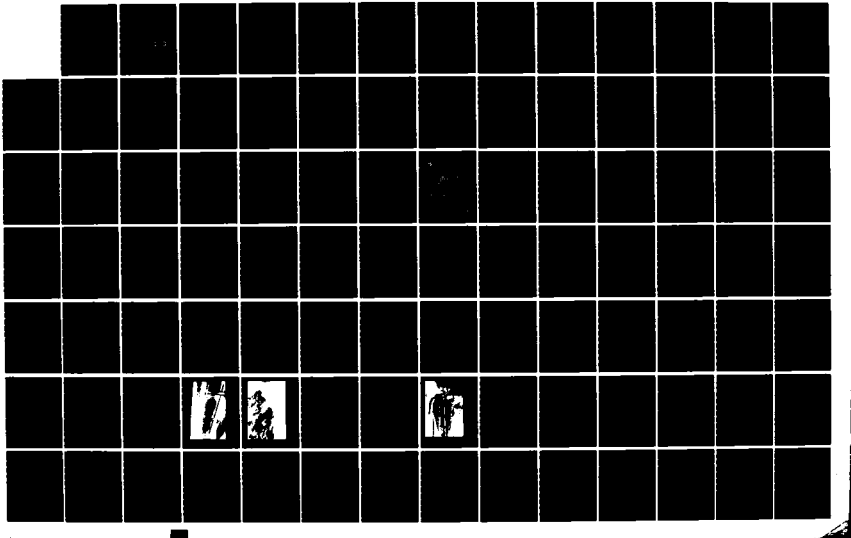
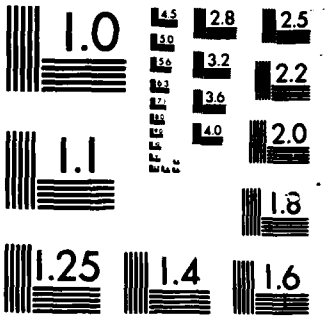
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Marine Chemistry in the People's Republic of China

by Chen-Tung Arthur Chen

•中國大陸海洋化學研究概況•

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AD-A163 254

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION	1b. RESTRICTIVE MARKINGS
2a. SECURITY CLASSIFICATION AUTHORITY UNCLASSIFIED	3. DISTRIBUTION / AVAILABILITY OF REPORT UNLIMITED
2b. DECLASSIFICATION / DOWNGRADING SCHEDULE	
4. PERFORMING ORGANIZATION REPORT NUMBER(S)	5. MONITORING ORGANIZATION REPORT NUMBER(S)
6a. NAME OF PERFORMING ORGANIZATION Oregon State University 6b. OFFICE SYMBOL (If applicable)	7a. NAME OF MONITORING ORGANIZATION Office of Naval Research
6c. ADDRESS (City, State, and ZIP Code) School of Oceanography Corvallis, OR 97331	7b. ADDRESS (City, State, and ZIP Code) 800 N. Quincy St. Arlington, VA 22217
8a. NAME OF FUNDING / SPONSORING ORGANIZATION Same as #7a 8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER N00014-79-C-0004
8c. ADDRESS (City, State, and ZIP Code) Same as #7b	10. SOURCE OF FUNDING NUMBERS

PROGRAM ELEMENT NO	PROJECT NO	TASK NO	WORK UNIT ACCESSION NO
61153N	RR03103	RR0310301	083-102-39

11. TITLE (Include Security Classification)
(U) Marine Chemistry in the People's Republic of China

12. PERSONAL AUTHOR(S) Chen-Tung A. Chen

13a. TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (Year, Month, Day)	15. PAGE COUNT
Final	FROM 10-1-82 TO 9-30-84	84 AUG 1	

16. SUPPLEMENTARY NOTATION

17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB-GROUP	Marine Chemistry, Chemical Oceanography, Chinese Science, People's Republic of China, Abstract Survey

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

Because of the long hiatus in communication with the People's Republic of China (PRC) and the inability of most westerners to read the original Chinese literature, U.S. marine scientists are largely unaware of the current status of marine chemistry in the PRC. This report presents a review of this field by compiling abstracts, and in many instances, translated papers from various subdisciplines in marine chemistry, e.g., apparatus and methods, natural water composition, physical and carbonate.

20. DISTRIBUTION / AVAILABILITY OF ABSTRACT	21. ABSTRACT SECURITY CLASSIFICATION
☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT. ☐ DTIC USERS	UNCLASSIFIED

22a. NAME OF RESPONSIBLE INDIVIDUAL	22b. TELEPHONE (Include Area Code)	22c. OFFICE SYMBOL
Dr. Frank L. Herr	202/696-4591	Code 422CB

DD FORM 1473, 84 MAR 83 APR edition may be used until exhausted
All other editions are obsolete

SECURITY CLASSIFICATION OF THIS PAGE
UNCLASSIFIED

MARINE CHEMISTRY IN THE PEOPLE'S REPUBLIC OF CHINA

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EXECUTIVE SUMMARY

Because of the long hiatus in communication with the People's Republic of China (PRC) and the inability of most westerners to read the original Chinese literature, a great deal of marine chemistry research in PRC is not known to the outside world. I have felt that a review of the status of Marine Chemistry research in PRC would be both interesting and important. Consequently, during the past few years, while being supported by the National Science Foundation and the Department of Energy, I collected PRC articles that were related to my research. Funding was subsequently obtained from the Office of Naval Research to conduct the review in a thorough and systematic manner. I believe that progress in Marine Chemistry in general should accelerate when marine chemists become aware of the existence of a large Chinese data base. Also, unnecessary and sometimes embarrassing duplication of efforts caused by lags in communication could be averted as a result of this study.

Progress in various subfields of marine chemistry and related research up to early 1984 is reviewed in the first part of this report. The references obtained prior to April 30, 1983, are listed under "Bibliography". The references obtained between May 1, 1983, and February 29, 1984, are listed under "Supplemental Bibliography".

Three major objectives for this study were:

- to review the status of marine chemistry research in the People's Republic of China;

- to publish an annotated and indexed bibliographic data report;

- to publish a review article summarizing the results of this project in a refereed journal.

I have contacted and requested reprints from three hundred fresh-water and marine chemists in PRC. I have also visited several key oceanographic institutions in PRC to ensure a thorough and

efficient acquisition of reference material, particularly items published in the "gray literature." The institutions visited are: the Shandong College of Oceanography; the Institute of Oceanology and the South China Sea Institute of Oceanology of the Academia Sinica; the institutes of the National Bureau of Oceanography (NBO), i.e. the First, and the Second Institutes of Oceanography, the Institute of Marine Scientific and Technological Information, the Institute of Oceanographic Instrumentation, and the Headquarters. In addition, I have met and consulted with scientists from the Third Institute of Oceanography of NBO; the Institute of Geochemistry of the Academia Sinica; the Department of Oceanography, Xiamen University; and the Institute of Estuarine and Coastal Research, East China Normal University. My impressions of oceanographic research in PRC are given in Appendix I.

Over 750 publications regarding fresh water and marine chemistry were collected. These papers represent a good coverage of what is available to a "foreigner," but are by no means complete. Over three hundred articles were annotated because there was no Chinese or English abstract. Fifty abstracts in Chinese were translated. Four hundred abstracts in English were mainly checked for spelling and grammatical errors only, but some were shortened. No editing was performed otherwise. Conclusions based on apparent political considerations such as relating the dissolution of calcite to the thoughts of Mao and Engel were deleted (dissolution was once characterized as a class struggle between the calcite and water).

Some authors may publish their articles verbatim or with only slight changes in more than one journal, these articles are identified as duplicate publications in our report. Keywords are selected and the author's current and former names are identified. Since it is not uncommon to find three or four English spellings for the same author, I have also written the author's name in Chinese character, if known to me, in the AUTHOR-TITLE INDEX to ensure proper identification of the scientists. Journal names sometimes changed, and these are identified in Chapter III.

The appropriate bibliographic data and selected references were entered into a FAMULUS bibliographic data management system of the Oregon State University Computer Center. These data were entered, stored, edited, and then sorted by alphabetical order of the authors' names.

We have listed and numbered (a number proceeded by "a" refers to a reference listed in the supplemental bibliography) the data set according to the authors' last name in the following format:

BIBLIOGRAPHY FORMAT

180 AUTH The authors of the reference are listed. 180 refers to the 180th reference listed in the reference. Some articles that arrived just before the reports were sent to press were inserted at the proper places and numbered as XXX.1, XXX.2 etc., rather than renumbering the entire bibliography.

AFFI The authors' affiliations.

DATE This refers to the year in which the reference was published.

TITL This refers to the title of the bibliographic entry.

CITA The journal or technical report citation.

ABST Abstract or annotation is included for each reference.

KEY Keywords are included to provide index of subject matter.

LANG The language used for the reference and whether an English or Russian abstract is included are noted.

NOTE The authors' former names, if any, are given. If new spellings are used since the publication of the reference, they are also given. Whether the same article has been published elsewhere is also noted.

The data base has been indexed according to the author's last name under the AUTHOR-TITLE INDEX. The author's name is also identified in Chinese character. All of the citation numbers and the corresponding titles are included. The bibliography has also been indexed by selected keywords for easy reference to subject area under KEY WORD INDEX. Finally, the Chinese names and the pronunciation of the Chinese phonetic alphabet (the Pinyin System) are listed in Appendices II and III, respectively.

ABSTRACT

The history of marine science development and the current marine chemistry research organizations and journals in the People's Republic of China are reviewed. A discussion on the progress in various subfields of marine chemistry and related research up to early 1984 is also presented.

The scope of marine chemistry research in PRC is wide and diversified. Although it still focuses on shallow water and resource-related phenomena, it has also branched out to include all aspects of physical and organic chemistry, analytical chemistry, marine pollution and applied marine chemistry. The main contributions can be summarized as follows:

1) Development of analytical tools and methods such as oxygen electrode, mass spectrophotometer, physically coated mercury film electrode for anodic stripping voltimeter, and neutron activation analysis.
2) Large-scale surveys of the major elements, trace metals, carbonates, gases, nutrients, particulates, organic matter, pollutants and radionuclides in the Chinese rivers, lakes, estuaries and seas and delineations of their horizontal, vertical and seasonal variations.
3) Studies of the microscopic approach to Marine Chemistry, i.e., to evaluate the chemical processes in seawater based on the fundamental physico-chemical properties of elements.
4) Studies of the interactions between marine chemistry and other disciplines of oceanography, such as fisheries and marine resources. The relationship between water chemistry and the high biological productivity near the mouth of Yangtze River, for example, was given special attention.
5) Systematic studies of the content, speciation, distribution, transport, transformation, self-cleaning capacity and secondary pollution of trace elements and pesticides, such as Cu, Pb, Zn, Cd, Cr, As, Hg, Si and BHC in the river water, seawater, ocean-river interface, sediments, and

organisms. The bioaccumulation of trace metals and pesticides in edible sea food and environmental quality have been studied extensively.

6) Utilization of resources such as desalination, extraction of energy, chemicals, and other living and non-living resources.

7) Studies on means of preventing and removing metal corrosion and biofouling on piers, drilling platforms, and ships.

Many of these fields are directly or indirectly related to understanding and utilizing marine resources. Projected future research directions are also heavily resource-oriented.

ACKNOWLEDGMENT

This work would not be possible without the generous support from the Office of Naval Research. I acknowledge the fine hospitality that I received everywhere in PRC. I am grateful for the assistance of Chen Bingxing, Chen Guozhen, Chen Saomo, Chen Shangji, Chen Song, Chen Yuwei, Chen Zexia, Gao Yunchang, Gu Hongkan, Guo Jianzhong, Guo Tian-Lin, He Lianbiao, He Yencheng, Hou Lian-San, Jing Qingming, Li Faxi, Li Jiliang, Li Peiquan, Li Tianmin, Li Yunwu, Lin Huiyong, Liu Hanhui, Liu Liansen, Luo Chin, Luo Yuru, Qin Yunshan, Shi Naiguang, Sun Shaobei, Sun Yubei, Tang Yunqian, Tong Jun-an, Wang Longwen, Xue Tingyao, Yang Jinxian, Yang Zuosheng, Ye Longfei, Yu Guohui, Zhang Zhen-bin, Zhao Xucai, Zhao Yiyang, Zheng Jianlu, and Zhou Jiayi, all of PRC; and W.V. Burt, J.V. Byrne, M.A. Champ, C. Correia, E.T. Drake, G. H. Keller, Kwok-Wai Lau, Kaijun Lin, R. W. MacVicar, L. A. Orleans, M. Tshibuabua, Chih H. Wang, Frank Wang, Kuan Wu Wang and Show-Yuei Chiang in USA; and many others. E.T. Drake wrote part of Appendices II and III. N.R. Anderson and T.L. Ku provided valuable comments. My parents and wife helped to keep the communication between the PRC marine chemists and myself going.

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CHAPTER I. INTRODUCTION

The study of marine chemistry in China began in the 1930's, but only fragmentary and sometimes unreliable data were collected for the first two decades. Systematic studies were started in the late fifties with the clear understanding that the basic policy for scientific research is service to production. All non-production related research was suspended between 1965 and 1975 when virtually all progress in science, including the publication of scholarly works, ceased. Academic and research institutions were sometimes closed; teachers and researchers were sent to work on farms or were persecuted. As expressed in one report (a256), "Oceanographic studies not concerned with production, especially basic research, were all suspended." It was not until 1978 that oceanographic institutes returned to their normal research and teaching activities.

Significant activity in marine chemistry was resumed after the decade-long turmoil, and progress has been rapid over the last few years. In 1979, M-h. Ji published a three-page overview of the marine chemistry research in PRC (a109). In 1981 Zhang, Liu and Chen (unpublished) prepared a 19-page handwritten review manuscript. Unfortunately, despite these efforts, much of the research has not been available or even known to the outside world because of the tremendous language barrier. The publication of Chinese research papers in English by some of the leading worldwide abstracting services has been a big step forward, which in itself, to a degree, demonstrates the growing status of marine chemistry research in China. This article attempts to delineate this development in a more systematic way.

We will first give an overview of the progress of marine chemistry in China, concentrating on the last 10-20 years and then introduce current studies. The content of the article is subdivided into various disciplines of marine chemistry, but it is necessarily biased toward physical chemistry because of the training of the author.

CHAPTER II. HISTORY OF MARINE SCIENCE DEVELOPMENT IN CHINA

The first oceanographic research unit, the Division of Oceanology, Qingdao Meteorological Observatory, was established by the city of Qingdao (Fig. 1), Shandong, in 1928. In 1931, the Marine Biological Association of China, based at the Amoy University, was inaugurated (a256). The Marine Biological Laboratory of the Academia Sinica, the Republic of China, was established, in Qingdao, in 1935 (a39). Early studies centered around marine biology. Studies of marine chemistry in the thirties involved only the measurement of salinity, pH, silicate concentration and other parameters in Chiaochou Wan (adjacent to Qingdao) and Bohai (a287). In the forties, the variation and distribution of pH, salinity, dissolved oxygen, phosphate, silicate, and total alkalinity were investigated in Chiaochou Wan and also around the Choushan Islands (a38, a109).

These pioneering efforts were necessarily disorganized, but activity became more systematic in the late fifties. The Marine Biological Laboratory was re-established by the Academia Sinica (now under PRC) in 1950 and later became the Institute of Oceanology, Qingdao, and the South China Sea Institute of Oceanology, Guanzhou. The Department of Oceanography of Amoy University was founded in 1952. The Shandong College of Oceanography, which included a Chemistry Department, was established in 1959. Furthermore, more marine chemistry research laboratories were established in other institutions of higher education and in the National Bureau of Oceanography (NBO, established in 1965 by the PRC Navy but is now administered by the State Council). These were the organizational foundations of marine chemistry in China.

Between 1949 and 1958, chemical oceanographers continued taking measurements of chemicals in seawater, and measurements were made on salinity, phosphate, nitrate, silicate, pH, and dissolved oxygen concentration (a109) near the mouth of the Yellow River and in the shallow Bohai Bay (maximum 78 m, average 18 m, with an area of 77,000 Km^2). The introduction of a Chinese standard seawater (chlorinity standard) in 1954 helped to standardize the salinity measurements.

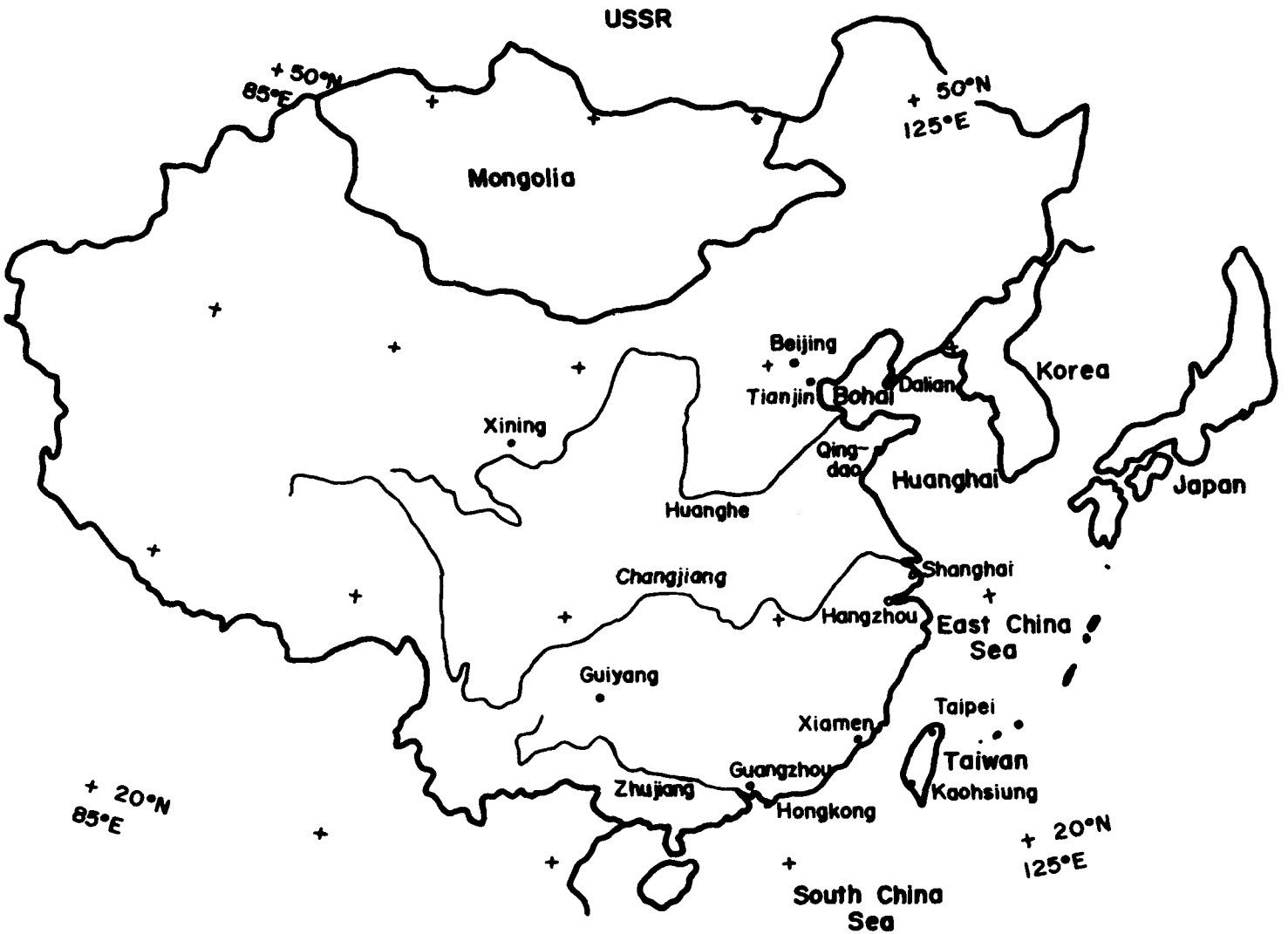


Fig. 1 Map of China showing the most frequently mentioned names.

In 1957, the first Chinese oceanographic research ship, the Venus (a converted 1300-ton tug), made a comprehensive survey in Bohai Bay and the deeper Yellow Sea (maximum 140 m, average 44 m, area 380,000 Km^2), including studies of dissolved oxygen content, phosphate and silicate (a109, a131). The Venus retired in 1980 after more than 60 years of service.

The first national, comprehensive marine survey over a large area (12,000 ocean stations) for a long period of time was conducted in the late 1950's and early 1960's. Thirty-four research units and fifty-four research vessels took part in the survey which involved Bohai Bay, the Yellow Sea, the East China Sea (maximum 2,719 m, average 370 m, area 770,000 Km^2) and the South China Sea. The first two areas and most of the East China Sea are on the continental shelf, but the South China Sea is a deep basin with a maximum depth of 5,559 m, averaging 3,500 m with an area of 3.5×10^6 Km^2. "Blue water" data were obtained for the first time. The vertical and horizontal distribution and seasonal and annual variations of salinity, pH, Eh, dissolved oxygen, nutrients and iron were measured and analyzed systematically (a109, a131). As a result of this survey, a series of shipboard analytic methods was established, and criteria for ocean surveys were set. A wealth of data was accumulated, and new personnel for future oceanographic research was trained. This survey laid the foundation for future marine chemistry research in PRC. Since the mid-1960's various institutes have carried on the research, with each institute studying a different subject in depth.

In the mid-1960's, the vertical and horizontal distribution and seasonal variations of the various forms of nitrogen (nitrate, nitrite, ammonia and organic nitrogen) and iron (dissolved and particulate) and the effect of these chemicals on the productivity of nearby fishing grounds were systematically studied in Chiaochou Wan and the Yangtze River mouth (a109). During this period, the marine pollution survey was coupled with marine chemistry research. The extent of marine pollution was studied in the Chinese seas, estuaries and river mouths. In addition to the regular measurements of pH, Eh,

dissolved oxygen, ammonia, nitrite and other nutrients, heavy-metal pollutants such as Hg, Cd, Cr, Pb, As, Cu and Zn, and organic compounds such as benzene and other hydrocarbons, chlorinated carbons, sulphur compounds and cyanides were measured (a109). Furthermore, the concentrations of these pollutants in marine organisms, bottom sediments and suspended particles were studied (a109). The Institute of Marine Scientific and Technological Information under the National Bureau of Oceanography was established in 1965 to collect and process the national oceanographic data.

CHAPTER III. CURRENT MARINE CHEMISTRY AND RELATED PROGRAMS IN PRC

In the 1970's, several hundred research units in the near-shore provinces established hundreds of sampling stations, providing much information for qualitative and quantitative studies of the marine environment. Both the scope and the depth of marine research were extended. Time-series observations at specific locations were begun; routine water analysis now included 30 chemicals, and the study domain was extended from the water column to marine organisms and bottom sediments. Furthermore, research went beyond simply describing the oceans; it included utilization of non-living marine resources (such as desalination and the extraction of uranium, bromine, magnesium, iodine, potassium, etc.) as well as living marine resources and pharmaceuticals (a58); survey and control of marine pollution, prevention of metal corrosion and biofouling; and theoretical studies of seawater physical chemistry in an effort to determine the intrinsic chemical laws of the oceans. Finally, the study of isotopes and marine radiochemistry was undertaken to determine the concentration and distribution of isotopes in seawater, marine organisms and bottom sediments, and their dilution and diffusion, as well as their accumulation, in marine organisms and bottom sediments (a109, a122).

Marine chemistry is now an established scientific discipline in PRC. Because of the country's isolation after the Anti-Rightist Movement in 1957 and especially during the 10-year turmoil, however, the Chinese have lagged behind in understanding of modern oceanographic concepts and technology developed in other nations. Also, while there are many experienced chemists (some of the senior ones were trained at western institutions), the majority of the younger scientists lack experience and do not appreciate the practical problems associated with the use of sophisticated instrumentation. They are working hard to catch up, and marine chemistry in China has now progressed past the isolation stage. Chinese chemical oceanographers are now participating in large-scale collaborative studies such as the international survey of the deep Western Pacific Ocean and the Equatorial Region (the Global Weather

Experiment program) and a recent Sino-American survey of the Yangtze River mouth. A series of articles and editorials regarding marine research have been published in the PRC party newspaper recently, indicating that oceanography carries significant weight in the eyes of PRC policy makers (see, for instance, Renmin Ribao, 20 Jan., 22 Jan., 12 Feb., and 13 Feb., 1984).

Organizations

The current marine chemistry research organizations include (Fig. 2):

- ACADEMIA SINICA
  - Institute of Acoustics, (underwater acoustics, ultrasonics, sound and vibrations, environmental acoustics, speech acoustics, infrasonics, electroacoustics, and nonlinear acoustics, 250 staff) Beijing;
  - Institute of Environmental Chemistry, Beijing;
  - Institute of Oceanology, (physical oceanography, marine chemistry, marine biology, marine geology, instrumentation, marine flora, marine invertebrate, marine vertebrate, information and data, 700 staff) Qingdao;
  - Institute of Geochemistry, (geochemistry of ore deposits, isotopic geochemistry, geochemistry of elements, organic geochemistry, meteoritics and cosmochemistry, environmental geochemistry, mineralogy, petrology, quaternary geology, 800 staff) Guiyang;
  - South China Sea Institute of Oceanology, (physical oceanography, marine physics, marine chemistry, marine tectonics, marine sedimentation, marine biology, new technology laboratory, coastal and estuarine processes, and central experimental laboratory, 700 staff) Guangzhou;
  - Qinghai Salt Lake Research Institute, (400 staff) Xining;

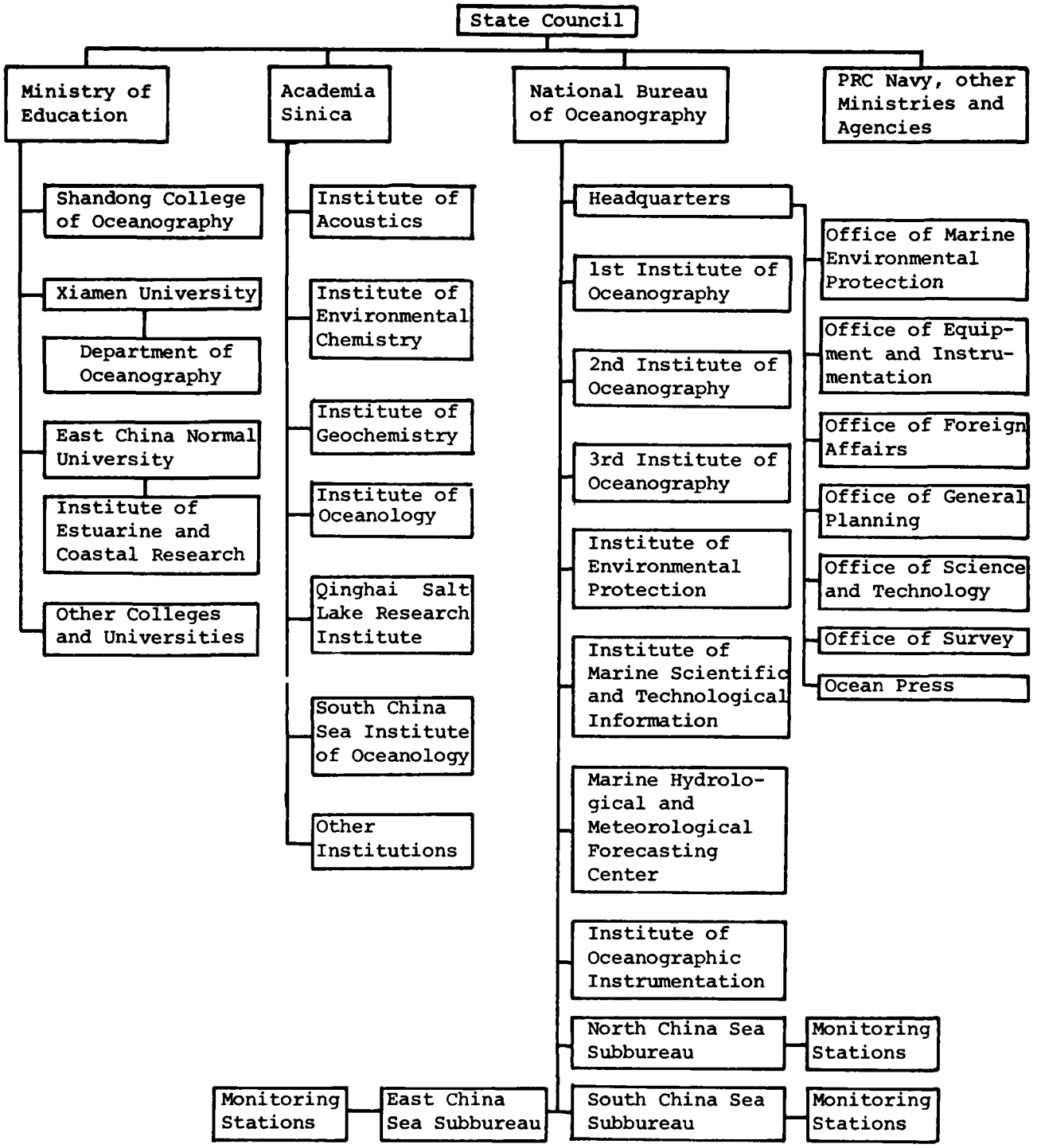


Fig. 2 Organizational chart of PRC's marine science education and research institutes. The fisheries units are not included.

- MINISTRY OF EDUCATION

Shandong College of Oceanography, (physical oceanography and marine meteorology, physics, chemistry, marine biology, marine geology, fisheries, marine resources, mathematics, marine engineering, 1300 staff; under NBO between 1965 and 1977) Qingdao;

Department of Oceanography (100 staff), Xiamen University, Xiamen;

Institute of Estuarine and Coastal Research, East China Normal University, Shanghai;

- NATIONAL BUREAU OF OCEANOGRAPHY

South China Sea Sub-Bureau, Guangzhou;

East China Sea Sub-Bureau, Hangzhou;

North China Sea Sub-Bureau, Qingdao;

First Institute of Oceanography, (hydrology, meteorology, harbors and ports, new technology, marine physics, library and marine chemistry, marine geology, marine biology, information services, 350 staff), Qingdao

Second Institute of Oceanography, (marine remote-sensing techniques, marine chemistry, marine geology, marine hydrology and meteorology, physical oceanography, marine geophysics, coastal zone, instrumental service, information and data, desalination, 300 staff) Hangzhou;

Third Institute of Oceanography, (marine physics, physical oceanography, marine chemistry, marine geology, marine biology, information and data, isotope laboratory, 250 staff) Xiamen;

Institute of Marine Scientific and Technological Information, (data collecting, chart making, prediction, editorial, library, computer archives, printing, 400 staff) Tianjin:

Institute of Oceanographic Instrumentation, (optics, electromagnetics, acoustics, mechanical and structural engineering, computer, oceanographic surveying technology, meteorology and standardization, and documentation and information, 700 staff) Tianjin;

Institute of Environmental Protection, (marine geology, marine biology, marine chemistry, analytical quality control, sea ice, information services, integrated assessments, Bohai surveillance, 350 staff) Dalian;

Marine Hydrological and Meteorological Forecasting Center, Beijing;

Ocean Press, Beijing.

Other organizations also perform limited marine-chemistry-related research. These include:

Bureau for Environmental Protection
Bureau of Aquatic Products
Ministry of Chemistry
Ministry of Geology
Ministry of Petroleum Industry
Ministry of Transportation
PRC Navy
Provincial Institutes

Journals

Several oceanographic journals have published or are publishing marine chemistry research:

Acta Oceanologica Sinica (two journals, one in Chinese, the other in English)

Collected Oceanic Works (formerly Oceanic Selections; publishes papers selected from the PRC marine science journals)

Current Status in Marine Science and Technology

Hai Yang Ke Xue (changed to Marine Science in 1982 and has been called Marine Sciences since 1983)

HaiYang (Oceans)

Haiyang Tongbao (formerly called Marine Scientific Information; changed to Haiyan Tongbao in 1982, also known as Marine Science Bulletin; called only as Marine Science Bulletin since 1983)

Ho Tzu K'o Shueh (Estuarine Science)

Information on Marine Sciences

Journal of Shandong College of Oceanology (may soon change to Journal of Shandong College of Oceanography because of a recent change in the college's name)

Marine Environmental Science

Marine Research (now called The Oceanography of the Yellow Sea and Bohai)

Marine Science Bulletin (formerly Marine Scientific Information; changed to Haiyang Tongbao but also known as Marine Science Bulletin in 1982; the current name has been used exclusively since 1983)

Marine Science (known as Hai Yang Ke Xue up to 1982 and is called Marine Sciences since 1983)

Marine Sciences (formerly Hai Yang Ke Xue, and Marine Science)

Marine Scientific Information (now called Marine Science Bulletin)

Ocean Science and Technology

Ocean Technology

Oceanic Abstracts

Oceanic Selections (now called Collected Oceanic Works)

Oceanologia et Limnologia Sinica

Practice in Oceanography (now called The Oceanography of the East China Sea)

Studia Marina Sinica

Taiwan Strait

The Oceanography of the East China Sea (formerly Practice in Oceanography)

The Oceanography of the Yellow Sea and Bohai (formerly Marine Research)

Transactions of Oceanology and Limnology

Translated Papers in Marine Science

Tropic Oceanology

Occasionally papers related to marine chemistry research can be

found in the following journals:

Acta Acoustica
Acta Geographica Sinica
Acta Geologica Sinica
Acta Scientiae Circumstantiae
Acta Scientiarum Naturalium Universitatis Amoiensis
Acta Scientiarum Naturalium Universitatis Sunyatseni
Analytical Chemistry
Applied Acoustics
Daqi Kexue (Scientia Atmospherica Sinica)
Diqiu Huaxue (Geochimica)
Environmental Chemistry
Environmental Sciences in China
Geochemistry
Geology
Guisuanyan Xuebao (Journal of the Chinese Silicate Society)
Haiyanyu Huagong (Oceanography and Chemical Engineering)
He Huaxue Yu Fangshe Huaxue (Nuclear Chemistry and Radiochemistry)
Huanjin (Environment)
Huanjing Baohu (Environmental Protection)
Huanjing Kexue (also known as Journal of Environment Science)
Huaxue Tonghbao (also known as Chemistry)
Huaxue Xuebao (Acta Chemica Sinica)
Journal of Seawater Desalination
Journal of Tianjin University
Kexue Shiyan (Scientific Experiments)
Kexue Tongbao (Science Bulletin)
Ko Hsueh Shin Wen (Science News)
Marine Geological Research
Organic Chemistry
Scientia Geologica Sinica
Shanghai Huan Jing Ke Xue (Shanghai Environmental Science)
Technology of Water Treatment
Zhongguo Kexue (Scientia Sinica)

Summary

The scope of marine chemistry research in PRC is wide and diversified. Although it still focuses on shallow water and resource-related phenomena, it has also branched out to include all aspects of physical and organic chemistry, analytical chemistry, marine pollution and applied marine chemistry. The main contributions can be summarized as follows:

1) Development of analytical tools and methods such as oxygen electrode, mass spectrophotometer, physically-coated mercury film electrode for anodic stripping voltimeter, and neutron activation analysis.
2) Large-scale surveys of the major elements, trace metals, carbonates, gases, nutrients, particulates, organic matter, pollutants and radionuclides in the Chinese rivers, lakes, estuaries and seas and delineations of their horizontal, vertical and seasonal variations.
3) Studies of the microscopic approach to Marine Chemistry, i.e., to evaluate the chemical processes in seawater based on the fundamental physico-chemical properties of elements.
4) Studies of the interactions between marine chemistry and other disciplines of oceanography, such as fisheries and marine resources. The relationship between water chemistry and the high biological productivity near the mouth of Yangtze River, for example, was given special attention.
5) Systematic studies of the content, speciation, distribution, transport, transformation, self-cleaning capacity and secondary pollution of trace elements and pesticides, such as Cu, Pb, Zn, Cd, Cr, As, Hg, Si and BHC in the river water, seawater, ocean-river interface, sediments, and organisms. The bioaccumulation of trace metals and pesticides in edible sea food and environmental quality have been studied extensively.
6) Utilization of resources such as desalination, extraction of energy, chemicals, and other living and non-living resources.

