6, 1990. Proceedings. Vol.2, Tsukuba, Japan, Ministry of Construction, Public Works Research Institute, 1990, p.341-366, 9 refs.
Pavements, Road maintenance.

45-3521
On the formation of underwater ice and the growth and energy budget of the sea ice in Atka Bay, Antarctica. [Zur Entstehung von Unterwassereis und das Wachstum und die Energiebilanz des Meereises in der Atka Bucht, Antarktis].
Kipfstuhl, J., *Berichte zur Polarforschung*, 1991, No.85, 88p., In German with English summary. Refs. p.82-88.
Sea ice, Underwater ice, Ice growth, Heat balance, Antarctica—Atka Iceport.
In Atka Bay the sea ice grows into a spongy layer of loose ice platelets up to 15 cm in diameter and 2-3 mm thick so-called underwater ice. In 1982 the solid sea ice and the sub-ice platelet layer, 2 m and 4 m thick respectively, represented a total ice column of 3 to 4 m, whereas in the Weddell Sea the average thickness of the sea ice is less than 1 m. This thesis investigates the formation of underwater ice and its importance for the growth and surface heat budget of the sea ice in Atka Bay. The Maykut-Untersteiner model of sea ice combined with meteorological data of the Georg von Neumayer Station was used to calculate the growth and surface heat budget of the sea ice in Atka Bay. For the latter the existence of the sub-ice platelet layer is of minor importance. Only about half of the observed solid ice growth can be explained by heat loss of the ocean to the atmosphere. The model yields good agreement with the observed sea ice growth when using a fraction of 20% of ice within the sub-ice platelet layer. A comparison of the surface heat budgets of the sea ice of Atka Bay with ice in the central Arctic shows that the high surface ablation observed in the Arctic seems to originate from a significantly higher radiative energy gain during the ablation season in the Arctic. (Auth. mod.)

45-3522
Flow of ice shelves—numerical simulations using the finite-difference method. [Das Fliessen von Schelfeisen—numerische Simulationen mit der Methode der finiten Differenzen].
Determann, J., Berichte zur Polarforschung, 1991, No.83, 82p., In German with English summary. 78 refs.
Ice shelves, Mass balance, Flow rate, Ice models, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf, Antarctica—Ekstrom Ice Shelf.
This thesis addresses the dynamics of ice shelves and their sensitivity to changing mass-balance quantities. Using the flow law for ice, a set of differential equations describing ice-shelf flow is developed. The calculated velocity field is improved locally by defining a retarding mechanism which simulates basal friction. Being able to reproduce the observed flow of the Filchner-Ronne Ice Shelf, the model is used to simulate transient ice-shelf dynamics. This implies solving the mass-conservation equation, involving accumulation rates and ablation rates from the ice-shelf surface and bottom. By means of the simulated present-day flow field, accumulation rates at the ice-shelf bottom in excess of 2 m a are derived for a locally limited area. Prognostic studies comprising hypothetical distributions of accumulation and melting reveal that the ice-shelf thickness profile strongly depends on interactions with the ocean. In order to investigate how steady-state profiles influence the grounding line position, the ice-shelf model is expanded by a flow model for the ice sheet. Due to lack of data, the coupled model is merely applied to a synthetic ice sheet-ice shelf system. For defined mass fluxes and a given sea-bottom topography the evolution of each component can then be followed. For the first time, the flow of Ekström Ice Shelf is simulated but, because the mass-balance is not known, prognostic calculations have not been performed. If mass balance and bottom topography should be recorded by future expeditions, the coupled model, when applied to the Ekström Ice Shelf, will reveal new findings on the dynamics of large ice masses.

45-3523
Quantification of sea-ice properties: automated image analysis of thin sections and parametrization of chlorophyll and salinity distributions. [Quantifizierung von Meereiseigenschaften: Automatische Bildanalyse von Dünnschnitten und Parametrisierung von Chlorophyll- und Salzgehaltsverteilungen].
Eicken, H., *Berichte zur Polarforschung*, 1991, No.82, 105p., In German with English summary. Refs. p.98-105.
Sea ice distribution, Ice salinity, Chlorophylls, Antarctica - Weddell Sea, Arctic Ocean, Fram Strait.
The aim of this paper is to (1) quantify sea-ice texture, (2) parametrize vertical profiles of important sea-ice properties, (3) develop methods for automated determination of these quantifiers, and (4) test the methods with representative data sets. This paper represents an attempt to use automated digital image-processing techniques for studies of sea-ice texture, allowing for rapid quantitative and reproducible textural evaluation. For approximately 100 sea-ice cores from the central Arctic,

Fram Strait and the Weddell Sea, stratigraphy, salinity, and chlorophyll concentrations have been determined. The first part describes the digitization of approximately 120 thin sections with a video camera and a simple microcomputer-based image-processing board along with methods of textural quantification through project software developments. Images have been recorded between crossed polarizers, in circularly polarized light, and in plain and diffuse light. Section 3 is aimed at parametrizing vertical profiles of salinity and chlorophyll concentration through polynomial curve fitting. This method allows for direct comparison of samples from different regions or between different ice properties and the growth history of a floe. Evaluating the regional distribution of textural and profile parameters determined in this study shows that variations of these parameters are closely linked to differences in the specific regimes of ice formation, growth and metamorphosis. (Auth. mod.)

45-3524

Interaction of ice sheets with the ocean in the continental margin zone.

Glazovskiĭ, A.F., *Polar geography and geology*, Apr.-June 1990, 14(2), Interaction of sea ice, snow, and glaciers with the atmosphere and ocean, Part 2. Edited by V.M. Kotliakov and M.G. Grosswald, p.127-146, For Russian original see 42-2852. For Parts 1 and 3 of this translation, see 45-1261 and 45-2409, respectively.

Ice sheets, Water temperature, Air temperature, Glacier beds, Ice rafting, Ice water interface.

45-3525

Evidence for a 50% increase in H2O2 over the past 200 years from a Greenland ice core.

Sigg, A., et al, *Nature*, June 13, 1991, 351(6327), p.557-559, 13 refs.

Neftel, A.

Ice composition, Ice cores, Atmospheric composition, Greenland.

45-3526

Investigative study on use of modified asphalts in Japan.

Himeno, K., et al, Workshop on Paving in Cold Areas, 4th, Sapporo, Japan, Sep. 4-6, 1990. Proceedings. Vol.1. Appendix, Tsukuba, Japan, Ministry of Construction, Public Works Research Institute, 1990, p.419-437, For another version included in Vol.1, see 45-3492.

Anzaki, Y., Hashimoto, K.

Pavements, Road maintenance, Bitumens.

45-3527

Snow Sapporo 21st Century Project.

Sugawara, T., Canada/Japan Special Seminar, Sapporo, Japan, Sep. 5, 1990, 1990, p.1-20, Japanese version p.39-55. This seminar was held in conjunction with the 4th Workshop on Paving in Cold Areas, Sapporo, Japan, Sep. 4-6, 1990, for which see 45-3490 through 45-3520.

Snow removal, Urban planning, Road maintenance, Japan--Sapporo.

45-3528

Recycling of pavement materials in cold areas.

Matsumura, S., *Canada/Japan Special Seminar*, Sapporo, Japan, Sep. 5, 1990, 1990, p.21-38, Japanese varsion p.57-73. This seminar was held in conjunction with the 4th Workshop on Paving in Cold Areas, Sapporo, Japan, Sep. 4-6, 1990, for which see 45-3490 through 45-3520.

Pavements, Road maintenance.

45-3529

Late Pliocene-Pleistocene paleoclimate in the Jane Basin region: ODP Site 697.

Burckle, L.H., et al, Proceedings of the Ocean Drilling Program, Vol.113, Scientific results, Weddell Sea, Antarctica, edited by D. Kennett, A. Masterson and N.J. Stewart, College Station, Texas A and M University, 1990, p.803-809, 38 refs.

Gersonde, R., Abrams, N.

DLC QE39.T49b

Paleoclimatology, Algae, Glacial geology, Pleistocene, Sea ice, Antarctica--Weddell Sea

Diatom preservation patterns in Pliocene age sediments of Jane Basin were examined and compared with diatom distribution in more northerly sites at various sectors of the southern ocean. All data support the view that there was significant ice growth on Antarctica during the late Pliocene. DSDP Site 514 in the Atlantic sector shows increased relative abundance of *Eucampia antarctica*, an ice-related form, in the upper part of the Gauss Chron with a larger increase just above it. With one exception, all sites included in the present study show increased relative abundance of *E. antarctica* in the upper part of the Gauss. The view that there was ice growth on Antarctica during the late Gauss Chron is supported by the results from ODP Site 697. While diatoms are present and percent opal is high in the early and middle Gauss Chron (suggesting more open-ocean conditions), late Gauss sediments contain low percentages of opal and few or no diatoms. This is also true for the early Matuyama Chron. The absence of diatoms and the low percentages of opal in middle and late Matuyama Chron sediments suggests increased sea-ice cover over the Jane Basin during this time. Although warmer open-ocean intervals are inferred for intervals near the Olduvai and Jaramillo Subchrons, most of the Matuyama Chron was marked by extensive sea-ice cover with low seasonal contrast. Results for the early part of the Brunhes Chron are similar, at least for the Jane Basin. During this time, sea-ice cover over the basin apparently extended well into the growing season. In contrast, the later Brunhes Chron is marked by alternating open water (during the growing season) and extensive, almost year-round, sea-ice. (Auth. mod.)

45-3530

Neogene paleoclimate development of the antarctic Weddell Sea region: organic geochemistry.

Macko, S.A., et al, Proceedings of the Ocean Drilling Program, Vol.113, Scientific results, Weddell Sea, Antarctica, edited by D. Kennett, A. Masterson and N.J. Stewart, College Station, Texas A and M University, 1990, p.881-897, Refs. p.892-893.

Pereira, C.P.G.

DLC QE39.T49b

Glacial geology, Geochemistry, Sediments, Ice cover effect, Antarctica--Weddell Sea.

Stable carbon and nitrogen isotopic compositions as well as organic carbon and total nitrogen contents of cored material are reported for the Weddell Sea, Sites 689 and 690 (Maud Rise), Site 693 (continental margin), and Site 694 (abyssal plain). Results from both high resolution sampling and low resolution are documented. In general, these results indicate large changes in the types and amounts of carbon and nitrogen preserved in the sediments of the Weddell Sea region during the past 25 m.y., with an especially important and dramatic event coinciding with the western antarctic ice-sheet becoming a semi-permanent or permanent feature about 5 Ma. The overall results may be correlated with the onset of major ice-sheets on West Antarctica, stabilization of the ice-sheet in the Pliocene and the intensified recycling of organic carbon and total nitrogen, which is possibly the result of increased ice cover. Evidence is also presented for either low production of organic carbon or the presence of a water column in the eastern Weddell Sea during the early and middle Neogene, which was highly corrosive to organic matter. This condition, together with slow sediment accumulation rates, inhibited the preservation of carbon in the sediments. (Auth.)

45-3531

Latest Cretaceous to Cenozoic climate and oceanographic developments in the Weddell Sea, Antarctica: an ocean-drilling perspective.

Kennett, J.P., et al, Proceedings of the Ocean Drilling Program, Vol 113, Scientific results, Weddell Sea, Antarctica, edited by D. Kennett, A. Masterson and N.J. Stewart, College Station, Texas A and M University, 1990, p.937-960, Refs. p.957-960.

Barker, P.F.

DLC QE39.T49b

Marine geology, Paleoclimatology, Paleoecology, Sediments, Biogeography, Glacial geology, Ice sheets, Sea ice, Antarctica--Weddell Sea.

This is a summary of principal findings made by ODP Leg 113 investigators concerning the latest Cretaceous-Cenozoic climatic, cryospheric and oceanographic history, and biogeographic developments of the Weddell Sea region. Twenty-two holes were drilled at 9 sites that sampled 4 contrasting environments. A wide range of sedimentologic, biotic, and isotopic evidence obtained in Leg 113 material indicates that sequential cooling and cryospheric development of Antarctica and the surrounding oceans during the Cenozoic profoundly affected the ocean-atmosphere circulation, sediments, and biota. Important cooling steps occurred during the latest Cretaceous, the middle Eocene, near the Eocene-Oligocene boundary, in the middle Oligocene, the middle Miocene, the early late Miocene, the latest Miocene, and the late Pliocene. Distinct but temporary warming trends occurred during the late Paleocene and the latest Oligocene to early Miocene. (Auth. mod.)

45-3532

Glacio-climatology of Antarctica. [Gliatsiokolimatologiia Antarktidy].

Aver'ianov, V.G., Leningrad, Gidrometeoizdat, 1990, 198p., In Russian. Refs. p.180-198.

Ice cover, Ice air interface, Glacial meteorology, Ice sheets, Glacier mass balance, Glacier heat balance, Radiation balance, Snow.

The interrelationship between antarctic ice cover and surface meteorological conditions, and the antarctic climate as a whole, are investigated. The 1st chapter of the book deals with the morphology of the ice cover, the 2nd, with its climate, including atmospheric temperature and circulation, precipitation, humidity and climatic zonation. Ch. 3 examines conditions for the formation of the cover's active layer, including the structure and properties of its snow cover, such as snow ablation, accumulation, and melting rates. A glacio-climatological zonation is included in this chapter. The 4th and final chapter presents a quantitative analysis of mean annual values of the ice cover surface balance, including water and moisture balance of the atmosphere, and radiation and heat balance. The structure of the mass energy balance is analyzed, leading to concluding remarks on the stability and the state of equilibrium of the contemporary antarctic glaciation.

45-3533

Scientific plan for deep ice drilling on Law Dome.

Etheridge, D.M., *Australian National Antarctic Research Expeditions. ANARE research notes*, Sep. 1990, No.76, 41p., Refs. p.39-41.

Ice cores, Low temperature research, Paleoclimatology, Boreholes, Drilling, Chemical analysis, Logistics, Antarctica--law Dome.

The Australian Antarctic division will undertake a deep drilling program in the summer seasons 1989-90, 1990-91 and 1991-92 near the summit of Law Dome to extract a 1240 m ice core using an electromechanical drill in a fluid-filled borehole. The report outlines the types of records it is intended to obtain from analysis of the core and surveys of the borehole, their potential applications and scientific justification. The recommended ice core analysis plan suggests the type and frequency of sampling required for the different parameters and describes the types of measurements and observations that will be made. The interrelation and interdependence of the various measurements is discussed. An outline of the logistic support required for the efficient running of the field program is included. (Auth. mod.)

45-3534

Brittle to ductile transition during indentation of ice.

Gold, L.W., *Canadian journal of civil engineering*, Apr. 1991, 18(2), p.182-190, With French summary. 31 refs.

Ice deformation, Ice elasticity, Crack propagation, Fracturing, Shear strain, Ice mechanics, Brittleness, Stress concentration, Analysis (mathematics).

45-3535

Cross-section elements to accommodate passing lanes and vehicle storage during avalanche control for the Trans-Canada Highway in Rogers Pass.

Morrall, J., *Canadian journal of civil engineering*, Apr. 1991, 18(2), p.191-200, With French summary. 7 refs.

Highway planning, Design, Cold weather operations, Avalanche triggering, Route surveys, Mountains, Construction.

45-3536

Case histories of attempts to remove three small ice jams.

Doyle, P.F., *Canadian journal of civil engineering*, Apr. 1991, 18(2), p.331-335, With French summary. 7 refs.

River ice, Ice jams, Ice removal, Ice blasting, Equipment, Flood control, Environmental impact, Ice control.

45-3537

Fracture and breakup of river ice cover: discussion and reply.

Demuth, M.N., et al, *Canadian journal of civil engineering*, Apr. 1991, 18(2), MP 2894, p.336-339, 13 refs. For article being discussed see 44-3702.

Prowse, T.D., Beltaos, S., Daly, S.F.

River ice, Ice jams, Ice breakup, Ice cover strength, Ice mechanics, Ice breaking, Flexural strength.

45-3538

Thermal analysis of forced-air and thermosyphon cooling systems for the Inuvik airport expansion.

Smith, L.B., et al, *Canadian geotechnical journal*, June 1991, 28(3), p.399-409, With French summary. 11 refs.

Graham, J.P., Nixon, J.F., Washuta, A.S.

Airports, Cold weather construction, Foundations, Concrete slabs, Permafrost beneath structures, Cooling systems, Temperature control, Thermal analysis, Thaw depth, Ventilation.

45-3539

Behaviour of broken ice as a geomaterial.

Wong, T.T., et al, *Canadian geotechnical journal*, June 1991, 28(3), p.451-457, With French summary. 19 refs.

Morgenstern, N.R., Sego, D.C.

Ice strength, Soil strength, Plastic deformation, Ice mechanics, Shear strength, Mechanical tests, Correlation, Grounded ice.

45-3540

Sea ice and climate.

Zakharov, V.F., *Polar geography and geology*, Apr.-June 1990, 14(2), Interaction of sea ice, snow, and glaciers with the atmosphere and ocean, Part 2. Edited by V.M. Kotliakov and M.G. Grosswald, p.75-99, For Russian original see 42-2850 or 16F-37313. For Parts 1 and 3 of this translation see 45-1261 and 45-2409, respectively.

Sea water freezing, Sea ice distribution, Ice cover thickness, Climatic changes.

Formation of sea ice in both hemispheres is discussed. The antarctic glacial situation compared to the Arctic Ocean and physical causes of sea ice impact on climatic conditions, resulting in major changes, are argued and illustrated with meteorological, oceanographic, and glaciological data.