7) Studies on means of preventing and removing metal corrosion and biofouling on piers, drilling platforms, and ships.

It may be interesting to note that many of the above mentioned fields are directly or indirectly related to understanding and utilizing marine resources. An article published in the party newspaper (Renmin Ribao, 20 Jan., 1984) described the resource-oriented research activities of the Qinghai Salt Lake Research Institute. Another article by the director of NBO (Renmin Ribao, 22 Jan., 1984) describes three reasons behind the rapid development of marine sciences (presumably in PRC). All three reasons boil down to resources. He concludes the article by providing three key development directions for marine sciences: (1) desalination and extraction of K, Br and Mg; (2) development of tidal, wave and thermal energy and; (3) mining of minerals. These may very well be the emphasis of PRC marine chemistry research in the immediate future.

III.1 APPARATUS AND METHODS

The development of marine chemistry in China has closely followed the development of analytical chemistry (a287). Early works include nutrients (55-57, 147, 182, 218, a38, a188, a189, a251, a321, a419, a420), chlorinity (55-57, a38, a192, a222, a287), oxygen (55-57), pH and carbonates (55-57, a287), trace elements (a94-96, a180, a186, a190, a191), organic material (a31, a32, a279), and the determination of heavy water content in bittern samples from Chiaochou Bay, Kwangchou Bay and Yellow Sea. (54).

Analytical techniques were standardized during the national ocean survey in 1958, and a standard manual for ocean surveys was published in 1961 on the methods for the determination of salinity, chlorinity, dissolved oxygen, pH, alkalinity, ammonia, nitrate, nitrite, phosphate, silicate, sulfate, H_2S, borate, bromine, potassium, sodium, magnesium, calcium, etc. These methods were later modified in the book Seawater Analytical Chemistry (a15). A textbook on analytical methods of water quality was published in 1979 (a103). This book describes the analytical methods for assessing the quality of water, analyzing human-waste sewage and industrial sewage and the determination of water quality by the presence or absence of certain aquatic organisms. Some new instruments are also described.

Recent work emphasizes multi-element analyses of samples (a119, a178) and the development of automating the analytical procedures (292, 307, a48, a178). But this effort is hampered by the lack of micro-computers; a paper published in 1978 describes the use of a slide rule for chlorinity calculation (a240), another in 1982 (a116) reports on how to build a mechanical calculator for calculating seawater density, reflecting the shortage of even hand calculators in PRC. Lin (152) introduced the current status of oceanographic instrumentation in U.S.A. and suggested how to speed up the development of marine instrumentation in PRC. Xu (a332) discussed the standardization of terminology for oceanographic scientific instrumentation.

Since 1970, the large-scale marine pollution survey has required additional measurements, including those for turbidity, chemical oxygen demand, biological oxygen demand, sulfides, cyanides, phenols, 666 (the PRC name for BHC) and other dissolved organic materials,

zinc, lead, cadmium, mercury, cobalt, copper, chromium. arsenic and other trace metals, and α and β radioactivity. Zhu (a416, a417) reviewed the role of analytical chemistry in environmental sciences and health. Different methods were developed for measurements in air, water, bottom sediments and biological materials (2-4, 61, 70, 71, 73, 75, 82-85, 90, 95, 100, 101, 104, 113, 119, 124, 127, 129, 137, 144, 146, 147, 156, 159, 161, 164-170, 172, 188, 197-199, 204, 219-221, 224, 232, 236, 245, 247-249, 255, 262-264, 272, 276, 279, 288, 292, 303, 305, 307, 315, 320, 321, 325-327, 331, a3, a10, a15, a25, a27-29, a31, a32, a46, a49-51, a60, a73-75, a85, a88, a94-96, a103, a114, a119, a125, a127, a133, a135.1, a136, a145, a148, a168, a175, a178, a180, a184-186, a188-190, a192-194, a198, a210, a212, a219, a221-225, a235, a236, a248, a251, a257, a260, a271, a273, a278, a282, a291, a292, a303, a306, a318, a319, a320, a323, a327, a328, a332, a335, a338, a343, a344, a349, a353, a354, a356, a370, a372, a374, a384, a388, a395, a398, a406, a415, a416, a419, a420).

Gu and coworkers (82-85, 164-170, 204, a73-76) developed portable physically-coated mercury-film electrodes for use in inverse polarography and eliminated the need to clean the electrodes frequently, resulting in their wide use. The same method (polarography, inverse polarography, or anodic stripping voltammetry) has been used to measure Yb (71), Eu (73, 144), Sn (82, 85, 90, 169), Bi (82, 85, 90, 169), Pb (83, 85, 90, 137, 156, 164, 167-170, 204, 219, 220, 249, 303, 325, a27, a73-75, a115, a184, a185, a198), Cu (85, 90, 137, 156, 164, 167-170, 188, 303, 325, a27, a75, a184, a185, a198), Zn (85, 90, 137, 156, 164, 167-170, 204, 221, 248, 249, 255, 303, a73, a75, a184, a185, a271), Cd (85, 90, 156, 164, 167-170, 204, 249, 279, 303, 325, a73, a85, a88, a184, a185, a198), Ni (a260), Y (127), Ti (236), Te (2, 4), W (3), Al (156), As (a127), Sc (72), Fe (156), Mn (156).

Atomic absorption is a frequently used method for trace-metal determination. Elements determined are: Rb (264), Cs(264), K (a6.1), Na (a6.1), Li (264, a389), Ca (a6.1, a303, a344), Mg (a6.1, a303, a344), Ba (264), Al (a303), Si (a303), Hg (101, 197, 198, 305, 326, 327, a60, a88, a299), Cr (262, 263, a389, a398), Pb (262, 263, a310, a398), Cd (262, 263, a310, a398), Ni (264, a310, a388, a389, a398), Sr (264, a148), Fe (263, a303, a344, a398), Mn (263, a235,

a344), Zn (255, 263, 264, a193, a303, a388, a389, a398), Cu (263, 264, a193, a303, a310, a388, a389, a398), Co (263, 264, a389) and Se (a221).

Neutron activation is used to determine Ag, As, Au, Cd, Ce, Co, Cr, Eu, Fe, Hf, Hg, La, Nd, Ni, Pb, Sc, Se, Sm, Tb, Th, U, W, Yb, Zn and Zr (199, a135.1, a398) in seawater. The same method has been applied for mineral analysis (331).

Chromatographic method (291, a51, a311, a349) is used to determine Cr (a273), chlorinated pesticides (153, 306, a101, a103, a104, a300, a370), sulfur (113), oil (93, 113), paraffin (113), total inorganic carbon (257, a239, a278), oxygen (a239, a278), Ar (a239, a278), NH_3 (a239), CO (a239), hydrocarbons (61, a239), amino acids (a32), nitrogen (a239, a278), fatty acids (a114), NO_3 (a371), NO_2 (a371), nitrosamine (a390), saccharides (a214) and many other organic compounds (a103).

Specific ion electrodes are used to determine iodine (245), ammonia (105), sulfide (149, 246), oxygen (304, a136), NO_x (a29, a115), Fe (105), cyanide (a226), Eh (79, 105, 136, 149, a6.1), Ca (a23), Na (a23), K (a23) and pH.

Fluorimetric method is used to determine aluminum (131), Hg (176), and chlorophyll a (130, a49). A laser fluorescence method was used to determine uranium in seawater (a374).

UV, visible or IR spectrophotometry is used to determine Cu (137, 159), Cr (159), B (119), Ba (159), Ni (159), Mn (159, a388), Th (a344), Ga (159), Ti (159, a344, a388), V (159), Pb (137), Zn (137), U (146, 232, 315, a344), Fe (a388), Si (156, a343), Ce (a135.1), Th (a320), Co (a323), Hf (a344), Zr (a344), Ta (a344), fulvic acid (124), humic material (124), I (a10), amino acids (a32) and oil (113, a395).

Emission spectroscopy is used to analyze Ag, Al, B, Ba, Be, Bi, Cd, Ce, Co, Ca, Cr, Cu, Fe, Ga, Ge, Hf, In, La, Mg, Mn, Mo, Nb, Ni, Pb, Sb, Sc, Si, Sn, Sr, Ta, Th, Ti, V, W, Yb, Y, Zn and Zr (159, a119, a398), K and Na (a119 and a303) and Li (a389). Mass spectroscopy is used to analyze B-10, Li-6, Li-7 (a236, a318, a319) and fatty acids (a114).

X-ray fluorescence spectroscopy is used to determine Fe (307, a125), Mn (307, a125), Ti (307), Zn (307, a125), Pb (307, a125), K (307, a125), Ca (307), Zr (307), Cu (307, a125), Rb (307, a125,a372), Yb (307), As (a125), Se (a125), Mo (a125), Sr (a125, a372), Br (a125), Cl (a125), pigments (a401). X-ray diffraction technique is used in studying chemical structures of marine natural products (a62) and minerals (10, 40, 102, 207, 231, 264, 336, a67, a149, a209, a305, a412, a421).

Colorimetry is used to determine As (a88, a103, a223), Cu (a103), Cd (161, a103), Sb (a96), Fe (180, 181, a103, a181, a389), Nb (a344), Co (280, a103), Tl (a94, a95), U (172, 276, a180, a186, a190, a191, a225, a322), Pb (a50, a103), Ti (a389), Si (133, 171, 182, a103, a321, a344, a419, a420), Th (276), Mn (a103, a303, a389), Al (a103), Be (a3, a344), Zn (a103), K (a103), Cr (a103), Se (a103), B (a103, a291, a388), Ni (a103), Hg (a103), Ce (a135.1), Sn (a223), Ga (a292), NO_3 (148, 182, 214, 218, a6.1, a103, a188, a189, a251, a321), NO_2 (182, a6.1, a103, a188), NH_3 (182, a48, a103, a338), PO_4 (182, a6.1, a103, a303, a344, a388, a389), Br (a211), alginate (a31), organic-N (79, a103, a279), organic-P (79), cyanides (a103), fluorides (a103), iodides (a103, a290, a303), carbohydrates (224, a214), phenols (a103) and pesticides (a103).

Significant progress has also been achieved in the research of radioisotopes in the marine environment; total α and β radioactivity has been measured. Analytical procedures have been established for the determination of K-40, Co-60, Sr-90, Cs-137, Ru-106, Ce-144, U-232, U-234, U-238, Th-228, Th-230, Th-232, etc., and these elements have been used as tracers for oceanographic studies (142-144, 223,276, a133, a134, a135.1, a175, a328, a398).

Extensive analyses of uranium in seawater have been made with various approaches such as photometric determination of U(VI) with arsenazo III (a186, a322) and with ion-exchange colorimetry in direct determination of U(VI) in seawater (161). More on isotopes is discussed under III.12, "ISOTOPES".

Contamination and loss of samples during collection, storage or treatment have also been evaluated (100, 180, a76, a145, a157, a212, a219, a282). The publication of a manual for marine pollution prevention in 1979 summarized the research done in this field (a103).

Other efforts are as follows: Wu et al. (a303) analyzed protein, sugar, fat , amino acids and vitamins. A group at Yunnan University determined Cu with Zn-EDTA titration (a356). Qian and Sun (a214) measured the dissolved Saccharides in seawater; Dai and Zhou (61) determined polynuclear aromatic hydrocarbons in seawater; Zhang et al. (a370) determined PCBs; Ji et al. (123) determined uronic acid in alginic acid. They also isolated humic material by a resin (124). Wu et al. (a306) determined petroleum by UV fluorescence spectroscopy. Wu and Xu (a291) determined boron in natural waters and sediments. The Water Analysis Group at the Sun Yat-Sen University determined Zn in natural waters turbidimetrically (a248). The development of pH-test paper was reviewed in 1977 (193).

Liang et al. (a148) determined Sr in corals. Feng et al. (70) and Ke et al. (129) analyzed minerals by a laser microprobe. Gong (75) also analyzed minerals by laser spectroscopy.

Chen and Wu (22) constructed a portable salinometer. Qian et al. (200) designed a laser holographic meter for measuring particles in seawater.

Xu (a332) suggested the standardization of oceanographic instrumentation terminology. Li (148) reported the analysis of nitrate with auto-analyzer. Wan (234) modified the triggering mechanism of a water sampler. Li (150) developed sampling technique for trace metals in the surface microlayer. Hu et al. (a97.1) and Liu (165) reported on interstitial water samplers. Yang et al. (a335) described a suction device that gives precise suction speed and volume. Water color, transparency and fluorescence are also measured (56,118,130,132,191, 192,195,201).

The use of advanced instrumentation is now widespread. The Chinese manufacture various spectrophotometers, polarography meters, anodic stripping voltimeters and mass spectrophotometers (71-73, 82-86, 161, 247, a3, a73-76, a184, a198, a210, a239, a322). Development of marine instruments and equipment is carried out in essentially all marine research and teaching institutions. But these efforts seem to be focused on easier-to-make instruments such as pH

meters (I did not see any pH meter that could read to better than 1 mv in the PRC laboratories that I visited; I was told that several research units are developing units that can read to 0.1 mv). Chinese-made, large instruments such as AA and spectrophotometers are available but the higher-priced major instruments are mainly purchased from Japan and western countries, at two to three times the normal price.

Institute of Oceanographic Instrumentation of NBO was established in Tianjin in 1965. The institute specializes in research and development of oceanographic instruments, equipment, and surveying techniques, with emphasis on developing systems for field measurements. It provides equipment and technical and calibrating services to the scientific research community, port authority and offshore industry. A strong tie exists among the institute, the navy, and the Chinese rocket research unit.

In addition, there is a pilot plant that manufactures instruments, provides maintenance service, and does research on machinery and manufacturing techniques. A recent catalog lists the following instruments manufactured: SZC4-1 1000m self-contained STD system (pressure precise to ± 0.5%, temperature to ± 0.05°C, salinity to ± 0.05 x 10^{-3} between the range of 32 and 37 x 10^{-3}); SWH1-1 airborne infrared radiation thermometer (precise to less than ± 0.5°C); SWC2-1 unprotected reversing thermometer (precise to ± 0.03°C); SYC1-1 inductive salinometer (precise to ± 0.003 x 10^{-3}; Fig. 3); JSL1-1 pressure test tank (ID 80cm, height 120 cm, maximum pressure 120 atm); DDC5-1 deep-sea boomerang sediment corer (ID 6.5 cm, maximum sample length 120 cm); GCC5-1 large volume water sampler (100 l); plus a number of tide and wave gauges. It is interesting to note that two stable power supply units are included, perhaps reflecting the unstable power supply in the PRC laboratories. A power stabilizer is attached to virtually all major instruments that I saw in PRC. Scientists and engineers of the institute not only develop and test instruments but also participate in research on major expeditions such as the joint USA-PRC East China Sea Continental Shelf Program and the WMO program in the western Pacific (a128).

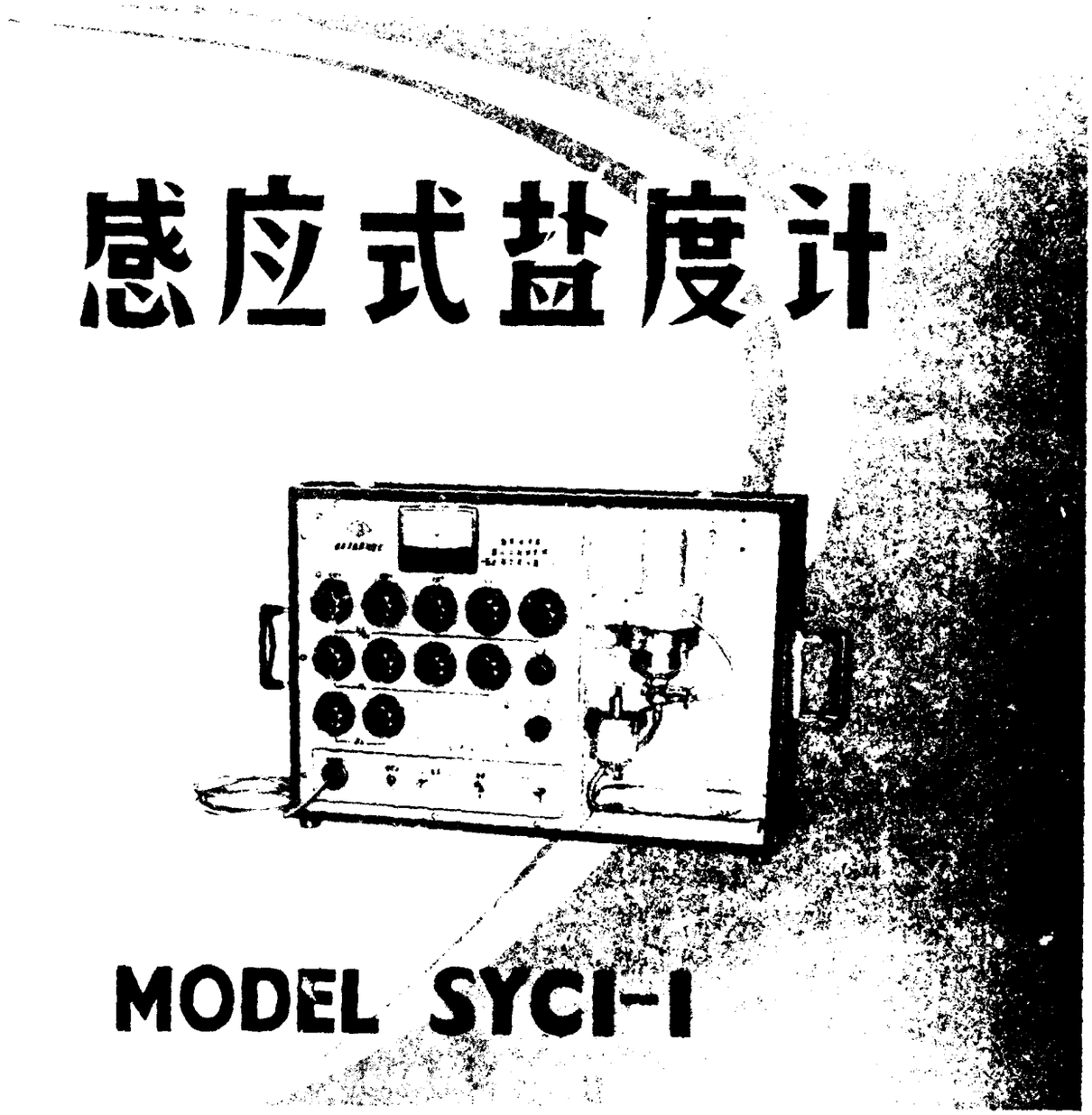


Fig. 3 A current advertisement for an inductive salinometer manufactured by the Institute of Oceanographic Instrumentation, National Bureau of Oceanography.

III.2 NATURAL WATER COMPOSITION

Obviously Chinese scientists have paid more attention to the composition of river and lake waters (55, 56, 118, 132, 173, 208, a6.1, a167, a227, a255) than they have to seawater. There are more than 130 lakes in China that exceed 100 Km^2, with a total area of over 80,000 Km^2. There are 1,600 rivers with a catchment area of more than 1,000 Km^2. Some rivers such as the Huanghe carry significant amounts of dissolved salt and silt which affect the geochemistry of the Chinese seas.

I was shown continuous major ion composition data of Huanghe (5,464 Km long with a catchment area of 752,443 Km^2) at numerous stations dating back three decades. Similar data are said to be also available for Changjiang (6,300 Km long and 1,807,199 Km^2 in catchment area). Unfortunately these data are classified for internal use only, and even decades-old data are being published only very infrequently (78, 88, 89, 201). It is not surprising, therefore, that a recent paper on the major ion chemistry of some large Chinese rivers published in Nature did not even give a Chinese reference (112). The authors of this paper conclude that the chemistry of the major rivers they studied (Changjiang, Huanghe, Hanjiang, Chialingjiang, Yuanjiang, Qiantangjiang, Yaluzangbujiang, Brahmaputra River, Zangbo River and Doilong River) is dominated by the weathering of carbonates and evaporites, with no pronounced effects of the degradation of aluminosilicates.

Salt Lake composition and salt deposits receive more attention, perhaps because of the large size (totaling 44,000 Km^2) and their role as an important source of chemicals such as sodium chloride, sodium sulfate, lithium, cesium, potassium, magnesium, boron, bromine, iodine, rubidium and uranium, etc. (24, 40, 49, 295, 328, 329, a67, a68, a351, a396, a328, a329, a337).

In 1950 Chu and Young (57) measured the vertical distribution of nutrients, chlorinity and alkalinity near Chusan Islands in the East China Sea. Yu (a348) reviewed the composition of seawater. Koo (a118) reviewed the distribution of chemicals in the oceans. The constant composition of major elements relative to chlorinity, the distribution and cycling of elements affected by primary production such as nutrients, carbon dioxide and calcium, and the concentration

of trace elements and isotopes were discussed. Chen et al. (23) measured Cl, SO_4, Al, K, Mg and Na in a river estuary. Huang and Zhang (119) reported the boron concentration for an unidentified seawater. Chen and Tang (a10) reported the iodine concentration. Nutrient concentrations are evaluated rather extensively and will be discussed under III.7 "NUTRIENTS".

Recently trace metal concentrations in seawater have received much attention (2-4, 81, 137, 143, 248, 255, 256, 268-273, 282, a71, a271, a404), but mostly stemming from concern over pollution. These studies are discussed under III.13 POLLUTION in a later part of the report. Exceptions to these studies are the works performed by Gu and co-workers, who investigated the distribution of trace metals in natural waters in rivers, lakes, wells, rain and coastal seas (82, 83, 85, 86, 90, a73-76) by inverse polarography using non-adsorbant membrane electrode. They observed that the concentrations and general speciation of Zn, Cd, Pb, Cu, Sn and Bi were similar from all unpolluted natural waters. This similarity was interpreted by Gu, et al. (90) as due to non-transfer between the trace metals and particulates in the pH range of natural waters through cycles of evaporation, precipitation, river run-off and other processes. This idea is rather unorthodox and may provoke heated debate. Zhou et al. (a404) reported the distributions of V, Cr and Mn in the Northeast Pacific.

Wang and co-workers (a266-269) analyzed the pH and metal contents of snow, ice, rain and glacial runoff. Liu et al. (a167) reported the seasonal variation in the contents of nitrogenous compounds (NH_4, NO_2 and NO_3) in precipitation.

III.3 SALINITY, CHLORINITY, CONDUCTIVITY AND DENSITY

Studies on the relationships among salinity, chlorinity, conductivity and density have received little attention until recently. A translated article of Zubov (342) discussed the increase in water density resulting from mixing seawater of different temperatures and salinities. Another translated article (a45) discusses the effect of temperature on the electrical conductivity of seawater.

Koo (a118) reviewed the relation among salinity, chlorinity and density. Chen et al. (21,23) evaluated the effect of the major constituents of seawater on conductivity-salinity and density. Chen et al. (23) also correlated salinity with chlorinity in an estuary. Min et al. (185,187) determined specific gravity of seawater from Changjiang Estuary. Liang and Wang (a151) correlated chlorinity, salinity, electrical conductivity of Zhujiang estuary water. Jing (128) evaluated the required accuracy level of salinity, temperature and depth measurements in shallow waters. Sun and Yu (a240) designed a slide rule to calculate the chlorinity and salinity from buret readings. Jing (a116) designed a mechanical calculator which can be used to calculate seawater density. Zhang (a368) deduced two formulae for calculating seawater salinity from knowing the specific gravity and temperature of the seawater when salinometers and titration equipment are not available for direct salinity measurement. Chou (54) measured the densities of bittern samples. Zheng (328) and Gao and Li (a68) studied the density of salt lake brines. Song et al. (a238) studied the density and refractive index of $Li_2B_4O_7$-Li_2SO_4-H_2O aqueous solutions.

Standard seawaters are produced by the Shandong College of Oceanography but are calibrated against the IAPSO standard seawater. The source of the PRC standard seawater varies from northern Yellow Sea to the South China Sea, hence the wide chlorinity range, 17.516 to 19.310 x 10^{-3}, with an uncertainty of 0.002 x 10^{-3}. The conductivity salinity has been measured relative to the IAPSO standard and labeled together with calculated chlorinity (chlorinity = conductivity salinity/1.80655) since 1978 (20, 22, a12, a14, a241).

The PRC standard seawater has been sold to some communist-block countries but my request to acquire a sample was denied. The PRC version of the 1956 Neil Brown salinometer is in wide use (Fig. 3).

Several recent papers (a12, a64, a65), a recent book (a14) and a special issue of Ocean Technology (Vol. 1, No. 3, 1982) are devoted to seawater conductivity, the 1978 Practical Salinity Scale and the 1980 Equation of State (a11, a25.1, a79.1, a172.1, a176.1). The announcement on the adoption of practical salinity scale 1978 and the international equation of state of seawater 1980, and the following UNESCO Technical Papers in Marine Science are also translated in the special issue: No. 36, Tenth report of the joint panel on oceanographic tables and standards; No. 37, Background papers and supporting data on the Practical Salinity Scale 1978; No. 38, Background papers and supporting data on the International Equation of State of Seawater 1980; and No. 39, International Oceanographic Tables Vol. 3.

III.4 PHYSICAL CHEMISTRY

Speciation

Speciation of chemicals in river water and in seawater has been studied extensively (15, 16, 68, 90, 104, 156, 211, 215, 219-221, 232, 248, 249, 254, 255, 268-273, 303, 308, 325, 334, a16, a22, a27, a85, a90, a108, a109, a118, a127, a132, a135, a139, a140, a145, a146, a152, a164, a166, a177, a191, a199-201, a252, a271, a277, a298, a307, a329, a339, a369, a376, a385, a403). These studies of determining chemical speciation depend on the use of equivalent constants which are either experimentally determined or theoretically calculated. Zhang and coworkers examined chemical speciation from a microscopic point of view (15-17, 308, 309, 311, a7, a376-379). The principle of least Σ (Σ is the sum of the negative logarithm of the concentrations and a measure of the hardness-softness of the elements; the lower the Σ, the more stable the species) was used to study the speciation of both major and minor elements in seawater. The reported results agree fairly well with those obtained from the equivalent constants.

An example is with uranium which has been studied extensively for decades in PRC. According to the world literature, uranium exists as $UO_2(CO_3)_3^{4-}$; however, the reported formation constants for the above species vary by 10^4 to 10^5. Consequently, the results from the calculation of uranium speciation differ by a great deal. Zhang and Liu determined the value for $K(UO_2(CO_3)_3)$ using the linear relationship among $K(UO_2CO_3)$, $K(UO_2(CO_3)_2)$, and $K(UO_2(CO_3)_3)$ (15). They concluded that the major species for uranium is $UO_2(OH)_3^-$ and claimed that this result agrees not only with the least Σ principle, but also with other experimental results.

Peng et al. (a202, a203) and Ji and Tsao (a108) reported the complexation of trace metals with humic material in natural waters. Many others investigated the complexation between trace metals and organic matter (137, 156, 215, 240, 255, 268-272, 303, 334, a85, a88, a108, a110, a127, a152, a277, a385).

Adsorption and ion-exchange

The current literature on trace element liquid/solid partition is based on the adsorption principle, commonly expressed by the Freundlich or the Langmuir equations. Zhang and coworkers claim that these two equations often do not adequately represent the experimental results and they derived a general equation to fit the experimental partition data (17, 18, 312, a7). This equation reduces to the Freundlich or the Langmuir equations under special cases.

The adsorbants commonly found in the oceans such as metal hydroxides (e.g. the hydroxides of Mn, Si, Fe and Al), clay minerals (e.g. illite, kaolinite and montmorillonite), organic minerals, etc. are typical inorganic ion-exchangers. Zhang and co-workers studied the interactions among trace metals, particles and organic material in seawater (15-18, 162, 308, 310, 312, a7, a8, a164). They found that the ion-exchange theory presented in the literature cannot be used to explain their observed phenomenon and proposed new isotherm equations. Fig. 4 shows the isotherms for the interactions between Cu^{2+} and montmorillonite, illite and kaolinite, respectively, at pH = 7.0. Stepwise features of the isotherms are obvious. These features in the seawater medium have not been reported in the western literature. Zhao (a383) reviewed the application of multiple equilibrium and stepwise equilibrium theory in aqueous solutions. Yuan et al. (a353, a354) studied the thermodynamics and mechanism of extraction of rare earth elements. A linear free energy relationship was reported.

Cai et al. (7,8) studied the adsorption mechanism of uranium by an organic resin. Wang et al. (a274) studied the ion-exchange of K with hydrated titanium bishydrogenphosphate. Xu et al. (a333) reported selective adsorption of I on copper-based platinum adsorbent. Xu et al. (a329) reported the hydrolysis of artificial radio-nuclides and their adsorption on particulates and colloids. Zhang and Liu (312) found that the ion-exchange reaction mechanisms between titanium hydroxide and U(VI), Cu(II), Cr(VI), Cr(III), Cd(II) and Zn(II) are the same. Liu et al. (162) suggested that extraction of uranium from seawater by titanium hydroxide can be considered as a five-step mechanism: 1) the uranium ions in seawater, $UO_2(CO_3)_3^{4-}$,

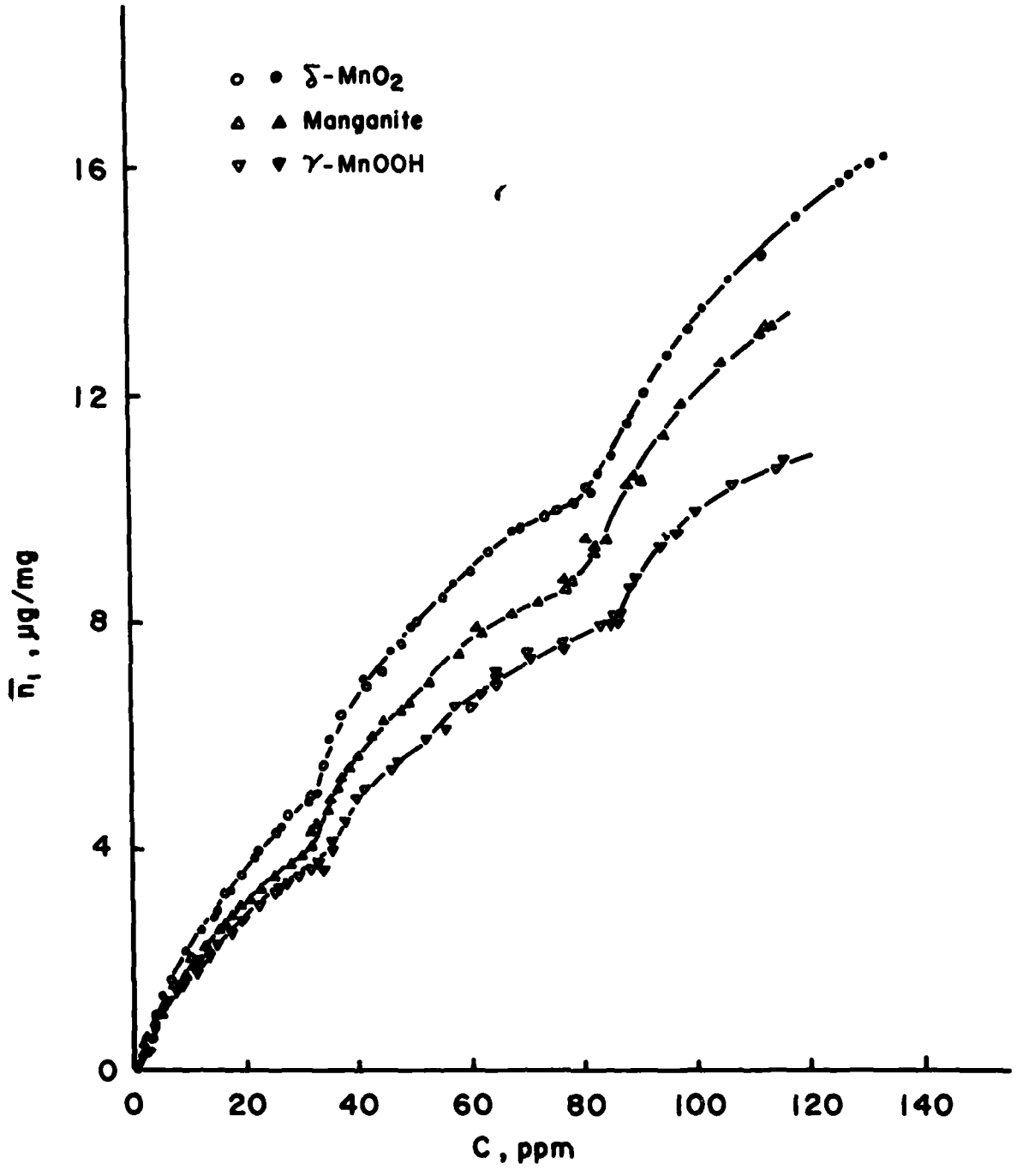


Fig. 4 Reaction isotherms for the interactions beween Cu^{2+} and montmorillonite, illite and kaolinite, respectively, at pH=7.0. $\bar{n}_1$ is the amount of Cu exchanged per mg of clay. Cu is the concentration of copper remaining in the solution at equilibrium.

$UO_2(OH)_3^-$, diffuse toward the surface of $Ti(OH)_3$; 2) $UO_2(CO_3)_3^{4-}$ and $UO_2(OH)_3^-$ transform into UO_2^{2+}; 3) the surface of $Ti(OH)_3$ is formed with a negative charge; 4) cation-exchange occurs on the surface; and 5) H^+ is released from the surface of $Ti(OH)_3$ into the seawater and lowers the seawater pH. They claim that this mechanism agrees with the experimental data (315). The activation energy of uranium for the above equation was determined to be 8.5 kcal/mol (a380). Many investigators also studied the uranium extraction reaction mechanism (31-33, 35-37, 60, 146).

The kinetic theory currently available for ion-exchange, the Boyd-Adamson-Meyers (BAM) Theory, can, in general, be applied to seawater, but Chang et al. (14) claimed that the theory is not entirely sound. A film-progressive model was proposed which suggest that the ion-exchange rate is limited by diffusion in the liquid film. Uranium extraction from seawater was found to be more efficient under the influence of a magnetic field, because, as the theory explains, the rate of reaction is controlled by diffusion, and a magnetic field decreases the thickness of the film (14,310,314). Chen et al. (31,35) measured the activation energy for the reaction between uranium and hydrous titanium oxide in seawater. They also studied the structure and surface properties of titanium oxide (32, 33).

Adsorption of nutrients, organic matter, isotopes and trace metals is also described under III.7, NUTRIENTS; III.9 ORGANIC COMPOUNDS; III.12, ISOTOPES; and III.13, POLLUTION, respectively.

Transformation of Elements Near River Mouths

The concentration and distribution of reactive silicates and their controlling factor near river mouths have been studied both in the laboratory and in the field (45, 133, 135, 136, 340, a122, a123). It was found that when mixed with seawater, the reactive silicate of the river water undergoes not only a simple dilution process but also a chemical or physico-chemical transformation. Most of the reactive silicate was found to be inorganically removed by adsorbing onto colloidal $Fe(OH)_3$ and $Al(OH)_3$ and that the rate of adsorption

increases with increasing salinity. (45, 133, 135, 136, 340, a122, a123). Dai and co-workers (a22-24, a42, a187) have studied the physical chemistry of silicic acid and its salts for five decades, but their work has not been extensively applied to oceanography.

The concentration of suspended particulates, mainly illite, montmorillonite, and kaolinite, is quite high in the Chinese rivers, estuaries and seas. These clay mineral particles, whether exposed to, or covered by, inorganic or organic films affect the distribution of trace metals mainly by adsorption (a307, a308). Zhang et al. (312) reported that the adsorption mechanism can be classified as L or H-1 types in the Gibbs classification. The adsorption isotherm can be expressed with the Freundlich equation. The adsorption activation energies for Cr(III), Cu(II), and Hg(II) fall between 10 and 25 kcal/mol.

Pang and Zhao (a201) studied the precipitation of mercury hydroxide at a river mouth. Chen et al. (34) reported the removal mechanism of Pb, Cu and Cd in Changjiang Estuary. Chen and Zeng (44) evaluated the transport and removal of iron, manganese and aluminum in the Changjiang river plume. Trace metal removal studies are also discussed under III.13 POLLUTION.

Application of the $\phi(Z/r,X)$ Principle

A $\phi(Z/r,X)$ principle has been developed to study the chemical models of seawater from a microscopic point of view by correlating chemical properties with valence, ionic radii and electronegativity of elements (80, 309, 311-313, a376-379). It has been applied to the understanding of (i) inorganic ion exchange, (ii) physical chemical properties of seawater such as partial molal volume, electrical potential, solubility and hydration energy, (iii) chemical cycles of elements such as the partition factors, rate of removal and residence time of elements in the oceans, and (iv) the principle of least Σ and seawater speciation models. The chemistry of seawater can thus be investigated from a microscopic point of view. Theories based on quantum chemistry have been applied to the studies of speciation with good results.

Thermodynamics of Aqueous Solutions

Gu (76) and Gu and Liu (80) concluded from field data and laboratory research of I, N and Fe that the oceans are not at an equilibrium state in the near shore regions, especially near river mouths where biological activity, movement of water masses and chemical transformations take place. Once the seawater is taken out of the oceans and away from the influence of the natural environment, however, it shifts toward a thermodynamically stable state. The time it takes for various components of seawater to reach equilibrium varies and the rate of approaching equilibrium for nitrogen, iron, and iodine were evaluated.

Chou (53) studied the activities on boundaries of the two-phase region in ternary systems. Wang et al. (249) determined the stability constants of Zn, Pb, and Cd hydroxides. Wu et al. (a303) studied the hydrolysis of 18 amino acids. Song et al. (a238) studied the phase relation and other physical-chemical characteristics of the $Li_2B_4O_7$-Li_2SO_4-H_2O system.

Wu (a307, a308) discussed the thermodynamics and kinetics of pollutants in seawater and at air-sea, river/ocean, seawater/ocean bottom, biota/seawater and particulates/seawater interfaces.

Kinetics

Chen et al. (34), Li (136), and Wu et al. (270-273) studied the kinetics and measured the rate constant and the activation energy for the adsorption of Pb, Cu and Cd on ferric and aluminum hydroxides. Chen et al. (40) reported on the kinetics of Ca-Mg carbonate, calcite, and aragonite precipitation. Many investigators studied the kinetics of extracting uranium from seawater (14, 31, 34-37, 146, 310, 314, a380).

Ye et al. (a340) reported the effect of metal ions (Hg, Cu, Cd, Cr and Pb) on the biological oxidation rate in river water. Zhou (333, a402) studied the influence of van der Waals' force upon diffusion-controlled reaction rate. Chen et al. (a24) reported the activation energy of the gelation process of mono-silicic acid. Chou (a35) reported the kinetics of the combination reaction between enzyme such as carbonate anhydrase and substrate. Wu (a307) and Wu

et al. (a308) studied the kinetics of metal-solid interactions. Gu et al. (87) studied the kinetics of nitrification and de-nitrification.

Miscellaneous

Gao et al. (a67, a68) studied the formation of evaporites by evaporating salt lake brines. Cai (a6) provided formulae for calculating the acidity of protonated acids. Gong and Kuang (a70) reported the solvation of electrons. Xu (284) studied the refractive index of a stratified medium with variable densities. Song et al. (a238) gave a formula for calculating the refractive index of $Li_2B_4O_7$-Li_2SO_4-H_2O solutions. Zhong et al. (a399, a400) studied the optical properties of seawater. Koo (a118) reviewed the photochemistry of nitrogen. Zhang (a361) studied the photochemistry of organic matters.

III.5 CARBONATE CHEMISTRY

Carbonate content of the sediments, karst, and coral reefs are routinely analyzed (5, 11, 35, 68, 209, 217, a26, a66, a99, a100, a102, a219, a301) but carbonate chemistry in the open ocean has only recently received attention (a298). Descriptive near-shore and fresh-water studies are more abundant and dated back to 1937 (55-57, 118, 295, a38, a109, a287). pH and alkalinity are the most measured parameters in studies of carbonate chemistry (23, 55-57, 105, 112, 115, 118, 132, 238, a6.1, a72, a87, a103, a122, a139, a140, a151, a205, a264, a267, a277, a279, a298, a321, a352), but calcium, free CO_2, and total CO_2 are also measured (55, 118, 132, 174, 217, 257, a6.1, a278, a298).

Koo (a118) discussed the carbon cycle in the oceans. Zang (302) defined alkalinity. Li (a122) reviewed recent studied on pH and alkalinity in PRC coastal waters. Liang and Wang (a151) correlated alkalinity with salinity in the Zhujiang estuary.

Chen and coworkers (39,40) studied rather extensively the thermodynamics and kinetics of the carbonate system between 6 and 35°C at 1 atm. They reported that Mg inhibits the precipitation of Mg-Calcite and aragonite in NaCl solution. In pure water the Mg inhibition only occurs when the molar ratio of Mg to Ca is above 20. At a molar ratio higher than 10 in NaCl solution and at higher temperatures, the precipitation of Mg-Calcite rather than aragonite is favored. Low temperatures, on the other hand, induce the formation of aragonite and some $CaCO_3 \cdot H_2O$. Chen et al. (40) also reported that the amount of Mg entering the calcite lattice increases both with temperature and with increase in the molar ratio of Mg to Ca. With higher ratios the addition of NaCl significantly increase the formation of high Mg-Calcite.

Zhou (332) reported the finding of low magnesium authigenic calcite in seawater in the East China Sea. Wu (a301) studied the influence of Huanghe on sediments deposition in the Yellow Sea based on $CaCO_3$ distribution. Wang and Zhang (243), Chen (a26) and Gao et al. (a66) studied the carbonate chemistry of sediments from the western Equatorial Pacific. These authors also reported the depths of the lysocline and the $CaCO_3$ compensation depth, and correlated the changes in foraminiferal shells with paleoclimate. Sui (217)

discussed the equilibrium concentration of carbonate species (HCO_3^-, CO_3^{2-}, total CO_2, PCO_2 and $CaCO_3$), and Wang and Zhu (a264) studied the diffusion of HCO_3^- in interstitial waters on the continental shelf of the East China Sea. Han et al. (a81) reported the distribution of pH in the South China Sea and correlated the variations with oxygen concentrations. Gu (a72) made similar correlations for waters in the Yellow Sea. In 1983 Wu (a298) also reported the carbonate system in the South China Sea based on pH and alkalinity data. He calculated the degrees of saturation for calcite and aragonite based on old equilibrium constants. The most recent reference cited by Wu was published in 1975, despite the recent explosion of Western publication in this field. Huang et al. (a100) studied the diagenetic processes such as cementation, transformation, metasomations, dissolution and infiltration of carbonate sediments (calcite, aragonite, magnesium calcite).

The excess CO_2 problem has also been discussed widely in the Western literature. The problem, however, has received little attention in the PRC literature. Fan (a55) and Koo (a118) mentioned the relation between excess CO_2 and climate. Some river work (a6.1) has been done in the context of global carbon cycles. The authors claim that the Yangtze River carries more dissolved inorganic carbon load than any other river in the world. Bi (a4) mentioned the CO_2 problem in his review of atmospheric chemistry. Work has also begun on the investigation of atmospheric CO_2 concentrations using glacial ice cores at the Lanzhou Institute of Glaciology and Cryopedology (P. Wang, personal communication, 1983), but no oceanic work has been published to my knowledge.

Fan et al. (67) derived a model for evaluating the ancient marine environment for sedimentation of carbonates. Sha et al. (209) studied dolomitization. Yang (286) studied limestone, dolomite and calcite, and dolomitization.

III.6 DISSOLVED GASES

Dissolved oxygen is one of the first chemicals studied in PRC (55-57, 78, 97, 118, 132, 174, a38, a118, a280) and is routinely measured in essentially all expeditions. Zhang et al. (304) and Li and Zhang (a136) determined oxygen in seawater with a membrane electrode. Zhao et al. (a390) determined nitrosamine with GC. Wu and Li (a286) determined low molecular weight hydrocarbons spectrophotometrically. Wang et al. (a278) and Sui et al. (a239) mentioned the determination of O_2, N_2, Ar, total CO_2, NH_3, CO and low-molecular-weight hydrocarbons in seawater also with GC.

Spatial and seasonal variations of oxygen in the Chinese seas and lakes have been described (77, 95, 132, 137, 174, a181). Gu (77) stated that the oxygen maximum observed in the Yellow Sea is derived from winter water: Gu (77, a72) also discussed the relationships among oxygen, temperature, photosynthesis, pH, density, nutrients, and organic matter. Lin reported the distribution of oxygen in the coastal upwelling zone off Chekiang (a155). Huang (116) and Wen (a280) reported the distribution and diurnal variation of oxygen in the Taiwan Strait. Ma et al. (a181) reported a minimum value of particulate iron at the same layer of maximum oxygen in the Yellow Sea. Sun and Yu (222) studied the air-sea transfer of oxygen and Xu and Sun (294) reported its distribution and seasonal variation in the South Yellow Sea. Xu (a334), Yu (281) and Han et al. (a80, a81) reported the vertical distribution of oxygen in the South China Sea and the rate of oxygen consumption. Sun (a250), Kinzelbach et al. (a117), Hou (a91, a92) and Hou and Li (a93) modeled the oxygen concentration and the biological and chemical oxygen demands in the rivers.

Koo (a118) reviewed the CO_2 and O_2 cycling in the oceans. Huang (118) determined oxygen and the free CO_2 in the San-Man-Xia reservoir.

Bi (a4) reviewed the atmospheric chemistry with some mention of gases such as nitrogen, oxygen, argon, carbon dioxide, ozone, freons, sulfur dioxide, nitrogen oxides and ammonia, etc. P. Wang (personal communication, 1983) and coworkers have started to measure O_2, Ar, N_2 and CO_2 in the air trapped in glacial ice cores.

The biological oxygen demand (BOD) and the chemical oxygen demand (COD) of natural waters are frequently reported for lakes and pollution-related studies (174, 219, 299, a27, a91-93, a117, a136, a228, a250, a281, a382). More on BOD and COD can be found under III.13 POLLUTION.

Sui (217) discussed the production of methane in the sediment reduced zone in the East China Sea. Liu (160) reported the vertical distribution of methane, ethane and ethylene in the South Yellow Sea. Zhou et al. (334) and a translated paper (a46) reported on methylmercury. Wu and Li (a286) reported on the use of enclosed experimental ecosystems for studying the change and transfer of gases such as hydrogen, methane and carbon monoxide.

III.7 NUTRIENTS

Nitrate, phosphate, silicate and ammonia are also among the first chemicals investigated in PRC (55-57, 87, 118, 132, 174, 218, a38, a287, a321) and are still routinely measured and invesitgated (12, 64, 65, 256, a28, a71, a167, a281, a338). Li (147,148) studied the determination of nitrate in seawater. Liu and Cai (171) studied the analysis of silicate in seawater. More on nutrient analysis is described under III.1 APPARATUS AND METHODS.

Gu and co-workers have been studying for more than two decades the distribution, seasonal and spatial variation, speciation, and thermodynamics of nitrogen in the estuaries and in the sea. In 1965 Gu (a118) reviewed the cycling of nitrogen (ammonia, nitrate, nitrite, organic-N, urea, amino acids, protein, etc.), phosphorus and silica in the oceans. Gu and co-workers have recently reported extensively on their findings observed in the sixties after the political turmoil in PRC: (78, 87-89).

Gu et al. (78, 87-89) studied the nitrogen cycle and geochemistry near the estuary of the Yangtze River. Gu and Li (79) discussed the nitrogenous and phosphorus compounds in interstitial water of Jiaozhou Bay. Wang and Zhu (a264) studied the diffusion of NH_4^+ in the pore water of the East China Sea. Gu (76) studied the thermodynamic equilibrium of nitrogen cycle in the sea using data from the English Channel, Long Island Sound, the Yellow and the East China Seas. He also correlated phosphate and silicate concentrations with oxygen, pH and density (a72).

Gu and Liu (80) reported that nitrogen is not at an equilibrium state in seawater because of biological activity, water movement and other chemical processes.

Huang et al. (115) and Wang et al. (a276) reported the concentrations and fluxes of silicate, phosphate, nitrate, nitrite and ammonia in the Changjiang Estuary. Cao (12) and Grant et al. (a71) discussed the distributions of phosphate, nitrate and silica in the same region. Huang (116) reported the distribution and diurnal variation of phosphate and silicate in the Taiwan Strait.

Li and co-workers studied the removal mechanism of silicate in estuaries for over two decades. They have started publishing again recently after a long hiatus (45, 133, 135, 136, 340). Several other reports are related to the same subject (1, 64, 303).

Hong et al. (105) measured ammonia in the interstitial waters of the East China Sea sediments. Tang et al. (230, 231) studied amino acids in the sediments from the same region. Ji and Tsao (a108), Koo (118) and a recent book (a219) report on amino acids in general.

Cheng and Qiao (a28) reported the distribution of phosphorus in sediments from the South Yellow Sea. Han et al. (a81) reported the phosphate and silicate distribution and Han (a80) reported the regeneration of phosphate in the South China Sea.

Ji and Tsao (a107) reported that the presence of humic material prevents the precipitation of Fe, Ca, Al, Cu, Co and other metal phosphates. The result is longer residence time and higher availability of phosphate (possibly also nitrate and silicate) in the water column, hence higher primary productivity.

Li (a129) reviews the distribution of nutrients in the Southern Ocean. Yao (a338) determined ammonia plus amino acid and related the concentration to the productivity. Zhou et al. (a404) correlated vanadium concentration with phosphate in the Northeast Pacific. Cao and Tu (11) reported that Al and Fe correlate with phosphate in the sediments of Jiaozhou Bay.

D.Q. Chen (19) observed the effect of vitamin C on the formation of Tradescantia MCN in polluted seawater. H.W. Chen (a17) discussed the distribution, changes, supply and demand of oceanic vitamin B-12 in relation to microbes.

III.8 PARTICULATE MATTER

Perhaps because of the concern over trace-metal pollution and the high sediment load of the Chinese rivers, a great deal of work has been done on the interaction between trace metals and particulates in the estuaries (44, 65, 86, 90, 136, 137, 156, 180, 181, 184, 194, 248, 256, 268, 270-273, 293, 334, a27, a85, a88, a103, a108, a127, a134, a166, a177, a181, a187, a203, a261, a266, a271, a307, a314, a329, a369, a385, a388, a404). Theoretical work has been described in section III.3 under Physical Chemistry. In addition, Li et al. (137), and Lin et al. (156), Luo et al. (a177) and Mo and Zhang (a187) studied the complexation of trace metals and particulates in Zhujiang Estuary. Liu et al. (a166) made similar studies in the Bohai. Sun and co-workers (219,221) studied the particulate lead in Jiaozhou Bay. He et al. (a87, a88) and Xin and Liu (a345) correlated the heavy metal content with particle size.

Ma et al. (180,181,183, a181) studied the distribution of dissolved and particulate iron in Jiaozhou Bay, Changjiang Estuary and the Yellow Sea. Many workers (248, 255, 256, 278, 282, a277) studied the distribution of particulate zinc in Jiaozhou Bay and in Changjiang Estuary and correlated the distribution of iron with the input from Changjiang, currents, flocculation and primary productivity. Chen and Zeng (44) studied particulate Fe, Mn and Al in the Changjiang River plume. Shi et al. (215) studied the removal of Zn and Pb by particulate organic matter in the estuaries. Qin and co-workers (201,202) studied re-suspended matter in the Bohai Gulf.

Zhao (a385) studied the adsorption of uranium on particulates. Zhao et al. (a386-389) correlated metal concentrations with particle size.

Martin (183) reviewed the association of chemicals in the suspended sediment in the estuaries. Li (a122), Wu and co-workers (268-273) and Zhang et al. (303) reported the mechanism of heavy metal transport and removal by particulates in estuaries. Chen et al. (a27) studied the association of Pb and Cu with particulates. Many other papers reported the association of metals with particulates. These can be found under III.13 POLLUTION.

Saburo et al. (207) and Yu et al. (293) reported the mineral composition of the suspended particles and sediments in the East China Sea. Li and co-workers (135, a122, a123), Zhuang et al. (340) and Chen et al. (45) studied the removal of silicate by particulates in the estuaries. Demaster et al. (64) and Edmond (65) reported the suspended solid concentration near the Changjiang River mouth. Particle size, distribution, size fractionation, particle diffusion and settling properties of sediments are also reported (99, 300, a52).

Ma et al. (a181) reported the vertical distribution of particulate iron in the Yellow Sea. Ji and Tsao (a108) studied the composition of marine particulate organic material. Koo (a118) related the cycling of Ca, nutrients, isotopes, and trace metals with particulates. Fan (66) analyzed the sediment deposition in density currents. Zhou et al. (a404) reported the vertical profile of particulate vanadium in the Northeast Pacific Ocean.

The research on marine optics is relevent to marine particulates studies along several lines. The underwater light scattering meter and in situ holography were used to measure the amount of suspended material, and primary productivity in seawater (69, 318, a34, a325, a399, a401).

Remote-sensing has also been applied to determine the amount of suspended sediments in the oceans (58, 318, a159, a324, a355).

III.9 ORGANIC COMPOUNDS

Chu and co-workers (55,56) and Lu et al. (174) measured organic carbon and chemical oxygen demand in lakes. Ji et al. (125) studied the initial products, mainly amino acids of metabolism in marine organisms. Other work by Ji and co-workers are related to marine natural products (50, 120-126, a30-32, a105-111). Peng and Wang (a202-203), Ji et al. (124) and Ji and Tsao (a108) studied humic materials; the chemical characteristics were discussed with respect to element composition, UV-visible-IR-fluorescent spectra in seawater, C-13, acid titration, molecular weight and H-NMR and C-13-NMR spectra. They also discussed the structure of humus and its complexation with metal irons. Ji (a110) discussed the complexation of metals with polyphenolic compounds from algae.

Huang (118) measured organic matter in a reservoir. Gu et al. (88,89) examined the organic nitrogen in Changjiang Estuary in 1963 but did not report until 1981. Shi et al. (215) studied the flocculation of organic matter with Pb and Zn in seawater. Liu et al. (a164) reported the complexation of Cu with humic materials. Gu and Li (79) investigated the distribution of organic nitrogen and phosphorus in seawater and interstitial water in Jiaozhou Bay. Li (a137) studied amino acids and Chen et al. (45) studied organic silicate. Chin and Liao (52) investigated organic matter in the sediments of the Bohai Bay. Bezrukov et al. (5) and Chen et al. (41) measured organic carbon in the East China Sea sediments. Chen et al. (a25) reported on organic carbon and nitrogen in the South China Sea. Chen (a20) investigated the organic matter in seawater and its relation to the growth of phytoplankton.

Liu (160) reported the vertical distribution of methane, ethane and ethylene in the South Yellow Sea. Sui (217) discussed the production of methane in the sediment reduced zone in the East China Sea.

Koo (a118) reviewed the oceanic cycling of organic nitrogen (protein, amino acids, urea, etc.), phosphorous, silica, and carbohydrates, fatty acids, and humics. Gu et al. (78, 79, 88, 89) also studied organic nitrogen and phosphorus in Jiaozhou Bay and Yangtze River estuary.

Tang et al. (230,231) studied lipids, amino acids and humic substances on the continental shelf of the East China Sea. They reported a linear correlation between organic matter and clay contents. Jiang et al. (a114) reported on the source and distribution of fatty acids in East China Sea sediments.

A group at Tianjin University (a6.1) reported on the transport of organic carbon by the Yangtze and Huanghe Rivers. Peng and Wang (a202) extracted and characterized humic and fulvic acids from river water. Peng et al. (a203) studied the influence of humic material on the transportation and distribution of mercury in the river and estuary systems. Zhou et al. (334) and Luo et al. (a177) studied methyl and other organic mercury. Many investigators (137, 156, 240, 282, 293, 303, a27, a88, a108, a110, a152, a228, a299, a307, a339) related the trace metal content in seawater and sediments to the organic matter concentration. Additional information can be found under III.13 POLLUTION.

Zheng et al. (a392) correlated the number of bacteria with the amount of organic matter. Zhong et al. (a401) determined pigment concentration by several methods including laser fluorescence spectroscopy; the pigment concentrations are then related to primary productivity.

In 1982 Gan reviewed the development of marine organic chemistry (a63). The following topics were covered: hydrocarbons, humic material, terpenoids, amino acids, organic nitrogen, carbohydrates, toxicants and toxins, and pigments.

III.10 GEOCHEMISTRY

Natural waters and sediments

One of the earliest general surveys of geochemistry and biogeochemistry was done by Soviet scientists on the R.V. Vityaz in 1958 (5) where the sediments and benthic fauna in the Northern East China Sea were examined for iron, calcium carbonate, phosphorus, silica and organic carbon. Fan and Chin studied the bottom sediments of the East China Sea and the southern Yellow Sea (a54). Chin reviewed the sediment types of the Chinese continental shelf (a33). Shi (a227) reviewed the hydrology and chemistry of lakes in China. Koo reviewed the marine geochemistry of elements. The concentration, distribution, speciation, transfer processes and mechanisms of major elements, bio-limiting elements, trace elements and isotopes were discussed (a118). Yu (a348) reviewed the composition of seawater including major elements, minor elements and isotopes. He calculated the age of seawater from Ar-40/K-40 ratios as 4.4×10^9 years and claimed it to be close to the age of the earth.

Li summarized the general chemical properties of rare earth elements in the oceans (a146). Liu (a169) described the use of trans-uranic elements in marine geochemistry. Zhao et al. (a388, a389) reviewed the geochemistry of major and minor elements in the East China Sea and Huanghai.

Gao (74) studied the geochemical potential. He asserts that the sum of potential energy, kinetic energy and pressure energy of a component in a certain phase remains as a constant. He suggested that it may be possible to turn non-profitable deposits into exploitable ores. Gu and co-workers (76, 79, 80, 87-89) examined the marine geochemistry of nitrogen. Chen and Liu (27) reported on the geochemistry of fluorine in China. Zhao (a385) reviewed the geochemistry of uranium in seawater and ocean sediments. He found that U concentration correlates linearly with P, Mn and $CaCO_3$ concentrations. Zhao et al. (a386) reviewed the geochemistry of Zr and rare earth elements. Wang et al. (a270) reported on the characteristics of coastal sediments and their transportation trends at the east margin of Lai Zhou Bay in Bohai.

Li (a122) studied the residence times of heavy metals in estuaries. Li and Kang (a135) investigated the residence time and cycle of uranium in the oceans. Chang and co-workers (a7, a8) reviewed and calculated the oceanic residence time of 50 elements. Han (a80) calculated the residence time of the deep South China Sea water. Hou and Zhang (111) determined the valence of manganese in manganese ores.

Li (a122) reviewed some recent studies on estuarine and coastal chemistry in PRC. Studies included nutrients, pH, alkalinity, Eh, Fe, Al, Mn, Cu, Pb, Zn, Cd, Hg, Cr, and the sedimentation rate by Pb-210 and insecticide concentrations. He also modeled the conservative and non-conservative properties of these chemicals. Lin et al. (a158) and Qian and Sun (a213) also used pesticides to estimate sedimentation rate in the East China Sea. Shi et al. (215) studied Zn, Pb, Fe and organic matter in seawater and sediments of Jiaozhou Bay. Li (a137) discussed the formation and revolution of Jiaozhou Bay based on the C-14 dating, paleomagnetic determination, spore-pollen analysis, amino acids and grain size of sediment. Han and Liu (99) studied flocculation and settling properties of sediments in the Changjiang Estuary. Li et al. (134) reported on the sources and distributions of sediments in Fengcheng Bay. Martin (183) reviewed the fate of chemicals during estuarine mixing. Xie et al. (278) and Mckee et al. (184) studied particle composition and scavenging near the Changjiang River mouth. Postma (196) reviewed estuarine sedimentation and sediment transport. Wang and Wu (240) studied the geochemistry of Cr, Cu and Hg in the East China Sea. Wang and Min (241,242) studied the calcareous nannoplankton and other sediment characteristics in the same area.

Qin and co-workers (52, 201, 202, a215) investigated the composition and characteristics of the bottom sediments in Bohai, Huanghai and the East China Sea. Lin et al. (a161) analyzed heavy minerals from sediments off Shandong. Zhao et al. (a384) reported on the chemical features of nearshore sediment off Shandong Peninsula.

Many investigators (265, 266, 301, 336, a174, a183) studied the chemical composition and factors affecting the distribution of near-shore and shelf sediments in the Yellow Sea and the East China Sea. Peng (a205) reported on the distribution and formation of

pyrite in the same area. L.-b. He (a84) examined the distribution of clay minerals in Huanghe Delta. Lin and Lu (155) and Lu (177) studied the dispersion of sediments in a near-shore region off Shandong Province.

Chen et al. (25) reported on the mineral assemblages and their distribution patterns in the sediments of Bohai. The influence of Huanghe and other rivers was discussed. The wind transport of fluorine in sand and dust in the Beijing-Tianjin-Bohai region was also evaluated (38). Zhao (320,321) studied the geochemistry of uranium in the sediments of Bohai. Wang and Yang (244) studied pyrite in the sediments from Huanghai.

A recent cruise in the western Central Pacific collected bottom sediments for $CaCO_3$, SiO_2, Fe_2O_3, CaO and MgO analyses (192, a26, a66). Wang et al. (253) dated sediments from that region using C-14 and pollens. Li (a137) dated sediments in the Jiaozhou Bay using C-14.

Guo and Li (97) studied the ratio of Fe^{3+}/Fe^{2+} and the oxidation-reduction processes in the sediments of Liaodong Gulf. Li and Wang (149) reported the redox equilibrium involving iron, sulfur and manganese in the East China Sea sediments. Cao (9) and Cao and Tu (11) studied the chemical components, minor elements and other geochemical characteristics of sediments in Jiaozhou Bay. Cao compared the results with data reported for the Barents Sea; such comparisons have rarely been done in PRC.

Zhu et al. (a413, a414) reported the first discovery of volcanic cinder in the East China Sea. Zhu and co-workers (337, 338, a408-412) studied the ferric concretions and Chin (51), and Yang and Milliman (287) studied the mineral compositions in the sediments of the same region. Chen et al. (41, 42, 43) measured Ra-226 as well as U, Th, Fe, Li, Rb, Cs, Ba, Sr, Mn, Ti, P, Cu, Co, Ni, Ti, Zn, B, Zr, Re, Ra, rare earth elements and organic carbon in cores from the East China Sea. Cheng and Qian (48) and Yu et al. (293) characterized the recent sediments of the Changjiang River mouth and the adjacent continental shelf.

Zhao et al. (a387) reviewed the use of Pb-210 for studying geological chronology in America. Xia et al. used Pb-210 to date the sedimentation rate in Bohai (a314-315). DeMaster et al. (63)

reported the sedimentation rate in the East China Sea using Cs-137, Pb-210 and Th-234. Huang et al. (115), Su et al. (216), Zou et al. (a422) and You et al. (290) did similar studies in the same region using Pb-210; You and his co-workers also used C-14. Xia and coworkers (274-276, a317) dated samples using uranium and thorium.

Several researchers (207, 250, 251, 300) reported on rare earth element geochemistry and clay mineral composition of sediments and suspended material in the East China Sea. Wells and Huh (259) discussed the dispense of silts and clays by monsoon in the same region. Chen et al. (26) reported on the distribution of glauconite in the sediments in the Taiwan Strait. Wu (264) determined REE of sediments, and Zhao et al. (322) studied Fe, Mn, Ti and P from the same area. Zhu et al. (339) and Wu and Zhao (a304) studied the sediments in the Pearl River estuary. Xia et al. (a314-315) dated these sediments using Pb-210.

Recent expeditions in the South China Sea (26, a25, a35, a100, a257, a305, a334) provided detailed descriptions of the geochemical characteristics of the water column, and the minerals in the surface sediments and the coral reefs. Lan and Chen (a119) analyzed 40 elements in the sediments. The distribution of foraminfera and other marine organisms in the sediments was also evaluated (a257). W[illegible] and Zhu (a305) and Chen et al. (a25) reported on the geochemical characteristics of the minerals in the surface sediments. Xia and Zhang (a316) measured the rate of accretion of manganese crust, and Xia et al. (a313) reported the sedimentation rate in the South China Sea.

Gu (94) reported on the check-value of marine fossil beds against which the dating of non-marine Mesozoic fossils in China can be compared. Lin et al. (153, a156) used the concentration of BHC as a measure of the sedimentation rate in the East China Sea.

Xu et al. (a331) correlated deep-sea sediments containing loess and related O-18 with paleoclimate. Yu et al. (a352) studied the composition of soil and loess in the middle section of the Huanghe catchment area. Li and Sun (139) dated the age of loess. Wen et al. (260,261) also investigated the loess. Zheng (323) studied the geochemistry of fluorine. Liu (163) examined the organic matter in the Pleistocene sediment of Huanghai.

Chen et al. (a13) studied the hydrochemical characteristics in an estuary. Wu and Zhao (a304) reported the composition of minerals in the Zhujiang Estuary.

Peng and coworkers have been studying cosmic dust, volcanic debris and microtektites (102,194, a204, a206-209, a421). One of their recent papers based on the First GARP Global Experiment sediment samples was published in the Journal of Geophysical Research (a204). He et al. (102) reported on the volcanic debris and clay minerals in sediments from the western Central Pacific. Huang and co-workers (a99, a100) studied chemical characteristics and the sedimentation of coral reefs.

Gao et al. (a66) studied foraminifera and calcium carbonate in the sediments of western mid-Pacific Ocean. They further related the carbonate and O-18 data to paleoclimate. Several other investigators also related O-18 data to paleoclimate (a118, a302, a331). Cheng (47) discussed the origin and distribution of iron and manganese in the bottom sediments of western Central Pacific. Chen (a26) studied the sediments from the same region and differentiated their sources into biological, volcanic, wind-borne, authigenic and cosmic. The vertical variations of foraminifera, $CaCO_3$ and clay minerals were related to paleotemperature. He (a83) analyzed clay minerals in sediments and claimed that the abundance of illite and montmorillonite increases as climate becomes colder, while the kaolinite content increases as climate becomes warmer.

Fan (a55) studied the origin and development of the earth and the oceans, the dynamic state of the lithosphere, the distribution of land and ocean, the shape and structure of the earth, its crust and core, its atmosphere, climatic evolution, and the evolution of life by analyzing the characteristics of seawater and sediments. He claims that the earth or the entire solar system had evolved from a dust cloud with contamination from the residuals of exploded old stars or supernova. A book translated from Russian "Origin of the Oceans" (a220) also discusses the origin of seawater and the oceans.

Pore Water

Little pore water work has been performed until recently. Hu et al. (a97.1) and Liu (a165) designed a device to extract pore water. Gu and Li (79) studied the nitrogenous and phosphorus compounds, Wang

and Chen (245) measured iodine and Ma et al. (180) studied iron in the sediment interstitial water of Jiaozhou Bay. Li et al. (a140) studied the major elements such as Ca, Mg, SO_4 and Cl of the interstitial water in Bohai Bay. Trace-metal pollutants (Zn, Cu, Pb and Cd) and Si are also studied. Li and Wang (149) made similar studies in the East China Sea.

Li et al. (a139) studied the redox parameters such as Eh, pH and Es of the surface sediments in the Changjiang estuary. In addition, major and minor elements and nutrients such as Ca, Mg, SO_4, Cl(‰), PO_4, SiO_2, Cd, Pb, Cu and clay minerals were measured. Thermodynamic calculations were performed to determine whether these chemicals are at equilibrium state. Eh and pH of pore water have also been reported by other scientists (79, 105, 149, 169, a109, a140).

Liu and Gu (169) and Liao et al. (a152) determined the concentrations of some trace metal ions. Sui (217) determined the inorganic carbon content; Wang and Jin (238) studied the chemical diagenesis of sulfur and mineralization of carbonates; Wang (a263) and Wang and Zhu (a264) studied diffusion of NH_4^-, HCO_3^-, Fe^{2+} and Mn^{2+}, all in the East China Sea sediments. Aller et al. (1) studied the early chemical diagenesis and sediment-water exchange in the same region. Wang et al. (252) reported on the current reworking and diagenetic features in the continental shelf environments such as the inner Labrador shelf, shelf off Nova Scotia and the Beaufort and the East China Seas. Zhou et al. (a403) studied the speciation of Cr and V in pore waters of northeast Pacific sediment.

Salt Lakes

Geochemistry and mineral deposits of salt lakes are mainly studied by scientists from the Qinghai Institute of Salt Lake, Academia Sinica. Yu and Tang (295) and Zheng (328) reported on the characteristics of the saline lakes on the Qinghai-Xizang Plateau. Chen et al. (24) examined the distribution of forty minerals in 123 salt lakes in the same region. Cheng et al. (49, a396) and Zhang et al. (329) studied the formation of salt lakes and the accumulation of salts for salt lakes in the same region. Zheng and Yang (a396) reported that many chemicals and minerals in the salt lakes in Xizang have reached their depositional stage and are ready to crystallize

out. Yang (a337) studied the sedimentation mechanism of potash deposits in a salt lake. Gao et al. (a67-68) studied the chemistry of borate in salt lake brine.

Much of the research done on salt lakes are resource-oriented. More information can be found in III.14 RESOURCES.

III.11 ORGANIC AND BIOGEOCHEMISTRY

In 1965, Chi reviewed advances in marine algal chemistry (a30), a subject he and Shi published extensively (120-122, 125, 126, a31-32, a105-111, a229-234). The chemical composition of algae and seaweeds including carbohydrates, pigments, vitamins, ascorbic acid, antibiotics, volatiles, major and minor elements and radionucleis was reported. The biochemistry and productivity of algae were also briefly mentioned. A textbook "Organic Geochemistry" was published in 1982 (a219) which covers the definition, characteristics, separation and analytical method of various organic compounds in geological structures. The principles of sedimentology, organic chemistry, environmental pollution and on stable isotopes are also discussed.

Ji et al. (50,126) reported on the seasonal variations in the contents of various amino acids in marine organisms. Ji (120) studied the chemical composition of seaweeds. Ji and Zhang (121, 122) studied trace elements and chemical composition in seaweeds. Ji and Tsao (a111) studied the geochemistry of humics in sediments, covering origin, distribution, transport, chemical composition, structure and chemical reactions. Liu et al. (a162) reported on the chemical composition of some marine zooplankton. The analyses made include protein, lipids, carbohydrates, amino acids and major and trace elements. Li and Yao (a126) and Jiang et al. (a113) studied the absorption and fluorescence spectra of chemicals in algae.

Wu et al. (a303) reported on the chemical composition of Bangia fusco-purpurea including protein, sugar, fat, pigments, amino acids, vitamins and inorganic elements such as K, Na, Ca, Mg, Fe, Al, Si, Cu, Zn, Mn, P, I, and SO_4. Moreover, the effect of hydrolysis on the contents of 18 amino acids was also studied. Yu and Wu (a349) isolated RNA from amphioxus.