45-3541
Pleistocene glaciation, the ocean, and glacial climates: a qualitative model.
Grosswald, M.G., *Polar geography and geology*, Apr.-June 1990, 14(2), Interaction of sea ice, snow, and glaciers with the atmosphere and ocean, Part 2. Edited by V.M. Kotliakov and M.G. Grosswald, p.100-126, For Russian original see 42-2851. For Parts 1 and 3 of this translation see 45-1261 and 45-2409, respectively.
Climatic changes, Sea ice distribution, Pleistocene, Glaciation, Air temperature, Models.

45-3542
Optimum operation of hydro-electric plants during the ice regime of rivers: a Canadian experience.
Foulds, D., ed, *National Research Council, Canada. Associate Committee on Hydrology. Subcommittee on Hydraulics of Ice Covered Rivers. [Report]*, [1991], NRCC 31107, 81p.
Electric power, Ice conditions, River ice, Ice cover, Freezeup, Ice breakup, Climatic factors.

45-3543
Advanced treatment technologies.
Koppers, H.M.M., et al, Slib, schlamm, sludge, Denver, CO, American Water Works Association Research Foundation, 1990, p.109-208, Refs. p.205-208.
Rolan, A.T., Vandermeyden, C., McTigue, N.E., Henke, H.A., Van Nieuwenhuyze, R.F., Martin, H.
Sludges, Sewage treatment, Artificial freezing, Freeze thaw cycles, Water treatment.

45-3544
Arctic research of the United States, Vol.5.
U.S. Interagency Arctic Research Policy Commission, MP 2895, Washington, D.C., Spring 1991, 99p., 35 refs.
Brown, J., ed, Bowen, S., ed, Cate, D.W., ed, Valliere, D.R., ed.
Research projects, Legislation, Organizations, Cost analysis, Meetings, International cooperation.

45-3545
Modeling the runoff of small rivers.
Kovalev, S.N., *Hydrotechnical construction*, May 1991, 24(11), p.708-714, Translated from Gidrotekhnicheskoe stroitel'stvo, 1990, No.11. 8 refs.
River basins, Runoff forecasting, Snowmelt, Mathematical models, River flow.

45-3546
Simulation studies help predict oil impact in Alaska offshore areas.
Signorini, S., et al, *Sea technology*, Oct. 1990, 31(10), p.41-44.
Lasch, W.
Ocean environments, Oil spills, Air ice water interaction, Environmental impact, Computerized simulation, Ocean currents, Ice cover effect, Wind factors, United States—Alaska—Gulf of Alaska.

45-3547
Break-up in Hudson Bay: its sensitivity to air temperatures and implications for climate warming.
Etkin, D.A., *Climatological bulletin*, Apr. 1991, 25(1), p.21-34, With French summary. 21 refs.
Sea ice distribution, Ice breakup, Climatic changes, Global warming, Ice forecasting, Air temperature, Temperature variations, Temperature effects, Climatology, Canada—Hudson Bay.

45-3548
***CLASS*—a Canadian land surface scheme for GCMS. 1. Soil model.**
Verseghy, D.L., *International journal of climatology*, Mar. 1991, 11(2), p.111-133, 44 refs.
Soil air interface, Surface temperature, Soil temperature, Thermal regime, Snow cover effect, Mathematical models, Soil water, Climatic factors, Air temperature, Computerized simulation.

45-3549
Searching for chaotic dynamics in snowmelt runoff.
Wilcox, B.P., et al, *Water resources research*, June 1991, 27(6), p.1005-1010, 32 refs.
Seyfried, M.S., Matison, T.H.
Snowmelt, Runoff forecasting, Mathematical models, Statistical analysis, Snow hydrology, Periodic variations, Correlation.

45-3550
Snow hydrology of a headwater arctic basin. 1. Physical measurements and process studies.
Kane, D.L., et al, *Water resources research*, June 1991, 27(6), p.1099-1109, 29 refs.
Hinzman, L.D., Benson, C.S., Liston, G.E.
Watersheds, Snow hydrology, Hydrologic cycle, Snowmelt, Runoff, Soil profiles, Water balance, Snow cover effect, Permafrost hydrology.

45-3551
Snow hydrology of a headwater arctic basin. 2. Conceptual analysis and computer modeling.
Hinzman, L.D., et al, *Water resources research*, June 1991, 27(6), p.1111-1121, 31 refs.
Kane, D.L.
Snow hydrology, Snowmelt, Hydrologic cycle, Computerized simulation, Runoff forecasting, Watersheds, Meteorological data, Ecosystems, Water balance.

45-3552
Abiotic dynamics of Lake Kitezh, Antarctica. [Dinámica abiótica del lago Kitiesh, Antártica],
Contreras, M., et al, *Santiago de Chile. Instituto Antártico Chileno. Serie científica*, 1991, No.41, p.9-32, In Spanish with English summary. 19 refs.
Cabrera, S., Montecino, V., Pizarro, G.
Lake ice, Limnology, Ice cover thickness, Algae, Light (visible radiation), Photosynthesis, Antarctica—Kitezh, Lake.
Lake Kitezh on Fildes Peninsula has an important anthropic influence because it is the source of drinking water for two antarctic stations, Rodoifo Marsh and the Bellingshausen. Between Jan. 1984 and Oct. 1987, the thermal structure of the lake's water column was analyzed together with the ice cover characteristics, the amount of total incoming radiation and the proportion of photosynthetically active radiation at different water depths, nutrients, conductivity, pH, redox potential, and some meteorological data. An inverted temperature gradient is observed in winter, and the water generally registers higher temperatures than the air. The ice cover represents 20% of the lake's total water volume: 0.41 million cu m. The maximum depth of the lake is 9.8 m, with a mean of 4.58 m. In Jan. 1987, prior to melting, the ice cover showed several strata, the principal layer consisting of vertical ice columns which contained water bubbles enclosing living colonies of microalgae. During summer the water temperature generally rises to +4 C, but in 1984 it reached +6 C, which is attributed to the "El-Niño-Southern Oscillation". During 1987 the total maximum incoming radiation was 23 moles/ sq m/d, which is 67 times higher than the minimum in June-July. In summer only 35% of the total incoming radiation is photosynthetically active. The mean light extinction coefficient in the water was -0.235/m in 1985, and -0.301/m in 1987. Photosynthesizing organisms living at 1 m of depth can use 50% of Ph AR energy, decreasing with depth. The lake is susceptible to changes due to wind action, which causes strong currents to suspend fine matter, detritus or microalgae from the lake's bottom. Sodium and chloride ions showed the influence of sea water on the lake. (Auth. mod.)

45-3553
Morphogenesis of the brown alga *Desmarestia antarctica* cultivated under seasonally fluctuating antarctic daylengths.
Wiencke, C., et al, *Santiago de Chile. Instituto Antártico Chileno. Serie científica*, 1991, No.41, p.65-78, Refs. p.77-78.
Stolpe, U., Lehmann, H.
Cryobiology, Experimentation, Seasonal variations, Light effects, Algae, Antarctica—King George Island.
The development of *Desmarestia antarctica* has been studied under daylengths mimicking the daylength conditions of King George I. Under June conditions the sporophytes were uniseriate. Primary laterals developed in July, secondary laterals were observed in Sep. Cortication of the main axis and primary laterals started in Oct. and Nov., respectively. Shedding of uncorticated parts was observed in the entire growth period of the sporophyte. In Feb. all uncorticated filaments were shed. The main axis of Oct-Nov. developmental stages consists of several layers of small outer cortical cells, larger inner cortical cells, into which smaller cells are interspersed, and the axial cell row. Cells of the axial filament show the characteristics of trumpet cells, which imply a transport function. Occlusions of their lumen apparent in sections of chemically fixed cells are artefacts since they were not found in cryofixed plants. The vegetative structure of the gametophytes varies depending on the light conditions. Gametogenesis was observed at temperatures of 5 C and below. (Auth. mod.)

45-3554
Note on the consumption of acid through cation exchange with clay minerals in atmospheric precipitation.
Sequeira, R., *Atmospheric environment*, 1991, 25A(2), p.487-490, 20 refs.
Precipitation (meteorology), Clay minerals, Soil chemistry, Ionization, Antarctica—Amundsen-Scott Station.
The first estimates developed in this study were obtained for three climatically different regions of the world: Antarctica (South Pole); continental Europe (north of the Alps); and the continental Mediterranean. From the calculations involving the ranges of the concentrations of potentially available strong acid and of clay minerals of low-to-medium cation exchange capacity for each of the three regions, it is suggested that the above process of acid consumption may almost always be insignificant in liquid (or liquified) precipitation over Antarctica and continental Europe. On the other hand, it is only under the most favorable conditions, involving the maximum stipulated cation exchange capacity of the clay minerals, that the same process could possibly lead to a maximum acid consumption in precipitation water up to 30% in the eastern Mediterranean region. The cation exchange process is also considered briefly in relation to the probable recycling of clay minerals of aeolian origin through evaporating clouds. Application of the first principles of cloud physics to the qualitative discussion suggests that clay minerals acting as freezing nuclei may have the best chance of participating in cation exchange, and hence in acid consumption in clouds. (Auth.)

45-3555
Polar ice and iceberg use: potential for water supply. [Polareis und Eisbergnutzung: Potential zur Wasserversorgung],
Stäblein, G., *Geographische Rundschau*, June 1991, 43(6), p.348-354, In German. 26 refs.
Ice sheets, Icebergs, Water supply.
Since about 80% of the Earth's fresh water is locked in polar ice sheets and icebergs, it would seem that these resources could provide substantial water amounts to drought areas if means could be found to transport the water from where it is and release it where it is needed. Considering both arctic and antarctic ice covers, various aspects of this concept are explored: how large is the resource; what are the seasonal maxima and minima; how much is from sea ice, how much from icebergs; what transport technology is available; what distances are involved and how will ocean currents aid or hinder; what water temperatures will be encountered; what are the costs and what history does this concept have.

45-3556
Meltwater and lakes in polar wastelands; on the hydrogeography of the Schirmacher Oasis, East Antarctica. [Schmelzwasser und Seen in der Polarwuste: zur Hydrogeographie der Schirmacheroase, Ostantarktika],
Richter, W., *Geographische Rundschau*, June 1991, 43(6), p.367-373, In German. 17 refs.
Meltwater, Hydrology, Lake water, Polar regions, Antarctica—Schirmacher Hills.
An overview is presented of the ice-free areas and unfrozen lakes of Antarctica, predominantly in East Antarctica, but existing in most coastal regions of the continent. Characteristics of the geologic structures of nearby features are pointed out and their interrelationship with the ice free portions are discussed.

45-3557
Numerical analysis of plant communities of tundra at the Värsc`bukta, Bellsund, Spitsbergen.
Moraczewski, I.R., *Polish polar research*, 1990, 11(1-2), p.47-68, With Polish summary. 31 refs.
Plants (botany), Tundra soils, Spitsbergen—Värsolbukta.

45-3558
Variation of upper layer dynamics during breakup of the seasonal ice cover in Hudson Bay.
Lepage, S., et al, *Journal of geophysical research*, July 15, 1991, 96(C7), p.12,711-12,724, 41 refs.
Ingram, R.G.
Sea ice distribution, Seasonal variations, Ice breakup, Shores, Ice cover effect, Ocean currents, Ice water interface, Stratification, Ice edge, Wind factors, Salinity, Canada—Hudson Bay.

45-3559
Internal waves and velocity fine structure in the Arctic Ocean.
D'Asaro, E.A., et al, *Journal of geophysical research*, July 15, 1991, 96(C7), p.12,725-12,738, 41 refs.
Morehead, M.D.
Sea ice, Ice cover effect, Ocean currents, Water temperature, Water waves, Wave propagation, Fluid dynamics, Spectra, Velocity measurement, Analysis (mathematics).

45-3560
Installation of deeply laid molded-in-place and combination piles in permafrost soils in Noril'sk.
Nekliudov, V.S., et al, *Soil mechanics and foundation engineering*, May 1991, 27(6), p.252-256, Translated from Osnovaniia, fundamenty i mekhanika gruntov, 1990, No.6.
Targulian, IU.O.
Cold weather construction, Permafrost beneath structures, Foundations, Concrete piles, Frozen ground strength, Concrete placing, Formwork (construction), Shear strength.

45-3561
Deformation of reinforced concrete anchor foundations in the far north.
Grebenets, V.I., et al, *Soil mechanics and foundation engineering*, May 1991, 27(6), p.257-260, Translated from Osnovaniia, fundamenty i mekhanika gruntov, 1990, No.6. 2 refs.
Nuriev, F.Z.
Cold weather construction, Anchors, Towers, Concrete structures, Permafrost beneath structures, Stabilization, Deformation, Concrete strength, Damage

45-3562
Proceedings.
IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990, [1990], 3 vols., Refs. passim. For individual papers see 45-3563 through 45-3688. For discussions of papers see Vol.3.
Ice loads, Offshore structures, Ice thermal properties, Ice mechanics, Ice composition, Ice breaking, Mechanical tests, Ice models, Impact strength, Ice solid interface, Icebreakers, Sea ice, River ice, Ice navigation, Ice cover, Electric power, Analysis (mathematics), Mathematical models.

45-3563
Physical modelling of icebreaking ships in fine-grain model ice.
Enkvist, E., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.15-42, 24 refs.
Ice breaking, Ice loads, Ice solid interface, Ice models, Tests, Icebreakers, Design.

45-3564
Twenty years of ice symposia.
Frankenstein, G.E., MP 2896, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.43-65.
Ice, Meetings, History.

45-3565
Microwave remote sensing in ice engineering.
Swift, C.T., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.66-78, 5 refs.
Remote sensing, Side looking radar, Microwaves, Sea ice, Spaceborne photography, Radiometry, Sea ice distribution, Analysis (mathematics).

45-3566
Navigation in ice covered waters.
Vesterinen, K., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.79-85.
Ice navigation, Icebreakers.

45-3567
Sediment enrichment of coastal ice covers.
Ackermann, N.L., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.86-96, 3 refs.
Shen, H.T., Sanders, B.E.
Shores, Sediments, Marine deposits, Ice cover, Ice surface, Analysis (mathematics).

45-3568
Mathematical modelling of the ice cover evolution in the arctic seas during the melt period.
Appel', I.L., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.97-110, 6 refs.
Mathematical models, Ice cover thickness, Ice melting, Thermodynamics, Pack ice.

45-3569
Studies of the ice dynamics in the Arctic Basin over long-term periods.
Appel', I.L., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.111-123, 7 refs.
Gudkovich, Z.M.
Mathematical models, Pack ice, Thermodynamics, Ice mechanics, Drift, Ice cover thickness.

45-3570
Prediction of reservoir freezeover.
Ashton, G.D., et al, MP 2897, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.124-135, 8 refs.
Mulherin, N.D.
Reservoirs, Freezeup, Simulation, Water temperature.
One of the critical gaps that persists in reservoir water temperature and quality modeling is in the ability to know the temperature of the water at the time of freezeover. Prior to and after freezeover, existing simulation models are capable of following the temperature structure reasonably well, but the "after" simulation requires starting values or the time of initial ice cover formation. The few existing year-round simulation models either impose the ice cover when the 0 C surface temperature is reached or use a heuristic set of threshold criteria proposed by Ashton. The latter has not been well tested and the former is known to fail at times, particularly when wind prevents formation of a stable ice cover. The authors set out to determine what conditions of wind, water temperature, and air temperature lead to the freezeover recorded at the mainstem dams of the Missouri River. The authors tested the criteria proposed by Ashton, a modified version of those criteria, and an index approach where the daily index is a combination of air temperatures, release water temperatures, and wind speeds. The limitations of an index approach are discussed, including the irregular behavior of freezeover and the conceptual difficulty of assessing how the ice cover gains sufficient integrity to withstand forces of wind and current during its formative stages.

45-3571
Ice investigations for the proof of tidal power plant designs.
Bernshtein, L.B., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.136-142, 5 refs.
Pechenkin, M.V., Monosov, L.M.
Electric power, Ice loads, Drift, Ice floes, Ice conditions.

45-3572
Method of thermodynamic numerical sea ice forecast in the Bohai Sea.
Chen, W.B., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.143-152, 10 refs.
Wang, R.S., Liu, X.S., Liu, Q.Z.
Sea ice, Thermodynamics, Ice models, Ice thermal properties, Ice forecasting, Mathematical models.

45-3573
Thermal response of ice rubble: predictions and observations.
Croasdale, K.R., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.153-167, 14 refs.
Allyn, N.F.B., Marcellus, R.W.
Ice solid interface, Ice thermal properties, Ice models, Freeze thaw cycles, Computerized simulation, Ice mechanics, Ice loads, Ice cover thickness, Analysis (mathematics), Porosity, Wind velocity, Air temperature.

45-3574
Crack growth stability in S2 ice.
DeFranco, S.J., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.168-181, 6 refs.
Dempsey, J.P.
Ice cracks, Crack propagation, Cracking (fracturing), Compressive properties, Analysis (mathematics).

45-3575
Ice formation and ice growth in the River Oulujoki.
Forsius, J., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.183-195, 4 refs.
Ice models, River ice, Ice formation, Ice growth, Ice cover.

45-3576
Parametric expressions for ice compressive and flexural strength.
Hirayama, K., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.196-209, 45 refs.
Compressive properties, Flexural strength, Stress strain diagrams, Ice loads, Ice strength, Brines.

45-3577
Ice cover simulation for arctic estuary.
Ivanov, V.V., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.210-218, 4 refs.
Doronin, IU.P., Tsarev, V.A.
Mathematical models, Ice models, Ice cover, Estuaries, Drift.