Bai (a1) evaluated the role of molybdenum in nitrogen fixation by plants. Ni et al. (195), Zhou et al. (a407) and Chen (a16, a18) isolated petroleum-degrading microorganisms for use in cleaning oil pollution. Chen et al. (a19) studied phenol-degrading yeasts. Several investigators studied the bioaccumulation of trace metals (145, 211, 277, a16, a18). Wu and Cao (267) studied marine luminous bacteria. Hsueh (a97) reviewed the advances in comparative

biochemistry of marine bioluminescence. Cao and Hu (13) reported on the physiological and biochemical characteristics of luminous bacteria in the Changjiang Estuary. Difference in sugar fermentation rates of different strains were also reported.

Zheng et al. (324, a392) related the abundance and distribution of bacteria in sediments to geographic location, source and type of sediments, and the amount of mud, organic matter or organic nitrogen in the sediments. They claimed that 80% of bacteria in sediments degrade protein into amino acids, ammonia and hydrogen sulfide. These bacteria also denitrificate, degrade carbohydrates, glucose and lipids.

Chen (19) reported that vitamin C and Na_2SeO_3 in polluted seawater somehow protect the integrity of the chromosomes. Chen (a17) studied the supply and demand of vitamin B-12 in relation to microbes, and the vitamin's chemical and ecological significance in the oceans. Ji et al. (125) investigated the initial products of metabolism of marine organisms. Zhao et al. (317) studied the effect of Mn on the growth of seaweeds. Ye et al. (a340) studied the effects of heavy metal ions on biological oxidation reaction rate in river water. Tang and Fang (a253) separated protoplast from Porphyra for genetic engineering studies. Gan (a61) extracted moult hormone from barnacles for use in anti-fouling paints.

Jiang et al. (a114) reported on the distribution and source of fatty acids in the East China Sea sediments. Wang et al. (237) studied the generation of petroleum in the South China Sea. Wu (a285) discussed the relationship between petroleum and fossil serpulids.

Several investigators reported on the use of bacteria or other microorganisms in clearing pollutants. Details are given under III.13 POLLUTION.

III.12 ISOTOPES

Scientists at the Institute of Oceanology, Academia Sinica and at the First and Third Institutes of Oceanography, NBO, contributed the most to the study of radioisotopes. Xu et al. (a229) reviewed the speciation, hydrolysis, adsorption, precipitation, and bioaccumulation of artificial radionuclides. Yu (a348) reviewed the distribution of natural isotopes. Li and co-workers (140-142) determined the gross Beta radioactivity in the Chinese Seas. Li (a132) reported U content, speciation and U-234/U-238 ratio in the oceans. Li et al. (a134) described the distribution of U, Ra, Th, K-40 and Cs-137 in the surface sediments of Bohai. Li and Li (141) also measured Sr-90 in coastal surface seawaters. Zhao (321) studied the geochemistry of uranium in sediments of Bohai Gulf. Li and Kang (a135) reviewed the global cycle of uranium. Chen et al. (41, 43) examined the distribution of Ra-226 and calculated the rates of sedimentation in near-shore sediments of the East China Sea.

DeMaster et al. (63) reported the sediment accumulation rates in the East China Sea using Cs-137, Pb-210, and Th-234. Huang et al. (117) did similar study in the same region using Pb-210. Mckee et al. (184) used Th-234/U-238 disequilibrium in examining particle scanvenging near the Changjiang River mouth. Wu et al. (a297) determined the U-234/U-238 and Th-230/Th-232 ratios in sediments.

Xia and Zhang (a316) analyzed the U/Th series of manganese crust to obtain its rate of accretion in the South China Sea. Xia et al. (a313) also reported on the sedimentation rate in the same region using the same method. Zhao et al. (a387), Zou et al. (a422) and Li (a122) determined the sedimentation rate using Pb-210 method. Li (a122) also used the vertical distribution of some insecticides, such as $C_6H_6Cl_6$, in the continental shelf sediments as an indicator of the sedimentation rate.

Koo (a118) reviewed the cycling of 30 radioisotopes including C-14, Ca-45, Sr-90, Cs-137, uranium and thorium series, etc. Li (a142) discussed the utilization of nuclear energy and the consequent marine radioactive pollution. Liu (a169) used transuranic elements for studying marine radioactive pollution, sedimentary processes, and diffusion and mixing of water masses.

Yin and Liu (a345) found that the distribution coefficients of CS-137 absorption are nearly inversely proportional to the average grain sizes of the sediments. Liu (a169) reviewed the determination and distribution of transuranic elements (Pu-238, Pu-239, Pu-240, Pu-241, Am-241, Cm-244, Cf-252 and Np-237) in seawater, sediments and marine organisms. Li (a143) used C-14 to determine primary productivity.

Xia and coworkers (274, 275, a312-317) reviewed dating methods and standards based on Be-10, C-14, Al-26, Si-32, Cl-36, Fe-55, Cs-137, Po-208, Pb-210, Ra-226, Th-228, Th-230, Pa-231, Th-232, U-234, U-238, and Pu-239. Koo (a118) reviewed the dating of seawater using C-14. Wang and Zheng (243) and Wang et al. (252) dated sediments with C-14. You et al. (290) used C-14 and Pb-210. Xiao (a236, a318) studied the isotopic composition of B and Li in some saline lakes.

Guo (98) investigated sea level changes since the late Pleistocene in China using C-14. Huang et al. (114) determined the age of the salt lakes in China, also with C-14. Qiu et al. (a216, a217) reported on the PRC sucrose-charcoal-standard for C-14 dating. Zhao et al. (319) studied Holocene stratigraphy and sea level changes along the coast of Hainan Island using C-14. Ji et al. (125) used C-14 to study the initial products of metabolism. Cai et al. (6) and Chen et al. (28, 29) studied the accumulation of Co-60 and Cs-137 in several marine organisms. Li (a141, a142), Li and Wang (145), Xiao et al. (277) and Yin and Wen (a346) studied the bioaccumulation of Zn-65.

Qin (203) determined C-13 and O-18 in carbonates. Zhu (410, 411) also determined C-13 and C-14 in calcareous concretions. Ji and Tsao (a108) reported the δC-13 value of marine humus. Several investigators (a66, a118, a302, a331) related O-18 in sediments with paleotemperature. Koo (a118) reviewed the distribution of deuterium, B-10, B-11, C-13, S-34, Cl-37. A textbook (a219) describes the stable isotope geochemistry of C, H, N and S. Lin et al. (154) determined tritium, deuterium and O-18 in rain water. Wei et al. (258) studied tritium in ground water. Chou (54), Fan (68), Lin et al. (154), Yu and Lin (292), Koo (a118) and Zhou (a406) studied deuterium in natural waters.

III.13 POLLUTION

Pollution from heavy metals and organic compounds in the soils, rivers, lakes, estuaries and seas has been studied very extensively in PRC (a34, a281, a283). Literally every province and every major city publishes a journal on pollution and environmental protection. Most of these journals have very limited circulation even within PRC, and are not surveyed in this report.

The analysis, speciation, distribution, transport and removal mechanism of trace metals (Cr, Cd, Zn, Pb, Hg, As, Ni, V etc.), radioactive waste, nutrients, organic matter, petroleum and pesticides in air, soil, sediments, and the major rivers, lakes, estuaries and Chinese seas have been documented (2, 4, 11, 14, 15, 19, 28, 30, 34, 65, 81, 85, 93, 104, 113, 130, 138, 140-143, 150, 153, 156, 157, 160, 165, 166, 168, 169, 170, 179, 183, 215, 219, 225, 233, 235, 239, 268-273, 277, 281, 282, 285, 299, 303, 305, 306, 310, 311, 317, 323, 326, 327, 330, 334, a4, a13, a16, a18, a19, a27, a29, a30, a34, a46, a50, a56, a61, a78, a85-88, a91, a92, a101, a103, a104, a109, a125, a127, a133, a139, a140-142, a152, a153, a163, a164, a166, a169, a170, a173, a177, a197 a203, a213, a219, a221, a223-225, a228, a249, a260-262, a266-269, a273, a275, a281, a284, a286, a293, a294, a299, a300, a307, a309, a310, a327, a329, a336, a339, a345, a346, a355, a357, a358, a360, a361, a366, a369, a381, a382, a391, a395, a397, a398, a405, a416-418, a187, a194).

Y.-q. He and Wen (a87) related the content and partition of pollutants to the ionic potential, ionic radius, physical and chemical conditions of sea water, current and bottom geomorphology. They also claimed that a relation exists between the heavy metal concentration and the amount of Fe-Mn concretions. Zhang et al. (a369) concluded that higher salinity and pH of seawater favor the settling of Cr-adsorbed colloids leading to high Cr content in the bottom of an estuary.

Wu (a307) and Wu et al. (a308) studied the thermodynamics and kinetics of pollutants in the oceans. Several seawater models were used as the basis for marine environmental monitoring, environmental quality control and prediction (a78, a91, a92, a350). Xu et al. (a326) discussed how to evaluate the heavy metal background levels in the sediments of the East China Sea. Yang (a336) reported on the

cluster analysis of trace metals in soils. Additional information on the speciation and thermodynamic modeling of heavy metals can be found under III.4 PHYSICAL CHEMISTRY.

Li (150) discussed the sampling techniques and enrichment factors of trace metals in the surface microlayer. Qian and Sun (a213) reported the cycling of PCB in the atmosphere and the oceans. They suggested that PCB be used as a tracer for geochemical studies. Zheng and Huang (a395) used UV-spectroscopy to identify the source of oil pollution.

Li (a142) discussed the pollution control and the effects of the radioactive radiation from radioactive wastes released by nuclear reactors. Liu (a169) studied transuranic elements in the oceans.

Total β radioactivity has frequently been measured (140-142, a87). Cai et al. (6) and Chen et al., (28,29) reported on the uptake of Co-60 and Cs-137 by marine organisms. Many authors reported (305, 326, 327, 330, a16, a18, a46, a87, a115, a141, a163, a261, a309, a357, a391, a416, a417) the mercury content, uptake, metabolism, accumulation and excretion in marine organisms. Many (6, 28, 29, 121, 145, 164-168, 170, 277, 305, 326, 327, 331, a16, a18, a60, a87, a115, a125, a135, a141, a163, a213, a300, a309, a310, a329, a357, a391, a416, a417) studied the bioaccumulation of trace metals and pesticides. Xu et al. (a329) reported the bioaccumulation of radionuclides. Li and Wang (145) studied the bioaccumulation and excretion of Zn-65. Yin and Wen (a346) reported that sea food samples from Bohai and Huanghai have increased in Zn-65 content. Li (a141) investigated the γ-radiation and Cr-51, Nb-95, Cs-137, Pu, Zn-65, Mn-54, Co-60, Ce-141, DDT, PCB, and heavy metals in the food chain.

Numerical models are available for the evaluation of the circulation and the pollutant dispersion in rivers, estuaries and the oceans (30, 157, 235, 239, 299, a13, a91, a92, a182, a350). Wu et al. (a293, a294) established a method for the evaluation of marine environmental quality. Hou (a91, a92) and Hou and Li (a93) modeled river water quality based on oxygen and BOD data. Dai et al. (63) studied the leaching rates of toxicological materials in antifouling chemicals at the harbor. Gu et al. (93) and Huang et al. (113) discussed a method using the paraffin carbon-number distribution

curve to indicate the source of crude-oil pollution in the Yellow Sea and in other unidentified regions. Li (a122) and Lin et al. (153, a156) reported the use of insecticides as an indicator of sedimentation rate.

Huang et al. (113) identified the source of marine oil pollution by measuring the adsorption ratios of UV spectrum, total sulfur content, and paraffin peak heights on gas chromatography. Remote sensing has been used to detect oil and thermal pollution (58, 103, 130, 195, 225, 233, 285, 318, 341, a98, a159, a262, a355, a360, a381, a405). Zhang (a360) reviewed the methods of monitoring and removal of oil pollutants.

Gu and Liu (81) established that heavy pollution caused by trace metals, organic material and raw sewage contributes to the large-scale fish-kill in Jiaozhou Bay. Shen and Sun (211) reported on the purification of chromic waste by bacteria. Shen and Jiang (212) studied the use of zooplankton to purify waters. Chen (a16, a18) studied Cr- and Hg-tolerant bacteria that degrade petroleum. Zhang (a366), Zhou et al. (a407) and Ni et al. (a195) also isolated petroleum-degrading microorganisms for use in anti-petroleum pollution. Chen et al. (a19) studied the use of yeasts in the biological treatment of wastewater containing phenol and cyanide. Chen (19) observed the effect of pollutants on the integrity of chromosomes. Cui et al. (59) reported that the toxicity of dinitrodiazophenol on mussel and sea cucumber is less than that of Hg and Cu. Fan (a56) studied the ecology in the polluted zone of the Jiaozhou Bay. Wu and Li (a286) and Zheng and Zhou (a358) reported on the Controlled Experimental Systems. Zhao et al. (a382) and Zhu (a418), respectively, studied the influence of environmental pollution on the fishery and phytoplankton at Hangzhou Wan.

Since 1972, 400,000 Km^2 of Chinese seas have been routinely monitored for pollution. The parameters monitored include Zn, Cd, Hg, Cu, Pb, Cr, COD, BOD, oxygen, chlorinity, petroleum, DDT, DDE, BHC and radionuclides in seawater, sediments and marine organisms. The pollutant sources have also been invetigated. Annual dumping of municipal and industrial wastewater amounts to about 5-6 x 10^9 tons. The main pollutants are oils, organic matters and heavy metals (a228,

a281). The recent PRC National Report on Physical Sciences of the Oceans to the XVIIIth General Assembly of IUGG (a34) summarizes the seawater pollution on the nearshore waters of China as follows:

1) Rivers are the chief source of marine pollutants, followed by the direct discharge of factories, ships, sea ports and off-shore platforms;

2) Oil is the main pollutant in the sea; oil pollution is more serious in the coastal regions of Bohai and the East China Sea;

3) Organic pollution is more evident in the northern part of the Chinese Seas than in the southern part;

4) Heavy-metal pollution is not serious except in part of the inshore and estuarine waters.

Papers on water quality standards and environmental protection and management have started to appear recently (a78, a86, a115, a170, a173, a284, a293, a294, a307, a397). A book published in 1983 (a115) explains what causes pollution and how to monitor and ameliorate the problem.

Liao (a153) categorized the systematic studies of environmental quality into four areas: (1) the flux of pollutants into the oceans; (2) the physical, chemical and biological processes of pollutants in seawater; (3) biological effects of oceanic pollution; and (4) indices for environmental quality evaluation. Liu (a170) reported the international regulations on marine environmental protection. The Marine Environmental Law was enacted in 1983. Wan (a259) discussed how "background" should be translated in Chinese.

Air pollution has also received attention in recent years. Wang et al. (a265) and Pan (a197) reported the vertical distribution of SO_2, CO_2 and dust in the air in Beijing. Sun et al. (a242-247) used laser to detect smoke and dust. Bi (a4) discussed the effects of atmospheric pollutants such as ammonia, NO_x, SO_2, freons and CO_2. Wuhan Institute of Metallurgical Safety (a311) measured Be in air. Wang and co-workers (a266-269) analyzed pH of rain water and trace-metal concentrations in snow, rain, ice and glacier run-off.

Information related to the interactions of pollutants with particulates, organic matter, and marine organisms can be found under III.8 PARTICULATE MATTER; III.9 ORGANIC COMPOUNDS; and III.11 ORGANIC AND BIOGEOCHEMISTRY, respectively.

III.14 RESOURCES

China was one of the first civilizations to produce sea salt, as early as 800 B.C., and currently is one of the world's leading producers. A recent review "Shift in Marine Research Emphasis" published in 1982 (a176) concludes that marine resources research has risen to the leading position in marine science. More than twenty chemicals are produced regularly from saline lakes and the oceans, including KCl, Br_2, $NaNO_3$, HNO_3, $MgSO_4$, HCl, Cl_2, B, NaOH, and KOH. In addition, studies on the extraction of minor elements are underway. For example:

(a) Extraction of uranium. China is producing about 1000 tons of uranium from mines (a2) and is keeping a large effort in extracting uranium from seawater. Studies on the extraction of uranium in China started in 1958 and continued with minimum disruption even during the period of political turmoil. Large-scale investigations were organized in 1967 and 1972 which accomplished the following: (i) development of a method for analyzing uranium in seawater (146, 172, 199, 232, 315); (ii) studies of various extractants (7, 8, 14, 15, 31, 32, 33, 35, 36, 146, 206, 232, 283, 335, a289, a330, a380, a393; Figs. 5 and 6). In testing many minerals and more than one hundred organic and inorganic absorbants, investigators found that the most efficient extractants are the series involving hydrous titanium hydroxide, some complexed with organic material or high molecular weight polymers, (iii) investigation of approaches other than absorption (a393); (iv) assessment of the possibility of industrializing uranium extraction (a393); (v) analysis and determination of the physical-chemical properties (such as IR, UV, x-ray spectrum, pore size, void space and surface properties (32,33); and (vi) detailed studes of the reaction mechanism, kinetics, activation energy, and the influence of other physical properties such as temperature and magnetic field. (7, 8, 14, 15, 31, 35, 36, 37, 60, 162, 310, 314, a7, a380, a393). Most publications on uranium extraction from seawater are still classified.

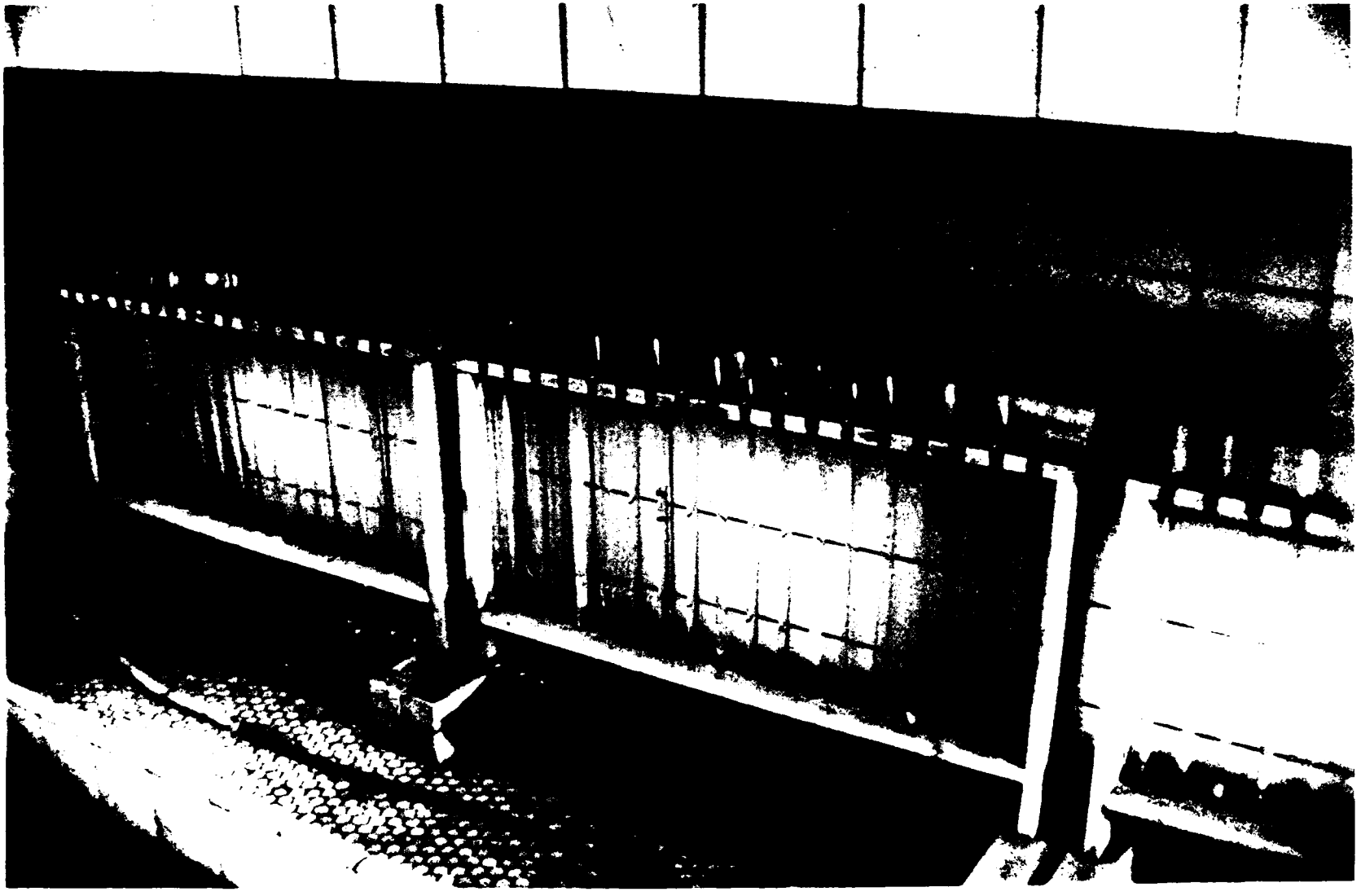


Fig. 5 Ion-exchange columns used in uranium extraction studies at Maidao by the Shandong College of Oceanography investigators. The columns were not loaded at the time the picture was taken.

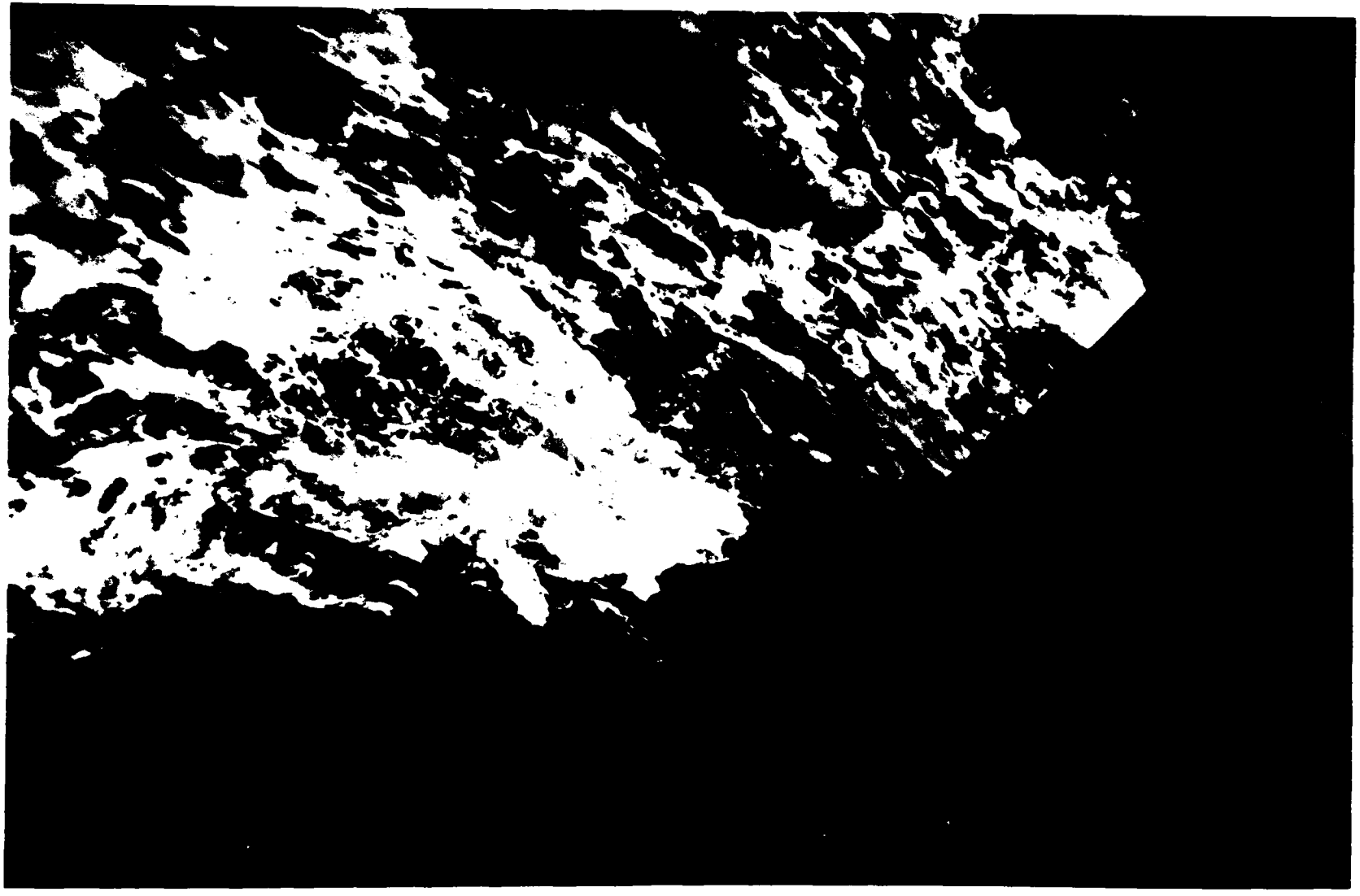


Fig. 6 A pumping station at Maidao for supplying seawater for uranium extraction studies.

(b) Extraction of other inorganic matter: Magnesium was one of the first elements extracted from seawater in addition to NaCl, followed by bromine, potassium and iodine (227, 228, 316, 328, 329, a107, a109, a237, a238, a252, a274, a288, a295, a296, a351, a367). Other extracting methods are being evaluated (a59, a164).

In 1963 Ji (a105) reviewed the extraction of iodine and potassium from kelps. Wu (a295, a296), Cheng and Tu (a28.1), and Yen (285) reviewed the progress in extracting elements from seawater and in mining manganese nodules. Many investigators also reported on manganese nodules (47, 136, 285, 337, a28.1, a33, a37, a55, a135, a295, a312, a342, a357, a409, a412).

Yu and co-workers (296-298) reported the solvation extraction of Cr, Mo, W and V from natural waters. Chow (54) reported that seawater may be a source for heavy water. Li (a138) mentioned the undersea hydrothermal ore formation. Veluchko et al. (a258) discussed the distribution of mineral resources in the oceans. Chen et al. (24) and Yu (a351) categorized salt lake resources (Na, K, Mg, Li, Rb, Cs, Sr, Br, I, borate, U and Th, etc.).

(c) Extraction of organic matter: The extraction of organic matter from marine organisms has been studied rather extensively (50,126,178). In addition to eating kelp and Porphyra for their nutritious value, Chinese eat a lot of agar-agar extracted from Gelidium and other sea weeds (a106, a229, a253). Other chemicals frequently extracted include ascorbic acid, enzymes, cytomin, carrageenan, algin, mannitol, laminarin, hormone, vitamins, antibiotics and pharmaceutical organics (a30-32, a57, a61, a63, a63.1, a105, a106, a172, a229-234).

(d) Extraction of energy: Li (a124) reported on the theoretically available ocean energy available to China: 1.9×10^8 KW in tidal energy, 1×10^8 KW in wave energy, 5×10^8 KW in thermal energy, 0.5 to 1×10^8 KW in kinetic energy from currents and 1×10^8 KW in potential energy due to salinity gradient. Yan et al. (285) reported on the progress in extracting ocean thermal energy.

(e) Manganese nodules: Chin (a33), Chu (a37), Li (136), Xia and Zhang (a316) and Zhu (337, a409, a412) examined the characteristics and the formation mechanism of manganese nodules. Cheng (47) analyzed the distribution of manganese nodules in the western central

Pacific. Yan et al. (285) and Wu (a295, a296) discussed the mining of manganese nodules. Cheng and Tu (a28.1) and Ze and Shi (a357) reviewed the history of manganese nodule research. Chu (a37) reported on the mineral characteristics of manganese nodules in the ocean.

(f) Desalination: Fresh water from the oceans is considered as a resource and has been utilized in PRC. China started researching the desalination of seawater in the early sixties (a109). This early research used mainly the electrodialysis process and dozens of various ion-exchange films were utilized. Since the late sixties, the effort has concentrated on the reverse electrodialysis process (a47, a82; Fig. 7). The capacity of the current working unit is 200 tons/day. Several other methods such as distillation and ion exchange have also been studied.

(g) Miscellaneous: Fang et al. (a57) studied the hypotensive effect and mechanism of soft corals. Liu et al. (172) studied the antitumor effects of sponges and soft corals. Fan (a55), Fang (a58) and Wu (a295) described marine chemical resources in general.

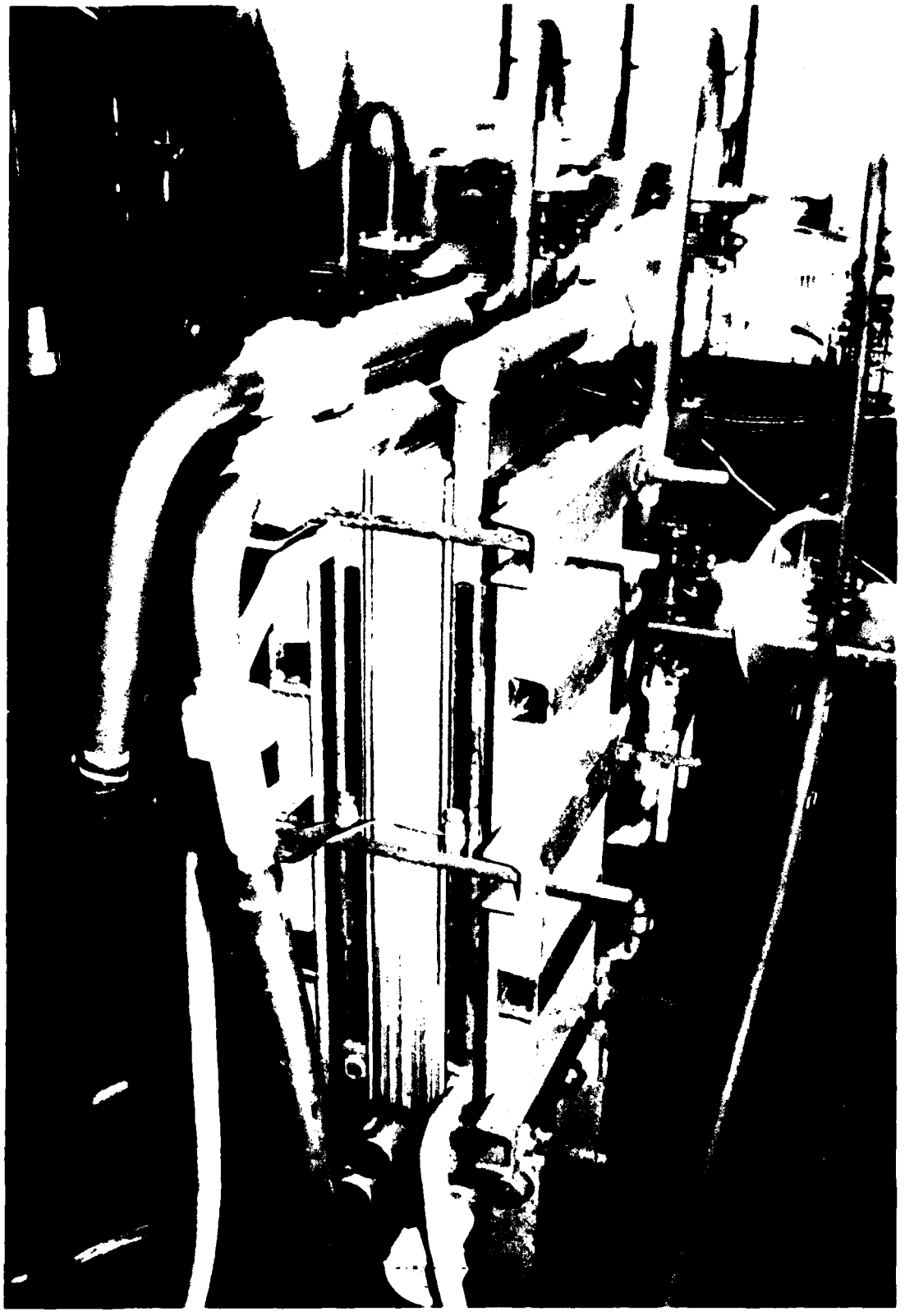


Fig. 7 A reverse electrodialysis desalination unit being developed at the Second Institute of Oceanography, NBO.

III.15 OTHER FIELDS

(1) Acoustics: Numerous papers are published on sound transmission, refraction, scattering, speed and absorption in seawater (106, 158, a77, a128, a160, a347, a375), and on sound channels (106, 189-191, 210, a77, a160), bioacoustics (a218, a346.1) and reflection by bottom sediments (a77), but I know of no publication regarding the application of acoustics to the study of physical chemistry of seawater. In 1964, You and Qiu (a346.1) reviewed the research and development of oceanographic acoustics with discussions on the above mentioned properties. They claimed that sound speed can be used to measure the dissolved gases but no reference was given. The Institute of Acoustics of the Academia Sinica was founded in 1964, but the major underwater acoustics work is probably still performed by the PRC Navy.

(2) Air-sea Exchange: In 1965, Koo reviewed the air-sea exchange using C-14 and deuterium (a118). Sun and Yu (222) studied the air-sea transfer of oxygen in the South Yellow Sea. Gu et al. (90) discussed the fluxes of trace metals across the air-sea interface. Liu (a169) used transuranic elements for air-sea exchange studies. Martin (183) discussed the atmospheric flux of elements into the oceans vs river and volcanic inputs. Demaster et al. (63) and Zhao et al. (a387) mentioned the atmospheric input of Pb-210 in the oceans. Qian and Sun (a213) reported the PCB cycling in the atmosphere and the oceans.

Chen et al. (38) reported on the wind transport of fluorine in sand and dust in the Beijing-Tianjin-Bohai area. He et al. (102), Qin and Li (201) and Chen (a26) studied the wind-borne material in the sediments.

(3) Corrosion: Ongoing studies on metal corrosion and anti-fouling in China were begun in the late fifties (a109, a120). So far, these studies have involved: (i) the investigation of the zinc- and aluminum-base anode applied to the prevention of the corrosion of ship hulls (a79); (ii) corrosion resistance alloy steel and Ca-Mg coated steel have been manufactured and used on oil platforms and wharf structures (a21 a44); (iii) investigation of zinc coating

which works well in preventing steel corrosion in the inter-tidal region (107,110); (iv) the manufacture of several anti-corrosion and anti-fouling paints which have been used on structures at sea (62, 213, a61, a150); (v) studies on the theories regarding fouling and corrosion (15, 91, 92, 108-110, a79, a158, a179, a359, a365); (vi) the manufacture of several essential instruments and the development of techniques in analyzing and removing corrosion (213, a44, a79, a363).

(4) Hydrothermal Studies: The PRC scientists have studied the hydrothermal systems on land (49, a367) but have not yet actively participated in the oceanic hydrothermal studies although they are taking note of western literature (a138, a144, a357). Chen et al. (40) reported on the formation of aragonite deposits near hot springs. Cheng et al. (49) reported that hot springs are the major source for the salt lake minerals. Li (a138) suggests that the thickness of the lithosphere and the water depth depend on the age of the oceanic crust. In a given age range, these values are in proportion to the square root of the crustal age. Liang (a149) studied the formation of scapolite in the hydrothermal system.

(5) Remote Sensing: Remote sensing techniques have been applied to studying the coastal waters. Research work concentrates on transparency of seawater, pigment concentration, suspended matter in seawater, red tide and the oil pollution (58, 103, 130, 195, 225, 233, 285, 318, 341, a98, a159, a262, a324, a325, a355, a360, a381, a405), in addition to estimating the sea surface temperature and salinity, surface wind, dust, and the bottom depth (151, a43, a171, a242-247, a355, a405). Images are processed both optically and digitally. Lu et al. (173) and Sun and Zhang (a245, a247) measured the aerosol and its size distribution, Sun et al. (a242-247) measured the smoke plume rise, particle concentration, and atmospheric diffusion parameters by laser.

(6) Miscellaneous

Cao and Hu (13) studied the distribution of luminous bacteria, and difference in the fermentation of sugars in different strains in Changjiang estuary. Hsueh (a97) reported on bioluminescence. Li and Zheng (a128) reported on the color, transparency, and luminescence of seawater. Zhong et al. (a401) used optical methods to survey the primary productivity. Ze and Shi (a357) reviewed the status of marine sciences in U.K. and France. Mao et al. (a182) reported on the research techniques and facilities for seawater pollution modeling at several Japanese laboratories.

BIBLIOGRAPHY

1 AUTH Aller, Robert C.; Wang, Chenghou; Jin, Jiancai; Tsai, F.; Sui, Yongnian

AFFI Department of the Geophysical Sciences, University of Chicago, Chicago, IL, U. S. A. (1); Second Institute of Oceanography, National Bureau of Oceanography, Hangzhou, China (2, 3, 4); Shandong College of Oceanography, Qingdao, China (5)

DATE 1983

TITL Early chemical diagenesis and sediment-water solute exchange in the East China Sea

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise Abstract, 133-135 (1983)

ABST Measurement of pore water solute profiles, sediment-water solute fluxes, and solute reaction rates in the upper few decimeters of sediment at 25 stations visited at least one time each in the E. China Sea allow inference of spatial patterns in the processes controlling early diagenesis of sediments on this shelf. Although the high mobility of surface deposits and the range in bottom types sampled hinder interpretations some general observations can be made. Directly measured dissolved $Si(OH)_4$, NH_4^+, NO_3^-, I^-, and Mn^{2+} fluxes from or into the bottom range from 0.15 to 13.2 ($Si(OH)_4$), -2.8 to 2.9 (NH_4^+), -0.29 to 2.8 (NO_3^-), -0.0019 to 0.094 (I^-), and -0.07 to 0.43 (Mn^{2+}) mmoles/m^2/day. These were measured during both summer and fall periods and correspond to temperatures in the range of 15-24 degree C. The magnitude of net solute flux does not correlate with depth of water, distance from shore, or, in most cases, total organic carbon in the underlying sediment. The magnitudes of measured fluxes out of the bottom are often lowest in

deposits having the highest solute concentrations. In addition, bottom regions having the highest buildup or depletion of pore water solutes have the lowest potential rates of reaction as measured in incubation experiments. These same areas of high pore water solute concentrations, low reaction rates and low net solute release are sites of high sedimentation rates and depauperate benthic communities. High water turbidity apparently hinders water column production and input to the bottom of reactive organic matter or other biogenic material which drive many diagenetic reactions while high sedimentation or disturbance hinders benthic community development, lowers biogenic reworking, and allows the build-up-depletion of reaction products or reactants. These areas of relatively low reaction rate generally lie in a zone trending south east of the Changjiang River mouth. Deposits having a well-developed infauna are biologically irrigated so that production-consumption of solutes relative to bottom water concentrations is not expressed in pore water profiles. The examination of pore water solute profiles alone would lead to misintepretation of the relative biogeochemical reactivity of bottom regions. A paradox resulting from the interaction between benthic communities and the physical environment of sedimentation is that the greatest storage of diagenetic products related to organic matter decomposition occurs in sediments that are volumetrically the least diagenetically reactive. There are exceptions on the outer shelf to these generalizations which largely apply to the area around the Changjiang River mouth.

KEY diagenesis, East China Sea, sediments, temperatures, Changjiang, silicate, ammonia, nitrate, iodide, manganese, organic matter, interstitial water

LANG Chinese, English abstract

NOTE abstract only

2 AUTH An, Jingru; Zhang, Qing

AFFI Fuzhou University

DATE 1982

TITL Analytical method for trace tellurium at ppt level in seawater and environmental waters.

CITA Acta Oceanologica Sinica 4, 555-563 (1982)

ABST Sulfhydryl cotton can quantitatively adsorb 0.25-100 ppt Te under the acidity of 0.1-9 M HCl, and the adsorbed Te can be washed off by concentrated HNO_3. In the medium of 0.28 M HCl - 2% $NH_2OH \cdot HCl$ - 1.6 μg/ml Re(VII) - 0.005% polyethylene glycol, the highly sensitive catalytic wave of Te showed a peak; the mechanism of catalytic wave was investigated. 9 x 10(E-11)M Te can be detected from this wave. Most of the ions show no interference with the determination. To detect ultratrace Te (0.1 - 10 ppt) by sulfhydryl cotton enrichment - catalytic polarography is simple and sensitive; and it can be used to determine the background value in natural waters. The concentration of Te in seawater is first quantitatively analyzed; the content in the seawater of South China Sea and East China Sea is at the level of 10(E-10)g/l.

KEY tellurium, seawater, natural waters, concentration, South China Sea, East China Sea, analytical chemistry, pollution, polarography

LANG Chinese

NOTE The English version is published in Acta Oceanologia Sinica 1, 204-209, 1982

3 AUTH An, Jingru; Lin, Giaji

AFFI Department of Chemistry, Fuzhou University, Fuzhou, China

DATE 1982

TITL Catalytic polarographic wave of tungsten in the presence of cetyltrimethylammonium bromide and determination of tungsten in ultramicroquantity in seawater

CITA Collected Oceanic works 5, 136-144 (1982)

ABST The polarographic catalytic characteristics of tungsten have been studied in H_2SO_4-HA (benzilic acid)-$KClO_3$-Cetyltrimethylammonium bromide (CTMAB) system. It is found that the presence of CTMAB improves the shape of polarographic wave, increases the sensitivity of tungsten determination, and eliminates the interfering effect of molybdenum. The extractive reaction between W(VI) and 6, 7-dihydroxy-2, 4 diphenyl benzpyranol in the dilute solution has been studied. Reaction is used for the concentration of tungsten in ultramicroquantity from seawater. An analytical procedure of preconcentration and determination of tungsten in seawater is proposed. The sensitivity of the proposed method is 5 * E-11 M. The tungsten content in water in East China Sea water along the coast line of Fujian and Zhejiang is found to be 0.13 and 0.12 μg/l respectively. The method can be applied to seawater as well as to the water of rivers, lakes, etc.

KEY tungsten, determination, seawater, concentrations, analytical chemistry, polarography, river water, lake waters, natural waters, East China Sea

LANG English

4 AUTH An, Jingru; Zhang, Qing

AFFI Department of Chemistry, Fuzhou University

DATE 1982

TITL An analytical method of ultra-trace tellurium for samples of sea- and environmental-water

CITA Acta Oceanologica Sinica 1, 204-209 (1982)

ABST Tellurium is known to be a poisonous element to human health. In recent years, determination of trace tellurium has received great attention in connection with the wide application of its compounds and/or with environmental pollution. Literature cited reported the determination of ppb level tellurium in waste water and artificial water samples by atomic-absorption spectrophotometry. As the tellurium content in natural water is extremely low, there is not yet any sensitive analytical method for determination of its background value in various natural waters. In chemical oceanography, data about tellurium content in seawater are rather scarce. This paper will summarize and evaluate a series of our investigations on the analytical method of preconcentration with sulfhydryl cotton fiber (S. C. F.) and catalyic polarographic determination of ultra-trace tellurium in water.

KEY tellurium, determination, pollution, natural waters, seawater, analytical chemistry, polarography

LANG English

NOTE The Chinese version is published in Acta Oceanologica Sinica 4, 555-563, 1982.

5 AUTH Bezrukov, P.L.; Saidova, K.M.; Murmaa, I.O.; Filatova, Z.A.

AFFI Institute of Oceanology, Academy of Sciences, U.S.S.R.

DATE 1958

TITL On the sediments and benthic fauna of the northern East China Sea

CITA Oceanologia et Limnologia Sinica, 1, 269-292 (1958)

ABST This is an account on the observation of the bottom sediments and benthic fauna in the northern East China Sea. Samples were collected during the twenty-second cruise of the R.V. Vityaz in November, 1955. Geochemical analysis included iron, calcium carbonate,

phosphorus, silica and organic carbon.

KEY iron, calcium carbonate, phosphorus, silica, organic carbon, East China Sea

LANG Chinese and Russian

NOTE Translated by H.L. Kim and S.C. Fan. The original article was published in Russian in the same issue, pp 293-315.

6 AUTH Cai, Fulong; Wu, Jinping; Chen, Qihuan; Yang, Jiadong; Li, Pingyu; He, Jingjin; Lin, Bishui

AFFI Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE 1980

TITL A preliminary study on concentration of Co-60 and Cs-137 by several marine organisms

CITA Acta Oceanologica Sinica 2,81-93 (1980)

ABST The paper takes marine organisms, i.e. mussel Mytilus crassitesta Lischke, clam Arca subcrenata Lischke, prawn Penaeus orientalis Kishinouye, Penaeus pencillatus Alcock, as well as brown algae Laminaria japonica Aresch, green algae Enteromorpha intestinalis Link and phytoplankton Platymonas sp. as material for experiment, on the understanding that certain water temperature, concentration of radionuclides in 5*10(E-8) Ci/l, make use of the method of feeding radionuclides in the laboratory experiment and determine concentration factors of Co-60 and Cs-137 in them. Counting the eatable portion, the highest concentration factors of Co-60 in them are specifically 1400, 240, 7.0, 68, 400, 240; the concentration factor of Cs-137 in the muscle of the prawn is 25. The authors have determined the distribution of Co-60 in the organism of the mussel and the clam. It is also determined the biological half-life time of Co-60 in the mussel, the clam and the prawn and that of Cs-137 in the prawn, also. Besides absorption of Co-60 and Cs-137 in the above

described organisms, a bait of organisms and concentration of radionuclides in the laboratory tracer experiment and the defects of such an experiment are discussed.

KEY cobalt-60, cesium-137, marine organisms, mussel, algae, phytoplankton, temperatures, concentrations, radionuclides, bioaccumulation, absorption

LANG Chinese, English abstract

7 AUTH Cai, Shuiyuan; Zhuang, Mingjian; Zheng, Wenqing

AFFI Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE 1981

TITL Exploration of AHP resin synthesized in aqueous phase and its adsorption mechanism of uranium.

CITA Acta Oceanologica Sinica 3, 86-96 (1981)

ABST AHP resin organic adsorbent for extraction of uranium from sea water, which was synthesized in the aqueous phase with tetraethylene pentamine (TEPA), epichlorohydrin (ECH) and C-reagent as the raw material and rubber solvent oil (120 gasoline) as the pore-producing agent is recommended here. The characteristics of the resin are: (1) It has a great exchange capacity: 20-40 mesh of wet sample was able to adsorb stably over 900 μg U/g-dry resin through which fresh sea water was passed for 15 days (the average adsorption capacity of five sets of sample was 1163 μg U/g-dry resin, but 1560 μg U/g-dry resin was the highest degree of adsorption among the samples); (2) It has a high exchange rate: a gram of the resin was able to adsorb about 80 μg of uranium every day; (3) it has a good selection and a high extraction rate and is less affected by the temperature of sea water; (4) It is reusable: there was a set of samples which had been used 12 times and the average adsorption capacity was 620 μg U/g-dry resin and the loss by solution was about 5.6%; (5) it has a lower mechanical

strength and a higher loss on dissolving: the loss by solution in the first period of use was about 20%. This sort of resin has never been reported before. Based upon the empirical theory that the reaction mechanism of chelate high polymers could be modeled on that of its similar substance with fewer molecules, we used the MPS-5000 spectrophotometer to explore the mechanism on which uranium was adsorbed by the C-reagent that played the main role in this adsorption of uranium in resin. Preliminary results were obtained: (1) The characteristic absorption peak of C-reagent was at 400 nm, the absorption peak of H_2N-C-O^- appeared at 465nm, and the absorption peak of H_3N^+-C-OH did not appear in visible wave length. Acid dissociation of C-reagent was nearly at pH=8.5 while basic dissociation was presumably at pH=1.5 or so. Most of the undissociated C-reagent and apart of H_2N-C-O^- existed at pH=8; (2) the Adsorption peak of C-reagent was independent of pH at 437 nm of the wave length in the solution; (3)At pH>9.5 and pH<6.5, the C-reagent unreacted with uranium, at pH=8, a part of the C-reagent reacted with uranium. It was thought possible, that the C-reagent reacted with $UO_2(OH)_x^{(2-x)}$. As for the actual reaction, the mode needs further study.

KEY AHP, adsorption, uranium, resin, adsorbent, seawater, gasoline, ion-exchange, temperature, adsorption, capacity, mechanism, pH, marine resources

LANG Chinese, English abstract.

NOTE Zhuang, Mingjian also spelled as Zhuang, Mingjiang

8 AUTH Cai, Shuiyuan; Zhuang, Mingjiang; Zheng, Wenqing

AFFI Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE 1982

TITL AHP resin and its uranium adsorption mechanism

CITA Acta Oceanologica Sinica 1, 225-233 (1982)

ABST A number of data on the organic adsorbent applied to extract uranium from sea water have been reported. In this paper, we introduce a new organic adsorbent which has high extracting uranium capacity. The syntheses and the experimental uranium adsorption as well as its mechanism are described.

KEY uranium, adsorption, mechanism, seawater, capacity, marine resources

LANG English

NOTE Zhuang, Mingjian also spelled as Zhuang, Mingjiang

9 AUTH Cao, Qinchen

AFFI Department of Marine Geology, Qingdao

DATE 1982

TITL A preliminary research on chemical components and minor elements of offshore surficial sediments near Qingdao

CITA Journal of Shandong College of Oceanology 12, 73-81 (1982)

ABST The chemical composition of offshore sediments are conformable basically with the average composition of terrigenous rocks, but only the contents of Na, K, Ca and P in offshore sediments are lower than the contents of terrigenous area. There is the positive relativity between the contents of Mg, Al, total Fe, and the ratio of Na_2O/K_2O, and there is a higher content of alkali than any other area in sediments. In these sediments, we also find that some minor elements are positively relative with some certain major elements in contents such as: Sr with Ca, Ba with K, Ga, Cr, V, Ni with Al, Cu with Mg, Ni with Fe, minor elements with clay minerals in association. The contents of major and minor elements (Ba, Cr, Zn, Ni, ...) in these sediments are lower than those of the clayey sediments and higher than those of sandy

sediments of Barents sea, so these offshore sediments should be regarded as belonging to the sediment type of sandy clay.

KEY minor elements, compositions, major ions, clay minerals, sodium, potassium, calcium, phosphorus, magnesium, aluminum, iron, strontium, barium, gallium, chromium, vanadium, nickel, copper, geochemistry, sediments

LANG Chinese, English abstract

10 AUTH Cao, Qinchen; Liu, Chengshi; Mou Weixi

AFFI Shandong College of Oceanology, Qingdao (1); Nanjing University, Nanjing (2,3)

DATE 1981

TITL A preliminary study of volcanic rocks and various intrusive rocks in Hongdao District, Qingdao

CITA Journal of Shandong College of Oceanology 11, 71-101 (1981)

ABST In this article the volcanic mechanism of Hongdao District, Qingdao is discussed. Petrographic-Chemical analysis was made for 60 samples collected from volcanic rocks and various intrusive rocks of Qingshan Group.

KEY potassium-40, dating, geochemistry, X-ray diffraction, compositions

LANG Chinese, English abstract

11 AUTH Cao, Qinchen; Tu, Renliang

AFFI Shandong College of Oceanology, Qingdao

DATE 1982

TITL Preliminary study on the geochemical characteristics of sediments in Jiaozhou Bay

CITA Acta Oceanologica Sinica 4, 473-482 (1982)

ABST The chemical composition of the surficial sediments in Jiaozhou Bay is essentially coincident with the average chemical composition of rocks in the influent water system region, approximately corresponding to

that of intermediate rocks. Since Na, K, Ca, Mg and P occur in large amounts in sea water and seawater-organism circulatory system, the contents of these elements from the sediments in the Bay are considerably lower than the average content of those from the rocks in the influent water system region. Data obtained show that P and Al, Fe from the sediments have a positive correlation. One of the significant characteristics of sediments in Jiaozhou Bay is that the contents of trace elements, Ca, Cr, V, Cu, Zn, Co, Ni, Sr, Ba and B are, in general, higher in the Bay than in any other bays and sea provinces of the world. The correlation analyses show that the elements just mentioned occur, in the main but in varying amounts, in clay minerals. Ca, Cr, Ba, Sr are related to illite, and Cu, Ni to montmorillonite. In addition, Cr, V, Co, Ni and B are associated with clastic constituents and authigenic minerals in sediments. Judging from the characteristics of the horizontal and vertical distribution of trace elements, it seems possible that Cr, V, Cu, Zn, Sr and Ba are derived from industrial pollution. And the determination of Cr content in influent industrial waste water shows that there does exist Cr contamination in sediments in the Bay.

KEY sediments, Jiaozhou Bay, seawater, trace metals, distribution, pollution, sodium, potassium, calcium, magnesium, phosphorus, aluminum, iron, gallium, vanadium , chromium, copper, zinc, cobalt, nickel, strontium, barium, boron, illite, montmorillonite

LANG Chinese, English abstract

12 AUTH Cao, Xinzhong

AFFI The Second Institute of Oceanography, the National Bureau of Oceanography, Hangzhou

DATE 1983

TITL On the main hydrographic factors influencing the distribution of nutrient off the coast of Zhejiang

CITA Journal of Marine Sciences 2, 36-38 (1983)

ABST The paper indicates the features of the nutrient distribution off the coast of Zhejiang in July, 1980. It is found that the main hydrographic factors influencing the nutrient distribution are coastal upwelling, vertical eddy mixing and river-runoffs. Coastal upwelling played an important role in influencing the nutrient distribution. Effect of the river-runoff is small.

KEY distribution, nutrients, upwelling, mixing, river water

LANG Chinese, English abstract

13 AUTH Cao, Yunhui; Hu, Xigang

AFFI Second Institute of Oceanography, National Bureau of Oceanography, Hangzhou

DATE 1982

TITL Distribution and composition of luminous bacteria in the estuary of the Changjiang River

CITA Acta Oceanologica Sinica 4, 89-94 (1982)

ABST The distribution and composition of luminous bacteria in the estuary of the Changjiang River were investigated preliminarily. Luminous bacteria were found in all of the 24 water samples collected in various depths at 6 stations on October 23-25 in 1979. It was observed that the abundance of luminous bacteria (total number) appeared to be 0.33-8.67 colony-forming units (CFU) per ml. 94 luminous bacterial strains were determined and showed to consist of both Photobacterium mandapamensis and Lucibacterium harveyi. L. harveyi was mainly found in surface sediments and also found in mid and lower-water, but P. mandapamensis was present throughout the whole water column. In a survey of

physiological and biochemical characteristics of P. mandapamensis strains, differences were found in the fermentation of sugars.

KEY bacteria, estuary, Changjiang, sediments, bioluminescence, seawater

LANG Chinese, English abstract

14 AUTH Chang, Chen-Ping(Zhang, Zhengbin); Li, Zijiang; Wang, Qiang

AFFI Department of Oceanological Chemistry, Shantung College of Oceanology

DATE 1979

TITL A kinetical study of the inorganic ion exchange of minor elements in seawater--Film-progressive model

CITA Oceanic Selections 2, 12-63 (1979)

ABST This article suggests a "film-progressive model" for inorganic ion exchange in seawater, whose features are simplicity and ease of mathematical treatment. It has a good straight line relationship when experimental data are plotted into graphs and there is a quantitative relationship between it and B.A.M theory and its formulate. Using this model and mathematical equations it has been decided that the rate of ion exchange of uranium(VI) and hydrous titanium oxide and/or aluminum-activated carbon composite exchanger systems, under conditions of natural seawater, concentrated seawater and under the effect of magnetic field throughout the whole process is controlled by film-diffusion. Experiments prove "film-progressive model" is correct under conditions of minor components and in seawater. It is at least as effective as B.A.M theory. This model will exhibit its theoretical guiding effect in the comprehensive utilization of marine resources, in marine pollution and prevention, in marine geochemistry of elements and suchlike spheres in so far as the study of kinetical problems are concerned.

KEY inorganic ion-exchange, minor elements, seawater, rate, uranium, hydrous titanium oxide, magnetic field, marine resources, pollution, geochemistry, thermodynamics, kinetics, ion-exchange

LANG English

NOTE See Note 15

15 AUTH Chang, Chen-ping; Liu, Lien-sen

AFFI Department of Oceanological Chemistry, Shantung College of Oceanology

DATE 1978

TITL Some chemical aspects in oceanography

CITA Oceanic Selections, 41-62 (1978)

ABST Oceanological chemistry is a new sphere of science, a developing borderline science, sandwiched between chemistry, biology, geology and the other branches of oceanology. We discussed in detail the characteristics of chemical reactions in the ocean from the stand points of sorption, complexation and ion exchange, with particular emphasis on the achievements we acquired in this field of study in recent years. I. This article reviews the various important aspects of sorption action in oceanic environments. There are at present three main theories relating to the sorption of elements in seawater, viz.: (1) expressed by corresponding formulae of Freundlich; (2) expressed by corresponging formulae of Langmuir; (3) we are the first to suggest and to deduce by means of the theory of stepwise equilibrium "the general equation of sorption of minor elements in seawater", i.e. $E = (N'a(M)^b)/(1+a(M)^b)$. (1) II. This article discusses in detail the complexation in marine environments, pointing out that they are quite important in the study of chemical models of the main components of electrolytes in sea water, in the study of species of "minor elements" in seawater, and in the study of the organic complexes in

seawater. From the point of view of micro structure of matter, we classified the anions and cations in seawater, and discussed their relationship with the periodic law of elements. We introduced the chemical equilibrium method of calculation into the theoretical determination of the species of minor elements in seawater and taking the species of uranium in seawater, which have been much discussed in the literature but remain in controversy up to now, as an example, we made concrete calculations by means of this method of ours. The characteristics of this method are: (1) in the selection of the stabilily constants of $[UO_2(CO_3)_3]^{-4}$ etc., the optimum is selected in accordance with the theory of straight line relationship or "S" type relationship between log β_n and ligand n proposed by us, after concrete analyses. For example, the stability constants of complexes UO_2L_n(n = 1, 2, 3) show a straight line relationship, viz. $\log \beta_n = \log \beta_1 + \alpha(n - 1)$ (2) Further, it has been deduced that log β_3 of $[UO_2(CO_3)_3]^{-4}$ = 20.7, which well agrees with the experimentally determined values as reported in the literature in recent years. Further, we obtained by calculation the main species of uranium in sea water as follows: $UO_2(OH)_3^-$ (52%) and $UO_2(CO_3)_3^{-4}$ (48%). (2) the activity coefficient has been used. The application of complexation action to the extraction of minor elements from seawater, to the analysis of seawater, the pollution of seawater and its prevention, as well as to the corrosion of sea water and its control has also been discussed in this article. III. This article introduces the most recent developments of inorganic ion exchange in seawater, in which the main discussion is about the newest developments of the stepwise equilibrium theory of inorganic ion exchange in seawater, which discussion includes: (1) regarding minor elements in

seawater and weakly combined R-A in RAn systems, it is observed that R does not necessarily combine with equal shares of more than one minor element A, when the stepwise equilibrium is not of an "integral type", i.e. does not necessarily show n = 0, 1, 2, ..., N, but may be a stepwise equilibrium of "fraction type" i.e. $n' = n/p = 1/p, 2/p, \ldots, N/p$ ($p >= N$). Hence, by means of the same method introduced in our literature(21) it is possible to deduce the general equation of sorption of minor elements in seawater, i.e. equation (1) It is possible that "fraction type" stepwise equilibrium represents the main chemical characteristics of minor elements in seawater. (2) In regard to the mechanics of the reaction of uranium (VI) with hydrous titanium oxide in sea water under the conditions of concentrated uranium, we suggested the five steps in mechanics "diffusion-special type UO_2^{+2} - reaction of cation ion exchange-diffusion", thus making it possible to explain the main experimental results already known (including those of Ogata). (3) Under the conditions of concentrated uranium, experimental determination of the stepwise equilibrium constant of the inorganic ion exchange of uranium with hydrous titanium oxide in seawater has been made, the results being: single order stepwise equilibrium constant K_1 = 1.0 * E+3 (g/g) two order stepwise equilibrium constant K_2 = 4.5 * E+10 (g/g). (4) Oftentimes chemical reactions that take place in oceans are quite complicated and so, they should be considered in conjunction with the three aspects of sorption, complexation and ion exchange, as they are oftentimes interconnected and/or interpermeating. Therefore, the reaction of uranium with hydrous titanium oxide in seawater may also possibly be explained by the mechanics of "dewater-complexation".

KEY ion-exchange, seawater, adsorption, minor elements, electrolytes, equilibrium, uranium, activity coefficients, extraction, pollution, speciation, thermodynamics, marine resources, diffusion, equilibrium constant, hydrous titanium oxide, corrosion

LANG Chinese, English abstract

NOTE Chang Chen-ping is also spelled as Chang Chen-Ping, Chang Chenping, Zhang Zhengbin, Zhang Zheng-bin or Zhang ZhenBin; Liu Lien-shen is also spelled Liu Liansheng, Liu Liensen, Liu Lian-Sheng, Liu Lien-sen, Liu Lien-sheng or Liu Lian-sen.

16 AUTH Chang, Chen-Ping; Liu, Lien-Shen

AFFI Department of Oceanological Chemistry, Shandong College of Oceanology, Qingdao

DATE 1977

TITL Coordination chemistry and marine chemistry

CITA Huaxue Tongbao 6, 343-358 (1977)

ABST The coordination chemistry has been applied to the study of chemical speciation in seawater.

KEY marine chemistry, coordination chemistry, equilibrium constant, activity, activity coefficients, thermodynamics, speciation, trace metals, heavy metals, uranium, pH, seawater, major ions, minor elements

LANG Chinese

NOTE See Note 15

17 AUTH Chang, Chen-ping; Liu, Liensen

AFFI Department of Oceanological Chemistry, Shantung College of Oceanology, Qingdao

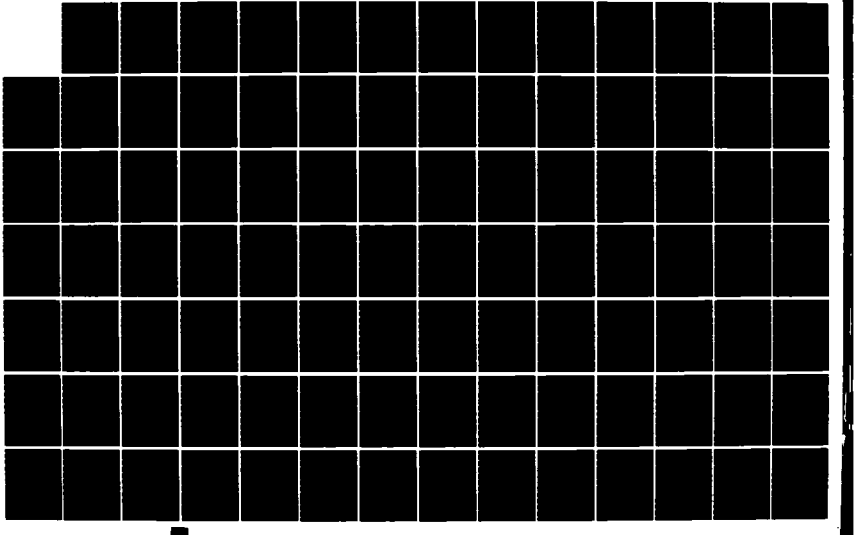
DATE 1974

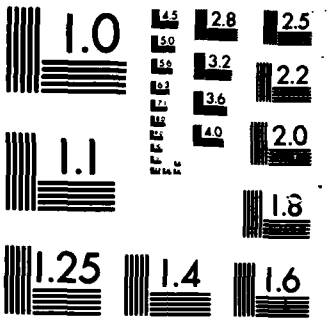
TITL A study of the theory of stepwise equilibrium of inorganic ion exchange in seawater

CITA Scientia Sinica 17, 486-503 (1974)

AD-A163 254 MARINE CHEMISTRY IN THE PEOPLE'S REPUBLIC OF CHINA(U) 2/11
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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

ABST This article deals with the three achievements acquired in the study of the theory of stepwise equilibrium of inorganic ion exchange in seawater, viz.: 1. It suggests that the theory of stepwise equilibrium of inorganic ion exchange in seawater is also applicable to ordinary aqueous solution system and introduces the average ion exchange number n, which can be measured experimentally. Three ways are suggested for calculating the formation constants of ion exchange products, by means of general mathematical treatments, using the basic formula of n (11). 2. A quantitative discussion of the relationship between the theory of stepwise equilibrium of ion-exchange and the theory of adsorption is given. Experimental data obtained by using uranium-hydrous titanium oxide system etc. well confirm this relationship. 3. The theory of stepwise equilibrium of inorganic ion exchange has been used to explain the most important experimental fact in the exchange of inorganic ion-- the relationship between ion-exchange ratio and pH. Two ways have been suggested for calculating K, the equilibrium constant of ion exchange equilibrium. Experimental data of several separate systems have been utilized in making calculations, with the result that theory and practice comparatively agree.

KEY equilibrium, inorganic ion-exchange, seawater, ion-exchange, aqueous solution, formation constant, adsorption, uranium, hydrous titanium oxide, pH, equilibrium constant, enrichment, adsorbent

LANG English

NOTE Chinese version of this paper published in Scientia Sinica No. 3, 270-282 (1974); see Note 15

18 AUTH Chang, Chenping; Liu, Liensen

AFFI Department of Oceanological Chemistry, Shandong College of Oceanology, Qingdao

DATE 1982

TITL A study of the theory of the liquid-solid distribution of elements in seawater II. The theory of distribution equilibrium of minor elements on hydrous metal oxides in seawater

CITA Collected Oceanic Works 5, 67-80 (1982)

ABST This article made a study of the theory of distribution equilibrium of minor elements on hydrous metal oxides in sea water, as well as of their calculating equations. As a result we found that: (1) when using Freundlich's formula in expressing the value of b in smaller systems, at present there is still no good calculating equation for expressing the law of their liquid-solid distribution. On the basis of the theory of step-wise equilibrium of inorganic ion exchange, we extended the conditions of positive integer n = 0, 1, 2, ..., N etc. in our previous article 1 to 0 <= n < 1, thus obtaining calculating equation (7). The result is satisfactory, as testified by calculations using experimental data. Consequently, this article is the continuation and development of our previous article; (2) Quantitative relationship also exists between the theory of step-wise equilibrium and Sips' adsorption equation (7) are entirely similar in form; (3) The experimental data of several systems have been calculated by means of equation (7) and curve fitting method. The result is that theory and experiment well coincide within the whole range of concentration. Finally, availing ourselves of the theory established in this article, we discussed the reasons for the deviations occurring in the literature regarding these systems. The theory established in this article is also applicable to the general aqueous solution systems similar to those discussed in this article.

KEY seawater, minor elements, equilibrium, ion exchange, adsorption, aqueous solution, thermodynamics

LANG English

NOTE See Note 15

19 AUTH Chen, Dengqin

AFFI Department of Marine Biology, Shandong College of Oceanology, Qingdao

DATE 1982

TITL A preliminary observation on the effect of vitamin C and Na_2SeO_3 on the formation of Tradescantia MCN in polluted seawater

CITA Journal of Shandong College of Oceanology 12, 55-56 (1982)

ABST Polluted sea water which could raise the amount of Tradescantia MCN was used in the experiment and different concentrations of vitamin C and Na_2SeO_3 were used to test the effect of these chemicals on the chromosomes. The results of the experiment showed that vitamin C and Na_2SeO_3 could reduce the formation of Tradescantia MCN in polluted sea water. This seems to mean that the two chemicals used could somehow protect the integrity of the chromosomes.

KEY vitamin, seawater, monitoring, pollution, biochemistry

LANG Chinese, English abstract

20 AUTH Chen, Guohua

AFFI Department of Chemistry, Shandong College of Oceanology, Qingdao

DATE 1980

TITL Determination of conductivity salinity of standard sea water of China

CITA Oceanologia et Limnologia Sinica 11, 115-120 (1980)

ABST This paper describes the determination of conductivity salinity of standard seawater of China. A comparison of conductivity salinity derived from the

International Oceanographic Tables, and chlorinity salinity, derived from the expression $S^{o}/_{oo}$ =1.80655 $Cl^{o}/_{oo}$ is presented in this paper.

KEY determination, conductivity, salinity, standard seawater, chlorinity

LANG Chinese, English abstract

21 AUTH Chen, Guohua; Wei, Zixing; Xue, Chuncai

AFFI Shandong College of Oceanology, Qingdao

DATE 1981

TITL Effect of the major constituents of sea water on conductance-salinity and specific gravity--A relationship of addition

CITA Oceanologia et Limnologia Sinica 12, 433-440 (1981)

ABST This paper investigates in detail the effect of main constituents of seawater on conductance-salinity and specific gravity. This effect of every electrolyte is nearly independent. When weight concentration of each electrolyte surpasses the "ideal" seawater concentration (ΔM_i), the total deviation of conductance-salinity and of specific gravity can be expressed respectively as follows: ($\Delta S^{o}/_{oo} = \Sigma A_i \Delta M_i$, $\Delta\sigma_t = \Sigma B_i \Delta M_i$). Where ($\Delta M_i$) is expressed in g/kg sea water; A_i and B_i are approximate constants of different electrolytes expressed in table 2. It is rather convenient to use these formulas to derive the anomaly of salinity and specific gravity of both deep sea water and estuarine water and the result is quite coordinate with those derived by the authors previously.

KEY seawater, salinity, specific gravity, conductivity, estuarine water

LANG Chinese, English abstract

22 AUTH Chen, Guohua; Wu, Baoren

AFFI Shandong College of Oceanology

DATE 1979

TITL A new portable electrode type salinometer

CITA Oceanologia et Limnologia Sinica 10, 142-151 (1979)

ABST This paper describes the principle of constructing a new portable salinometer of electrode type suitable for laboratory or on board use. Replaceable seawater is adopted for compensation of temperature. Based on the definition of conductivity salinity, the conductivity ratio (Rt) of sample is first read out directly through an improved alternating current bridge, which is relatively 35.000°/$_{oo}$ S. Before determination of salinity, the sample and standard seawater are not required to be equilibrated to room temperature. Therefore, it is readily available to operate on board and produces excellent result. In the meantime, the precision in measurement has remarkably increased. The range of salinity determination is 3-42°/$_{oo}$ S. While within the range of 8-42°/$_{oo}$ S, the sensitivity reaches about 0.0004°/$_{oo}$ S. Its reproducibility is + or - 0.001°/$_{oo}$ S. Over ordinary oceanic salinity, the error in standard sea water salinity is excluded, the accuracy is about + or - 0.003°/$_{oo}$ S.

KEY salinometer, temperature, seawater, conductivity, standard seawater

LANG Chinese, English abstract

23 AUTH Chen, Jiarong; Wu, Youyi; Huang, Shanggao; Yang, Jiadong; Zheng, Shu; Lin, Jiaqi

AFFI Xiamen Fisheries College, Xiamen (1,2); Third Institute of Oceanography, National Bureau of Oceanography, Xiamen (3,4,5,6)

DATE 1981

TITL Preliminary discussions on some problems of hydrochemical characteristics in the tidal estuaries

CITA Acta Oceanologica sinica 3, 233-246 (1981)

ABST According to the data observed on $Cl^{o}/_{oo}$, SO_4^{-2} AlK, Mg^{+2}, $Na^{+} + K^{+}$ (calculated value) as well as pH in the Jinjiang River Estuary for two years or so, the characteristics of the distribution and variation of the relative composition of major hydrochemical constituents in the tidal estuaries are discussed and summarized in present paper. The ratios of all the major constituents to chlorinity in the Jinjiang River Estuary is increasing with the mixing coefficient (y). The rate of increase in the ratio of each major constituent to chlorinity $\Delta(I/Cl)$ in the dry season is greater than that in the flood period. Since the values observed on the rate of increase in the ratio of each major constituent to chlorinity well agree with the values calculated by the formula $\Delta(I/Cl)=-((Cl_m - Cl)(Cl_m I_r - Cl_r I_m)/(Cl_m - Cl_r)I_m Cl$, which is derived from the mixing equation,it is concluded that the simple mechanical mixing of seawater with river water is a fundamental factor which influences the relative composition of the major constituents in the estuaries. The authors put forward the concept "critical chlorinity" (Cl_k) of the rate of increase of each major constituent to chlorinity, with which the extent of influence by river on the relative composition of the major constituents can be estimated quantitatively. Finally, according to the observed data of the chlorinity and salinity in the Jinjiang River Estuary, an empirical formula relating chlorinity to salinity $S= 0.032+1.807Cl$ has been derived, which can be used under various hydrographic conditions. The salinity equations of Knudsen or Wooster et al. can't be used under the Jinjiang River estuary conditions. However, if the allowed absolute deviation of the calculated salinity is enlarged to $\pm 0.04^{o}/_{oo}$, then Knudsen's equation can still be used. Even if the estuaries have excellent interchange with open sea water (or if the coastal waters are diluted

by river water), it is necessary to use a relevant equation relating salinity to chlorinity, because of the influence of river water on the estuary waters.