45-3578
Ice thermal processes in the mouth areas of the Siberian rivers.
Ivanov, V.V., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.219-230, 13 refs.
Nalimov, IU.V.
River ice, Ice thermal properties, Thermal regime, Ice breakup, Ice cover thickness.

45-3579
Rheological model of polycrystalline ice.
Ivchenko, A.B., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.230-237, 9 refs.
Ice crystals, Rheology, Mathematical models, Ice elasticity, Viscosity.

45-3580
Deformation of natural ice island ice under constant strain rate uniaxial compression.
Jeffries, M.O., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.238-251, 14 refs.
Sinha, N.K., Sackinger, W.M.
Ice deformation, Ice islands, Stress strain diagrams, Ice mechanics, Calving.

45-3581
River frazil ice: a simplified theoretical model.
Kolodko, J., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.252-260, 7 refs.
River ice, Frazil ice, Ice models, Velocity, Mathematical models, Ice water interface.

45-3582
Results from in situ four point bending tests with Baltic Sea ice.
Kujala, P., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.261-278, 11 refs.
Sea ice, Flexural strength, Ice cover strength, Ice solid interface, Temperature effects.

45-3583
Modeling of the ice growth and melting in a lake.
Kvon, V.I., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.279-288, 1 ref.
Dumnov, S.V.
Mathematical models, Ice cover, Ice formation, Lake ice.

45-3584
Properties of sea ice in the Weddell Sea, Antarctica.
Lange, M.A., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.289-299, 12 refs.
Sea ice, Frazil ice, Ice cover thickness, Snow ice, Snow cover effect, Antarctica—Weddell Sea.
Major properties of antarctic sea ice as seen during a number of expeditions to the Weddell Sea are summarized. Investigations are concentrated on the assessment of ice texture and its relation to physical, chemical and biological properties of sea ice. The textural distribution of antarctic sea ice is dominated by granular ice of frazil origin. This is a consequence of the main processes of ice formation in the advancing ice edge, the "pancake cycle". Ice thicknesses of undeformed and deformed first year ice lie between 0.4 to 0.8 m and 0.8 to 1.1 m, respectively. In the near absence of congelation growth at the ice-water interface, formation of snow ice and the incorporation of meteoric ice into sea ice floes become significant processes. (Auth. mod.)

45-3585
Fractality of sea ice cover.
Lensu, M., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.300-313, 9 refs.
Sea ice, Ice cover, Pack ice, Ice floes.
Because of the self-similar appearance of pack ice fields it has been frequently suggested that fractal geometry would provide a powerful tool in the analysis of floe geometry. Here the box-counting fractal dimension is calculated for antarctic summer pack ice and a value of 1.56 is found. This dimension is valid for all scales. The fractality of fragmentation processes has usually been studied by considering the size distribution: it should obey a power law. Here the power law is found to be valid for small floes only. (Auth.)

45-3586
Occurrence and size of ice ridges in the Baltic Sea.
Leppäranta, M., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.314-323, 8 refs.
Lewis, J.F., Granberg, H.B.
Sea ice, Ice surveys, Pressure ridges, Lasers, Remote sensing, Lidar.

45-3587
Laboratory investigations of mixing processes under simulated ice cover.
Loose, F., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.324-336, 9 refs.
Heat transfer, Ice cover effect, Channels (waterways), Temperature distribution, Velocity.

45-3588
Summer sea ice simulation in the East Greenland area.
Lu, Q.M., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.337-351, 20 refs.
Christensen, F.T.
Sea ice, Ice models, Heat flux, Ocean currents, Drift, Ice forecasting, Ice conditions.

45-3589
River ice cover initiation due to the spreading of border ice.
Matoušek, V., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.352-362, 1 ref.
River ice, Ice cover, Ice formation, Heat transfer coefficient, Freezeup, Analysis (mathematics).

45-3590
River surface temperature determination in calm weather.
Matoušek, V., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.363-371, 2 refs.
Heat transfer coefficient, River ice, Water temperature, Surface temperature, Analysis (mathematics).

45-3591
Waves induced by calving of Unteraargletscher.
Funk, M., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.372-384, 13 refs.
Müller, D.
Water waves, Calving, Glacier flow, Reservoirs, Models.

45-3592
Modelling the ice/water boundary layer.
Omstedt, A., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.387-395, 14 refs.
Boundary layer, Mathematical models, Ice water interface, Heat transfer, Mass transfer.

45-3593
Thermal regime of reservoirs in tundra zone.
Razgovorova, E.L., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.396-404, 7 refs.
Tregub, G.A.
Reservoirs, Ice thermal properties, Thermal regime, Thermal conductivity, Tundra, Analysis (mathematics).

45-3594
Characterization of the behaviour of ice masses in marine environments.
Romagnoli, R., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.405-416, 7 refs. For another version see 43-3721.
Varvelli, R.
Ice mechanics, Ice solid interface, Hydrodynamics, Offshore structures, Ice loads, Analysis (mathematics), Icebergs.

45-3595
Mechanical properties of sea ice and adfreeze strength of sea ice and subsea soil.
Sadovskiĭ, A.V., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.417-426, 5 refs.
Bondarenko, G.I., Tikhomirov, S.M., Konstantinov, A.V.
Sea ice, Ice temperature, Ice mechanics, Ocean bottom, Ice adhesion, Ice strength, Ice salinity, Frozen ground mechanics, Stress strain diagrams.

45-3596
Frazil ice problems at Stornorrfors water power plant in the Ume River.
Sahlberg, J., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.427-441, 5 refs.
Frazil ice, Ice models, Electric power, Heat flux, Models, Ice cover effect, Supercooling, Ice forecasting, Ice formation.

45-3597
Accumulation of ice on slopes of pumped storage plant basins.
Shatalina, T.N., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.442-448, 4 refs.
Sokolov, I.N., Kovalevskiĭ, S.I.
Ice accretion, Ice loads, Slopes, Analysis (mathematics).

45-3598
Continuum damage modelling of polycrystalline ice.
Sjölind, S.G., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.449-463, 6 refs.
Ice crystals, Damage, Ice models, Thermodynamics, Viscoelasticity, Ice cracks, Analysis (mathematics).

45-3599
Role of thermal expansion of ice in forming lake shoreline profiles.
Tesaker, E., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.464-473, 6 refs. For another version see 44-3315.
Shoreline modification, Lake ice, Thermal expansion, Rock mechanics, Ice pressure, Ice temperature, Ice cracks, Climatic factors, Snow cover effect.

45-3600
Effects of water transfer on temperature and ice regime.
Tesaker, E., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.474-485, 13 refs. For another version see 44-3318.
River flow, Ice conditions, Water temperature, Water transport, Heat transfer, River ice, Electric power, Countermeasures.

45-3601
Effect of soil type on the bending strength of alluvium reinforced ice.
Weber, L.J., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.486-499, 18 refs.
Nixon, W.A.
Ice strength, Ice composition, Ice deformation, Ice mechanics, Ice (construction material), Soils, Brittleness, Flexural strength, Strains.

45-3602
Experimental observations of shoving and thickening: comparison to equilibrium thickness theory.
Zufelt, J.E., MP 2898, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.500-510, 6 refs.
Ice cover thickness, Ice mechanics, Ice water interface, Ice models.
While several models have been developed over the past 25 years to simulate ice cover progression and the shoving and thickening process, it remains as one of the least understood topics in ice hydraulics. Most models are based on some adaptation of equilibrium ice thickness theory, and treat ice shoving and thickening as a steady or quasi-steady process. During ice shoving, the water and ice flows are highly unsteady. Discharge is constantly changing as a result of ice transport and deposition under the cover. The interaction between the flows of ice and water is very complex, and except at the ice surface, it is almost impossible to observe in nature. As a first step to improve the understanding of shoving and thickening, several series of experiments were conducted to observe and document the process. The experiments were conducted in laboratory flumes using real and plastic ice. Stable brash ice accumulations were formed in the flume, and the discharge was then varied to induce shoving and thickening. Hydraulic and ice data were gathered, including velocity, ice thickness, and jam length. These observations are presented, and the data are compared to results from equilibrium-based models. Differences between the experimental and theoretical results are identified, and explanations for these differences are given.

45-3603
Integral analysis of the initiation of river ice cover cracking.
Abdel-Zaher, A.K., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.511-530, 21 refs.
Davar, K.S., Dawe, J.L.
River ice, Ice cover, Cracking (fracturing), Ice models, Ice water interface.

45-3604
Electrohydraulic and electrochemical phenomena in the process of an icebreaker's hull contact with ice.
Androsenko, V., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.531-541, 8 refs.
Bajar, E.S. Jr., Kachurin, L.G., Loginov, V.B.
Icebreakers, Electrical properties, Ice solid interface, Chemical properties, Ice mechanics, Damage, Protective coatings, Metal ice friction, Electromagnetic properties.

45-3605
Comparative economic efficiency of icebreakers of different models and capacities: methodology of evaluation.
Arikainen, A.I., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.542-553, 4 refs.
Icebreakers, Economic analysis, Cost analysis, Analysis (mathematics), Marine transportation.

45-3606
Influence on ice conditions of variations in winter discharge from power plants.
Asvall, R.P., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, *[1990], p.554-574, 10 refs.*
Ice conditions, Electric power, River ice.

45-3607
Discrete element simulations of river ice transport.
Babić, M., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.564-574, 10 refs.
Shen, H.T., Bjedov, G.
River ice, Marine transportation, Ice water interface, Ice mechanics, Simulation, Analysis (mathematics).

45-3608
Model material for river ice breakup studies.
Beltaos, S., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.1, [1990], p.575-585, 15 refs.
Wong, J., Moody, W.J.
Ice models, Ice water interface, River ice, Artificial ice, Ice cover, Ice breakup, Ice jams, Water waves.

45-3609
Laboratory investigation of trash rack heating to prevent freezeup by frazil ice.
Daly, S.F., et al, MP 2899, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.584-595, 12 refs.
Haynes, F.D., Garfield, D., Gagnon, J.J.
Water intakes, Hydraulic structures, Channels (waterways), Freezeup, Frazil ice, Electric heating, Ice control, Design, Cold weather tests.
There have been no systematic studies of heated trash racks under frazil ice conditions, so a heated, model intake trash rack was observed in the refrigerated flume facility at USACRREL, Hanover, NH. Supercooled water and frazil ice were generated in this facility and allowed to pass through the model trash rack. In each test a near constant upstream head was maintained and the discharge through the trash rack was allowed to vary. A novel and efficient means of applying heat is described. The heat transfer rate from the rack was measured and is described in terms of nondimensional parameters. The discharge rates through the rack as a function of time and heat application rate are described. Based on these observations, an approach to quantify the design of heated trash racks is proposed.

45-3610
Rubble-spray ice islands.
Gulati, K.C., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.596-605, 7 refs.
Prodanovic, A.
Ice islands, Offshore structures, Design, Spray freezing, Cold weather construction, Stability, Ice (construction material), Foundations.

45-3611
Ice jams and forecast of the maximum raising of the water level caused by ice jams to be used in the design of protective measures.
Havlik, A., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.606-615, 2 refs.
River ice, Ice jams, Water level, Flood forecasting, Flood control, Mathematical models.

45-3612
Ship model tests in ice with systematically varied ice parameters.
Ilves, L., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.616-626, 1 ref.
Eskola, H.
Ships, Ice solid interface, Ice breaking, Sea ice, Simulation, Performance, Ice cover strength, Ice mechanics.

45-3613
Ice clearance using air-lifted propeller streams.
Järvi, A., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.627-638, 2 refs.
Ships, Channels (waterways), Ice removal, Ice control, Propellers, Hydraulic jets, Bubbling, Design, Performance.

45-3614
Experience with a chemically-doped fine-grained model ice.
Jalonen, R., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.639-651, 18 refs.
Ilves, L.
Artificial ice, Doped ice, Ice models, Ice makers, Sea ice, Ice strength, Ice composition, Mechanical tests, Physical properties.

45-3615
Crystallography of impacted ice.
Jones, S.J., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.652-660, 1 ref.
Sinha, N.K.
Ice crystal structure, Impact tests, Ice solid interface, Ice cracks, Cracking (fracturing).

45-3616
Effect of density on the trajectory of ice pieces around a ship's hull.
Jones, S.J., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.661-673, 5 refs.
Hardiman, K.C., Ritch, R., Abdelnour, R.
Icebreakers, Floating ice, Ice density, Buoyancy, Ice solid interface, Simulation, Propellers, Sea ice.

45-3617
Prediction of maximum water stages due to ice jams.
Karnovich, V.N., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.674-679, 11 refs.
Vasilevskiĭ, A.G.
River ice, River flow, Ice jams, Ice forecasting, Water level, Flood forecasting, Mathematical models.

45-3618
Hydraulic and morphological criteria of ice jamming at channel contractions.
Mayer, I., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.680-689.
Szepessy, G.
River flow, Hydraulics, Ice jams, Hydraulic structures, Channels (waterways), Ice floes, Mathematical models, Ice control, Flood control.

45-3619
Impact of dams on the ice regime of rivers.
Michel, B., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.690-696, 2 refs.
River flow, River ice, Ice formation, Ice breakup, Dams, Thermal regime, Reservoirs.

45-3620
Study on ice control at fishing harbor by air-bubble method.
Mizuno, Y., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.697-708, 7 refs.
Ports, Wharves, Sea ice, Ice control, Ice prevention, Equipment, Bubbling, Freezeup, Aeration, Mechanical tests.

45-3621
Pattern of disperse channel flows forming in sluiced disposal areas in winter periods.
Panteleev, V.G., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.709-718, 8 refs.
Ogarkov, A.A., Frolov, A.N.
Sluices (hydraulic engineering), Waste disposal, Ice formation, Manufacturing, Thermal regime, Hydrothermal processes, Fluid flow, Ice cover effect, Fluid mechanics.

45-3622
Unbalanced ice transportation at ice bar river reach.
Ren, Z.W., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.719-725, 2 refs.
River ice, Hydraulics, River flow, Ice floes, Ice jams, Temperature effects.

45-3623
Mathematical model for ice processes in river networks.
Shen, H.T., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.726-734, 11 refs.
Gunaratna, P.P., Lal, A.M.W.
River ice, River flow, Mathematical models, Channels (waterways), Thermal regime, Ice formation, Hydraulics, Computerized simulation, Ice cover effect.

45-3624
Ice cover strength decay using borehole indentor.
Sinha, N.K., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.735-744, 3 refs.
Sea ice, Ice cover strength, Borehole instruments, Test equipment, Ice deterioration, Sampling, Accuracy, Penetration.

45-3625
CD model ice: a process to produce correct density (CD) model ice.
Spencer, D.S., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.745-755, 8 refs.
Timco, G.W.
Artificial ice, Ice density, Ice makers, Floating ice, Ice composition, Buoyancy, Bubbles, Mechanical properties.

45-3626
Calculation of water level in a river reach with frazil ice jam.
Sun, Z.C., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.756-765, 5 refs.
Sui, J.Y.
River ice, Ice jams, Ice cover effect, Water level, Frazil ice, Ice formation, Ice bottom surface, Ice water interface, Analysis (mathematics).

45-3627
Model surface treatment for testing in ice.
Tatinclaux, J.C., et al, MP 2900, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.766-775, 6 refs.
Martinson, C.
Metal ice friction, Experimentation, Coatings, Models, Surface properties, Ships, Simulation, Ice solid interface.
Forces due to ice friction may represent a significant portion of the total forces exerted on a floating or grounded structure subjected to ice action. In model tests, one of the parameters that must be specified is the kinetic friction factor, f(i), between the model ice and the surface of the model structure. This paper describes a method of surface treatment of a model structure with an appropriate mixture of silica powder and paint which allows a prescribed friction factor to be achieved. This surface treatment method has the advantage of eliminating previous trial-and-errors that were often very time consuming. Other methods of surface treatment for the same purpose of obtaining a given ice kinetic friction factor are known to exist but are often proprietary and have not been published in the open literature.

45-3628
Drop impact tests on freshwater ice: spherical head.
Timco, G.W., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.776-787, 8 refs.
Frederking, R.
Ice cover strength, Impact strength, Impact tests, Ice solid interface, Ice breaking, Equipment, Ice mechanics, Projective penetration.

45-3629
Investigation of manoeuvring qualities of ships in ice conditions.
Tronin, V.A., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.788-799, 7 refs.
Poliakov, A.S.
Ships, Ice navigation, Performance, Ice cover effect, Ice solid interface, Ice loads, Ice mechanics, Dynamic loads, Mathematical models.

45-3630
Influence of ice cover on transverse bed slopes in a curved alluvial channel.
Tsai, W.F., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.800-810, 8 refs.
Ettema, R.
River ice, Ice cover effect, Channels (waterways), Sediment transport, Bottom topography, Hydraulics, Water flow, Topographic effects, Simulation.

45-3631
Mathematical modelling of icebreaking pattern based on the elastic wave theory.
Wang, S.L., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.811-820, 14 refs.
Shih, L.Y., Hsiung, C.C., Hazell, C.R.
Icebreakers, Ice water interface, Ice breaking, Wave propagation, Ice edge, Ice solid interface, Mathematical models, Dynamic loads, Water waves.

45-3632
Classification system of winter conditions of small-craft harbor design for the Great Lakes.
Wortley, C.A., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.821-834, 8 refs.
Ports, Docks, Design criteria, Lake ice, Ice conditions, Winter, Classifications, Site surveys, Meteorological data.