KEY pH, estuary, distribution, chlorinity, sulfate, alkalinity, magnesium, sodium, potassium, mixing, salinity, seawater, river water

LANG Chinese, English abstract

24 AUTH Chen, Ke-zao; Yang, Shao-Xiu; Zhen, Xi-Yu

AFFI The Qinghai Institute of Saline Lake, Academia Sinica

DATE ?

TITL The saline lakes on the Qinghai-Xizang Plateau

CITA Geological and Ecological Studies of Qinghai-Xizang Plateau 2, 1719-1724

ABST At present, in 123 saline lakes on the plateau more than 40 salt minerals are already discovered. Among them are lazurite, mirabilite, borate, sylvite, etc. which are all of commercial importance. In the saline lake brines, especially in the intercrystalline brines, are also enriched in potassium, magnesium, lithium, boron, rubidium, cesium, uranium and so on. In the following, a general description will be given of the plateau's saline lakes in connection with several subjects such as their two main periods of salt-formation, their zoning, their evolution as well as their material source since the Pliocene.

KEY brine, potassium, magnesium, lithium, boron, rubidium, cesium, uranium, resources, lake waters, salt lakes, interstitial water

LANG English

NOTE Chen Ke-zao is also known as Cheng Kezhao. Chinese version is published in Acta Geographic Sinica, 36, 13-21, 1981.

25 AUTH Chen, Lirong; Luan, Zuofeng; Zhen, Tiemin; Xu, Wenqiang; Dong, Tailu

AFFI Insititute of Oceanology, Academia Sinica, Qingdao

DATE 1980

TITL Mineral assemblages and their distribution patterns in the sediments of the gulf of Bohai Sea

CITA Oceanologia et Limnologia Sinica 11, 46-64 (1980)

ABST This paper presents the results of a study on the mineral assemblages and their distribution patterns in the sediments of the Gulf of Bohai Sea. The 212 bottom-surface sediment samples were collected from the Gulf of Bohai Sea and its tributaries. The 0.1-0.05mm fraction was analyzed. The results of our study showed that the sediments are made up of 43 mineral components. Analysis of the light minerals showed that plagioclase is the predominant component, quartz ranked the second in abundance, and orthoclase the third. A small amount of carbonate minerals and rock grains was also present. In the heavy minerals hornblende, epidote and ilmenite are the most abundant, and garnet, zircon and titanite placed the second. In addition, a small amount of leucoxene, muscovite, tremolite and magnetite placed the third. The remaining components were present in insignificant quantities. Sediments with high content of plagioclase, hornblende, muscovite and carbonate minerals contributed principally by the Huang He River (Yellow River) are distributed in the southern part of the Gulf of Bohai sea, while sediments with high content of orthoclase, magnetite, ilmenite, zircon and garnet are distributed in the northern part of the Gulf of Bohai sea. These minerals are contributed from different sources. For example, orthoclase are mainly derived from the Liao He River, while the other minerals are derived from the Luan He River, the Lugu River, the marine erosion of eastern coast of Liaodong Bay, and the Liaodong Bank. The investigated area may be divided into two mineral provinces and nine mineral subprovinces on the basis of their heavy and light mineral assemblages.

KEY sediments, Bohai, Yellow River, minerals, carbonates, quartz

LANG Chinese, English abstract

26 AUTH Chen, Lirong; Shi, Yingmin; Shen, Shunxi; Xu, Wenqiang; Li, Kunye

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL Glauconite in the sediments off the southern Fujian Province coast to the continental shelf of Taiwan Province

CITA Oceanologia et Limnologia Sinica 13, 35-47 (1982)

ABST Glauconite in 76 bottom samples from this region was studied. Most of glauconite is in the cavities of foraminiferal tests, ostracod shells, molluscal shells and bryozoan zooecial chambers, but some are found in varoius forms of pellets and booklets. Most grains are brown-green, some are black, a few of them are yellow-green and light yellow. Glauconite distributes chiefly in the southwestern part of the area investigated. The highest content of glauconite is 35% of the total sediment from the station 10 (116 degree 08'E 21 degree 28'N). Our research shows that the well-sorted foraminiferal sands (2-0.063mm) at a depth of 200-250m and with a bottom temperature of 14-18°C, a salinity of 34.534.7°/$_{oo}$, are favorable to the formation of galuconite as fillings of organisms. The parent materials of glauconite as fillings of organisms are micaceous clay fraction with a small amount of mineral fragments such as quartz. The light yellow glauconite is in the earliest stage glauconite as fillings of organisms.

KEY sediments, Taiwan Strait, shells, temperature, salinity, quartz, continental shelf, aluminum, iron, potassium, silicate, magnesium, sodium, phosphorus, foraminifera

LANG Chinese, English abstract

27 AUTH Chen, Qingmu; Liu, Yulan

AFFI Institute of Geochemistry, Academia Sinica, Qingdao

DATE 1982

TITL Environmental geochemistry of fluorine

CITA Annual Reports, Institute of Geochemistry, Academia Sinica (1980-1981), 106-107 (1982)

ABST Owing to climatic effects, surficial salts have undergone geochemical differentiation, thus leading to the concentration of F in various carbonate formations. The evolution of environmental geochemistry of fluorine shows a tendency to decrease from northwest to southeast in China, especially in underground water and soils. Our studies show that the distribution of fluorine and its concentration in various geological bodies are closely related to the distribution and occurrence of endemic F-poisoning disease, showing a tendency to decrease from west to east.

KEY geochemistry, fluorine, concentrations, carbonates, natural waters, climate

LANG Chinese, English abstract

28 AUTH Chen, Shihua; Wang, Yongyuan; Yang, Weixiang; Xiao, Yusheng; Teng, Wenfa

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1981

TITL The effect on uptake and loss of Co-60 of various concentrations by two marine unicellular algae

CITA Acta Ecologica Sinica 1, 209-214 (1981)

ABST The two species of phytoplankton used in this experiment were a diatom Phaeodactylum tricornutum Bohl and a green alga Chlorella vulgaris Beij. Both species took up Co-60. The concentration factor was constant with several activating concentrations in our experiments. However, there was a seasonal variation, probably due to difference in physiological states.

There was a clear correlation between the accumulation of Co-60 in the cell and the decrease of activity in the medium, which was in keeping with the increasing rate of phytoplankton population. The rate of loss in the two species of phytoplankton was not influenced by the difference in original concentration of the medium, but influenced by the length of time and population density. In addition to part of activity being lost to the medium, there was also a "biological dilution" in the unicellular algae.

KEY concentrations, algae, phytoplankton, diatom, seasonal variation, bioaccumulation, cobalt-60, enrichment, pollution, environment

LANG Chinese, English abstract

29 AUTH Chen, Shihua; Wang, Yongyuan; Yang, Weixiang; Xiao, Yusheng; Teng, Wenfa

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL The absorption and adsorption of Co-60 by two phytoplankton species with different amounts of carrier

CITA Oceanologia et Limnologia Sinica 13, 165-169 (1982)

ABST The phytoplankton used in this experiment are the diatom Phaeodactylum tricornutum Bohi and the green alga Chlorella vulgaris Beij. Both of the two species take up the Co-60 when concentrations of isotopic carrier in experimental media are more than that in natural sea water. Their concentration factors are, however, different. Under suitable temperature conditions, 20° + or - 2°C for Phaeodactylum, and 28° + or - 2°C for Chlorella, it was found that the lower the concentration of isotopic carrier, the lower the concentration factor. With the phytoplankton being boiled to death, this situation was reversed, that is, the higher the concentration of isotopic carrier, the lower their ability to adsorb Co-60. A comparison

between absorption (Fig. 1) and adsorption (Tab. 1) of the marine unicellular alga Phaeodactylum showed that in living cell the passive adsorption of Co-60 occurred first on the surface of cell wall, but as time went on, the active absorption became progressively predominating. But it is difficult to determine the exact difference quantitatively between adsorption and absorption.

KEY absorption, adsorption, phytoplankton, seawater, bioaccumulation, temperature, cobalt-60

LANG Chinese, English abstract

30 AUTH Chen, Shijun; Sun, Wenxin; Wang, Huatong

AFFI Department of Physical Oceanology and Marine Meteorology, Shandong College of Oceanology, Qingdao

DATE 1982

TITL Numerical modeling of the circulation and the pollutant dispersion in Jiaozhou Bay II. Computation of pollutant dispersion

CITA Journal of Shandong College of Oceanology 12, (1982)

ABST This paper is the further study of Reference (1). Based on Leendertse's model (2) and his numerical method with the input data of tidal constituents M_2 and S_2 at the Bay mouth. Reference (1) has shown us the computation of the tidal wave and the distribution of tidal heights, hours and residual currents in Jiaozhou Bay. In this paper, in addition to the re-calculated tidal regime and new obtained results of tides, we lay special emphasis on the modeling of pollutant concentration in the domain of interest by applying Leendertse's improved implicit method. With the given conditions of continuous quantities of 17 point sewage discharge sources, the concentrations of pollutant in the Bay are computed. The results obtained are analysed and compared with the field observations and then a preliminary prediction of pollutant dispersion in Jiaozhou Bay is provided.

KEY modeling, circulation, Jiaozhou Bay, pollution

LANG Chinese, English abstract

31 AUTH Chen, Song; Liao, Wenzhuo; Xu, Xibin

AFFI Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE 1982

TITL A kinetic study of the extraction of uranium from seawater by hydrous titanium oxide-measurement of the activation energy of adsorption

CITA Acta Oceanologica Sinica 1, 210-213 (1982)

ABST The measurement of the activation energy is an important part of the kinetic study of uranium-uptaking on Hydrous Titanium Oxide (HTO) from sea water. But the kinetic problem of this process still remains in the exploratory stage, and its measurement of adsorption activation energy is difficult due to the complexity of sea water system and its low level of uranium concentration (3 μg U/l). In this paper we propose a method of measurement of adsorption activation energy which is a simple approximation and can be directly applicable to natural sea water, according to Langmuir's theory with some simplified treatment.

KEY extraction, uranium, activation energy, adsorption, hydrous titanium oxide, kinetics, marine resources, seawater

LANG English

NOTE Xu Xibin is also spelled Xu Xiben

32 AUTH Chen, Song; Liao, Wenzhuo; Huang, Xuanbao; Tang, Jinlong

AFFI Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE 1980

TITL The structures of hydrous titanium oxide and its property of extraction of uranium from sea water

CITA Acta Oceanologia Sinica 2, 57-66 (1980)

ABST The structures and surface properties of hydrous titanium oxide prepared at different conditions are determined and their properties of extraction of uranium from sea water are compared. The results are given as follows: (1) The structure of hydrous titanium oxide is that of anatase crystallite, its particles size lies between 10-10(E+3)angstrom , and its empirical chemical formula can be expressed as $TiO_{2-y}(OH)_{2y}\ xH_2O$ (y<1). (2) The properties of extraction of uranium by hydrous titanium oxide are closely related to their surface properties and the conditions and the regions of steep change correspond to pH 4-6 at the end of prepartion. The mechanism of formation of pore structure of hydrous titanium oxide and its effects on the property of extraction of uranium are explained theoretically.

KEY hydrous titanium oxide, extraction, uranium, seawater, surface, mechanism, pH, marine resources

LANG Chinese, English abstract.

33 AUTH Chen, Song; Liao, Wenzhuo; Huang, Xuanbao; Tang, Jinlong

AFFI Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE 1982

TITL The structure of hydrous titanium oxide and its properties of extraction of uranium from seawater

CITA Acta Oceanologica Sinica 1, 77-81 (1982)

ABST Hydrous titanium oxide (HTO) is a better inorganic absorbent for the extraction of uranium from sea water. Although its structure has been proposed by some authors, little attention has been paid to the relation between the structure and the property of uranium-uptaking. Some relevant articles only concentrated their efforts on the interior structure

and little was given to the investigation of its surface properties which play an important part in the property of uranium-uptaking.

KEY hydrous titanium oxide, extraction, uranium, seawater, surface, absorption, marine resources

LANG English

34 AUTH Chen, Song; Liao, Wenzhuo; Pan, Jiezai; Xu, Aiyu; Zhuang, Guoshun; Xu, Jianzhong

AFFI Third Institute of Oceanography, National Bureau of Oceanography, Xiamen, China

DATE 1983

TITL The sedimentation mechanism of Pb, Cu and Cd in Changjiang Estuary

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise abstract, 37 (1983)

ABST Investigations of Changjiang Estuary preliminarily show that the sedimentation mechanism of Pb and Cu is mainly controlled by the adsorption-desorption and deposition-solution processes of hydrous ferric oxide (HFO) and organic matter, while Cd is probably controlled by the deposition-solution process of CdS. The order of the adsorption is Pb >= Cu > Cd. The chemical behavior of Pb is quite similar to that of Cu in the sediment. The simulation experiments for the adsorption of Pb, Cu and Cd on synthetic HFO have been carried out. The thermodynamic and kinetic patterns were proposed, and the maximum adsorption capacity, the equilibrium constant as well as the rate constant and the activation energy for each element were measured. The simulation experimental results were identical with that of the field investigation, which were further quantified. It was concluded that the adsorption of Pb and Cu on HFO are mainly chemical, whereas it was mainly ion-exchange in the case of Cd.

KEY Changjiang, estuary, adsorption, organic matter, equilibrium constant, rate constant, ion-exchange, lead, copper, cadmium, thermodynamics, kinetics, activation energy

LANG Chinese, English abstract

NOTE abstract only

35 AUTH Chen, Song; Liao, Wenzhuo; Xu, Xiben

AFFI Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE 1981

TITL A kinetic study of the extraction of uranium from sea water by titanic gel I. Measurement of the activation energy of adsorption - A method directly used for natural sea water.

CITA Acta Oceanologica Sinica 3, 79-85 (1981)

ABST Some previous works and our experimental data have shown that the adsorption process of uranium on the titanic gel in sea water could be treated by using *Langmuir's theory of monolayer adsorption.* A method for determining the activation energy of adsorption is proposed on the basis of this theory with some simplifying assumptions in connection with the characteristics of the adsorption process, low velocity of adsorption, long time to reach equilibrium, and low percentage extraction. By use of this method, the activation energy of uranium adsorbed on the titanic gelin the natural sea water has been determined and found to be about 10 kcal/mol. The essential point of this method is that, after a given short time of adsorption t, the adsorption capacity X is proportional to the adsorption velocity constant K, for different temperatures, and related to the Arrhenius equation: $\log K_1 = -(E/2.303R)(1/T) + B$, $\log X = -(E/2.303R)(1/T) + B'$. These equations can be used for the determination of the activation energy of adsorption from the adsorption capacity X after a

definite short time of contact with sea water, thus enabling us to determine the activation energy of the adsorption process. It seems that this simple and useful method can be extended to the measurement of activation energy of adsorption of some other micro-elements in sea water.

KEY kinetics, extraction, uranium, seawater, titanic gel, activation energy, adsorption, equilibrium, temperature, Arrhenius equation, adsorption, capacity, marine resources

LANG Chinese,Engish abstract.

NOTE Xu Xiben is also spelled Xu Xibin

36 AUTH Chen, Song; Liao, Wenzhuo; Huang, Xuanbao; Tang, Jinlong

AFFI Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE 1981

TITL A kinetic study of the extraction of uranium from seawater by titanic gel II. Deduction of the adsorption mechanism.

CITA Acta Oceanologica Sinica 3, 571-578 (1981)

ABST Mainly based upon the effects of the surrounding conditions (temperature, pH value and concentration of HCO_3^- of sea water on extraction of uranium by titanic gel, together with the calculations on the related thermodynamic equilibriums, it is considered that there exist the following eqilibriums in the seawater: $UO_2(CO_3)_3^{-4} + mH_2O = UO_2(OH)m^{2-m} + mHCO_3^- + (3-m)CO_3^{-2}$ (m=1,2,3) and it is proposed that the mechanism of the adsorption of uranium from sea water by titanic gel may be a cationic coordination exchange as follows: $RTi_X(OH)_Z + UO_2(OH)_m^{2-m} = RTi_X(OH)_{Z-i}O_i \cdot UO_2(OH)_{(m-i)}$ (i=0,1,2; m=0,1,2,3) and it is more probable that there is a process of chelation exchange. (1) The experiment shows that the adsorption capacity (referring to the adsorption of the first stage) of

uranium on the titanic gel increases with a rise in temperature, and the activation energy determined is about 10kcal/mol. It shows that this adsorption process is mainly chemical. (2) The adsorption capacity of uranium decreases rapidly with an increasing concentration of HCO_3^-. (3) On the curve of adsorption capacity of uranium related to the pH of sea water, there is a maximum at pH=5.

KEY kinetics, extraction, uranium, seawater, titanic gel, adsorption, mechanism, temperatures, pH, bicarbonate , equilibrium, mechanism, chelation, marine resources

LANG Chinese, English abstract.

37 AUTH Chen, Song; Xu, Aiyu; Huang, Xuanbao; Xu, Jianzhong; Tian, Chunlan

AFFI Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE 1982

TITL A kinetic study of extraction of uranium from sea water by titanium gel III. The diffusion mechanism of exchange process.

CITA Acta Oceanologica Sinica 4, 175-182 (1982)

ABST The diffusion kinetics of the ion exchange process of uranium[VI] on hydrous titanium oxide in two systems of uranium enriched seawater and one system of natural seawater has been studied according to Boyd's theory. The results show that, though there is a great difference in uranium concentration, similar characteristics in kinetics have been found among these three systems and the rate of the exchange process is mainly controlled by particle diffusion. The results obtained can be further explained by the following facts: 1. The exchange fraction--time curve shows that the adsorption rate is comparatively high for a short time at the beginning and then drops to a slower rate. The faster rate corresponds to surface adsorption and the slower rate corresponds to

diffusion in the particle, which is characteristic of particle diffusion. 2. The exchange rate increases demonstrably with the decreasing of the particle size which is also an important property of particle diffusion. 3. The exchange rate increases obviously with the pore diameter of hydrous titanium oxide as a direct result of particle diffusion. 4. The surface structure of hydrous titanium oxide with a big surface area and small pore and its adsorption property of slower rate and longer equilibrium time shows that the results obtained is reasonable. 5. The exchange process may be more complex in the natural seawater system. The chemical action may play a certain part in the process which indicates the start of a step jointly controlled by particle diffusion and chemical action. A three-step model for the uranium-uptaking process has been proposed.

KEY kinetics, extraction, uranium, seawater, titanic gel, diffusion, mechanism, ion-exchange, hydrous titanium oxide, concentrations, particle size, pore diameter, surface area, equilibrium, marine resources

LANG Chinese, English abstract.

38 AUTH Chen, Yecai; Wan, Guojiong; Chen, Qingmu; Cao, Yeqing

AFFI Institute of Geochemistry, Academia Sinica, Qingdao

DATE 1982

TITL Environmental geochemical characteristics of the Beijing-Tianjin-Bohai Bay area

CITA Annual Reports Institute of Geochemistry, Academia Sinica (1980-1981), 110-111 (1982)

ABST This paper deals with the migration ability of some typical elements in rocks, soils and off-shore sediments, the variation of F/Cl ratios for various soils, and the morphological features and transport regularities for wind, sand and dust in this region. Based on the results from the study of purification

and accumulation of pollutants a mathematical model has been established. In addition, a calculation method, together with a new concept of annual capacity has been presented as well.

KEY Bohai, sediments, wind, fluorine, chlorine, pollution

LANG Chinese, English abstract

39 AUTH Chen, Youming

AFFI Institute of Geology, Academia Sinica, Beijing

DATE 1982

TITL Experimental studies on the system of Ca^{+2} - Mg^{+2} - HCO_3^- - H_2O at an atmospheric temperature and pressure

CITA Collected Oceanic Works 5, 81-99 (1982)

ABST This paper is addressed to the influence of the Mg^{+2} concentration (Mg^{+2}/Ca^{+2} mole ratio), temperature (6-35°C) and the amount of NaCl added into the system on the carbonate mineral composition and the the Mg^{+2} content entering calcite lattice. A series of Mg-calcites with a range of Mg^{+2} contents were obtained in laboratory. Of them a Mg-calcite containing 66 mole % of $MgCO_3$ has been synthesized at atmospheric temperature and pressure.

KEY temperatures, carbonates, compositions, calcite, lattice, magnesium, calcium, sodium-chloride

LANG English

40 AUTH Chen, Youming; Wang, Xiulan; Sha, Qingan; Zhang, Naixian

DATE 1979

TITL Experimental studies on the system of Ca^{2+} -Mg^{2+} -HCO_3^- -H_2O at room temperature and pressure

CITA Scientia Geologica Sinica 1, 22-36 (1979)

ABST In order to correctly recognize the genesis of calcium-magnesium carbonate sediments, the authors of this paper have carried out experimental studies on the system Ca^{2+} -Mg^{2+} -HCO_3^- -H_2O at room temperature

(6-35 degree C) and pressure. The conclusions obtained are given as follows: 1. According to the rate of precipitation of materials in solid phase from solution and the kinetics of every experimental system, the mechanism of the formation of calcium-magnesium carbonate minerals has been studied. It has been found that, in the system with additional NaCl, the rate of precipitation of both magnesian-calcite and aragonite decreases rapidly with increase of the concentration of Mg^{+2} ions in the solution. It is apparent that the Mg^{+2} existing in solution inhibites not only the formation of magnesian-calcite but also the precipitation of aragonite. However, the inhibiting effect of Mg^{2+} on the precipitation of the magnesian-calcite is greater than that on the precipitation of aragonite. In the system with 13% additional NaCl, even though the molar ratio of Mg/Ca in the solution reaches 40, the rate of precipitation of the magnesian-calcite is still greater than that of aragonite. In the system without additional NaCl, the precipitation of aragonite is also inhibited when the concentration of Mg in the solution has been raised to a certain extent (molar ratio of Mg/Ca = 20). 2. It is well known that increase in temperature of the solution favours the precipitation of $CaCO_3$ in the form of aragonite. According to our experimental data, in the system without Mg or with low concentration of Mg this conclusion is correct. It is interesting to point out that, in the system with a higher molar ratio of Mg/Ca (more than 10) and additional NaCl, increase in temperature in the range from 6 degree C to 35 degree C favours the precipitation of magnesian-calcite rather than that of aragonite. On the contrary, low temperature promotes the formation of aragonite, accompanied by the precipitation of a lesser amount of monohydrocalcite ($CaCO_3 \cdot H_2O$). It is of theoretical

importance to recognize the temperature conditions that favoured the formation of the ancient calcium-magnesium carbonate sediments. 3. A series of magnesian-calcite with different content of Mg has been synthesized. The amount of Mg entering calcite lattice bears close relation with the temperature and the Mg /Ca ratio in solution from which the magnesian-calcite has been precipitated. The amount of Mg entering calcite lattice increases with increase both in temperature and in molar ratio of Mg /Ca in solution. In the system with or without additional NaCl, the amount of Mg entering calcite lattice was relatively slight. However, in the system with higher Mg /Ca ratio, the addition of NaCl can significantly promote the formation of magnesian-calcite. Magnesian-calcite containing 66 mole % of $MgCO_3$ has been synthesized by the authors. 4. Recent marine carbonate sediments are composed principally of aragonite with a lesser amount of magnesian-calcite. On the other hand, the greater part of recent fresh-water carbonate sediments is formed by calcite. On the continent, aragonite deposits are formed only in regions adjacent to hot springs. According to the experimental data, reasonable interpretation for the geological occurrence of these carbonate minerals may be given. In the system lacking Mg or with low Mg /Ca ratio, without additional NaCl (analogous to fresh water on continent), only calcite or low-magnesian calcite was precipitated; in contrast, in the system with additional NaCl (analogous to sea water) when the molar ratio of Mg /Ca in the system is equal to 5, the rate of the precipitation of aragonite is maximum. At present, the average value of the molar ratio of Mg /Ca in sea water is 5.05

KEY magnesium, sediments, temperature, rate, precipitation, kinetics, mechanism, calcite, aragonite, lattice, hot spring, seawater, sodium chloride, calcium carbonate, magnesium carbonate, dolomite, bicarbonate, X-ray diffraction, fresh water

LANG Chinese, English abstract

41 AUTH Chen, Yuwei; Liu, Juying; Zhao, Yiyang; Qiu, Jiangan

AFFI Institute of Geochemistry, Academia Sinica (1, 2); Institute of Oceanography, Academia Sinica (3, 4)

DATE 1982

TITL Study of the distribution pattern of Ra-226 in sediments of the East China Sea and the rates of coastal sedimentation

CITA Annual Reports Institute of Geochemistry, Academia Sinica (1980-1981), 34-36 (1982)

ABST Knowledge of the distribution of Ra-226 in sea sediments is not only crucial to the understanding of its geochemical behavior in the oceanic environment, but also important in the use of Ra-226 as a natural tracer in geochemical study. In principle Ra-226-method can be used to measure accumulation rates on the order of magnitude of centimeters per thousand years, which is applicable to shelf sediments of the East China Sea. Sediment samples were collected during 1973-1978 in the range from 26 degree 23' to 32 degree N and off shore to 129 degree E. 51 samples from two vertical profiles were also taken from the stations of Core D-427(123 degree E, 30 degree N) and Core D-489 (122 degree 30'E, 29 degree N). Ra-226 as well as U. Th, Fe, Mn, Ti, P, Cu, Ni, Zn, B, Zr, REE, and organic carbon conentrations in these samples were analyzed. Primary results are outlined as follows: (1) The mean concentration of Ra-226 in sediments of the East China Sea is 4.1 * E-13 g/g, which can be compared with most of the

values from continental rocks. (2) Ra-226 shows a zonal distribution along the coastal area, where the Ra-226 concentration is higher along the intra-shelf shore and decreases offward, with the highest value occurring in the Chong Sheng trench. This distribution pattern can be attributed to the type of sediments, the dynamic system of seawater medium and the biological process. (3) A drastic exponential decrease of the Ra-226 concentration has been found in the upper 100 cm of the vertical profile. The maximum concentration of Ra-226 is found in the surface samples, which can be considered to be the excess Ra-226. On the basis of the results, the calculated rates of coastal sedimentation are 36 cm/1,000yr for Core D-427 and 25 cm/1,000yr for Core D-489 respectively, averaging 30 cm/ 1,000 yr.

KEY sediments, East China Sea, seawater, radium-226, sedimentation rates, uranium, thorium, iron, manganese, titanium, phosphorus, copper, nickel, zinc, boron, zirconium, rare earth elements, organic matter

LANG Chinese, English abstract

42 AUTH Chen, Yuwei; Wang, Xianjue; Wu, Mingqing, Zhao, Yiyang

AFFI Institute of Geochemistry, Academia Sinica, Qingdao, China (1, 2, 3); Institute of Oceanology, Academia Sinica, Qingdao, China (4)

DATE 1983

TITL Geochemistry of trace and rare-earth elements and the material source of sediments in the East China Sea

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise Abstract, 145-146 (1983)

ABST The average contents of Li, Rb, Cs, Ba, Sr, Cu, Co, Ni, Ti, Re, U, Th and Ra in different types of sediments in East China Sea are presented. The higher

content of Sr (Ba) in the sediments is caused by biogeochemical effect of shells (aragonite) and foraminifera (calcite). The various crystal structures of $CaCO_3$ have different selectivities in respect to Ba and Sr. According to the different kinds of figures and lanthanide patterns, two sediment types may be recognized in the East China Sea, i.e., continental shelf type and Okinawa trench type. The material of the first type comes from the continental crust and that of the second comes from both the continental crust and the oceanic crust, actually belonging to transitional type with the material of continental crust in dominance.

KEY sediments, East China Sea, shells, aragonite, foraminifera, calcite, trace metals, lithium, rubidium, cesium, barium, strontium, copper, cobalt, nickel, titanium, uranium, thorium, cadmium, rhenium, radium, continental shelf

LANG Chinese, English abstract

NOTE abstract only

43 AUTH Chen, Yuwei; Zhao, Yiyang; Liu, Juying; Qiu, Jiangen

AFFI Institute of Geochemistry, Academia Sinica, Guiyang, Guizhou (1,2); Institute of Oceanology, Academia Sinica, Qingdao (3,4)

DATE 1982

TITL Distribution characteristics of Ra-226 in sediments of the East China Sea and determination of sedimentation rate in near-shore region

CITA Oceanologia et Limnologia Sinica 13, 380-387 (1982)

ABST Geochemistry of Ra-226 in sediments of the East China Sea has been studied for the first time. The following four conclusions were drawn from our study: (1) Contents of Ra-226 have been determined in 51 samples from the area of study, ranging from 0.6 to 13.5x10(E-13) g/g, with an average of 4.1x10(E-13) g/g

(on a $CaCO_3$ free basis, Ra-226=-4.6 10(E-13) g/g). It is in good agreement with the "normal" abundance of Ra-226 in sediments from many epicontinental seas. The variations of Ra-226 contents follow the law of grain-size control of elements, i.e. Ra-226 concentrations increase gradually with the decrease of grain size of sediments. Ra-226 abundance appr. ates to that of the terrestrial rock, soil and Earth rust, but differs from that of the deep-sea clay nd Pacific clay thus indicating the philo-continental property of the chemical elements on the continental shelf. (2) The area distributions of Ra-226 show a zonal pattern along the coast, i.e. Ra-226 distributions are belt shaped and parallel with the coastline. The distribution patterns are: high Ra-226 content is found in the inner shelf, low Ra-226 content in the outer shelf and the highest Ra-226 content in the trough. The chief factors controlling the distributions are the sediment distribution, water medium environment, hydrodynamic condition and biological process. (3) Ra-226 contributed by the chemical and biological processes is not dominant in shelf sediments, whereas that derived from adsorption by clay minerals and iron manganese hydroxides and from biological processes in the trough is. It is this mechanism that leads to the presence of the "excess" Ra-226. (4) We have studied 2 sediment cores from the nearshore region. Ra-226 geochronology was used to estimate the rate of sedimentation. The average sedimentation rate is calculated to be 30 cm per 1000 years. It is very similar to that determined by other methods.

KEY distribution, East China Sea, sediments, sedimentation rates, continental shelf, adsorption, clay minerals, radium, radium-226

LANG Chinese, English abstract

44 AUTH Chen, Zexia; Zeng, Xiushan

AFFI Third Institute of Oceanography, National Bureau of Oceanography, Xiamen, China

DATE 1983

TITL Mechanisms of iron and manganese transport in Changjiang River plume

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise Abstract, 39 (1983)

ABST Samples collected from Changjiang River plume were analyzed to separate the Fe, Mn and Al into the following fractions in dissolved, potential reactive particulate (0.5N HCl leachable) and lattice-held particulate phases. The Dissolved Transport Indexes of Fe, Mn and Al in Changjiang River were 0.2%, 0.3% and 0.07%, respectively. In the SPM and surficial bottom sediments of Changjiang River plume, 16-18% of Fe, 64-70% of Mn and only 5% of Al were in potential reactive phase. The Fe and Mn in SPM transported by Changjiang River could come from the weathering products of the crust rocks under stable state, without additional sources. Ca. 30% of dissolved Fe was removed during mixing fresh water with sea water, while dissolved Mn was added in the solution by a factor of 2.

KEY iron, manganese, Changjiang, sediments, aluminum, river water, seawater, particulates

LANG Chinese, English abstract

NOTE abstract only, Chen, Zexia was formerly spelled as Chen, Ze-hsia

45 AUTH Chen, Zexia; Zhuang, Donghua; Xu, Musi; Wu, Yuduan; Li, Faxi

AFFI The Third Institute of Oceanography, National Bureau of Oceanography, Xiamen (1,2,3); Department of Oceanography, Xiamen University, Xiamen (4,5)

DATE 1979

TITL Physico-chemical processes of silicates in the estuarial region III. Preliminary in situ studies of the mechanism of reactive silicate removal in the estuarial region-The distribution of suspended Si, Fe, and Al

CITA Acta Oceanologia Sinica 1, 219-226 (1979)

ABST In situ observations were conducted to verify the mechanism and geochemical pattern proposed previously by the authors. Series of samples of suspended matter in estuarine waters were collected along Jiulong River, Fujian. The part which can be dissolved by hot 0.48N HCl was considered as the "authigenic" inorganic silicate constituent of the suspended matter, and the filtrates were analyzed for reactive silicate, Fe and Al. The part of the residue which can be further dissolved by concentrated HNO_3 and then by 0.48N HCl was analyzed for reactive silicate and considered as the organic Si content of the suspended matter. It is assumed that the "authigenic" inorganic silica comes from the inorganic chemical removal of the reactive silicate from the water phase. It was found that: (1) The upper layers of the estuarine water contained more "authigenic" inorganic silica than the bottom layers, which supports the above assumption. (2)the organic Si contents of the suspended matter was (relatively) lower than the "authigenic" inorganic Si contents (about 1:4), indicating a lower extent of biological uptake than of inorganic removal. (3) The sum of the suspended "authigenic" inorganic silicate, suspended organic Si, and the dissolved reactive silicate per liter showed a fairly linear relationship with chlorinity as that of a theoretical conservative dilution curve. (4) The atom ratios of Si/Fe and Si/Al of the "authigenic" inorganic portion of the suspended matter for all the samples taken had values remarkably

around 1.0, a simple integer, which gives support to the geochemical pattern that certain kinds of chemical transformation may have taken place.

KEY mechanism, silicate, distribution, river, suspended matter, authigenic, estuarine water, chlorinity, iron, aluminum, geochemistry, organic silicate, estuary, rivers

LANG Chinese, English abstract

NOTE Chen, Zexia was formerly spelled Chen, Ze-hsia, Li, Faxi was formerly spelled Li, Fa-si; Wu, Yuduan was formerly spelled Wu, Yu-duan; Zhuang, Donghua is also spelled Zhuang, Dongfa

46 AUTH Chen Zongliang; Hsu Zhenquan; Yang Shulang

AFFI Institute of Environmental Chemistry, Academia Sinica

DATE 1983

TITL Airborn particles and benzene soluble organic compounds in Beijing-Tienjin area.

CITA Academia Sinica, 33-35

ABST This paper reports on the major organic components of airborne particles and the possible pollution sources in the Beijing-Tienjin area. In addition to metal oxidates and specific amounts of elemental carbon, the composition of airborne particles in this area includes sulfates, nitrates, high amounts of hydrocarbons and organic materials. The benzene-soluble organic compounds make 9.3 ± 3% and 7.5 ± 3.7% of the total particles in Beijing and Tienjin, respectively. In the city, the major pollution sources are from production and other human activities.