45-3633
Traffic and transport on ice cover in Nenjiang River.
Xu, B.M., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.835-844.
Yu, S.Q., Lu, X.L.
River ice, River crossings, Ice roads, Trafficability, Design criteria, Road maintenance, Ice temperature, Ice cover strength.

45-3634
Severe break-ups in the river Torneälven: measures to mitigate damages from ice jamming.
Zachrisson, G., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990 Proceedings, Vol.2, [1990], p.845-857, 7 refs.
River ice, Ice jams, Ice breakup, Countermeasures, Flood forecasting, Ice forecasting, International cooperation.

45-3635
Way of preventing structures from damage due to ice pressure.
Ao, B.J., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.858-863.
Su, S.
Hydraulic structures, Ice cover effect, Ice pressure, Ice solid interface, Ice removal, Steam, Equipment, Design, Reservoirs.

45-3636
Thirty-five years of sea-ice runway operation—McMurdo Station, Antarctica.
Barthelemy, J.L., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.864-877, 5 refs.
Ice runways, Cold weather construction, Ice sheets, Loading, Design criteria, Computer programs, Aircraft landing areas, Military engineering.
As heavier aircraft are introduced to Antarctica, the Naval Civil Engineering Laboratory provides criteria for safe operation in terms of required ice thickness and period of operation. Improved analytical tools and computing ability have enabled NCEL to develop more refined load curves for landing and parking aircraft on ice. The finite-element computer program VISICE predicts both the elastic ("landing") and linear viscoelastic ("parking") responses of a floating ice sheet to loads applied to the surface. Material properties are built in as a function of temperature. In addition, a library subroutine of common aircraft allows the user to specify a craft by name and percent of maximum load only. Superposition of all wheel loads is provided automatically. Program VISICE was used as history was made during the unprecedented landing of a fully-loaded C5B Galaxy at McMurdo Station in Oct. 1989. (Auth. mod.)

45-3637
Small scale field indentation tests on first year sea ice.
Chin, S.N., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.878-889, 7 refs.
Nadreau, J.P., Parsons, B.L., Guy, E.V.
Sea ice, Ice cover strength, Penetration tests, Impact strength, Ice solid interface, Ice load, Offshore structures, Dynamic loads.

45-3638
Full scale iceberg impact: a pilot experiment in Antarctica.
Duthinh, D., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.890-901, 7 refs.
Iceberg towing, Impact tests, Ice solid interface, Mechanical tests, Impact strength, Ice strength, Floating ice.
At the French antarctic station Dumont d'Urville, a 1700 tonne iceberg was towed by a bulldozer into a rock face in 13 m water depth. The impact occurred at a velocity of 0.89 m/s and lasted 2.25 seconds. The impact force was estimated to be between 4.5 and 6.5 MN, the contact area between 1.8 and 3.6 sq m and the impact pressure between 1.3 and 3.6 MPa. This research is pertinent to design criteria for fixed man-made structures, such as runways, which may extend into iceberg infested waters. (Auth. mod.)

45-3639
Apparent friction coefficient between steel and ice under high contact pressure.
Enoki, K., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.902-911, 4 refs.
Nakazawa, N., Ueda, T., Saeki, H.
Metal ice friction, Ice solid interface, Ice deformation, Ultimate strength, Loading, Mechanical tests, Sea ice, Offshore structures, Ice (construction material).

45-3640
Numerical simulation of dynamic ice structure interaction.
Eranti, E., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.912-922, 5 refs.
Floating ice, Ice solid interface, Impact tests, Ice pressure, Dynamic loads, Ice breaking, Computerized simulation, Offshore structures, Stability.

45-3641
Sources of uncertainties in methods of ice design for offshore structures.
Foroughi, A.R., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.923-930, 20 refs.
Offshore structures, Design criteria, Ice loads, Ice solid interface, Floating ice, Analysis (mathematics), Loads (forces), Ice pressure.

45-3642
Field tests of ice indentation at medium scale—Hobson's Choice Ice Island, 1989.
Frederking, R., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.931-944, 9 refs.
Jordaan, I.J., McCallum, J.S.
Sea ice, Impact tests, Ice solid interface, Ice cover strength, Ice breaking, Dynamic loads, Offshore structures, Impact strength.

45-3643
Numerical modelling of mixed snow and sea spray icing.
Horjen, I., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.945-960, 15 refs.
Offshore structures, Ice accretion, Spray freezing, Sea spray, Ice models, Simulation, Falling snow, Mathematical models, Ice forecasting.

45-3644
Stochastic approach to the ice-structure interaction.
Kajaste-Rudnitski, J., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.961-973, 5 refs.
Ice solid interface, Offshore structures, Sea ice, Ice loads, Impact strength, Stability, Analysis (mathematics), Spectra, Structural analysis.

45-3645
Total ice force on multi-legged structures.
Kato, K., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.974-983, 5 refs.
Offshore structures, Sea ice, Ice solid interface, Ice models, Design, Ice loads, Stability, Structural analysis, Mathematical models.

45-3646
Problems of ice force evaluation on offshore structures.
Khrapatyi, N.G., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.984-994, 10 refs.
Bekker, A.T.
Offshore structures, Sea ice, Stability, Ice solid interface, Ice loads, Loads (forces), Analysis (mathematics), Structural analysis.

45-3647
Estimation of ice worn action on hydraulic structures.
Korzhavin, K.N., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.995-998, 9 refs.
Postnikov, P.M.
Hydraulic structures, Ice solid interface, Ice friction, Concrete, Temperature effects.

45-3648
Spongy saline ice formation in the vicinity of a stagnation point.
Lock, G.S.H., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.999-1009, 14 refs.
Sea ice, Spongy ice, Offshore structures, Ice formation, Ice solid interface, Sea spray, Wind tunnels, Simulation, Brines.

45-3649
Effect of ice pile-up on the ice force of a conical structure.
Määttänen, M., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.1010-1021, 8 refs.
Hoikkanen, J.
Offshore structures, Sea ice, Ice solid interface, Ice pileup, Ice loads, Ice models, Ice breaking, Ice mechanics.

45-3650
Origin of spongy ice.
Makkonen, L., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.1022-1030, 20 refs.
Spongy ice, Sea ice, Ice water interface, Dendritic ice, Ice growth, Sea spray, Unfrozen water content, Analysis (mathematics).

45-3651
Indentation and penetration of edge-loaded freshwater ice sheets by pairs of indenters at various separations.
Parsons, B.I., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.1031-1043, 20 refs.
Ice cover strength, Penetration tests, Ice solid interface, Ice breaking, Impact strength, Cracking (fracturing), Microstructure, Design criteria, Offshore structures, Loading.

45-3652
Experimental study on local ice pressures acting on structures.
Tozawa, S., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.1044-1055, 5 refs.
Kawasaki, T., Taguchi, Y.
Ice solid interface, Penetration tests, Ice pressure, Ice loads, Fracturing, Physical properties, Offshore structures.

45-3653
Design optimization of jacket platforms for ice infested waters.
Wang, L.Y., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.1056-1070, 5 refs.
Xu, J.Z.
Offshore structures, Sea ice, Ice solid interface, Stability, Coverings, Design, Ice loads, Vibration, Dynamic loads, Impact, Analysis (mathematics).

45-3654
Application of Maattanen model on multilegged structures.
Wang, L.Y., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.1071-1083, 11 refs.
Xu, J.Z.
Offshore structures, Ice solid interface, Sea ice, Stability, Impact, Vibrations, Analysis (mathematics), Dynamics loads.

45-3655
Model test investigation of local ice pressure distribution at cylindrical structures.
Wessels, E., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.1084-1096, 6 refs.
Offshore structures, Sea ice, Ice solid interface, Ice loads, Ice pressure, Penetration tests, Simulation, Pressure ridges, Design criteria.

45-3656
Contribution of damping in the Maattanen model.
Xu, J.Z., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.1097-1104, 10 refs.
Wang, L.Y.
Offshore structures, Ice solid interface, Dynamic loads, Vibrations, Damping, Sea ice, Analysis (mathematics), Pile structures.

45-3657
Use of airborne remote sensing for assessment of intensity of slush ice transport in river.
Dobrowolski, A., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.1105-1112, 4 refs.
Gronet, R.
River ice, Remote sensing, River flow, Aerial surveys, Photointerpretation, Image processing, Computer applications, Photographic techniques, Slush, Infrared photography.

45-3658
Prediction of the horizontal progressions of arctic ice by remote methods.
Frankenstein, S., et al, MP 2901, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.1113-1121, 10 refs.
Frankenstein, G.
Sea ice distribution, Ice conditions, Ice forecasting, Spaceborne photography, Air ice water interaction, Ice growth, Radiometry, Ocean currents, Water temperature, Salinity.
Satellites are a tool with which seasonal ice conditions in the Arctic Ocean may be studied. During the fall, when new ice growth is at a maximum, it is necessary to make observations at wavelengths at which atmospheric water vapor is transparent, due to the presence of high cloud concentrations during these months. The scanning multichannel microwave radiometer, and the upcoming SAR are passive response satellites that operate at frequencies which will make it possible to distinguish open water from first-year and multi-year ice. To break these signals down into frazil/new ice and other categories, it is necessary to combine the satellite observations with heat flux calculations. To do this, weather data for the area of interest are needed, which are available globally on a nearly real-time basis. The only other information needed to approximate the heat flux is the water or ice surface temperature. If no such data exist, a reasonable estimate of the water temperature can be obtained from published monthly sea-surface charts, and surface ice temperatures determined from equations developed from studies on the relationships between air-water temperatures and the concurrent ice thickness. Combining the satellite data and the resulting heat flux calculations into a model, it is thus possible to follow the growth of first-year ice into the open water in a given area. With the advent of the SAR satellite, these estimates can be done in real time, thus providing an important tool for analyzing offshore operations in the arctic shelf seas.

45-3659
Development of seawater batteries as a long-term arctic power source.
Hammond, R., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.1122-1129.
Colony, R.
Electric power, Sea water, Portable equipment, Chemical composition, Electric potential, Design, Performance, Chemistry.

45-3660
Baltic Sea ice ridges studied by field measurements, synthetic aperture radar, airphotos and laser profilometer.
Kankaanpää, P., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.1130-1143, 9 refs.
Stringer, W.
Sea ice, Pressure ridges, Remote sensing, Synthetic aperture radar, Radar photography, Detection, Image processing, Photointerpretation, Ice navigation.

45-3661
Method of radar fresh-water ice measurements from a moving vehicle.
Klein, G.S., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.1144-1154, 3 refs.
IUfit, G.A.
River ice, Lake ice, Ice cover thickness, Measurement, Radar echoes, Remote sensing, Ice surveys, Analysis (mathematics), Snow cover effect.

45-3662
Measurements of flow velocity under the ice cover.
Yamaguchi, H., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.2, [1990], p.1155-1170, 25 refs.
Hirayama, K.
River flow, River ice, Velocity measurement, Subglacial observations, Ice cover effect, Flow rate, Ice bottom surface, Surface roughness.

45-3663
Global warming and arctic shipping.
Jansson, J.E., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.3, [1990], p.19-27.
Global warming, Marine transportation, Logistics.

45-3664
River ice hydraulics.
Majewski, W., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.3, [1990], p.29-47, 16 refs.
River ice, Hydraulics, River flow, Ice water interface, Ice formation, Mathematical models.

45-3665
Thermal regimes of waters in cold regions.
Ono, N., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.3, [1990], p.49-58, 12 refs.
Thermal regime, Air ice water interaction, Heat flux, Sea ice, Polynyas.

45-3666
Development of ice-oil platform interaction problem in USSR.
Vershinin, S.A., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.3, [1990], p.59-72, 8 refs.
Offshore structures, Offshore drilling, Ice loads, Ice pressure, Ice models.

45-3667
New approach to dynamic ice-flexible structure interaction.
Vershinin, S.A., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.3, [1990], p.73-80, 9 refs.
Iliadi, A.A.
Ice strength, Ice relaxation, Ice solid interface, Ice mechanics, Mathematical models.

45-3668
Report of Working Group on Ice Modelling Materials.
Timco, G.W., et al, MP 2902, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.3, [1990], p.81-98.
Tatinclaux, J.C.
Ice mechanics, Ice models.

45-3669
Formation of ice cover on impounding reservoirs and its influence on unsteady flow conditions.
Bagińska, M., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.3, [1990], p.99-111, 4 refs.
Majewski, W.
Reservoirs, Ice cover effect, River ice, River flow, Ice formation.

45-3670
Winter habitats of Atlantic salmon and brook trout in small ice-covered streams.
Calkins, D.J., MP 2903, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.3, [1990], p.113-126, 34 refs.
Ecology, Cryobiology, River ice, Animals, Cold weather survival, Ice cover effect.
A review of winter habitat studies conducted in ice-covered streams for two species of salmonids (Atlantic salmon and brook trout) provided some general information on substrate conditions, flow velocities and depths. Brook trout fry are usually found at depths of less than 40 cm and at focal velocities of 5 cm/s or less; juveniles of the same species are found at velocities of less than 17 cm/s but at slightly greater depths. Atlantic salmon young-of-the-year and parr (age 1) were found in the one study to be in the substrate and the velocities at the 0.6 depth in 40-45 cm of water were 40-45 cm/s. The size of substrate used by all salmonids is a function of fish size, with both species preferring a combination of sand, gravel and rubble. Silt in high concentrations is detrimental to sustaining a natural fish population. A lack of continuous physical, chemical and biological measurements throughout the ice-covered season was a common deficiency of the studies reviewed, indicating a need for more interdisciplinary work.

45-3671
Oil spill in the Gulf of Finland in 1987.
Hirvi, J.P., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.3, [1990], p.127-141, 14 refs.
Oil spills, Environmental impact, Ice conditions, Ocean environments, Sea ice, Water pollution, Oil recovery, Finland, Gulf.

45-3672
Mathematical model of the heat transfer in the channel reservoir which takes into account ice formation.
Ivanov, A.V., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.3, [1990], p.143-148, 5 refs.
Reservoirs, Heat transfer, Ice formation, Ice water interface, Mathematical models.

45-3673
Investigation of stress of ice cover under changes of temperature.
Ivchenko, A.B., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.3, [1990], p.149-157, 3 refs.
Ice cover strength, Thermal stresses, Ice loads, Ice thermal properties, Analysis (mathematics), Ice temperature, Temperature variations.

45-3674
Ice force calculation with the creep damage and cracking model of ice.
Pulkkinen, E., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.3, [1990], p.159-171, 8 refs.
Ice loads, Ice creep, Ice cracks, Ice models, Mathematical models.

45-3675
Experiments on numerical sea ice forecasting in the Bohai Sea.
Wu, H.D., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.3, [1990], p.173-186, 10 refs.
Leppäranta, M.
Ice forecasting, Ice conditions, Ice models, Mathematical models, Sea ice distribution, China Bohai Sea.

45-3676
Can the Northern Sea Route have international significance.
Arikainen, A.I., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.3, [1990], p.187-199, 6 refs.
Marine transportation, Ice navigation, Ice breaking, International cooperation, Economic development.

45-3677
On the motion of river ice near a breaking front.
Ferrick, M.G., et al, MP 2904, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.3, [1990], p.201-213, 4 refs.
Weyrick, P.B.
River flow, Ice breakup, River ice, Analysis (mathematics), Ice mechanics.
A time series of ice velocity data was obtained from videotape of the initial 300 s of motion at a point during a controlled dynamic ice breakup of the Connecticut River. A polynomial fit to the data provides a smooth velocity-time relationship that eliminates the noise in the data, and identifies the primary ice motion. The hydraulic radius associated with the ice cover changes continuously with the ice velocity. The authors expand the analysis by assuming a constant breaking front speed and consistent ice velocity behavior through a reach local to the measurement site. The results obtained include the total ice acceleration, the equilibrium ice velocity as a function of bank stress, the time-varying bank resistance at the measurement location, the convergence behavior of the moving ice sheet and the influence of breaking front speed on this behavior, and the ice continuity implications of these results at the breaking front.

45-3678
Finnish River Ice Research Project—the numerical river ice model in use.
Huokuna, M., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.3, [1990], p.215-230, 8 refs.
River ice, River flow, Ice models, Mathematical models, Ice control, Unsteady flow.

45-3679
Analysis of damage and energy flow in the crushed layer during rapid ice loading.
McKenna, R.F., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.3, [1990], p.231-246, 23 refs.
Jordaan, I.J., Xiao, J.
Ice loads, Ice strength, Ice solid interface, Ice pressure, Ice mechanics, Mathematical models, Ice models.

45-3680
FGX model ice at the Masa-Yards Arctic Research Centre.
Nortala-Hoikkanen, A., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.3, [1990], p.247-259, 6 refs.
Ice models, Artificial ice, Laboratories.

45-3681
Preliminary results from ice indentation tests using flexible and rigid indentors.
Kärnä, T., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.3, [1990], p.261-275, 20 refs.
Muhonen, A.
Ice pressure, Penetration tests, Ice solid interface, Ice loads, Ice strength.

45-3682
Frequency of intermittent ice crushing during indentation tests.
Sodhi, D.S., et al, MP 2905, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.3, [1990], p.277-289, 13 refs.
Nakazawa, N.
Ice pressure, Ice loads, Penetration tests, Ice solid interface, Ice strength.
The results of small-scale indentation tests with freshwater ice are analyzed to obtain the frequency of intermittent crushing failure. From the experimental results, a correlation is obtained between the average distance travelled by an indenter during successive failure events and the maximum relative displacement of the indenter with respect to the carriage during the loading phase of a cycle. From this correlation, the frequency of intermittent crushing can be obtained in terms of structural stiffness, ice velocity, effective pressure, indenter width, and the ice thickness.

45-3683
Modelling the growth of saline spongy ice on small ship components.
Zakrzewski, W.P., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.3, [1990], p.291-300, 11 refs.
Lozowski, E.P.
Ship icing, Ice loads, Spray freezing, Spongy ice, Ice models.

45-3684
Low-velocity rigid sphere vertical impact on a floating ice sheet.
Zhao, Z.G., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.3, [1990], p.301-312, 5 refs.
Dempsey, J.P.
Ice cover strength, Impact strength, Ice loads, Penetration tests, Ice pressure, Ice models, Analysis (mathematics).

45-3685
Helicopterborne remote sensing of antarctic sea ice using a laser profiler, synchronized video and 70 mm camera during FINNARP-89.
Granberg, H.B., et al, IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.3, [1990], p.313-325, 9 refs.
Leppäranta, M.
Ice surveys, Sea ice distribution, Ice cover thickness, Remote sensing, Pressure ridges, Lasers, Aerial surveys, Antarctica Weddell Sea.
A PRAM IV laser profiling system, a video camera and a Hasselblad 70 mm camera were used to study ice conditions near the ice margin in the eastern Weddell Sea, Antarctica. The sensor combination offers some interesting analytical possibilities. Digital elevation models of the ice surface, and ice block, ridging and other statistics may be produced without need for supporting ground surveys. The field work was carried out between Dec. 29, 1989 and Jan. 5, 1990 and the data thus represent the time of year when most shipping activity takes place in this region. This paper describes the techniques used in the data acquisition, outlines the analytical procedures and presents some preliminary results. These preliminary results indicate that ridge size and frequency are greater in the Weddell Sea than in the Ross Sea. (Auth.)

45-3686
Experimental investigations and calculations of snow cover formation and melting in field catchment.
Shutov, V.A., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.3, [1990], p.327-337, 9 refs.
Snow cover distribution, Snow depth, Snow water equivalent, Runoff forecasting, Snowmelt, Snow surveys, Analysis (mathematics).

45-3687
Measurement of river water temperature with better repeatability than 1 mK.
Hari, J., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.3, [1990], p.339-340, 1 ref.
Water temperature, Temperature measurement, River ice.

45-3688
Lori ice cleaner.
Korppoo, S., IAHR Symposium on Ice, 10th, Espoo, Finland, Aug. 20-23, 1990. Proceedings, Vol.3, [1990], p.341-342.
Oil recovery, Floating ice, Oil spills.

45-3689
Predicting pavement response during thaw weakening periods using the falling weight deflectometer.
Janoo, V.C., et al, MP 2906, International Conference on Bearing Capacity of Roads and Airfields, 3rd, Trondheim, Norway, July 3-5, 1990. Proceedings, Vol.1. Edited by R.S. Nordal et al, Trondheim, Norway, Norwegian Institute of Technology, 1990, p.31-40, 14 refs.
Berg, R.L.
Pavements, Measurement, Freeze thaw tests, Thaw weakening, Thaw depth, Subgrade soils, Mechanical tests, Soil mechanics, Bearing strength.
Pavement structures in northern regions are subjected to seasonal temperature changes. It is important for pavement engineers to have a tool for determining the structural capacity of a pavement during thaw weakening periods. Tests were conducted at the U.S. Army Cold Regions Research and Engineering Laboratory to study the performance of pavement structures during thaw periods. During the thaw period, temperature and deflection measurements were obtained. The results of the deflection measurements are presented in this paper. A method is also presented for estimating the thaw depth using frequent falling weight deflectometer measurements.

45-3690
Threshold pavement thickness to survive spring thaw.
White, T.D., et al, International Conference on Bearing Capacity of Roads and Airfields, 3rd, Trondheim, Norway, July 3-5, 1990. Proceedings, Vol.1. Edited by R.S. Nordal et al, Trondheim, Norway, Norwegian Institute of Technology, 1990, p.41-51, 7 refs.
Coree, B.J.
Pavements, Thaw weakening, Bearing strength, Performance, Loading, Thickness, Cracking (fracturing), Climatic factors, Design criteria.

45-3691
Temperature regime of road pavements—its observation and characteristics in Czechoslovakia.
Poliček, I., et al, International Conference on Bearing Capacity of Roads and Airfields, 3rd, Trondheim, Norway, July 3-5, 1990. Proceedings, Vol.1. Edited by R.S. Nordal et al, Trondheim, Norway, Norwegian Institute of Technology, 1990, p.53-63, 8 refs.
Staňo, R.
Pavements, Cold weather performance, Thermal regime, Frost penetration, Frost action, Temperature effects, Design criteria, Runways.

45-3692
Guidelines on when to apply and remove seasonal load restrictions—development through implementation.
Mahoney, J.P., et al, International Conference on Bearing Capacity of Roads and Airfields, 3rd, Trondheim, Norway, July 3-5, 1990. Proceedings, Vol.1. Edited by R.S. Nordal et al, Trondheim, Norway, Norwegian Institute of Technology, 1990, p.75-84, 5 refs.
Jackson, N.C.
Pavements, Thaw weakening, Highway planning, Standards, Air temperature, Degree days, Temperature variations.

45-3693
Norwegian/Swedish in-depth pavement deflection study (2)—seasonal variations and effect of loading type.
Wiman, L.G., et al, International Conference on Bearing Capacity of Roads and Airfields, 3rd, Trondheim, Norway, July 3-5, 1990. Proceedings, Vol.2. Edited by R.S. Nordal et al, Trondheim, Norway, Norwegian Institute of Technology, 1990, p.829-839, 2 refs.
Jansson, H.
Pavements, Cold weather performance, Loading, Bearing strength, Thaw depth, Deformation, Seasonal variations, Subgrades.

45-3694
Norwegian model for prediction of pavement deterioration (7).
Bertelsen, D., International Conference on Bearing Capacity of Roads and Airfields, 3rd, Trondheim, Norway, July 3-5, 1990. Proceedings, Vol.2. Edited by R.S. Nordal et al, Trondheim, Norway, Norwegian Institute of Technology, 1990, p.875-886, 10 refs.
Pavements, Models, Deterioration, Frost action, Climatic factors, Forecasting, Computerized simulation, Loading, Design criteria.

45-3695
Potential effects of global warming on the primary productivity of a subalpine lake.
Byron, E.R., et al, *Water resources bulletin*, Dec. 1990, 26(6), p.983-989, 23 refs.
Goldman, C.R.
Limnology, Ice melting, Lake water, Primary productivity, Climatic changes, Snow cover effect, Statistical analysis, Climatic factors, Temperature variations, Global warming, Carbon dioxide, Correlation.

45-3696
Spatial and temporal influence of soil frost on infiltration and erosion of sagebrush rangelands.
Blackburn, W.H., et al, *Water resources bulletin*, Dec. 1990, 26(6), p.991-997, 35 refs.
Pierson, F.B., Seyfried, M.S.
Plains, Soil erosion, Soil water, Seepage, Freeze thaw cycles, Vegetation factors, Frozen ground, Saturation, Soil analysis.

45-3697
Longitudinal and seasonal water chemistry variations in a northern Appalachian stream.
Phillips, R.A., et al, *Water resources bulletin*, June 1990, 26(3), p.489-498, 37 refs.
Stewart, K.M.
Stream flow, Water chemistry, Precipitation (meteorology), Impurities, Chemical properties, Snowmelt, Air pollution, Sampling, Seasonal variations, Watersheds.

45-3698
Estimated runoff from man-made snow.
Eisel, L.M., et al, *Water resources bulletin*, June 1990, 26(3), p.519-526, 8 refs.
Bradley, K.M., Leaf, C.F.
Snowmelt, Runoff forecasting, Artificial snow, Snow manufacturing, Human factors, Snow hydrology, Water reserves, Watersheds, Simulation, Environmental impact.

45-3699
Moving and deforming finite-element simulation of two-dimensional Stefan problems.
Zabaras, N., et al, *Communications in applied numerical methods*, Oct. 1990, 6(7), p.495-506, 10 refs.
Ruan, Y.
Stefan problem, Phase transformations, Liquid solid interfaces, Boundary value problems, Analysis (mathematics), Computerized simulation, Solid phases.

45-3700
Diffraction of VLF radio waves by polar ice caps.
Wait, J.R., *Electronics letters*, June 6, 1991, 27(12), p.1030-1032, 11 refs.
Ice sheets, Analysis (mathematics), Theory, Ice surface, Radio waves, Attenuation, Wave propagation, Very low frequencies, Electromagnetic waves.
In this paper, a rudimentary theory is outlined for the phenomenon of diffraction of long radio waves by continental land masses for long seawater paths. The results would seem to be particularly relevant to observations for a path that just grazes the coast of Antarctica. (Auth. mod.)

45-3701
Studies on snow and ice: to improve power generation.
Kuroiwa, D., ed, New Delhi, Amerind Publishing Co., 1986, 524p., Translation of Seppyo no kenkyu: shutoshite dengen kaihatsu no tameni, Nov. 1953, No.1. Refs. passim. Bibliography p.501-523. For individual papers see 45-3702 through 45-3733.
Snow loads, Power line icing, Ice accretion, Avalanches, Snow creep, Power line supports, Metamorphism (snow).

45-3702
Snow research and electric power generation.
Hori, S., Studies on snow and ice: to improve power generation. Edited by D. Kuroiwa, New Delhi, Amerind Publishing Co., 1986, p.1-11, U.S. Library of Congress, National Translations Center order No.89-21750.
Electric power, Snowmelt.

45-3703
Railway electrification and snow.
Seki, S., Studies on snow and ice: to improve power generation. Edited by D. Kuroiwa, New Delhi, Amerind Publishing Co., 1986, p.12-24, 6 refs. U.S. Library of Congress, National Translations Center order No.89-21751. For Japanese original see 10-13470.
Railroads, Power lines, Snow loads, Snow removal.

45-3704
On the size distribution of rimed snowflakes.
Ito, K., et al, Studies on snow and ice: to improve power generation. Edited by D. Kuroiwa, New Delhi, Amerind Publishing Co., 1986, p.25-35, 5 refs. U.S. Library of Congress, National Translations Center order No.89-21752. For Japanese original see 10-13895.
Yano, T., Hama, K.
Snowflakes, Particle size distribution, Falling snow.

45-3705
Velocity of falling snowflakes.
Magono, C., Studies on snow and ice: to improve power generation. Edited by D. Kuroiwa, New Delhi, Amerind Publishing Co., 1986, p.36-55, 7 refs. U.S. Library of Congress, National Translations Center order No.89-21753. For Japanese original see 10-13896.
Snowflakes, Falling snow.

45-3706
Snowstorm.
Shiotani, M., Studies on snow and ice: to improve power generation. Edited by D. Kuroiwa, New Delhi, Amerind Publishing Co., 1986, p.56-67, 6 refs. U.S. Library of Congress, National Translations Center order No.89-21754. For Japanese original see 10-13471.
Snowstorms, Blowing snow, Analysis (mathematics).

45-3707
Study on ice accretion.
Imai, I., Studies on snow and ice: to improve power generation. Edited by D. Kuroiwa, New Delhi, Amerind Publishing Co., 1986, p.68-87, 13 refs. U.S. Library of Congress, National Translations Center order No.89-21755. For Japanese original see 10-13343.
Ice accretion, Power line icing, Analysis (mathematics).

45-3708
Icing on overhead electric transmission lines.
Oguchi, H., Studies on snow and ice: to improve power generation. Edited by D. Kuroiwa, New Delhi, Amerind Publishing Co., 1986, p.88-101, 5 refs. U.S. Library of Congress, National Translations Center order No.89-21756. For Japanese original see 10-13344.
Power line icing, Ice accretion.

45-3709
Studies on snow accretion.
Shoda, M., Studies on snow and ice: to improve power generation. Edited by D. Kuroiwa, New Delhi, Amerind Publishing Co., 1986, p.102-150, U.S. Library of Congress, National Translations Center order No.89-21757. For Japanese original see 10-13897.
Snow loads, Power line icing.

45-3710
Observations of snow accretion on electric transmission lines.
Hayashi, K., et al, Studies on snow and ice: to improve power generation. Edited by D. Kuroiwa, New Delhi, Amerind Publishing Co., 1986, p.151-169, 5 refs. U.S. Library of Congress, National Translations Center order No.89-21760. For Japanese original see 10-13898.
Aiki, K., Kashimura, R.
Snow loads, Power line icing.

45-3711
Forecasting the snow accretion.
Ito, H., Studies on snow and ice: to improve power generation. Edited by D. Kuroiwa, New Delhi, Amerind Publishing Co., 1986, p.170-180, U.S. Library of Congress, National Translations Center order No.89-21758. For Japanese original see 14-17328.
Snow loads, Weather forecasting, Power line icing.

45-3712
Practical methods of snow accretion forecast.
Kurashige, K., Studies on snow and ice: to improve power generation. Edited by D. Kuroiwa, New Delhi, Amerind Publishing Co., 1986, p.181-195, U.S. Library of Congress, National Translations Center order No.89-21759. For Japanese original see 14-17314.
Snow loads, Weather forecasting, Power line icing.

45-3713
Studies on sleet jump.
Kito, S., Studies on snow and ice: to improve power generation. Edited by D. Kuroiwa, New Delhi, Amerind Publishing Co., 1986, p.196-210, 5 refs. U.S. Library of Congress, National Translations Center order No.89-21761. For Japanese original see 10-13899.
Power line icing, Snow loads, Vibration, Analysis (mathematics).

45-3714
Sleet jump of overhead transmission wires due to falling of accreted snow and ice.
Shoda, M., Studies on snow and ice: to improve power generation. Edited by D. Kuroiwa, New Delhi, Amerind Publishing Co., 1986, p.211-225, U.S. Library of Congress, National Translations Center order No.89-21762. For Japanese original see 10-13900.
Power line icing, Snow loads, Vibration, Analysis (mathematics).

45-3715
Studies on accumulation of snow on different materials.
Takahashi, T., Studies on snow and ice: to improve power generation. Edited by D. Kuroiwa, New Delhi, Amerind Publishing Co., 1986, p.226-239, 11 refs. U.S. Library of Congress, National Translations Center order No.89-21763. For Japanese original see 10-13901.
Snow accumulation, Snow loads.

45-3716
Snow deposition on the arms of an electric pole: model test.
Takahashi, T., Studies on snow and ice: to improve power generation. Edited by D. Kuroiwa, New Delhi, Amerind Publishing Co., 1986, p.240-251, 2 refs. U.S. Library of Congress, National Translations Center order No.89-21764. For Japanese original see 10-13902.
Power line icing, Snow loads, Power line supports.

45-3717
Method to prevent cornice formation by erecting wooden fences.
Saito, Y., Studies on snow and ice: to improve power generation. Edited by D. Kuroiwa, New Delhi, Amerind Publishing Co., 1986, p.252-260, U.S. Library of Congress, National Translations Center order No.89-21765. For Japanese original see 10-13903.
Snow cornices, Snow fences.

45-3718
Various methods to prevent cornice formations.
Takahashi, K., Studies on snow and ice: to improve power generation. Edited by D. Kuroiwa, New Delhi, Amerind Publishing Co., 1986, p.261-269, 7 refs. U.S. Library of Congress, National Translations Center order No.89-21766. For Japanese original see 14-17315.
Snow cornices, Snow fences.

45-3719
Physical properties of deposited snow: metamorphosis of snow crystals and thermal conductivity of snow.
Yoshida, J., Studies on snow and ice: to improve power generation. Edited by D. Kuroiwa, New Delhi, Amerind Publishing Co., 1986, p.270-288, 3 refs. U.S. Library of Congress, National Translations Center order No.89-21767. For Japanese original see 14-17316.
Metamorphism (snow), Snow evaporation, Snow crystals, Snow thermal properties, Analysis (mathematics).

45-3720
Study on the effects of the settling force of snow on electric poles, stays and transmission towers.
Shoda, K., Studies on snow and ice: to improve power generation. Edited by D. Kuroiwa, New Delhi, Amerind Publishing Co., 1986, p.289-326, 21 refs. U.S. Library of Congress, National Translations Center order No.89-21768. For Japanese original see 10-13904.
Power line icing, Snow loads, Power line supports.

45-3721
Snow load and the damage it causes to structures.
Furukawa, I., Studies on snow and ice: to improve power generation. Edited by D. Kuroiwa, New Delhi, Amerind Publishing Co., 1986, p.327-349, U.S. Library of Congress, National Translations Center order No.89-21769. For Japanese original see 10-13905.
Snow loads, Buildings.

45-3722
Settling force of deposited snow.
Shidei, T., Studies on snow and ice: to improve power generation. Edited by D. Kuroiwa, New Delhi, Amerind Publishing Co., 1986, p.350-383, 4 refs. U.S. Library of Congress, National Translations Center order No.89-21770. For Japanese original see 14-17317.
Snow loads, Snow compression, Analysis (mathematics).

45-3723
Studies on the settling force of snow on the legs of iron transmission towers.
Hayashi, K., et al, Studies on snow and ice: to improve power generation. Edited by D. Kuroiwa, New Delhi, Amerind Publishing Co., 1986, p.384-403, U.S. Library of Congress, National Translations Center order No.89-21771. For Japanese original see 14-17318.
Furuchi, S., Shimada, K.
Snow loads, Power line supports.