KEY sulfate, nitrate, hydrocarbons, organic matter, pollution, aerosol

LANG Chinese

47 AUTH Cheng, Bo

AFFI The First Institute of Oceanography, National Bureau of Oceanography, Qingdao

DATE 1981

TITL The iron and manganese in the sediments from the west of the center Pacific

CITA Transactions of Oceanology and Limnology, 33-38 (1981)

ABST The regional distributions, the evolutionary rules, the transported forms and the influeuce factors etc. of both iron and manganese in the surface sediment and the core C2032 from the west of the Center Pacific are studied. The origins of both iron and manganese are discussed. Author proposed to use the coloured characteristic of both iron and manganese and roughly estimated a higher or lower of the iron and manganese contents in the various deep-sea sediments. Author indicated that the iron-manganese nodules to be used economically could be formed in process of the deposition, and that it is necessary to study the deposition of both iron and manganese by a synthetic analysis for the various factors.

KEY iron, manganese, sediments, Pacific Ocean, distribution, manganese nodules, marine resources

LANG Chinese, English abstract

48 AUTH Cheng, Guodong; Qian, Jiangchu

AFFI Institute of Marine Geology, Ministry of Geology and Mineral Resources, China (1); Second Institute of Oceanographhy, National Bureau of Oceanography, Hangzhou, China (2)

DATE 1983

TITL Structural and textural characteristics of the recent sediments of the Changjiang River mouth and adjacent continental shelf

CITA International symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise Abstract, 87-88, (1983)

ABST The structure and texture of the recent sediments of the Changjiang River mouth and adjacent continental shelf are controlled by the accumulation rate and mixing intensity. Obvious stratified structure is formed while the accumulation rate is high and the intensity of mixing is week. Otherwise they are homogeneous. Based on the analysese of Pb-210 and Th-234, X-ray photographs and subbottom seismic profiles, the sedimentary structures in this area can be divided into four types: I. Horizontal stratified structures. This type of structures occur mainly in the region of modern subaqueous delta of Changjiang River where the accumulation rate is high and the physical mixing is week. II. Homogeneous structures. These structures are developed in the early subaqueous delta region of Changjiang River where accumulation is not present and the biological mixing is strong. III. Irregular bedding structures. These structures occur on the adjacent continental shelf of the delta where the accumulation rate is very low and the physical mixing is strong. IV. Mottled structures. These structures are developed in the shallow sea region to the south of the Chejudo under the condition of low accumulation rate and medium biological mixing.

KEY sediments, Changjiang, lead-210, thorium-234, East China Sea, continental shelf, bioturbation, sedimentation rate

LANG Chinese, English abstract

NOTE abstract only

49 AUTH Cheng, Kezhao; Yang, Zhaoxiu; Zheng, Xiui

AFFI Qinghai Institute of Salt Lake, Academia Sinica, Xining

DATE 1981

TITL The salt lakes on the Qinghai-Xizang Plateau

CITA Acta Geographica Sinica 36, 13-21 (1981)

ABST The salt lakes are well developed on the Qinghai-Xizang plateau. From the Pliocene period up to the present, there have been two periods of mineralization. The first one took place in the Pliocene period, in which the minerals, such as gypsum, glauber salt and halite were major products. The second period took place from the late Pleistocene up to the present, during which boron, lithium, potassium were highly concentrated--one of the most significant characteristics of this period. The saline lakes on the Qinghai-Xizang Plateau can be classfied into two zones: the sulfate-chloride type, zones in Qaidam Basin and conbonate-sulfate type zones in northern Xizang. Some of the saline lakes in this district developed on the basis of the Neogene fossil lakes, while others are newly grown in the Quaternary. Most of them are tectonic lakes. Rocks and hot springs are the main sources of the saline lake mineral.

KEY lakes, halite, gypsum, boron, lithium, potassium, sulfate, chloride, hot spring, lake waters, carbonates, resources, salt lakes, Pleistocene

LANG Chinese, English abstract

NOTE Cheng Kezhao is also known as Chen Kezao. Zheng Xiui is also spelled Zheng Xiyu. English version was published in Geological and Ecological Studies of Qinghai- Xizang plateau, 2, 1719-1724.

50 AUTH Chi, Ming-hou; Pu, Shuzhu; Cao, Wenda; Zhang, Jinzhi

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1976

TITL Seasonal variations in the contents of various states of amino acids in Laminaria japonica Aresch

CITA Studia Marina Sinica, 7-23 (1976)

ABST Seasonal variations in the N contents in two breeds of Laminaria japonica Aresch, the common cultivated breed and the Haiqing No. 1 collected in 1962 and 1963, were studied,and the results were discussed in connection with the hydrochemical factors.

KEY amino acids, marine resources, marine organisms

LANG Chinese, English abstract

NOTE Chi Ming-hou is now spelled Ji Minghou

51 AUTH Chin, Yun-Shan

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1979

TITL A study on sediment and mineral compositions of the sea floor of the East China Sea

CITA Oceanic Selections 2, 130-142 (1979)

ABST The investigation of marine geology of East China Sea has been increasing since 60's. The earlier published studies concerning the sedimentation of East China Sea floor are those by F. P. Shepard, H. Niino, K. O. Emery and the author of this paper. The sedimentation was described in detail in these studies, but the mineral compositions of the sediments were only generally investigated by them.

KEY minerals, compositions, East China Sea, marine geology, sedimentation, sediments, geochemistry

LANG English

NOTE Chin Yun-Shan is now spelled Qin Yunshan

52 AUTH Chin, Yun-Shan; Liao, Sian-Kui

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1962

TITL Preliminary investigation of the bottom sedimentation in the Bohai Bay

CITA Oceanologia et Limnologia Sinica 4, 199-207 (1962)

ABST The bottem sediments in the Bohai Bay, their transportation and composition were investigated.

KEY Bohai, sediments, transport, compositions, organic matter, nitrogen, phosphorus, calcium carbonate, iron, particle size

LANG Chinese, Russian abstract

NOTE See note 51

53 AUTH Chou, Kuo-chih

AFFI Department of Physical Chemistry, Peking Institute of Iron and Steel Technology, Peking

DATE 1978

TITL Activities on boundaries of two-phase region in ternary systems

CITA Scientia Sinica 21, 601-612 (1978)

ABST A new formula is presented for calculating the activities on the boundaries of a two-phase region of various kinds in a ternary system. The application of ϕ function has overcome the difficulties encountered in graphical integration in the two-phase region.

KEY thermodynamics, activity

LANG English

NOTE Chou Kuo-chih is now spelled Zhou Guozhi.

54 AUTH Chow, Chia-yi

AFFI Department of Oceanological Chemistry, Shantung College of Oceanology

DATE 1963

TITL The determination of heavy water content in bittern

CITA Oceanologia et Limnologia Sinica 5, 11-17 (1963)

ABST 1. The deuterium contents of two bittern samples obtained from Chiaochou Bay in Tsingtao Locality and Kwangchou Bay in Chenkiang Locality were determined by float method. Sp. gr. of Shantung sample is 1.240 (28.0 degree Be) and that of Kwangtung sample is 1.260 (29.7 degree Be). A sample from Yellow Sea was chosen as a standard for comparison. All determinations were carried out after normalization of O-18 in the sample by means of CO_2-$NaHCO_3$ equilibrium method. In

experiments employing a stream-lined spindle-shaped float and setting the observation region of floating in the middle portion of liquid column, therefore, a larger range of linear relation between temperature and velocity (rising or falling) of float is obtained, that is, temperature range is + or -0.33 degree C and the velocity range is + or -0.26mm/sec. 2. Determined results show that the density of Shantung bittern sample (28 degree Be) is 4.208 γ higher than that of standard sea water sample, that is, the D content of Shantung bittern is 0.0037 mole % D_2O higher than that of the standard (Corresponding to 24.03% of D contant of standard sea water sample), the density of Kwangtung bittern sample (29.7 degree Be) is 6.250γ higher than that of standard, that is, the D content of Kwangtung bittern is 0.0058 mole % D_2O higher than that of the standard (Corresponding to 37.66% of D content of standard sea water sample). The max. experimental error is ± 0.6γ. 3. Comparing the determined results of these two samples from Shantung and Kwangtung we can see that the Kwangtung sample is more abundant in heavy water content (through degree Be of two samples are not entirely the same, the density difference is still apparent). This agrees with the expected results caused by the evaporation diffference which is due to the latitudinal difference between the two localities (Chenkiang situated at 21 degree north latitude and Tsingtao at 36 degree north latitude). 4. The density difference between sample water and standard water shows that after solar evaporation of sea water and salting out of sodium chloride the D content in bittern is concentrated as expected. Thus, highly concentrated bittern may be used as raw material for production of heavy water--a valuable information for the comprehensive utilization of sea water and bittern.

KEY determination, heavy water, deuterium, Yellow Sea, density, seawater, salting out, oxygen-18, marine resources

LANG Chinese, English abstract

NOTE Chow Chia-yi is now spelled Zhou Jiayi

55 AUTH Chu, S.P.; Wang, Y.

AFFI National Hwanghai Fisheries Research Institute, Qingdao

DATE 1960

TITL Some morphological features of the basin of, and the physical, chemical, and biological properties of the water in the southeastern part of the lake Weishan adjacent to the island Hwangshan

CITA Oceanologia et Limnologia Sinica 3, 61-85 (1960)

ABST The morphological features of the basin of, and the physical, chemical and biological properties of the water in lake Weishan were investigated, measurements included temperature, turbidity, oxygen, phosphate, silicate, nitrate, alkalinity, pH, iron, calcium and biological oxygen demand. Phytoplankton, zooplankton, benthos, and fish samples were also collected.

KEY lakes, lake waters, rivers, phosphate, nitrate, silicate, calcium, iron, turbidity, temperatures, nutrients, pH, alkalinity, organic matter, phytoplankton, oxygen, photosynthesis, algae, zooplankton, fish

LANG Chinese, English abstract

56 AUTH Chu, S.P.; Yang, K.C.

DATE 1959

TITL On some physical and chemical properties of the water in the northern part of the lake Taihu

CITA Oceanologia et Limnologia Sinica 11, 146-162 (1959)

ABST It is pointed out in the preface of the paper that there is an urgent need for detailed studies of lakes and hydrochemistry of inland waters in China as a

consequence of the accelerated development of industries and agriculture, and any information of the properties of these waters can be very useful in fish farming, irrigation, and other water works. Therefore, it is thought worth while to have the results of this preliminary investigation of the lake Taihu published, although it was carried out quite some years ago, as data like these are still very scanty. The sinking of the Taihu Basin and the formation of the great delta between the two rivers, Yangtze and Chiantang, and also by these two rivers, are considered as the main factors for the formation of the lake, as judged from the present geographical environment as well as on geological information. These two factors contributed much to the characteristic feature and also to the water properties of the lake. This preliminary investigation was carried out once a month during the period from Oct.13th, 1949 to Oct.10th, 1950, at five stations, numbering I, II, III, IV & V, with depths of 2.75, 2.56, 3.34, 2.26 & 2.4 meters repectively. Stations I, II & III were located in an almost enclosed bay, Wulihu, while stations IV & V, within the northern part of the lake proper (fig.1). The surface water temperatures range from 5.0 degree C in January to 29.2 degree C in July at stations IV & V, and from 5.3 degree C in January to 29.5 degree C in July at stations I, II & III. The bottom water temperatures range from 5.0 degree C in January to 28.9 degree C in July at stations IV & V, and from 4.9 degree C in January to 29.9 degree C in July at stations I, II & III(Fig. 2 & 3). The transparency in the bay varied in different months of the year, being lowest in April (55cm) because of the silt from land drainage after the rain, the highest being in the period form July to October, when the bottom was clearly visible(Fig.4). In the lake proper the lowest

transparency occurred in March (21cm) as a result of phytoplankton growth, and the second lowest, in April(50cm) because of the silt; while the highest, in September, October and November with a clear visibility to the bottom. The pH value ranges from 7.5 to 9.0; with the highest in October and April (8.3) in the lake proper, and in the period from July to October in the bay Wulihu (mostly about 9.0). The alkalinity ranges from 43.20 to 100 ($CaCO_3$ mg/L) and with the highest in November and the lowest in June (Fig. 5, 6 & 7). The dissolved nutrient salts, such as PO_4 (Fig. 8-10), NO_3 (Fig. 11-13), NH_3 (see data tab), SiO_2 (Fig. 14-16), and dissolved organic matter (Fig. 17-19) are generally rich. The effect of replenishment by land drainage is obvious, and clearly demonstrated by the April data (of PO_4-P and SiO_2). Dissolved Fe and Ca are also plentiful (see data table), and there should be no difficiency in these elements for plankton growth. Oxygen is always saturated or over-saturated in the lake water. Five fish ponds at the eastern side of the bay were also investigated. They are well supplied with phosphates and silicates, which can be obviously enriched from land drainage after the rain (Fig. 20 & 21). In conclusion the authors emphasize the beneficient factors for fish farming development in the lake itself as well as in the numerous rivers and small lakes connected with it.

KEY hydrochemistry, lake waters, Yangtze River, phosphate, nitrate, silicate, iron, calcium, temperature, transparency, pH, alkalinity, nutrients, organic matter, plankton, oxygen, ammonia

LANG Chinese, English abstract

57 AUTH Chu, S.P.; Young, K.C.

AFFI Institute of Zoology, Academia Sinica, Shanghai

DATE 1950

TITL The variation with depth of certain nutrient salts for phytoplankton growth and some other properties of water in the fishing ground east of Chusan Islands in the Chinese East Sea.

CITA Kexue 31, 181-182 (1950)

ABST The vertical distribution of phosphate, silica, oxygen, alkalinity, chlorinity and temperature were measured at a station near Chusan Islands in the East China Sea. The nutrient concentrations were related to the phytoplankton productivity and fish population.

KEY oxygen, phytoplankton, fish, East China Sea, primary productivity, nutrients, phosphate, silica, alkalinity, chlorinity, temperature, seawater

LANG Chinese and English

58 AUTH Collins, Michael

AFFI Department of Oceangraphy, University College, Singleton Park, Swansea, Wales, U. K.

DATE 1983

TITL The application of satellite imagery to sedimentological investigation on the continental shelf

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise Abstract, 183-184 (1983)

ABST Remote sensing, both within the visible and thermal ranges of the spectrum, is now being used extensively in oceanographic investigations. One application is the identification of near-surface suspended material in waters. This contribution reviews the history, basic principles, general availability and application of such imagery to investigations on continental shelf areas. Case studies of the use of satellite data are described, for the determination of both small- and large-scale fine-grained sediment transport paths.

LANDSAT and some thermal imagery is used in association with more conventional oceanographic instrumentation, to measure water movement and suspended sediment concentrations. Comparisons are made also with the results of numerical modelling of the areas. Three continental shelf investigations are described, with varying levels of marine and fluvial influences. The relevance of such studies to the understanding of natural sedimentation processes and in the offshore transfer of fluvial material and associated pollutants will be considered. Limitations to the qualitative and quantitative interpretation of imagery and the collection of "sea-truth" data will be discussed as will problems associated with time averaging of information. Finally, consideration will be given to the potential applicability of LANDSAT imagery to the Changjiang River input to the adjacent East China Sea.

KEY continental shelf, remote sensing, suspended matter, Changjiang, East China Sea, pollution

LANG Chinese, English abstract

NOTE abstract only

59 AUTH Cui, Keduo; Qu, Nianshow; Lin, Ying; Che, Pingchuan; Wang, Tianxiang

AFFI Institute of Oceanology, Academia Sinica, Qingdao (1); Environmental Protection Research Institute, Yentai, Shandong province (2, 3, 4, 5)

DATE 1981

TITL The studies on the effect of DDNP (Dinitrodiazophenol) on mussel and sea cucumber

CITA Hai Yang Ke Xue 4, 20-23 (1981)

ABST The effect of dinitrodiazophenol on mussel and sea cucumber was evaluated. The toxicity was found to be lower than mercury or copper.

KEY pollution, toxicity, mussel, mercury, copper

LANG Chinese

60 AUTH Cui, Qingchen

AFFI Department of Chemistry, Shandong College of Oceanology

DATE 1979

TITL The adsorption mechanism of uranium in sea water on hydrous titanium oxide

CITA Oceanologia et Limnologia Sinica 10, 119-124 (1979)

ABST This paper has suggested a new adsorption mechanism, which considers that uranium in sea water, as a species of hydrolysis product, is adsorbed on hydrous titanium oxide through OH bridging. To compare the mechanism with some experiments known nowadays, the author finds that it can well interpret the experimental fact. In addition, it is quite corresponding to the adsorption theory suggested by James.

KEY adsorption, mechanism, uranium, hydrous titanium oxide, seawater, hydrolysis, marine resources

LANG Chinese, English abstract

61 AUTH Dai, Minying; Zhou, Chennian

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL Determination of polynuclear aromatic hydrocarbons in seawater

CITA Journal of Marine Science 4, 33-35 (1982)

ABST For the analysis and determination of trace polynuclear aromatic hydrocarbons in seawater samples a method to extract and concentrate with Amberliter XAD-2 resin was studied. The seawater samples were filtered and passed through the XAD-2 resin column. The absorbed substances were eluted from the resin with 100 ml ether. The eluate was concentrated to dryness and then was determined by HPLC-UV. This method is simple and convenient.

KEY determination, hydrocarbons, seawater, analytical chemistry, chromatography

LANG Chinese, English abstract

62 AUTH Dai, Zhongdao; Zhao, Hongru; Sun, Keliang; Lan, Shumei

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1981

TITL Studies on leaching rates of toxicological materials in antifouling at harbour

CITA Studia Marina Sinica, 97-116 (1981)

ABST The leaching rate is a critical factor for antifouling in harbour. We set up a series of methods for studying the leaching rate based on our own work; and studied, by using these methods, the properties of several antifouling paints, some toxicological materials, and the relations between their leaching rates and antifouling effects. 1. The plot that leaching rates increase rapidly with the rise of temperature showed a quadratic power curve. A correlative expression of u-t°C to count the leaching rates of paints in 0-40°C was obtained. 2. We found that the contents of Cu_2O could reduce correspondingly when the talcum-powder or the mixture of talcum-powder and iron oxide red was used as filling materials, but still had a definite leaching rate and antifouling effects. 3. The use of porous nature earthen-wares as carriers of antifouling material to prevent marine fouls enables us to observe not only the effect of antifouling but the degree of leaching rate also, and does not affect the chemical and physical properties of the said materials. It provides us with a simple and effective method to screen the toxicological materials and to analogize the antifouling tests of paints. The effective critical leaching rates of toxicological materials for antifouling using porous nature earthen-wares as carriers are: copper

23.52μg/cm^2 day, mercury 4.31μg/cm^2 day, the mixture of copper and mercury: copper 5.93μg/cm^2 day, mercury - 1.98μg/cm^2 day. The above data are comparable to those in paints: copper 10.0μg/cm^2 day, mercury 2.0μg/cm^2 day. The critical leaching rates of the mixture of cuprous oxide and mercury compounds are much less than those when used separately, the effect of each element is thus improved.

KEY antifouling paints, leaching rate, temperature, copper, mercury, fouling

LANG Chinese, English abstract

63 AUTH DeMaster, David; Mckee, Brent; Nittrouer, Charles; Qian, Jiangchu; Zhao, Yiyang

AFFI Department of Marine, Earth, and Atmospheric Sciences, North Carolina State University, Raleigh, NC, U. S. A. (1, 2, 3); Second Institute of Oceanography, National Bureau of Oceanography, Hangzhou, China (4); Institute of Oceanology, Academia Sinica, Qingdao, China (5)

DATE 1983

TITL Rates of particle mixing and sediment accumulation based on radionuclide profiles from continental shelf deposits in the East China Sea

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise Abstract, 99-101 (1983)

ABST Profiles of naturally occurring Th-234 ($t_{1/2}$ = 24 days) have been measured in continental shelf sediments from the East China Sea. These profiles are used to characterize the rate and depth of particle mixing during the 100 days prior to core collection. In the fine-grained deposits near the Changjiang River mouth Th-234 profiles indicate that surface sediment is transported in a 100-day period to depths as great as 12 cm. Based on X-radiographs, physical processes appear to account for most of the particle transport

in these sediments. In the offshore mud deposit sediment particles are mixed to a depth of 5 cm, primarily by biological activity. Based on an eddy-diffusion model for particle mixing, the Th-234 profile from the offshore mud deposit yields a mixing coefficient of 20 cm^2/yr. Naturally occurring Pb-210 ($t_{1/2}$ =22 years) and bomb-produced Cs-137 are used to establish accumulation rates for sediments deposited during the last 100 years. Sediment accumulation rates near the river mouth appear to increase to the south and are as high as 5.4 cm/yr. In the offshore mud deposit accumulation rates are less than 0.3 cm/yr. The inventory (integrated excess activity in the seabed) of Th-234 near the Changjiang River mouth is as much as 20 times greater than the amount predicted from production in the overlying water column. The Pb-210 inventory in these sediments, however, is only 2 times greater than the amount predicted from production in the water column and atmospheric supply. The difference in radiochemical inventories can be related to temporal variability in the movement and deposition of fine-grained sediment. In the offshore mud deposit, the inventories of Th-234 and Pb-210 are approximately equal to the values predicted from production in the overlying water column and atmospheric supply.

KEY sediments, East China Sea, Changjiang, thorium-234, lead-210, cesium-137, sedimentation rates, mixing, air-sea exchange, bioturbation

LANG Chinese, English abstract

NOTE abstract only

64 AUTH DeMaster, David; Nittrouer, Charles; Aller, Robert C.

AFFI Department of Marine, Earth and Atmospheric Sciences, North Carolina State University, Raleigh, NC, U. S. A. (1, 2); Department of Geophys. Sciences, Univeristy of Chicago, IL, U. S. A. (3)

DATE 1983

TITL Uptake, dissolution and accumulation of silica near the Changjiang River mouth

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise Abstract, 40-41 (1983)

ABST Measurements of dissolved silica, salinity, and suspended solid concentration were made during June, 1980 and November, 1981 near the mouth of the Changjiang River. During June, 1980 (a period of high discharge), uptake of dissolved silica from continental shelf surface waters began at a salinity of $24^{o}/_{oo}$ and a suspended solid concentration of approximately 10 mg/l. The biological removal accounts for approximately 20% of the riverine dissolved silica. During November, 1981 (a period of low discharge), silica uptake was not detected near the mouth of the Changjiang River. Greater sediment resuspension caused by strong winds and frequent storms, as well as reduced daylight probably contributed to the reduced biological uptake during November. Fluxes of dissolved silica from sediment pore waters on the Changjiang River shelf range from 10 to 170 $m/cm^2/yr$. The biogenic silica content of shelf sediment is approximately 0.2 weight percent. In areas of rapid sediment accumulation (>3 cm/yr) 95% of the silica arriving at the sediment-water interface is preserved in the seabed; whereas, in slowly accumulating sediments (1 cm/yr) less than 20% is preserved. More than 80% of the dissolved silica carried by the Changjiang River reaches open ocean waters.

KEY silica, Changjiang, salinity, river water, seawater, sediments, particulates, resuspension

LANG Chinese, English abstract

NOTE abstract only

65 AUTH Edmond, John M.

AFFI Massachusetts Institute of Technology Cambridge, MA, U. S. A.

DATE 1983

TITL Chemistry of the Changjiang estuary and plume

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise Abstract, 43-44 (1983)

ABST Samples were collected on cruises made at high and low stage. On each expedition the grid of stations around the mouth of the estuary was occupied. Time series were also obtained at the several anchor stations. In the main channel of the estuary, where much of the mixing takes place, the current velocities are such as to maintain very high concentrations of particulate material in suspension. Photosynthesis is thus precluded and does not appear to commence until salinities of about 25. This compares with values of less than 10 in the Amazon and Orinoco. Phosphate levels in the estuary are similar to those of other large rivers, between 0.5 and 1.0 μM. The values show considerable scatter with no obvious dilution trend. Above a salinity of 25 there is a sharp decrease in the area of the diatom/dinoflagellate blooms. Nitrate is extremely high in the fresh water end member, 65 μM, and shows a regular dilution trend with perhaps some measurable removal above $25^{\circ}/_{\circ\circ}$. Similar behavior is shown by silica with the end member value being 125 μM. The nitrate can not be of industrial origin and presumably is produced by nitrogen fixing bacteria symbiotic to the water fern introduced to the

rice-paddies every season. The flux of nitrate to the ocean from the Changjiang River is about 10% of the estimated total for the globe. Barium shows the commonly observed desorption maximum at low salinities. The data are scattered presumably because of interactions with the high and variable suspended load. Cadmium shows remarkable behavior being present in dissolved form at undetectable level in the fresh water (less than 5 pM) and showing a broad maximum (250 pM) at salinities of about 15. We have subsequently observed similar behavior in the Orinoco; hence this very peculiar feature can not be a pollution artifact but must result from relatively slow release from particles. Nickel shows an initial sharp rise from the end-member value of 2 nM to values idential to oceanic surface water, 3.5 nM. Thereafter it behaves conservatively. Copper is generally conservative. However, the data show considerable scatter suggesting some interaction with the suspended load. No significant enrichments were observed in the salt wedge where one was developed. However, sampling was restricted to the northern end of the plume. Water column evidence for regeneration may be obtainable along the southern axis of the plume. However, nothing on the scale of the enrichments observed in the Amazon can be expected.

KEY Changjiang, estuary, photosynthesis, phosphate, salinity, nitrate, barium, cadmium, nickel, copper, particulates, river water, seawater, pollution

LANG Chinese, English abstract

NOTE abstract only; H.K. Gu (89; personal communication, 1983) feels that the high nutrient concentrations are anthropogenic

66 AUTH Fan, Jiahua

AFFI Water Conservancy and Hydroelectric Power Research Institute, Academia Sinica and Ministry of Water Conservancy and Power

DATE 1980

TITL Analysis of the sediment deposition in density currents

CITA Scientia Sinica 23, 526-538 (1980)

ABST This paper deals with the laws of velocity and concentration-changes in density currents of low concentration in blind canals. (For example, an approach canal reach in front of a navigation lock.) According to the measurements from laboratory tests and the field observations, it is apparent that clear water may seep vertically from density current during depositing of sediments and may flow out through the interface into the overlying layer. In consideration of the effect of the vertical velocity of the seeping clear water on the movement of density current, a sedimentation model of density current has been established. Analytical solutions of differential equations have been made respectively for the decreases of mean velocity and of mean concentration in density currents along the course of the canal. A formula has also been derived for calculating the initial velocity of density current at the entrance of the blind canal. By using the findings cited in this paper, it is possible to predict the distribution of sediment deposition in density current along the course of the canal for practical design purposes.

KEY sediments, sedimentation, distribution

LANG English

67 AUTH Fan, Jiasong; Li, Juyin; Zhao, Shengcai

AFFI Institute of Geology, Academia Sinica, Beijing

DATE 1979

TITL A basic model of the ancient marine environment for sedimentation of carbonate

CITA Scientia Geologica Sinica, 287-301 (1979)

ABST The results of our preliminary studies on the Middle Devonian, Late Permian and Middle Triassic carbonate facies from Guizhou province and the Early-Middle Triassic from Sichuan are given as follows. 1. Facies pattern of the Middle Devonian in Guizhou Province. There the facies pattern of the Middle Devonian was controlled by the Central-Guizhou landmass extending in an east-west direction. In the region from Guiyang to Longli, Duyun and Kaili, the deposits are represented by offshore terrigenous clastics composed of mainly quartzites with subordinate mudstones and dolomites. The Central-Guizhou landmass was intermittently uplifted during the Middle Devonian, supplying much terrigenous clastics to form the offshore deposits. A wide transgression took place perhaps by late Middle Devonian, when the carbonate deposits with prolific stenohaline fauna (corals and stromatoporoids) were developed. Further south in Huishui and Changshun districts, there developed a carbonate platform after the name of Huishui-Changshun. In this carbonate sequence are intercalated two layers of quartzite which show that the offshore terrigenous deposits derived from the central Guizhou land mass extended to the carbonate platform. Along the margin of this platform there is a series of reefs composed of corals and stromatoporoids. However, these organisms could not constitute a huge reef owing to the interference of terrigenous clastics. In this region from Ziyun and Luodian to Nandan, south of the carbonate platform, the Middle Devonian is represented by open marine basin deposits, consisting chiefly of grey and greyish black thin-bedded calcareous mudstones with some siliceous shale, marls and sandstones. Moreover, these deposits also contain abundant pelagic (planktonic and nektonic) fauna, such as Tentaculites,

Hyolithes, Trilobites and ammonites. The carbonate platform extends further south in the Wangmo-Anlong area, judging from the general lithologic characters, despite the scarcity of outcrops and insufficient data. 2. The Late Permian sedimentary facies in East Yunnan-South Guizhou. In this region the Niushoushan landmass was gradually uplifted, supplying a large amount of terrigenous clastics during the Late Permian, and in the Weining and Shuicheng districts very thick coal-bearing terrigenous clastics were deposited presumably in terrestrial swamps or paralic swamps. Toward the south-east near Guanling there occur deposits that are transitional between terrestrial or paralic clastics to platform carbonate. Further south-eastward, in the Ziyun, Wangmo and Ceheng counties there appears again the carbonate platform, the margin of which is dotted with many reefs composed of calcareous algae, sponges and bryozoans and they may extend as barrier reefs. Further on in the same direction the carbonate platform deposits are replaced by carbonate shelf deposits composed mainly of cherty limestones and thin-bedded siliceous rocks. 3. The sedimentary facies of the Middle Triassic in Guizhou Province. The facies-change belt extends over the whole Guizhou in a nearly NE to SW direction. On both sides of this belt, the lithology and life assemblages differ greatly from one other. On the north-west side are predominantly carbonate rocks, while on the south-east clastics, and they differ remarkably in thickness. Hence the north-western part of this belt is called the carbonate platform of south-west Guizhou. Along its margin are a great number of reefs, e.g. the Qingyan and Nidang localities. On the south-east side of the belt exist open sea basin deposits of fine clastics with some limestones, siliceous rocks and turbidites as well, which contain pelagic ammonites

and thin-shell bivalves (such as Halobia, Daonella and Posidonia). 4. The sedimentary facies of the early stage of Early Triassic Feixianguan Formation, Sichuan Province. During the early stage of Early Triassic, the Feixianguan Formation was formed with two different types of deposits. To the west of Huayingshan and Qingshanling mountains, it is represented by purplish terrigenous clastics, while around the Sichuan-Yunnan massive it is made up of purplish-red sandstone and conglomerates. It becomes finer and finer towards the east resulting in fine-grained sandstone, sandy shale and mudstones. East of Huayingshan and Qingshanling mountains as the supply of terrigenous clastics decrease in amount, an alternation of carbonate and terrigenous clastics appears. From eastern Sichuan to western Hubei, especially along the Mts. Fangdoushan and Qiyueshan, the Feixianguan Formation changes abruptly in its lithology. The third member of this formation contains a large amount of oolites and bioclastic grains which form the shallow bioclastic and oolitic shoal. 5. The sedimentary facies of late Early Triassic Jialingjiang Formation, Sichuan Province. During the late Early Triassic, the Jialingjian Formation was deposited on a very gentle eastward slope. Starting from the sedimentation of Lower Jialingjiang (the first and second members of the formation) regression took place over Sichuan, though it was interrupted by small-scale advances and retreats of the sea. During the sedimentation the Sichuan-Yunnan landmass was gradually uplifted and supplied plenty of terrigenous clastics, thus the lower Jialingjiang was mainly composed of purplish-red clastics and was spread to the west of Qingshanling mountain. However, east of this mountain clastics gave way to micrites, oolites (bioclastic limestone), dolomite and anhydrites. Obviously the major

transgression was followed by a regression, and the anhydrites-dolomites-skeletal and/or oolitic limestone appear to the east of Qingshanling. 6. The sedimentary facies of the Middle Triassic (Badung Formation and Leikoupo Formation) in Sichuan basin. During the early Middle Triassic the Xuefeng landmass was rapidly uplifted and became a provenance of terrigenous clastics. As a result purplish-red clastics were widely spread east of Huayingshan mountain, involving eastern Sichuan and western Hubei, such clastics represent offshore terrigenous deposits, named as Badung Formation. West of Huayingshan the entire central Sichuan can be considered as a typical evaporitic basin, where the deposits are chiefly composed of carbonates and evaporites (Leikoupo Formation). Further westward, broad open sea basin deposits predominate with abundant pelagic thin-shell bivalves and ammonites.

KEY sedimentation, carbonates, geochemistry, corals, dolomite, algae, palaeontology, limestone, evaporite

LANG Chinese, English abstract

68 AUTH Fan Shi-qing

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1979

TITL Marine Chemical Composition and the Suggestion of Origin of the Earth

CITA Transactions of Oceanology and Limnology 1, 44-47 (1979)

ABST The author claims that the characteristics of marine chemical elements show that the earth or the entire solar system had evolved from a dust cloud (secondary nebulae) that was contaminated by the residuals from the explosion of stars or supernova. These contaminated secondary nebulae contain many heavy elements, e.g. Fe, Co, Ni, Cu, Zn, Ag, I, Pb, Ra, La, Th, U, etc., at the beginning.

KEY geochemistry, seawater, compositions, temperature, hydrogen, deuterium, helium, carbon, carbonates, bicarbonate, oxygen, iron, cobalt, nickel, copper, zinc, silver, iodine, lead, radium, lanthanum, thorium, uranium, neon, magnesium, silicate, speciation, sulfur

LANG Chinese

NOTE The author is currently at the South China Sea Institute of Oceanology

69 AUTH Fan, Shouzhi; Jin, Xianglong; Pan, Zhongzheng

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1981

TITL The optical density of the suspended particles in water

CITA Oceanologia et Limnologia Sinica 12, 441-446 (1981)

ABST The formula of the optical density of the suspended particles is obtained by means of the calculation of the single scattering. A factor, which is the ratio of the effective cross-section for scattering of a particle to its geometrical cross-section, and a parameter R, which may be called the average optical radius of the suspended particles, are shown to be necessary for determining the concentration of the suspended particles from its optical density measured.

KEY suspended matter, optics, scattering

LANG Chinese, English abstract

70 AUTH Feng, Qiangbo; Ke, Liqin; Chai, Pingxia

AFFI Institute of Geochemistry, Academia Sinica, Qingdao

DATE 1982

TITL Quantitative analysis of base-line conversion calculation by laser microprobe

CITA Annual Reports Institute of Geochemistry, Academia Sinica, Qingdao, 181 (1982)

ABST This method is applicable for bulk analysis of metallic elements in rocks, minerals and compounds. With the method the relative percentage of measured elements can be obtained. The limits of detection are within the range of 0.1-90%. In the analysis with the method samples and standards must be homogeneous in composition. The composition of standards is required to be similar to that of samples to be measured. With the help of calibration curves the accuracy of analytical results can be significantly enhanced. The method has some inherent advangtages, e.g. simple operation, high speed and high accuracy.

KEY laser, microprobe, analytical chemistry, minerals

LANG Chinese, English abstract

71 AUTH Gao, Xiao-Xia; Zhang, Li-qun

AFFI Department of Chemistry, Peking University, Peking

DATE 1982

TITL Studies on the electroanalytical chemistry of rare earths. IV. The catalytic wave of Yb^{+3} -NO_3^- (or NO_2^-)-NH_4Cl system

CITA Acta Chimica Sinica 40, 621-628 (1982)

ABST The catalytic system Yb^{3+}--NO_3^- (or NO_2^-)-NH_4Cl has been studied as early as 1975. In dc polarography Yb^{3+} can be detected as low as 5x10(E-8)M under optimal condition, and a linear relationship holds between the wave heights and the concentrations of 1x10(E-7)- 1x10(E-6)M Yb^{3+}. The method has been used to determine micro amounts of Yb in ores without the interference of other rare earths. The catalytic current may be contributed by: (1) the current of EC mechanism $Yb^{3+} + NO_3^- = Yb^{2+} + NO_2^-$; (2) reduction current of NO_3^- or NO_2^- at electrode catalyzed by Yb^{3+}; (3) diffusion current of $Yb^{3+} + e = Yb^{2+}$ which is very small in comparison with (1) and (2). When the relative concentration of NO_3^- and NO_2^- is much greater than Yb^{3+}, a catalytic wave (1) is observed

which can be used to determine Yb^{3+}; while the relative concentration of Yb^{3+} is much greater than NO_3^- or NO_2^-, a reduction wave (2) is observed which can be used to determine micro amounts of NO_3^- and NO_2^-. For catalytic current, the rate constants are found to be $K_f(NO_3^-)$ =3.5x10(E+8), $K_f(NO_2^-)$=3.9*10 (E+10), and for reduction current, hydroxylamine may be the main product in both cases. Addition of polyvinyl alcohol (PVA) into the catalytic system is necessary for analytical purposes, because the surfactant improves the wave shape and separates it from hydrogen wave.