45-3724
Creeping of snow deposited on the slope.
Shidei, T., Studies on snow and ice: to improve power generation. Edited by D. Kuroiwa, New Delhi, Amerind Publishing Co., 1986, p.404-418, 2 refs. U.S. Library of Congress, National Translations Center order No.89-21772. For Japanese original see 10-13906.
Snow loads, Snow creep, Analysis (mathematics).

45-3725
Snow load on slopes.
Furukawa, I., Studies on snow and ice: to improve power generation. Edited by D. Kuroiwa, New Delhi, Amerind Publishing Co., 1986, p.419-431, U.S. Library of Congress, National Translations Center order No.89-21773. For Japanese original see 10-13907.
Snow loads, Snow creep, Slope processes.

45-3726
Mechanical properties of snow avalanche.
Kuroda, M., Studies on snow and ice: to improve power generation. Edited by D. Kuroiwa, New Delhi, Amerind Publishing Co., 1986, p.432-438, 2 refs. U.S. Library of Congress, National Translations Center order No.89-21774. For Japanese original see 14-17319.
Avalanche mechanics, Snow loads, Analysis (mathematics).

45-3727
Properties of snow deposited on mountains.
Takahashi, K., Studies on snow and ice: to improve power generation. Edited by D. Kuroiwa, New Delhi, Amerind Publishing Co., 1986, p.439-447, U.S. Library of Congress, National Translations Center order No.89-21775. For Japanese original see 14-17320.
Snow cover, Mountains, Topographic effects.

45-3728
Review of avalanche classifications.
Miyazaki, K., Studies on snow and ice: to improve power generation. Edited by D. Kuroiwa, New Delhi, Amerind Publishing Co., 1986, p.448-454, 7 refs. U.S. Library of Congress, National Translations Center order No.89-21776.
Avalanches, Snow cover, Terminology, Classifications.

45-3729
Impact force of an avalanche.
Shinoda, N., Studies on snow and ice: to improve power generation. Edited by D. Kuroiwa, New Delhi, Amerind Publishing Co., 1986, p.455-462, U.S. Library of Congress, National Translations Center order No.89-21777. For Japanese original see 10-13908.
Avalanche mechanics, Snow loads, Avalanche models, Impact tests.

45-3730
Outline of snow survey.
Onuma, M., Studies on snow and ice: to improve power generation. Edited by D. Kuroiwa, New Delhi, Amerind Publishing Co., 1986, p.463-481, 20 refs. U.S. Library of Congress, National Translations Center order No.89-21778. For Japanese original see 14-17321.
Snow surveys, Snow water equivalent, Electric power.

45-3731
Review of important literature on rainmaking.
Magono, N., Studies on snow and ice: to improve power generation. Edited by D. Kuroiwa, New Delhi, Amerind Publishing Co., 1986, p.482-490, 3 refs. U.S. Library of Congress, National Translations Center order No.89-21779.
Artificial precipitation, Cloud seeding, Condensation nuclei.

45-3732
Review of important literature on ice accretion.
Imai, I., Studies on snow and ice: to improve power generation. Edited by D. Kuroiwa, New Delhi, Amerind Publishing Co., 1986, p.491-496, 6 refs. U.S. Library of Congress, National Translations Center order No.89-21780.
Ice accretion, Clouds (meteorology).

45-3733
Study of ice accretion in water. Studies on snow and ice: to improve power generation. Edited by D. Kuroiwa, New Delhi, Amerind Publishing Co., 1986, p.497-500, 6 refs. U.S. Library of Congress, National Translations Center order No.89-21781.
Ice accretion, Frazil ice.

45-3734
Scientists solve mystery of duck deaths. *Alaska geographic. Supplement*, 1991, 18(2), p.S11.
Wetlands, Pollution, Environmental impact, Military facilities, Animals, Explosives.

45-3735
Experimental comparison of EPA and USATHAMA detection and quantitation capability estimators.
Grant, C.L., et al, *American laboratory*, Feb. 1991, MP 2907, p.15-33, 18 refs.
Hewitt, A.D., Jenkins, T.F.
Wastes, Pollution, Chemical analysis, Detection, Statistical analysis.

45-3736
Geotextiles as capillary barriers.
Henry, K.S., *Geotechnical fabrics report*, Mar.-Apr. 1990, MP 2908, p.30-36, 12 refs.
Geotextiles, Capillarity, Thermal insulation, Soil freezing, Frost heave, Frost protection, Soil stabilization.

45-3737
Effect of geotextiles on water migration in freezing soils and the influence of freezing on performance.
Henry, K.S., MP 2909, Geosynthetics '91 Conference, 1991, p.469-483, 10 refs.
Geotextiles, Soil freezing, Soil water migration, Thermal insulation, Capillarity, Frost protection, Soil stabilization, Frost heave.
It is believed that certain geotextiles can be used in place of granular capillary breaks to reduce frost heave because they have relatively large pore sizes and their fibers tend to repel water. An experimental program was conducted to verify that geotextiles reduce frost heave by inhibiting water flow to the freezing front, and to examine the performance of soil-geotextile samples when subjected to more than one freeze-thaw cycle. The addition of a needle-punched fabric reduced frost heave rate in the test soil by an average of 65%, while a heat-bonded fabric reduced frost heave by 37%. The presence of needle-punched fabric resulted in very high soil moisture tensions and soil pressure gradients above the fabric during freezing. Both of these conditions would decrease water flow rates to the portion of the soil which is freezing. Results of tests in which a soil/fabric system was subjected to three freeze/thaw cycles indicate little, if any, influence on the fabric's ability to reduce frost heave. Estimates of unsaturated hydraulic conductivities were made by using Darcy's law in conjunction with measured soil pressure gradients in the soil and assumed water flow rates based on the rate of frost heave. The results of this procedure suggest that there is a relationship between soil moisture tension and hydraulic conductivity in the frozen fringe and conditions in the unsaturated soil below the freezing front.

45-3738
Pilot scale studies of sludge dewatering in a freezing bed.
Martel, C.J., et al, MP 2910, National Conference on Environmental Engineering, Hamilton, Ontario, May 15-18, 1990. Proceedings, Canadian Society for Civil Engineering, [1990], 15p., 8 refs.
Diener, C.J.
Sludges, Artificial freezing, Water treatment, Sewage treatment, Freeze drying, Freeze thaw cycles.
In 1986, a pilot scale sludge freezing bed was constructed at the U.S. Army Cold Regions Research and Engineering Laboratory in Hanover, NH, USA. This bed was operated for the next three years using both anaerobically and aerobically digested sludges. Results indicate that both sludges were effectively dewatered by this process. The final solid contents were 39.3% and 24.5% for anaerobically digested and aerobically digested sludges respectively. The quality of the meltwater from the bed was similar to that of raw wastewater. The actual depth of sludge frozen and thawed in the bed during each year of operation was very close to that predicted by design models. The maximum depth of sludge frozen during this study was 1.14 m. Operational experience demonstrated the importance of a sand layer at the bottom of the bed for adequate drainage. Also, odors developed when the meltwater was allowed to accumulate in the bed. Odors were not a problem when the meltwater was drained away as quickly as it formed. All sludges were easily removed with a front end loader.

45-3739
Phase change heat transfer analysis with applications to frost shielding.
Farag, I.H., et al, MP 2911, International Heat Transfer Conference, 9th, Jerusalem, Aug. 19-24, 1990. Proceedings, Vol.3. Heat transfer 1990, Washington, D.C., Hemisphere Publishing Corporation, [1990], p.9-13, 19 refs. For another version see 45-2915.
Virameteekul, N., Phetteplace, G.E.
Phase transformations, Heat transfer, Thermal insulation, Frost protection, Mathematical models, Underground pipelines.
A computer package has been developed to solve heat transfer problems with phase change and to predict the temperature distribution and phase front location variation with time. The fixed-mesh package incorporates latent heat effects. The time domain solution uses a central difference procedure. Underground freezing of pipelines with and without frost shields is studied using this package, and the results are discussed.

45-3740
Solvent-water partitioning and extraction of phosphonates.
Leggett, D.C., *U.S. Army Chemical Research Development and Engineering Center. Special publication*, Aug. 1990, CRDEC-SP-024, MP 2912, p.889-895, 18 refs. Included in the proceedings of the Scientific Conference on Chemical Defense Research, Nov. 14-17, 1989.
Pollution, Waste treatment, Military research, Chemical properties, Water chemistry, Soil chemistry, Solutions.
Phosphonates are used as G-agent simulants in a number of applications. Partitioning of dimethyl methylphosphonate (DMMP) between water and various solvents was examined with a view toward optimization of solvent extraction methods for this class of compounds. The results of these partitioning experiments indicate that the best solvents for extraction of DMMP from water are H-donors, suggesting H-bonding as the principal mechanism. Advantage was also taken of the universal salting-out effect; saturating the aqueous phase with NaCl increased the partition coefficient of DMMP six-fold (0.78 log units), irrespective of the solvent. By analogy, similar results may be expected for other low molecular weight phosphonates, phosphites, phosphates and phosphonofluoridates.

45-3741
Simulant interaction with ice and agent persistence estimation for cold regions.
Leggett, D.C., *U.S. Army Chemical Research Development and Engineering Center. Special publication*, Dec. 1988, CRDEC-SP-002, MP 2913, p.237-247, 22 refs. Included in the proceedings of the 2nd International Simulant Workshop.
Pollution, Impurities, Chemical properties, Military research, Solubility, Ice composition, Simulation
The role of ice surfaces in determining G-agent persistence in cold regions is examined. A solubility model is used with available data to predict the weathering of agents on snow due to evaporation and hydrolysis. The results compare well with experiment, but the model cannot be validated for other agents without more information. The data most critically needed are the solubility of water (ice) in agents and their unbuffered hydrolysis rates in water.

45-3742
Longitudinal dispersion in overland flow of wastewater.
Adrian, D.D., et al, MP 2914, Cambridge, Massachusetts Institute of Technology, [1990], p.1-8, 3 refs. For presentation at the International Conference on Physical Modeling of Transport and Dispersion, Aug. 7-10, 1990.
Martel, C.J.
Sewage treatment, Water treatment, Waste treatment, Water flow, Flow rate, Vegetation factors, Slopes.
A series of experiments were conducted to measure dispersion in an overland flow system. The overland flow system consisted of three parallel grass covered areas 30.5 m long and 2.9 m wide, and sloping at 5%. Primary wastewater was applied at the upper end of the slopes and was collected at the lower end of the slope. Steady hydraulic flow was established prior to an area source of chloride tracer being applied to the upstream end of the slope. The chloride tracer concentration was measured at the outlet of the overland flow system. Data were collected during three consecutive years so that the effects of grass growth and slope maturation on dispersion could be studied. The average velocities during the dispersion measurements varied from 003 m/s to 025 m/s. Longitudinal dispersion coefficients varied from a low of .02 sq m/s to a high of 0.3 sq m/s. Phenomena which led to difficulties in relating the dispersion measurements to velocity include the continual changing growth patterns of the grass, grass harvesting patterns, and the development of erosion channels on the slope.

45-3743
Measurement of heat losses from a buried heat distribution system.
Phetteplace, G.E., MP 2915, Heat transfer in geophysical media, New York, American Society of Mechanical Engineers, 1991, p.47-54, 11 refs. Presented at the 28th National Heat Transfer Conference, Minneapolis, MN, July 28-31, 1991. HTD (Heat Transfer Division), Vol.172.
Heating, Heat pipes, Heat loss, Heat transfer, Buildings, Military facilities.
The actual heat losses from operating heat distribution systems used to convey heat from central plants to buildings are not well known. The effect of the type of distribution system and the length of time in service on heat losses are also not known. Methods used to calculate heat losses have not been adequately verified. This paper will describe a field project at Ft. Jackson, SC, which addresses these needs. At Ft. Jackson three different types of systems have been instrumented: shallow concrete trench, steel conduit with supply and return in common conduit, and separate conduits for supply and return pipes. The heat losses from these systems have been and are being monitored using several methods. Data have been collected from these sites for over four years. The initial results will be presented in this paper.

45-3744
Dissolution of metals from soils and sediments with a microwave-nitric acid digestion technique.
Hewitt, A.D., et al, *Atomic spectroscopy*, Sep.-Oct. 1990, 11(5), MP 2916, p.187-192, 26 refs.
Reynolds, C.M.
Soil pollution, Waste treatment, Microwaves, Soil chemistry, Metals.
A microwave-nitric acid digestion technique for metal extraction efficiency using an environmental reference standard sediment has been tested. Recoveries have been compared with a certified hot-plate digestion method for a standard soil. The microwave-heated acid extraction of metals from soils and sediments is faster, more routine, and less subject to technician error, yet, it does not sacrifice extraction efficiency or precision. The proposed procedure appears to be suitable for extracting Ag, As, Ba, Cd, Cu, Cr, Hg, Ni, Pb, Se, Tl, and Zn from anthropogenically contaminated soils and sediments.

45-3745
Comparative study of icing rates in the White Mountains of New Hampshire.
Govoni, J.W., MP 2917, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-31, 1990. Proceedings, [1990], 5p., 6 refs.
Ice accretion, Icing rate, Topographic effects, Meteorological factors, Mountains, Power line supports.
During the three winter icing seasons from 1987-1990, meteorological data including wind speed and direction, air temperature and icing rates were measured at two mountain sites. These sites, located in the White Mountains of New Hampshire, were the summit of Cannon Mountain and a location on the west side of Mt. Washington (Cog), both at an elevation of 1230 m. This study compared icing rates and intensities from a site located at the summit of a mountain to those of a site of similar elevation located on the weather-prevalent side of a mountain. Analysis of data from the same weather system passages for both sites show a substantially higher icing rate at the mountain summit site than at the mountainside site.

45-3746
Efficiency analysis of a steam heat distribution system.
Phetteplace, G.E., MP 2918, International Symposium on Fluids for District Heating, Copenhagen, Apr. 10-11, 1991. Proceedings, Technical University of Denmark, 1991, p.199-213, 9 refs.
Heating, Heat pipes, Cost analysis, Steam, Analysis (mathematics), Buildings, Military facilities, Heat transfer.
This paper describes an efficiency analysis for the steam heat distribution system at Hawthorne AAP. The analysis is based on the limited data available from the boiler logs maintained at the central plant. From this information, along with energy and mass balances that are constructed for the central plant data, gross measures of efficiency are obtained. A weighted average of the heating degree days for two groups of buildings connected to the system is developed as an indicator of the load on the system. Statistical analysis is used with the data from a 181-day continuous period of boiler operation to obtain estimated linear functions for the efficiency measures as they relate to the heating load. The results of the analysis show that only 43.5% of the steam input to the distribution system is used to meet the required space heating load. The results also indicate that on the average only 46.2% of the steam that leaves the plant returns as condensate. By converting to a low temperature hot water heat distribution system it is estimated that savings would exceed $292,000 for the 181-day study period.

45-3747
Thaw weakening of pavement structures in seasonal frost areas.
Janoo, V.C., et al, *Transportation research record*, 1990, No.1286, MP 2919, p.217-233, 16 refs.
Berg, R.L.
Thaw weakening, Pavements, Freeze thaw tests, Seasonal freeze thaw, Thaw depth.
Pavement structures in the northern United States, Canada, Scandinavia, and other seasonal frost areas of the world are subject to freezing in winter and thawing in spring. Most damage to pavements in seasonal frost areas occurs during the spring thaw and, to a lesser extent, during partial thaw periods in winter. To minimize damage, pavement engineers must be able to determine the structural capacity of road and airfield pavements during thawing periods. Four pavement test sections were built in the Frost Effects Research Facility at the U.S. Army Cold Regions Research and Engineering Laboratory in Hanover, NH, to study the performance of various pavement structures subjected to freeze-thaw cycling. The test sections consisted of asphalt concrete pavement over a clay subgrade, asphalt concrete over 178 mm of crushed gravel and 203 mm of clean sand on a clay subgrade, and asphalt concrete over 254 mm of crushed gravel and 127 mm of clean sand on a clay subgrade. Thermocouples were embedded throughout the pavement structure and subgrade, and the pavement structure was subjected to several freeze-thaw cycles. Deflection measurements taken during the thawing periods at four locations in each test section used a Dynatest falling-weight deflectometer (FWD) to validate existing back-calculation procedures for pavements subject to seasonal frost. Soon it became apparent that the back-calculation procedures had difficulties. Another study was initiated to determine if additional information pertaining to freeze-thaw cycling could be obtained from the FWD measurements. The results of the second study are presented.

45-3748
Prediction of damage to flexible pavements in seasonal frost areas.
Allen, W.L., et al, *Transportation research record*, 1990, No.1286, MP 2920, p.234-247, 16 refs.
Berg, R.L., Bigl, S.R.
Pavements, Frost resistance, Frost action, Seasonal freeze thaw, Computer programs, Fatigue (materials), Thaw weakening.
The U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) is developing a mechanistic pavement design method for use in seasonal frost areas by the Corps of Engineers and the Air Force. The mechanistic method will employ results from a series of five computer programs that compute soil and pavement moisture and temperature conditions (FROST1), resilient modulus and Poisson's ratio (TRANSFORM), stresses and strains in the pavement system (JULEA and NELAPAV), and cumulative damage (CUMDAM). The model has been calibrated for the properties of six soils. Five fatigue equations, three based on horizontal strain at the bottom of the asphalt layer and two based on vertical strain at the top of the subgrade, are used to determine the cumulative damage for two-, three-, and four-layer pavement sections at Springfield, MO, and Rochester, MN. Although all of the equations predicted failure during the design life for each pavement section modeled, significant jumps occurred during the spring, indicating that the thaw period is crucial in the fatigue life of a pavement.

45-3749
Evaluation of variables affecting flexible pavement thawing for timing spring load restrictions.
Rutherford, M.S., *Transportation research record*, 1990, No.1286, p.248-258, 21 refs.
Pavements, Road maintenance, Thaw weakening, Analysis (mathematics), Trafficability.

45-3750
Integrated computer model to estimate moisture and temperature effects beneath pavements.
Pufahl, D.E., et al, *Transportation research record*, 1990, No.1286, p.259-269, 13 refs.
Lytton, R.L., Liang, H.S.
Pavements, Frost action, Computerized simulation, Subgrades, Road maintenance.

45-3751
Development of an Alaskan radiocarbon data base as a subset of the International Radiocarbon Data Base (IRDB).
Galloway, J.P., et al, *U.S. Geological Survey. Bulletin*, 1989, No.1946, p.83-87, 23 refs.
Kra, R.
Radioactive age determination, Data processing.

45-3752
Proceedings of the Second Airborne Synthetic Aperture Radar (AIRSAR) Workshop, June 7 and 8, 1990.
Kobrick, M., ed, *California Institute of Technology. Jet Propulsion Laboratory. JPL publication*, Nov. 15, 1990, No.90-56, 57p. + appends., For selected papers see 45-3753 through 45-3755.
Sea ice, Synthetic aperture radar, Remote sensing, Airborne radar, Ice conditions.

45-3753
Synthetic aperture radar observations of the Greenland Ice Sheet.
Jezek, K.C., et al, *California Institute of Technology. Jet Propulsion Laboratory. JPL publication*, Nov. 15, 1990, No.90-56, p.21-28, 4 refs.
Ice sheets, Synthetic aperture radar, Airborne radar, Sea ice, Remote sensing.

45-3754
Comparison of active and passive microwave signatures of arctic sea ice.
Drinkwater, M.R., et al, *California Institute of Technology. Jet Propulsion Laboratory. JPL publication*, Nov. 15, 1990, No.90-56, p.29-36, 3 refs.
Sea ice, Airborne radar, Synthetic aperture radar, Remote sensing, Radiometry.

45-3755
River and lake ice conditions as determined from AIRSAR imagery.
Melloh, R.A., et al, *California Institute of Technology. Jet Propulsion Laboratory. JPL publication*, Nov. 15, 1990, No.90-56, MP 2921, p.37-42, 5 refs.
Gatto, L.W.
Ice conditions, River ice, Lake ice, Synthetic aperture radar, Remote sensing, Airborne radar.
Synthetic aperture radar (SAR) imagery data can provide information on types and distribution of river and lake ice needed for studying river ice processes and dynamics, monitoring ice during winter navigation, and formulating ice control strategies. Visible and IR remote sensing systems cannot provide such data, and present field methods are inadequate for characterizing ice conditions over long river reaches. The ongoing analysis of JPL's AIRSAR imagery data and concurrent ground truth of ice conditions on the Tanana River and surrounding lakes near Fairbanks, AK, in Mar. 1988, has resulted in several findings: hummocked ice covers and zones of variable ice surface roughness within them can be differentiated; C- and L-band data are more sensitive than P-band to the range of surface roughnesses encountered; smooth, level ice that is clear or contains small bubbles produces little backscatter; snow-covered river ice, whether rough or smooth, is distinguishable from snow-covered river sediments on exposed river beds and unvegetated bars; and open water leads are readily distinguished.

45-3756
Hazards to antarctic exploration and production.
Reid, D.E., et al, *American Association of Petroleum Geologists. AAPG studies in geology*, July 1990, No.31, Antarctica as an exploration frontier: hydrocarbon potential, geology, and hazards. Edited by B. St. John, p.31-45, 63 refs.
Anderson, J.B.
DLC TN870.5.A63 1990
Sea ice, Ice shelves, Icebergs, Climate, Bottom topography.
Antarctica's continental shelf averages 500 m in depth and exhibits a landward slope, due to the combined effects of isostatic loading and glacial erosion. These effects are more pronounced near the continent. The highly rugged topography of the shelf typifies high latitude continental shelves. Antarctica is the coldest, driest, windiest place on earth and the extremely hostile climate represents a formidable obstacle to the exploration for hydrocarbons. Sea ice covers the entire continental shelf during most of the year and presents another serious threat to the explorationist. The distribution and movement of sea ice on the continental shelf are hard to predict and have historically been responsible for the demise of several research vessels. Even less predictable is iceberg movement. Individual icebergs within the same area may drift at different speeds and in different directions because their size and draft determines to what extent winds and currents affect them. Drift speeds up to 3 km/hr and drafts exceeding 400 m have been reported. Rugged topography and interstratification of stiff glacial

deposits with water-saturated glacial-marine deposits combine to make the sea floor of the antarctic continental shelf and slope unstable. Evidence for this exists in the form of abundant sediment gravity flow deposits on the shelf and slope. To date, shallow gas has been observed only in the Bransfield Basin. Significant earthquake activity is virtually nonexistent. (Auth.)

45-3757

Simultaneous balloonborne measurements of stratigraphic water vapor and ozone in the polar regions.

Hofmann, D.J., et al, *Geophysical research letters*, June 1991, 18(6), p.1011-1014, 15 refs.

Oltmans, S.J., Deshler, T.

Water vapor, Atmospheric composition, Ozone, Stratosphere, Antarctica—McMurdo Station, Antarctica—Amundsen-Scott Station, Sweden—Kiruna.

Vertical profiles of stratospheric water vapor and ozone were measured together at McMurdo and South Pole Stations in Antarctica, and at Kiruna, Sweden, on several occasions during the austral spring of 1990 and the boreal winter of 1991. The antarctic data indicated that major dehydration had occurred on a continental scale over the winter stratospheric cloud formation period leaving only 2 to 3 ppmv water vapor between 11 and 19 km. Measurements before and after movement of the boundary of the polar vortex across McMurdo detected increases in both water vapor and ozone in the 17 to 20 km region. This injected layer was still observed at South Pole Station a month later, suggesting continental proportions. In early November, with the vortex still intact, South Pole measurements indicated a substantial degree of inhomogeneity in both water vapor and ozone in the lower stratosphere. In comparison, stratospheric water vapor measurements in the Arctic gave values of 4 to 5 ppmv, indicating the absence of the gross stratospheric dehydration effects obvious in the Antarctic, and they did not reveal significant structure except on one occasion with very cold temperatures (-90 C) at 25 km and nacreous cloud displays. (Auth.)

45-3758

Total ozone trends deduced from Nimbus 7 TOMS data.

Stolarski, R.S., et al, *Geophysical research letters*, June 1991, 18(6), p.1015-1018, 15 refs.

Bloomfield, P., McPeters, R.D., Herman, J.R.

Measuring instruments, Models, Ozone.

The Total Ozone Mapping Spectrometer (TOMS) on the Nimbus 7 satellite has been measuring the total column amount of ozone over the globe for more than 11 years. Recent improvements in the data analysis have led to a technique for determining and removing drift in the calibration such that the data at the end of the record are precise to + /- 1.3% relative to the data at the beginning of the record. A statistical model, including terms for seasonal variation, linear trend, quasi-biennial oscillation, solar cycle and second-order autoregressive noise has been fit to the TOMS time series of total ozone data. The linear trend obtained when this statistical model is fit to the TOMS data averaged between 65N and 65S latitudes is -0.26%/year or -3% over the 11.6 year time period from Nov., 1978 through May, 1990. The trend is near zero at the equator and increases towards both poles. At 50N the annually averaged trend is -0.5%/year. The 50N trend over the 11.6 year time period shows a strong seasonal variation from more than -0.8%/year in winter and early spring (Feb. and Mar.) to about -0.2%/year in summer (July and Aug.).

45-3759

Response of the middle atmosphere to the solar proton events of August-December, 1989.

Reid, G.C., et al, *Geophysical research letters*, June 1991, 18(6), p.1019-1022, 17 refs.

Solomon, S.

Ionization, Ozone, Atmospheric composition.

Intense solar activity during the period Aug.-Dec. 1989 gave rise to several major energetic-particle events, which were accompanied by greatly enhanced ionization rates and NOy production in the polar regions of both hemispheres. A two-dimensional model of the chemistry and dynamics of the middle atmosphere has been used to calculate the production and subsequent fate of the NOy and its effect on ozone concentrations and temperatures. In the sunlit southern polar cap, NO increases as large as a factor of 20 are estimated near 60 km altitude, with column density enhancements of 55%. Corresponding peak ozone depletions of about 20% are calculated near 40 km in late Oct. 1989, with predicted temperature decreases of about 3-3.5K. Effects in the northern polar regions are considerably smaller, due to the lack of sunlight during the peak phase of the events. (Auth.)

45-3760

Preliminary measurements of CO2 in melting snow.

Sommerfeld, R.A., et al, *Geophysical research letters*, July 1991, 18(7), p.1225-1228, 8 refs.

Musselman, R.C., Reuss, J.O., Mosier, A.R.

Snow melting, Snow composition, Carbon dioxide.

45-3761

Absorption coefficients of ice from 250 to 400 nm.

Perovich, D.K., et al, *Geophysical research letters*, July 1991, 18(7), MP 2922, p.1233-1235, 14 refs.

Govoni, J.W.

Ice cover, Absorption coefficients, Laboratory techniques, Remote sensing.

Absorption coefficients for pure bubble-free ice are a critical element in theoretical efforts to determine levels of ultraviolet radiation reaching marine biota in and under a sea ice cover. A 3-m block of ice was used to measure these coefficients from 250 to 400 nm. Absorption coefficients were found to increase from 0.092/m at 400 nm to 0.665/m at 250 nm. Values in the ultraviolet were shown to be comparable to visible results from 580 to 720 nm. This suggests that existing data on the interaction of visible light with snow and sea ice can be used as a first-order estimate of ultraviolet optical properties. (Auth.)

45-3762

Volcanic ash from the 1362 A.D. Oraefajokull eruption (Iceland) in the Greenland Ice Sheet.

Palais, J.M., et al, *Geophysical research letters*, July 1991, 18(7), p.1241-1244, 17 refs.

Taylor, K., Mayewski, P.A., Grootes, P.

Ice cores, Electrical resistivity, Volcanic ash, Greenland Ice Sheet.

45-3763

Freed from a glacier after 25 years—glacial and meteorological aspects. [Nach 25 Jahren vom Gletscher freigegeben—Glazialmeteorologische Aspekte],

Ambach, W., et al, *Sonderdruck aus Wetter und Leben*, 1990, 42(3/4), p.183-188, In German with English summary. 4 refs.

Schneider, H., Ambach, E., Tributsch, W.

Accidents, Glacial deposits, Mountain glaciers, Meteorological factors.

45-3764

National atlas; Mongolian People's Republic. [Natsional'nyĭ atlas; Mongol'skaia narodnaia respublika],

Sodnom, N., ed, Ulan Bator, Moscow, 1990, 144p., In Russian with English table of contents and introduction.

IAnshin, A.L., ed.

Maps, Geocryology, Natural resources, Geomorphology, Geological maps, Snow cover, Snow melting, Snowstorms.

45-3765

Microwave-heated-acid dissolution of metals from contaminated soils and sediments.

Hewitt, A.D., et al, *U.S. Army Toxic and Hazardous Materials Agency (USATHAMA). Report*, 1989, CETHA-TE-TR-90055, MP 2924, p.463-470, 19 refs. Proceedings of the 14th Annual Army Environmental R&D Symposium, Williamsburg, VA, Nov. 14-16, 1989.

Reynolds, C.M.

Soil pollution, Wastes, Chemical analysis, Soil chemistry, Metals.

45-3766

Interpretation of synthetic aperture radar imagery of snow-covered river ice.

Melloh, R.A., et al, MP 2923, U.S. Army Corps of Engineers Remote Sensing Symposium, 7th, Portland, OR, May 7-9, 1990. Proceedings, 1990, 13p., 9 refs.

Gatto, L.W.

Synthetic aperture radar, Radar photography, River ice, Ice conditions, Remote sensing, Ice surveys, Snow cover effect, Photointerpretation.

An ongoing CRREL research project is interpreting snow and ice conditions on the Tanana River near Fairbanks, AK, using airborne synthetic aperture radar (AIRSAR) imagery. The data in this report were acquired in Mar. 1988 by NASA and the Jet Propulsion Laboratory. The C-, L- and P-band images include four polarizations (HH, VV, HV and VH) and represent both wet and dry snow conditions. Ground truth data taken during the SAR overflights include snow and ice depth, stratigraphy, and surface roughness, as well as aerial video and impulse radar traces. Results to date confirm that the radar distinguishes accumulation ice covers (ice jams), smooth ice, open leads, and exposed river beds and bars. Variation in the magnitude of radar backscatter is observed along ice jams and is dependent on radar wavelength and ice jam roughness. The ability to distinguish river ice types and conditions on the images indicates good potential for the use of the data in studies of river ice processes and in engineering applications.

45-3767

Ammonium uptake by field-grown *Eriophorum vaginatum* roots under laboratory and simulated field conditions.

Marion, G.M., et al, *Holarctic ecology*, Feb. 1990, 13(1), MP 2925, p.50-55, 34 refs.

Kummerow, J.

Tundra, Nutrient cycle, Plant ecology, Plant physiology, Roots, Ecosystems.

Nitrogen (N) deficiencies in tundra ecosystems could be caused, in part, by the kinetics of root N uptake. The objectives of this study were to quantify NH4 uptake by field-grown excised roots of *Eriophorum vaginatum* L. under controlled NH4 concentrations (0-250 micromoles/l) and temperatures (5-20 C) and to evaluate this laboratory derived model as a means of estimating field NH4 uptake. There was no consistent temperature effect on root NH4 uptake, which suggests a relative insensitivity of *E. vaginatum* roots to short-term temperature fluctuations. The Michaelis-Menten equation parameters for NH4 uptake were Vmax = 22.1 micromoles/h/g and Km = 191 micromoles/l. Using field NH4 concentrations, field *E. vaginatum* root biomass data, and the Michaelis-Menten equation, an estimate was made of NH4 uptake over a 42 day period. This estimate of NH4 uptake accounted for 28% of the net incorporation of N into leaves and roots, which is a reasonable estimate for *E. vaginatum* which relies primarily on N retranslocation for supplying new leaves and roots. Major uncertainties in field N uptake rates, model parameterization, and site characterization preclude an accurate model validation and indicate research areas most in need of future study

45-3768

Maximum variation of air/snow interface temperature.

Bates, R.E., et al, *U.S. Army Chemical Research, Development and Engineering Center. Report*, Nov. 1990, CRDEC-CR-092, MP 2926, p.411-422, 14 refs. Proceedings of the 14th Smoke/Obscurants Symposium, Vol.2.

Yen, Y.C., Gerard, S.

Snow air interface, Snow temperature, Snow heat flux, Temperature measurement, Military operation, Analysis (mathematics), Surface temperature, Snow surface.

Prediction of snow surface temperature is vital to the successful development of sensing devices and weapon systems. In this paper, a simplified mathematical analysis is made by assuming that the snow cover is dry and of uniform density. The computed results are expressed in terms of surface temperature response as a function of snow density and its effective thermal conductivity, and are compared with limited temporal field data. The results are found to be in reasonable agreement if an appropriate surface heat flux is chosen along with proper snow density and effective thermal conductivity. The same analysis is applied to a semi-infinite metallic plate. Because of its much greater thermal inertia value, the temperature response is much smaller, and this provides a considerable thermal contrast, which is essential for the development and use of the infrared sensors.

45-3769

Portable thermal reference for winter field studies.

Lacombe, J., *International Society for Optical Engineering. Proceedings*, 1990, Vol.1311, MP 2927, Characterization, propagation, and simulation of infrared scenes, Orlando, FL, Apr. 16-17, 19-20, 1990, p.48-54.

Infrared photography, Snow cover effect, Temperature measurement, Military equipment, Detection, Subsurface investigations.

When documenting the infrared images of targets and backgrounds it is usually necessary to place one or more sources having known surface radiances within the field-of-view of the imaging system in order to calibrate the imagery. Although a variety of commercially available thermal references (i.e., "black bodies") exist they generally are very expensive and are not well suited for operating in the field under severe winter environmental conditions. A portable low-temperature thermal reference was recently developed at the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) to calibrate infrared images of mines and snow backgrounds in winter.

45-3770

Evaluation of existing hypotheses used in the mathematical description of ice segregation in freezing soils.

Nakano, Y., et al, MP 2928, [1990], 14p., Unpublished manuscript. 13 refs. For presentation at the 5th International Colloquium on Free Boundary Problems, Montreal, June 1990.

Takeda, K.

Soil freezing, Freezing front, Mathematical models, Ice growth, Soil water migration, Ice lenses.

The steady growth of a segregated ice layer in freezing soils was studied mathematically and experimentally under each of three distinct and representative hypotheses on the properties of the frozen fringe, chosen among many such hypotheses reported in the literature. The condition of steady growth was found to be determined by a set of two independent variables, such as the temperature gradient at the 0 C isotherm and that in the ice layer at the interface between ice layer and the frozen fringe, regardless of models. The results of the study clearly showed that one model is consistent with experimental data while the other two models contradict them.

45-3771

Waveform analysis of electromagnetic scattering for a three dimensional tunnel.

Moran, M.L., et al, MP 2929, Annual International Meeting and Exposition of the Society of Exploration Geophysicists, 60th, San Francisco, Sep. 23-27, 1990. Proceedings, [1990], 4p., 9 refs.

Greenfield, R.J.

Tunnels, Electromagnetic prospecting, Wave propagation, Subsurface investigations.

A three-dimensional numerical model simulating a cross-borehole electromagnetic survey in the presence of a cylindrical tunnel is developed and shown to compare well to field data. The model is based on an exact Green's function solution for a true vertically oriented unit electric dipole. Model simulations for tunnels filled with air, water and highly conducting material exhibit low amplitude shadow zones which extend along the entire length of the tunnel. This shadow zone is the most reliable indicator for the presence of a tunnel. Model results for air-filled tunnels in which the angle alpha, formed by a line normal to the tunnel axis and the line connecting the source and receiver is larger than 45 deg, indicate that the tunnel is effectively

opaque to incident radiation. Beyond angles of alpha = 45 deg arrivals in the shadow zone are dominated by energy which diffracts around the tunnel. It is also shown that moderate tunnel dips for air-filled tunnels do not appreciably affect waveforms. Comparisons of profiles in the vertical direction between air-filled and water-filled or highly conducting tunnels show that water-filled and highly conducting tunnels exhibit only minor waveform alteration as alpha increases. Water-filled tunnels also alter the latter half of the waveform

45-3772
Performance of an earthquake motion simulator for a small geotechnical centrifuge.
Ketcham, S.A., et al. MP 2930, Centrifuge 91, Rotterdam, A.A. Balkema, 1991, p.361-368, 7 refs. Proceedings of an international conference, Boulder, CO, June 13-14, 1991.
Ko, H.Y., Sture, S.
Earthquakes, Engineering geology, Embankments, Simulation, Hydraulic structures.
An electrohydraulic servocontrolled slip table system for earthquake motion simulation in a 15 g-ton geotechnical centrifuge is in operation at the University of Colorado. The performance of the system is illustrated here by measures of the slip table system response for a specific operating condition and by results from a model embankment experiment. It is shown that reasonable simulations of specific prototype horizontal earthquake motions can be achieved using a signal correction technique which incorporates a measure of the system frequency response.

45-3773
Stage distribution approach to estimating ice related flooding probabilities.
Burn, D.H., *Water resources bulletin*, Oct. 1989, 25(5), p.953-960, 18 refs.
River ice, River flow, Ice jams, Flood forecasting, Floodplains, Analysis (mathematics), Water level, Statistical analysis, Simulation.

45-3774
Transient creep of an ice sheet lying on a hydraulic base under a concentrated load.
Aleksandrov, V.M., et al. *Journal of applied mechanics and technical physics*, Mar. 1991, 31(5), p.793-799, Translated from Zhurnal prikladnoi mekhaniki i tekhni heskoi fiziki, 1990, No.5. 5 refs.
Shmatkova, A.A.
Ice sheets, Ice creep, Ice deformation, Analysis (mathematics), Loading, Ice mechanics.

45-3775
Effect of gelatin on the kinetics of hydrolysis of P-nitrophenyl acetate in frozen aqueous solutions.
Sergeev, B.M., et al. *Kinetics and catalysis*, Mar. 1991, 31(5-pt.1), p.979-983, Translated from Kinetika i kataliz, Vol.31, 1990. 12 refs.
Konstantinova, N.R., Sergeev, G.B.
Frozen liquids, Solutions, Polymers, Colloids, Chemical analysis, Molecular energy levels, Temperature effects, Unfrozen water content, Cryobiology, Chemical properties.

45-3776
Hydrology of Svalbard—hydrological problems in cold climate. Proceedings.
Arctic Hydrology. Present and Future Tasks, Longyearbyen, Svalbard, Sept. 14-17, 1990. *Norwegian National Committee for Hydrology. Report*, 1990, No.23, 224p., Refs. passim. For individual papers see 45-3777 through 45-3796.
Gjessing, Y., ed.
Meetings, Permafrost hydrology, Glacial hydrology, Hydrology, Water reserves, Glacier melting, Water flow, Climatic change, Climatic factors, Air temperature, Glacial erosion, Groundwater, Remote sensing, Norway – Svalbard.

45-3777
Isdammen: the public water supply in Longyearbyen.
Björnsen, B., *Norwegian National Committee for Hydrology. Report*, 1990, No.23, Arctic Hydrology. Present and Future Tasks, Longyearbyen, Svalbard, Sep. 14-17, 1990. Proceedings. Edited by Y. Gjessing et al, p.1-8.
Water supply, Reservoirs, Cold weather operations, Glacial hydrology, Ice cover effect, Municipal engineering, Water transport.

45-3778
Arctic hydrology in Greenland—permafrost hydrology and data technology.
Thomsen, T., *Norwegian National Committee for Hydrology. Report*, 1990, No.23, Arctic Hydrology. Present and Future Tasks, Longyearbyen, Svalbard, Sep. 14-17, 1990. Proceedings. Edited by Y. Gjessing et al, p.9-26, 21 refs.
Permafrost hydrology, Water balance, Precipitation (meteorology), Surface temperature, Soil temperature, Measurement, Temperature distribution, Greenland.

45-3779
Glaciofluvial sediment transport and erosion.
Tomasson, H., *Norwegian National Committee for Hydrology. Report*, 1990, No.23, Arctic Hydrology. Present and Future Tasks, Longyearbyen, Svalbard, Sep. 14-17, 1990. Proceedings. Edited by Y. Gjessing et al, p.27-36, 8 refs.
Glacial rivers, Lake bursts, Glacial erosion, Sediment transport, Glacial hydrology, Flooding, Ice dams, Glaciology.

45-3780
Structural and measurement problems of arctic atmospheric water balance.
Lenart, W., *Norwegian National Committee for Hydrology. Report*, 1990, No.23, Arctic Hydrology. Present and Future Tasks, Longyearbyen, Svalbard, Sep. 14-17, 1990. Proceedings. Edited by Y. Gjessing et al, p.37-45, 9 refs.
Polar atmospheres, Atmospheric composition, Water balance, Precipitation (meteorology), Water vapor, Vapor transfer, Global warming, Climatic changes.

45-3781
Change in hydrological cycle in cold region corresponding to greenhouse warming.
Higuchi, K., *Norwegian National Committee for Hydrology. Report*, 1990, No.23, Arctic Hydrology. Present and Future Tasks, Longyearbyen, Svalbard, Sep. 14-17, 1990. Proceedings. Edited by Y. Gjessing et al, p.47-49, 2 refs.
Global warming, Hydrologic cycle, Climatic changes, Ice cover effect, Ice melting.

45-3782
Hydrological peculiarities of permafrost regions.
Novikov, S.M., et al. *Norwegian National Committee for Hydrology. Report*, 1990, No.23, Arctic Hydrology. Present and Future Tasks, Longyearbyen, Svalbard, Sep. 14-17, 1990. Proceedings. Edited by Y. Gjessing et al, p.55-61, 7 refs.
Sokolov, B.L.
Permafrost hydrology, Hydrologic cycle, Swamps, Ground water, Naleds.

45-3783
Studies of the arctic water resources: state-of-the-art and future plans.
Ivanov, V.V., *Norwegian National Committee for Hydrology. Report*, 1990, No.23, Arctic Hydrology. Present and Future Tasks, Longyearbyen, Svalbard, Sep. 14-17, 1990. Proceedings. Edited by Y. Gjessing et al, p.63-74, 28 refs.
Water reserves, Hydrologic cycle, Water balance, Runoff forecasting, River flow, Ecosystems, Natural resources, Hydrology.

45-3784
Svalbard contribution to global studies of arctic hydrology and sediment transfer.
Clark, M.J., *Norwegian National Committee for Hydrology. Report*, 1990, No.23, Arctic Hydrology. Present and Future Tasks, Longyearbyen, Svalbard, Sep. 14-17, 1990. Proceedings. Edited by Y. Gjessing et al, p.75-83, 4 refs.
Permafrost hydrology, Research projects, Global change, International cooperation, Standards.

45-3785
Climate time series of the Norwegian arctic meteorological stations—temperature and precipitation.
Nordli, P.Ø., *Norwegian National Committee for Hydrology. Report*, 1990, No.23, Arctic Hydrology. Present and Future Tasks, Longyearbyen, Svalbard, Sep. 14-17, 1990. Proceedings. Edited by Y. Gjessing et al, p.85-98, 5 refs.
Air temperature, Polar atmospheres, Meteorological data, Climatic changes, Seasonal variations, Global warming, Wind factors.

45-3786
Cold air drainage in the Arctic.
Hanssen-Bauer, I., *Norwegian National Committee for Hydrology. Report*, 1990, No.23, Arctic Hydrology. Present and Future Tasks, Longyearbyen, Svalbard, Sep. 14-17, 1990. Proceedings. Edited by Y. Gjessing et al, p.99-110, 3 refs.
Wind (meteorology), Air flow, Valleys, Wind velocity, Air temperature, Dams, Temperature effects, Topographic effects.

45-3787
On the relationship between snow distribution and snow melt.
Gjessing, Y., *Norwegian National Committee for Hydrology. Report*, 1990, No.23, Arctic Hydrology. Present and Future Tasks, Longyearbyen, Svalbard, Sep. 14-17, 1990. Proceedings. Edited by Y. Gjessing et al, p.111-119, 3 refs.
Snow cover distribution, Snowmelt, Snow hydrology, Advection, Albedo, Air temperature, Heat transfer, Radiation balance, Wind factors.

45-3788
Drainage pattern in a subpolar glacier: Brøggerbreen, Svalbard.
Hagen, J.O., et al. *Norwegian National Committee for Hydrology. Report*, 1990, No.23, Arctic Hydrology. Present and Future Tasks, Longyearbyen, Svalbard, Sep. 14-17, 1990. Proceedings. Edited by Y. Gjessing et al, p.121-131, 12 refs.
Korsen, O.M., Vatne, G.
Glacier surveys, Taliks, Glacier melting, Surface drainage, Permafrost hydrology, Meltwater, Glacier flow.

45-3789
Hydrometric investigations in Svalbard 1989-1990.
Pettersson, L.E., *Norwegian National Committee for Hydrology. Report*, 1990, No.23, Arctic Hydrology. Present and Future Tasks, Longyearbyen, Svalbard, Sep. 14-17, 1990. Proceedings. Edited by Y. Gjessing et al, p.133-138.
Permafrost hydrology, Runoff, Hydrologic cycle, Measurement.

45-3790
Groundwater in cold climates: interaction between glacier and karst aquifers.
Lauritzen, S.E., *Norwegian National Committee for Hydrology. Report*, 1990, No.23, Arctic Hydrology. Present and Future Tasks, Longyearbyen, Svalbard, Sep. 14-17, 1990. Proceedings. Edited by Y. Gjessing et al, p.139-146, 23 refs.
Permafrost hydrology, Karst, Water reserves, Subpermafrost ground water, Hydrogeology, Glacial hydrology, Ice solid interface.

45-3791
Erosion and sediment transport in Svalbard.
Bogen, J., *Norwegian National Committee for Hydrology. Report*, 1990, No.23, Arctic Hydrology. Present and Future Tasks, Longyearbyen, Svalbard, Sep. 14-17, 1990. Proceedings. Edited by Y. Gjessing et al, p.147-158, With Norwegian summary. 4 refs.
River flow, Sediment transport, Glacial erosion, Glacier melting, Weathering, Glacial hydrology.

45-3792
Glacial and glaciofluvial material transport in subpolar glaciers; examples from Svalbard.
Sollid, J.L., et al. *Norwegian National Committee for Hydrology. Report*, 1990, No.23, Arctic Hydrology. Present and Future Tasks, Longyearbyen, Svalbard, Sep. 14-17, 1990. Proceedings. Edited by Y. Gjessing et al, p.159-165, 2 refs.
Glacier flow, Drainage, Sediment transport, Glacial lakes, Glacial deposits, Glacier melting, Ice water interface, Flow measurement, Suspended sediments.

45-3793
Gravel-pad foundations to control groundwater movements in frost-susceptible soil—a case study.
Walum, R.S., *Norwegian National Committee for Hydrology. Report*, 1990, No.23, Arctic Hydrology. Present and Future Tasks, Longyearbyen, Svalbard, Sep. 14-17, 1990. Proceedings. Edited by Y. Gjessing et al, p.175-186, 9 refs.
Permafrost hydrology, Ground thawing, Cold weather construction, Foundations, Permafrost beneath structures, Soil stabilization, Soil water migration, Temperature control, Buildings.

45-3794
Observing snow melting in southern Norway from satellite passive microwave.
Faanes, T., *Norwegian National Committee for Hydrology. Report*, 1990, No.23, Arctic Hydrology. Present and Future Tasks, Longyearbyen, Svalbard, Sep. 14-17, 1990. Proceedings. Edited by Y. Gjessing et al, p.187-194, 5 refs.
Snow cover distribution, Snow hydrology, Spaceborne photography, Radiometry, Snow melting, Sensor mapping, Wet snow, Microwaves, Runoff forecasting.

45-3795
Albedo measurements from snow—image processing of LANDSAT-5 TM data.
Winther, J.G., et al, *Norwegian National Committee for Hydrology. Report*, 1990, No.23, Arctic Hydrology. Present and Future Tasks, Longyearbyen, Svalbard, Sep. 14-17, 1990. Proceedings. Edited by Y. Gjessing et al, p.195-201, 3 refs.
Faanes, T.
LANDSAT, Spaceborne photography, Snow cover distribution, Albedo, Radiometry, Image processing, Sensor mapping.

45-3796
Climate related research in Svalbard.
Sand, K., et al, *Norwegian National Committee for Hydrology. Report*, 1990, No.23, Arctic Hydrology. Present and Future Tasks, Longyearbyen, Svalbard, Sep. 14-17, 1990. Proceedings. Edited by Y. Gjessing et al, p.203-217, 13 refs.
Hagen, J.O., Repp, K., Berntsen, E.
Permafrost hydrology, Glaciology, Climatology, Research projects, Glacier mass balance, Meteorological data.

45-3797
Proceedings.
Workshop on Applications of Remote Sensing in Hydrology, Saskatoon, Saskatchewan, Feb. 13-14, 1990, *National Hydrology Research Institute, Canada. Symposium*, 1990, No.5, 386p., Refs. passim. For selected papers see 45-3798 through 45-3815. Discussion follows each paper.
Kite, G.W., ed, Wankiewicz, A., ed.
Radiometry, Remote sensing, Hydrology, Snow cover distribution, Snow water equivalent, Models, Snowmelt, Runoff forecasting, Watersheds, Microwaves, Snow water content, Mapping, Snow courses, Brightness.

45-3798
Effective use of satellite-observed snow cover data in the snowmelt-runoff model (SRM).
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Remote sensing, Snow cover, Ice conditions, Radiometry, Ice jams, Microwaves, Lake ice, River ice, Synthetic aperture radar.
Passive and active microwave imagery provide information about freshwater ice and snow environments needed for a better understanding of river and lake ice processes, winter stream habitats, winter water supply and ice management. The ability to image at night and through clouds is an advantage of microwave systems over shorter wavelength visible and infrared systems. Additionally, microwave imagers have a different sensitivity to ice and snow conditions and thus provide added capability to observe features that could not be detected with visible and infrared instruments. To exploit the imagery data fully, a better understanding of microwave signatures created by freshwater ice conditions is needed. An ongoing CRREL investigation interprets snow and ice conditions on lakes and rivers near Fairbanks, AK, using both passive and active microwave imagery taken in Mar. 1988 during both wet and dry snow conditions. The imagery includes that obtained with the Jet Propulsion Laboratory's Synthetic Aperture Radar (SAR) in quad-polarized (HH, VV, HV and VH) C-, L- and P-bands, and that obtained with NORDA's Ka-band Radiometric Mapping System. Ground truth data taken during overflights includes aerial video, observations of snow depth and stratigraphy, ice core descriptions and thickness measurements, and impulse radar traces. The field data and available experimental studies of microwave interactions with snow and ice are used to interpret imagery patterns. Results to date confirm that the microwave imagery distinguishes snow and ice conditions including open leads, wet overflows, ice jams, and main channels on the Tanana River, and fracture patterns and changing snow conditions on nearby lakes. The specific geophysical characteristics and conditions of river and lake ice that produced the imagery patterns are being investigated.

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There are three broad areas where determining the physical mechanisms is important for developing a physically based understanding of the response of the high latitudes to climate change: sea ice dynamics and thermodynamics, the thickness distribution of sea ice and its evolution, and the coupling of sea ice with the ocean. In this article, aspects of these features that are relevant to climatic change are discussed, including some perspectives on recent research on sea ice cover in both the Arctic and Antarctic. (Auth. mod.)

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Sea ice, Marine biology, Microbiology, Ice growth, Biomass, Antarctica—Weddell Sea.
The pelagic foraminifer *Neogloboquadrina pachyderma* (Ehrenberg, 1861) occurs in new ice, congelation ice, and the underlying water column of the Weddell Sea. *N. pachyderma* is incorporated into the ice in large numbers at the time of its formation. The average number of foraminifers per liter of ice was 87 and numbers ranged between 0 and 1,075. Sea ice contained 70 times more foraminifers per unit volume than the underlying water column, and on an areal basis the sea ice cover has approximately the same number of specimens as 60 m of underlying water column. The foraminifera are usually incorporated into the ice when it is being formed dynamically and are thus subsequently associated mainly with granular ice. Many foraminifers are able to survive and grow in the ice where algal biomass in winter is high compared to the water column, perhaps indicating an overwintering strategy. Arctic sea ice, on the other hand, is practically devoid of foraminifers. These observations may have implications for paleoceanographers who use *N. pachyderma* as a tool to reconstruct past surface water conditions. (Auth.)

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