KEY polarography, mechanism, electrode, rate constant, rate, ytterbium, rare earth elements, analytical chemistry

LANG Chinese, English abstract

NOTE Gao Xiao-xia is also spelled Gao Xiaoxia, Gao Xiao-Xia, or Kao Sheau-shya

72 AUTH Gao, Xiaoxia; Jiao, Kui

AFFI Chemistry Department, Peking University, Peking

DATE 1982

TITL Studies on the electroanalytical chemistry of rare earths II. On the mechanism of the adsorptive complex wave of Sc^{3+}--NH_4Cl-Cupferron-diphenylguanidine system

CITA Acta Chimica Sinica 40, 611-620 (1982)

ABST The catalytic system Sc^{3+} -NH_4Cl-Cupferron (Cup)-diphenylguanidine (DPG) suggested by Yao et al. gives a sensitive derivative wave in single-sweep polarograph. The linear relationship between the wave heights Hw and the concentration of Sc^{3+} in the range of 10x(E-7)-10x(E-6) M has been used successfully in the ores analysis for Sc. We compared the waves in single sweep polarograph with that in the do polarograph and applied several electrochemical methods to investigate the mechanism of this wave.

The experiments of electrocapillary curves, variation of the height of the mercury column and the time of the rest period before scanning, the temperature coefficent, cyclic voltammetry etc. indicated that the wave is absorptive complex in nature and the ligand-Cupferron in the complex is catalytically reduced but not the cation Sc^{3+}, therefore we call such catalytic wave as "adsorptive-complex wave". By applying the equation derived in our previous work, the composition of the adsorptive complex Sc^{3+}:Cl^{-}:Cup:DPG is determined to be 1:2:1:1 with the conditional stability constant β=1.22x10(E+7). The structural formula is also determined. The electrode processes are described with the following steps: (1) complex formation of Sc^{3+} with Cup and DPG; (2) adsorption of the complex on the surface of the electrode; (3) dissociation of the complex and the reduction of Cup on the surface of the electrode; (4) repeat of the steps 1 to 3 to yield the adsorptive-complex catalytic wave.

KEY mechanism, complex, electrode, scandium, polarography, stability constant

LANG Chinese, English abstract

NOTE See note 71

73 AUTH Gao, Xiaoxia; Zhang, Manping

AFFI Department of Chemistry, Peking University, Peking

DATE 1982

TITL Studies on the electroanalytical chemistry of rare earth elements - Polarographic catalytic wave of europium-xylenol orange system

CITA Scientia Sinica(series B) 25, 690-697 (1982)

ABST A sensitive catalytic wave of Eu^{3+}-XO in derivative single-sweep polarography is proposed. The detective limit is 5x10(E-8)M Eu, and the linear range is 1x10(E-7)M-1x10(E-5)M. The mechanism of this catalytic wave has been studied by several

experimental methods. It is proved that the catalytic wave behaves as an adsorptive-complex wave as well as an EC catalytic wave in which free radical formed by the reduction of XO acts as anoxidizing agent. For this reason, Eu^{3+}-XO is the most sensitive catalytic wave among the rare earths.

KEY rare earth elements, europium, polarography, analytical chemistry, complex

LANG English

NOTE See note 71

74 AUTH Gao, Xuzheng

AFFI Inner Mongolian Metallurgical and Geological Survey, Inc.

DATE 1978

TITL Constancy of geochemical potential

CITA Scientia Geologica Sinica 1, 73-87 (1978)

ABST Summation of geochemical potential relating to kinetic energy (u_k), potential energy (u_u) and pressure energy (u_p) of certain component within certain phase of certain matter system in earth space is constant and it is given by $u_k + u_u + u_p = C$ or $u_{k1} + u_{u1} + u_{p1} = u_{k2} + u_{u2} + u_{p2} = C$. The relations expressed above are respectively defined as constancy of geochemical potential. The constancy model of geochemical potential describes the ways of migration and concentration of ore components such as Fe or other metallic elements during mineralization. It may be applied as one of the basic principles for turning once nonprofitable deposits into exploitable.

KEY geochemical potential, kinetic energy, potential energy, geochemistry, iron minerals, resources

LANG Chinese, English abstract

75 AUTH Gong, Jiwen

AFFI Institute of Geochemistry, Academia Sinica, Guiyang

DATE 1982

TITL A new approach to the identification of micrograin minerals--A laser-excited holospectral comparing method

CITA Annual Reports Institute of Geochemistry, Academia Sinica (1980-1981), 179-180 (1982)

ABST In the past ten years laser spectrography has been widely used to identify minerals; however, it is not of any use in mineral nomenclature. More recently, the author, based on his long-term practice, has studied laser-excited holospectra of various minerals in reference to their intensity and intensity ratio. He has found a close relation between the holospectra of an unknown mineral and its composition. On the basis of this relation exact nomenclature of unknown minerals is not out of the question.

KEY laser, spectroscopy, analytical chemistry, minerals

LANG Chinese, English abstract

76 AUTH Gu, Hongkan

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1976

TITL On the thermodynamic equilibrium of nitrogen cycle in the sea

CITA Studia Marina Sinica 11, 1-6 (1976)

ABST A discussion is made on the thermodynamic equilibrium of nitrogen cycle in the sea. Most of the NH_4^+, NO_2^- and NO_3^- must be converted to NO_3 at thermodynamic equilibrium state. The seasonal variations of nitrogen compounds in English Channel, Long Island Sound, the Yellow Sea and the East China Sea suggest that the NH_4^+ and NO_2^- are not converted sufficiently to NO_3^-. The system of NH_4^+, NO_2^- and NO_3^- are not in the thermodynamic equilibrium state, but there is a difference in the degree of conversion. The degree of conversion is low in the Yellow Sea and East China Sea. The system of NH_4^+, NO_2^- and NO3$^-$ is not in the thermodynamic equilibrium state, mainly due to

activity of phytoplankton. The difference in the degree of conversion in NH_4^+ to NO_3^- is related to period of growth of phytoplankton. The NH_4^+ is converted to NO_3^- more sufficiently in the state of long period, as in the English Channel and Long Island Sound. The conversion is not sufficiently in the state of short period, as in the Yellow Sea and the East China Sea.

KEY nitrogen, equilibrium, nitrogen cycle, Yellow Sea, East China Sea, phytoplankton, ammonia, nitrate, nitrite, thermodynamics

LANG Chinese, English abstract

NOTE Gu Hongkan was formerly spelled Koo H.K. or Ku Hong-Kan

77 AUTH Gu, Hongkan

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL Maximum vertical distribution of dissolved oxygen in the Huanghai Sea and its mechanism

CITA Acta Oceanologica Sinica 1, 71-76 (1982)

ABST Maximum vertical distribution of dissolved oxygen in the Huanghai Sea (Yellow Sea) and its mechanism are studied. The oxygen maximum in the summer thermocline is mainly conserved (derived) from winter.

KEY distribution, oxygen, Huanghai Sea, thermocline

LANG English

NOTE See Note 76

78 AUTH Gu, Hongkan

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL The nitrogen cycle near the estuary of the Yangtze River

CITA Collected Oceanic Works 5, 48-66 (1982)

ABST The nitrogen cycle near the estuary of the Yangtze River was investigated during five cruises between August and December of 1963. The NO_3-N, NO_2-N, NH_4-N, organic-N were measured. The high contents of nitrogen compounds are in the estuary and are from the Yangtze River water, which is not a limiting factor of growth of phytoplankton. High concentration of NH_4-N shows that the NH_4^+ -NO_2^- -NO_3^- system is in thermodynamic nonequilibrium state. There may be various catalysts, especially enzymes, in sea water because of the activity of organisms, so there may be a relationship between ΔG° and dc/dt in the sea.

KEY nitrogen, estuary, Yangtze River, nitrate, nitrite, ammonia, organic nitrogen, thermodynamics, river water, primary productivity, pollution, phytoplankton, enzyme, seawater, oxygen

LANG English

NOTE Gu Hongkan was formerly spelled Koo H. K. or Gu Hong-Kan

79 AUTH Gu, Hongkan; Li, Guoji

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1979

TITL The nitrogenous and phosphorus compounds in interstitial water of Jiaozhou Bay

CITA Oceanologia et Limnologia Sinica 10, 103-111 (1979)

ABST The NO_3-N, NO_2-N, NH_4-N, Organic-N, PO_4-P, Organic-P, pH, Eh in bottom seawater and interstitial water of Jiaozhou Bay were determined and discussed. The depth of the coring was about 4 meters, using vibratory piston-corer with a diameter of 7.6cm. The interstitial water was prepared by the pressure method under the pressure 300 kg/cm^2; compared with the dilution method it was found to be better than the dilution method for the nitrogenous and phosphorus compounds. The analytical methods: for the pH, pH meter and glass electrode, for the Eh, pH meter and Pt

wire electrode with flame treatment, and for nitrogenous and phosphorus compounds, coloric methods were used. The characteristics of distribution of the nitrogenous and phosphorus compounds were illustrated. The high content of dissolved organic-N and organic-P and very low Eh showed rich primary production of organic matter in the Jiaozhou Bay.

KEY interstitial water, Jiaozhou Bay, organic nitrogen, organic phosphate, pH, Eh, electrode, primary production, organic matter, nitrate, nitrite, ammonia, phosphate, colorimetry

LANG Chinese, English abstract

NOTE See note 78

80 AUTH Gu, Hongkan; Liu, Mingxing

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1976

TITL The thermodynamic state of sea water

CITA Studia Marina Sinica 11, 25-31 (1976)

ABST The thermodynamic state of sea water is discussed by the systems of I, N and Fe and some properties of physical chemistry of sea water. It is concluded that the sea water is at thermodynamic unstable state in many systems in consequence of biological activity, water movement and chemical process of estuary. Sea water removed from nature tends to reach thermodynamic stable state automatically.

KEY seawater, biological activity, estuary, thermodynamics, iodine, nitrogen, iron

LANG Chinese, English abstract

NOTE See note 78

81 AUTH Gu, Hongkan; Liu, Mingxing

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1979

TITL The cause of large scale fish kill after heavy summer rain in Jiaozhou Bay

CITA Transactions of Oceanology and Limnology 1, 55-58 (1979)

ABST It is established that the heavy pollution due to trace metals, organic material, and raw sewage contributes to the large-scale fish kill in Jiaozhou Bay. The concentrations of various pollutants in rivers and riverine sediments are reported.

KEY pollution, environment, pollutant, trace metals, fish

LANG Chinese

NOTE See note 78

82 AUTH Gu, Hongkan; Liu, Mingxing

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1981

TITL A method for determination of Sn and Bi in sea water using physically-coated mercury film electrode inverse polarography

CITA Oceanologia et Limnologia Sinica 12, 427-432 (1981)

ABST A method for determination of Sn and Bi ions in sea water using physically coated mercury film electrode inverse polarography is presented. The conditions for analysis are 0.25 M HCl base, 45 degree C temperature, -1.2V pre-electrolysis volts, and 3 min. pre-electrolysis time. It is important that the pre-electrolysis voltage must always be connected with the pre-eletrolysis electrode until anodic stripping has been done, because the Sn(Hg) and Bi(Hg) can be oxidized automatically if once the voltage is turned off. Alternative current does not affect the pre electrolysis. The concentrations of Sn and Bi ions in sea water are 1.0x10(E-8)M and 0.9x10(E-9)M respectively. The analytical errors are $S_n < \pm 12\%$ and $B_i < \pm 10\%$

KEY determination, electrode, polarography, seawater, concentrations, tin, bismuth

LANG Chinese, English abstract

NOTE See note 78

83 AUTH Gu, Hongkan; Liu, Mingxing; Bao, Wanyou
AFFI Institute of Oceanology, Academia Sinica, Qingdao
DATE 1980
TITL A study of the anti-adsorption membrane of electrode
CITA Acta Chimica Sinica 33, 381-386 (1980)
ABST The anti-adsorption membrane of electrode was first proposed by us and it was completed in 1977. The adsorption on the surface of solid electrode can be prevented successfully. The characteristics of anti-adsorption electrode were also studied. The anti-adsorption membrane consists of a net structure of alginic acid or calcium alginate. The method of preparation is as follows: Put the electrode in 1.0% sodium alginate, take out slowly and put it gently in a 0.10N HCl or saturated calcium chloride solution for about half a minute, and take out again. A colorless transparent alginic acid or calcium alginate membrane is formed on the electrode. The alginic acid membrane is useful in acidic solution, and the calcium alginate membrane is useful in alkaline solution. Twelve seawater samples containing 2.0x10(E-10)M Pb^{2+} can be determined, with error of ±14% using anti-adsorption electrode single cell differential inverse polarography, but only one sample can be determined by normal electrode. The I_p, I_c, E_p and wave of inverse polarography of anti-adsorption electrode are the same as that of normal electrode, except I_c of the former is 15% lower than that of the latter. In the anti-adsorption membrane, the driving force for the Pb^{2+} ion to get to the electrode surface is not only through diffusion, but mainly due to the turbulence caused by stirring.
KEY electrode, adsorption, seawater, polarography, diffusion, lead
LANG Chinese, English abstract
NOTE See note 78

84 AUTH Gu, Hongkan; Liu, Mingxing; Bao, Wanyou
AFFI Institute of Oceanology, Academia Sinica, Qingdao
DATE 1982
TITL Anti-adsorption physically coated mercury film electrode for inverse polarography
CITA C. J. of Oceanology and Limnology 1, 76-81 (1982)
ABST Anti-adsorption physically coated mercury film electrode inverse polarography consisting of three parts (Gu and Liu, 1973, 1974a, 1974b, 1981; Gu et al., 1980) was described: (1) Anti-adsorption membrane of electrode; (2) Physically coated mercury film electrode; (3) Single cell differential cell system.
KEY adsorption, mercury, electrode, polarography
LANG English
NOTE See note 78

85 AUTH Gu, Hongkan; Liu, Mingxing; Bao, Wanyou; Zhang, Xingjun; Wang, Qi; Guo, Ruxin; Zeng, Zhaowen
AFFI Institute of Oceanology, Academia Sinica, Qingdao
DATE 1978
TITL The concentrations of some ions of trace metals in China coastal waters
CITA Studia Marina Sinica 13, 1-7 (1978)
ABST Several ions (including unstable complexes) of trace metals (Zn, Pb, Cu, Cd, Sn and Bi) have been determined by single-cell differential inverse polarography in China coastal waters. The results indicate that the concentration of these ions are relatively uniformly distributed in China coastal waters. The variable range is ±20-30% of middle value and no tendency is presented. The concentrations in the river waters are same in the coastal waters.
KEY concentrations, trace metals, coastal water, zinc, lead, copper, cadmium, tin, bismuth, polarography, river water, seawater
LANG Chinese, English abstract

NOTE Gu Hongkan was formerly spelled Koo H.K. or Ku Hong-Kan

86 AUTH Gu, Hongkan; Liu, Mingxing; Zhang, Xingjun; Bao, Wanyou; Guo, Ruxin; Wang, Qi; Zeng, Zhaowen

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1978

TITL On the concentrations of ions of trace metals in sea water

CITA Studia Marina Sinica 14, 23-27 (1978)

ABST The degree of undersaturation of several ions (including unstable complexes) of trace metals in sea water and its control factor are studied. It is concluded that the ions are undersaturated in sea water and are at thermodynamic unstable state (nonequilibrium concentration and nonequilibrium state). The control factor is that the continent (natural processes) does not supply the sea water with sufficient ion content (no suspended matter) to reach saturation. Chemical, biological and physical processes all affect the ion content to a certain degree.

KEY concentrations, trace metals, seawater, equilibrium, thermodynamics, biological activity, particulates

LANG Chinese, English abstract

NOTE Gu Hongkan was formerly spelled Koo H.K. or Ku Hong-Kan

87 AUTH Gu, Hongkan; Ma, Xinian; Shen, Wanren; Ren, Guangfa; Chen, Zi; Diao, Huanxiang; Li, Guoji; Zhang, Lianying

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL Marine geochemistry of nitrogen near estuary of Changjiang River II. Nitrite and ammonia in sea water near estuary

CITA Journal of Shandong College of Oceanology 12, 31-38 (1982)

ABST The horizontal distribution of NO_2-N near estuary of the Changjiang River during five cruises between August and December 1963 shows that there is a gradient in summer-autumn with a tendency of high contents in estuary and low in offshore water, such as 10→0.8mg/m^3 in August. In autumn-winter, it tends toward homogeneous distribution. Obviously, the high concentration is from the river water. The NH_4-N contents are high in the estuarine water in all seasons, 60-140→20mg/m^3. The NO_2^- maximum layer is a characteristic of vertical profile distribution of NO_2-N. The mechanism of NO_2^- maximum is due to consumption of NO_2^- by phytoplankton in upper water layer and regeneration of NO_2^- from dead organisms below the thermocline. It coincides with the high phytoplankton mass, high O_2%, high total organic-N and low nutrients in the water layer above the thermocline. The NH_4-N contents in the upper layer and especially in bottom are higher than in the middle layer. In monthly variation, high NO_2-N is in summer-autumn in estuarine and coastal waters and NO_2^- maximum layer, and in autumn-winter in other offshore area. However, the content of total inorganic nitrogen near the estuary of the Changjiang River is high which keeps high primary productivity, and it is not a limiting factor of phytoplankton. In the nitrogen cycle in the sea, the different thermodynamic free energy ΔG° in $NH_4^+ = NO_2^-$ and $NO_2^- = NO_3^-$, which shows the spontaneous degree of reaction, coincides with the reaction rate of kinetics dc/dt; it shows that there may be various catalysts, especially enzymes, in sea water owing to the activity of organisms, so there may be a relationship between ΔG° and dc/dt in the sea. After catalyst removes the potential barrier of kinetics of a spontaneous

reaction, the reaction will take place automatically and directly from initial state to final state, and the reaction rate of kinetics, dc/dt, may relate to the thermodynamic free energy, ΔG°, which shows the spontaneous degree of reaction.

KEY geochemistry, nitrogen, estuary, Changjiang, nitrite, ammonia, seawater, distribution, phytoplankton, regeneration, thermocline, seasonal variation, oxygen saturation, primary productivity, free energy, reaction rate, kinetics, enzyme, coastal waters, nitrification, thermodynamics

LANG Chinese, English abstract

NOTE Gu Hongkan was formerly Ku Hong-kan or Koo H.K.

88 AUTH Gu, Hongkan; Wei, Qingren; Wu, Yuying; Jiang, Chuanxian

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL Marine geochemistry of nitrogen near estuary of Yangtze River III Organic nitrogen in sea water near estuary

CITA Transactions of Oceanology and Limnology 2, 1-8 (1982)

ABST Organic-N, both total organic-N and dissolved organic-N, were measured during five cruises between August and December 1963. The horizontal distribution of organic-N near estuary of Yangtze River shows that the high concentration of organic-N is in estuarine water especially in August which is from 1200 and 1100 mg/m^3 at station 0401 (estuary) and 600 mg at station 0403 (offshore). High concentration of organic-N is also in some offshore water which have large amount of plankton. The source of organic-N is the river water and plankton. High concentration of organic-N in upper and bottom waters especially in estuary and August is the characteristic of vertical profile distribution of organic-N, which relates to the source

of organic-N that is mainly the river particulate-N and living plankton in upper water and the river particulate-N and dead plankton in bottom water. Monthly variation of organic-N except estuary shows that the high concentration is in August because of large amount of river water and plankton, and it decrease toward November. High percentage of organic-N, to inorganic-N, such as 91% to 9% in August in surface water at station 0405 and 64% to 36% in December, shows that the nitrification near the estuary is not enough due to the activity of large amount of plankton. High concentration of organic-N in estuary indicates the high fertility and high primary production near the estuary of Yangtze River.

KEY geochemistry, nitrogen, estuary, Yangtze River, organic nitrogen, seawater, distribution, concentrations, plankton, river water, nitrification, primary production, seasonal variation

LANG Chinese, English abstract

NOTE Gu Hongkan was formerly spelled Koo H.K. or Gu Hong-Kan

89 AUTH Gu, Hongkan; Xiong, Xiaoxian; Liu, Mingxing; Li, Yan

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1981

TITL Marine geochemistry of nitrogen near estuary of Yangtze River. I. Nitrate in sea water near estuary.

CITA Journal of Shandong College of Oceanology 11, 37-45 (1981)

ABST Marine geochemistry of nitrogen near estuary of Yangtze River was investigated during five cruises between August and December 1963. NO_3-N, NO_2-N, NH_4-N and organic -N were measured. High concentrations of NO_3-N, 150-220 mg/m^3, are in estuarine and coastal waters, and low concentrations, 0-5mg/m^3, are in offshore waters. It clearly shows that the high

concentration of NO_3-N is from Yangtze River water which takes NO_3-N etc. from nitrogen cycle along the river and partly from chemical fertilizer. The vertical profiled distribution of NO_3-N shows coincidence with the sigma-t. In summer, the low concentration of NO_3-N in upper layer is due to consumption by phytoplankton, and the high concentration below the thermocline is from regeneration from dead organisms. The monthly variation of NO_3-N shows that most of them in middle and upper layers are low in summer-autumn due to consumption and high in autumn-winter supplied by water vertical mixing. The high atomic ratio of NO_3-N/PO_4-P in estuary and low ratio in offshore water show the large influence of river water. High concentration of NH_4-N shows that the NH_4^+ -NO_2^- -NO_3^- system is in thermodynamic nonequilibrium state. However, the total inorganic nitrogen in estuarine area is high, and this is the chemical nutrient base of the famous fishing ground. In June 1980, a very high concentration of NO_3-N, 910mg/m^3, was found in estuarine water (J. Edmond), which is 4 times higher than in 1963. This increased NO_3-N is mainly from chemical fertilizer, which coincides with increase of fertilizer factories along the river, and with death and decrease of green frog, field snail and snake etc. in rice water field.

KEY geochemistry, nitrogen, estuary, Yangtze River, nitrate, seawater, cycle, rivers, phytoplankton, river water, thermodynamics, equilibrium, fertiltzer, density, organic nitrogen, nitrite, ammonia, phosphate, nitrification

LANG Chinese, English abstract

NOTE Gu Hongkan was formerly spelled Koo H. K. or Ku Hong-Kan

90 AUTH Gu, Hongkan; Liu, Mingxing; Li, Guoji; Bao, Wanyou; Zhang, Shoulin

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1983

TITL On the homogeneous distribution of trace metal ions in natural waters

CITA Kexue Tongbao, in press

ABST Gu et al. (1978-1980) observed that the concentrations and general speciation of Zn, Cd, Pb, Cu, Sn and Bi ions were similar in unpolluted waters from the China sea, river, lakes and wells and in rain water. This was interpreted as the trace metal ions being carried by the natural water cycle, which includes the in situ processes of sea water evaporation, rain and river run-off. No significent equilibration transfer takes place between trace metal ions and particulate phase at the pH of natural waters (7-8). In the natural water cycle the trace metal ions are carried with the water. The transfer is not determined by the energy of the metal ions and, consequently, the thermodynamics do not present a problem. Gu and Liu (1973,1974,1980) used their anti-adsorption physically coated mercury film electrode inverse polarography which determines only the free metal ions and unstable metal complexes. Metal in suspended matter and in stable complexes were not included in the determinations. Goldberg (1978) pointed out that there may be a movement of heavy metals from the surface of the sea to the atmosphere by an effect as yet not elucidated. This is an enigma. This paper presents and discusses data which show the homogeneous distribution of trace metal ions in natural waters throughout the water cycle.

KEY trace metals, natural waters, concentrations, speciation, rivers, lakes, rain water, pH, polarography, complex, zinc, cadmium, lead, copper, tin, bismuth, seawater, air-sea exchange, particulates

LANG English

NOTE Gu Hongkan was formerly Koo H.K. or Ku Hong-Kan

91 AUTH Gu, Lan; Ji, Shipu

AFFI Qingdao Experimental Station for Maritime Steel, Academy of Steel Research, Ministry of Metallurgy

DATE 1982

TITL Effect of belt structure and sulfide inclusions on behaviors of steel in sea water

CITA Journal of Marine Science 4, 30-32 (1982)

ABST Corrosion behaviors of low alloy steel and carbon steel immersed in sea water for two years are analyzed by electron probe microanalyzer and metalloscopy in this paper. The results show that belt structure and sulfide inclusions have an evident effect on growth rate of rusty layer.

KEY corrosion, steel, seawater

LANG Chinese, English abstract

92 AUTH Gu, Quanying; Kang, Xinglun; Zhang, Jinglei; Pang, Xuezhong; Wu, Yuying; Shen, Zhiliang

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1980

TITL Determination of corrosion property for some metals in sea water

CITA Transactions of Oceanology and Limnology 1, 53-58 (1980)

ABST Corrosion rate and electrode potentials of twelve copper-alloys, two stainless steel and one carbon steel have been determined by electrochemical method. The corrosion resistance of the stainless steel has been tested after being jointly welded in different

atmosphere in the marine condition. Some metal materials have been selected which have not only higher corrosion resistance but also more fouling resistance.

KEY determination, corrosion, metals, seawater, fouling, steel

LANG Chinese, English abstract

93 AUTH Gu, Tangxiu; Zhang, Tianfo; Hu, Zhaobin; Guo, Ruxin

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1981

TITL The source identification of crude oil pollution in the north of southern Yellow Sea

CITA Studia Marina Sinica, 73-85 (1981)

ABST This paper describes the source identification of crude oil pollution by means of gas chromatography employing a flame ionization detector and a flame photometric sulfur detector, illustrates the normal paraffin carbon-number distribution curve and gets the $(C_{21} + C_{22})/(C_{28} + C_{29})$ ratio for the identification. This procedure is applicable to source identification of crude oil pollution, as a part of marine pollution control, and is particularly useful to weathered crude oil.

KEY crude oil, pollution, Yellow Sea, sources, gas chromatography

LANG Chinese, English Abstract

NOTE Zhang, Tianfo is also spelled Zhang, Tianfu

94 AUTH Gu, Zhi-wei

AFFI Nanjing Institute of Geology and Palaeontology, Academia Sinica, Nanjing

DATE 1982

TITL Note on the check value of marine fossil beds for the age-dating of non-marine Mesozoic fossils in China.

CITA Acta Palaeontologica Sinica 21, 19-27 (1982)

ABST Prof. Yin Zhan-xun recently pointed out: "Traditionally the chronological standard was founded on the marine formations. Non-marine formations should be correlated with marine ones." On reviewing the investigative history two classic principles were adopted for the two different sedimentary formations, one is that of the Middle Jurassic Ziliujing formation in the red bed of Sichuan basin; the other, of the Upper Cretaceous Nengkiang formation in the Sunghuachiang-Liaoho plain of Northwest China. The accuracy and the limitations of age in the determination of age by non-marine fossils, both plants and animals, are briefly discussed. It is suggested that the geological age of Mesozoic non-marine fossils or fossil faunas should be checked not only by some marine fossil beds, but also by their distribution in the stratigraphic succession of geologic times.

KEY chronological standard, Jurassic, Cretaceous, age, fossil, Mesozoic, stratigraphy, dating, palaeontology

LANG Chinese, English abstract.

NOTE Gu Zhi-wei is also spelled Gu Zhiwei

95 AUTH Gu Zhiwei

AFFI Nanjing Institute of Geology and Paleontology, Academia Sinica

DATE 1982

TITL Distribution and development of nonmarine Mesozoic bivalves and formations in China

CITA Scientia Sinica (Series B) 25, 438-452 (1982)

ABST In this paper the author reviews the available materials on the nonmarine Mesozoic bivalves in China and divides these fossils into five faunas and several faunules according to their geologic ages. Their distributions are briefly summarized. The Early Cretaceous or TPN (Trigonioides-Plicatounia-Nippononaia) fauna marks the greatest event and vicissitude

in the developmental history of these faunas. Besides the subdivision and correlation of the nonmarine Mesozoic in China with the aid of these fossil bivalves the stratigraphical development and some phases of the Indosinian and Yanshanian tectonic cycles are briefly discussed and chronologically dated. The Early Cretaceous Mincheian movement is considered to play a more important role than the latest Middle Jurassic Ningchinian movement. The Mincheian with a younger uplift is essentially accordant with the results recently reached about Mid-Cretaceous events by international geological and palaeontological studies.

KEY dating, stratigraphy, palaeontology, age, Jurassic, Mesozoic, fossil, Cretaceous

LANG English

NOTE Gu Zhiwei is also spelled Gu Zhi-wei

96 AUTH Guan, Bin-sian; Zhen, Yi-fun; Ren, Yun-wu; Gan, Tze-chun

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1962

TITL The development and current status of ocean survey

CITA Oceanologia et Limnologia Sinica 4, 217-228 (1962)

ABST This article presents the history of ocean survey and its current status, with emphasis on physical oceanography.

KEY oxygen, marine chemistry

LANG Chinese

97 AUTH Guo, Jinnian; Li, Jianbo

AFFI Institute of Oceanology, Academia Sinica, Qindao

DATE 1982

TITL A preliminary study on the ratio Fe^{+++}/Fe^{++} and the oxidation-reduction in the marine sediments of Liaodong Gulf

CITA Journal of Marine Science 6, 9-14 (1982)

ABST The distribution of the ratio Fe^{+++}/Fe^{++} and the character of the oxide-reduction in marine sediments of Liaodong Gulf are described. The greater the ratio Fe^{+++}/Fe^{++} of the sediments, the more brownish is their color. Blackish if smaller. Most of sediments of Liaodong Gulf are oxidized or weakly oxidized. There is a clear boundary layer of oxide-reduction on the vertical section. Fe, Mn concentration in the oxidation layer is higher than in the reduction layer. The ratio Fe^{+++}/Fe^{++} in sediments decrease with increase of its depth.

KEY distribution, depth, sediments, iron, manganese, redox equilibrium, color

LANG Chinese, English abstract

98 AUTH Guo, Xudong

AFFI Institute of Geology, Academia Sinica, Beijing

DATE 1979

TITL Sea level changes since late Pleistocene in China

CITA Scientia Geologica Sinica 4, 330-341 (1979)

ABST Geological investigations made recently in coastal regions and continental shelf have offered some definite evidences on the sea level changes in China during Late Quaternary. Some peat and peaty deposits have been found in the bottom of the Bohai Sea, the north Huanghai Sea and the East China Sea. It is especially interesting that from the continental shelf of the East China Sea, were also found bones of big terrestrial mammals, brackish-water mollusks, shallow-water marine mollusks (relict shells), wood, peaty deposits as well as charcoal. Three chenier ridges are preserved on the coastal plain of the Bohai and the Donghai near Tianjin and Shanghai. Generally, raised coral reefs or coral limestones are distributed in the tropical areas along the South China Sea, such as Hainan island, Xisha island, south Taiwan and Nansha islands. According to radio carbon-14 dating

the sea level was higher about 40000 yrs. B.P. than today in the East China Sea. It dropped 36000 years ago at a depth of 70-80m below the present level. Since then, the sea level rose slowly to a depth of -40 to -30m at 25000-20000 yeas B.P. and it once again dropped to about -110m 15000 yrs B.P. Therefore, the author is inclined to regard the lowest strand line to be existing 15000 yrs ago, while the Qomolangma Feng glacial stage (maximum Wurm) reached its maximum glacier advance. During the post glacial stage, the sea level rose slowly until it was higher by 5-7m than the present level 5000-6000 yrs ago. The highest strand line during Holocene may have appeared 6000 yrs ago. The sea level was higher by 3-4m than today's level 3500-2500 yrs ago. About 1800 yrs ago the sea level had a tendency to drop and finally 200 to 70 yrs ago it changed especially remarkably with an amplitude greater than that in other parts of the world. Many climatic records related to the changes of sea level during Late Pleistocene indicate that sea level changes agree with the advances of continental glaciers and the evolution of ancient organism and that they are related to climatic fluctuations on land.

KEY sea level, continental shelf, Bohai, Huanghai, East China Sea, South China Sea, carbon-14, climate, glacier, dating, corals, Pleistocene, palaeontology, shells, limestone, interglacial, Holocine

LANG Chinese, English abstract

99 AUTH Han, Naibin; Lu, Zhongyi

AFFI Nanjing Hydraulic Research Institute, China

DATE 1983

TITL Settling properties of the Changjiang Estuary's sediment in salt water

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise Abstract, 81-82 (1983)

ABST The deposits in the entrance bar area of the Changjiang Estuary belongs to cohesive sediments. The settling behavior of the sediments in salt water may be described by the following: (i) flocculation settling; (ii) turbid-water level settling; (iii) consolidation settling. Based upon laboratory experiments critical conditions have been determined for the three ways of settlement. It is shown that the settling velocities in the flocculation and turbid-water level settling are related to sediment concentration, salinity, grain diameter and depth. Because of the impact of electrolyte, fine particles tend to group together into flocs. The settling velocities of the flocs do not vary simply with the grain size, and a peak settling velocity may occur. An optimum flocculation sediment concentration may be present when the settling velocity varies with the sediment concentration and an optimum flocculation salinity may occur when it varies with the salinity. These characteristic values depend on various factors such as salinity, sediment concentration, grain diameter etc. This fact makes the behavior of settling of the sediment extremly complicated. Using the experimental data, settling velocity formulae have been derived for the various settling regions.

KEY Changjiang, estuary, sediments, salinity, seawater, particulates, flocculation, settling velocity, grain size

LANG Chinese, English abstract

NOTE abstract only

100 AUTH He, Chengshun; Zhang, Guanxi

AFFI South China Sea Institute of Oceanology, Academia Sinica, Guangzhou

DATE 1980

TITL Preservation of trace mercury in water samples

CITA Nanhai Studia Marina Sinica 1, 175-179 (1980)

ABST The present study deals with the method of preserving mercury solution in polyethylene containers. Experiments show that 4 microgram/l of mercury can be preserved in distilled water with 0.1% $K_2S_2O_8$ and 1% NaCl and in seawater with 0.1% $K_2S_2O_8$ alone. In both solutions, no loss of mercury is found after 3 months storage. Satisfactory results have also been made by storing in field conditions seawater samples containing 0.05 microgram Hg/l with 0.1% $K_2S_2O_8$, and estuary water samples (salinity 1.6°/$_{oo}$S) containing 0.05 microgram Hg/l with 1% NaCl and 0.1% $K_2S_2O_8$, where 80% or so of mercury has been preserved after 23 days storage. These preservation compounds have been proved better than with HNO_3 and $K_2Cr_2O_7$. They are convenient to carry, safe to operate, and therefore, suitable for field sampling.

KEY preservation, mercury, seawater, estuary, storage

LANG Chinese, English abstract

101 AUTH He, Chengshun; Zhou, Kaifu; Zhang, Guanxi

AFFI South China Sea Institute of Oceanology, Academia Sinica, Guangzhou

DATE 1981

TITL The determination of mercury at ppt level in seawater by the enrichment with sulfhydryl cotton and cold vapour atomic absorption method

CITA Oceanologia et Limnologia Sinica 12, 33-40 (1981)

ABST In this paper a simple and sensitive method for the determination of organic and inorganic mercury at ppt level in seawater is described. The present method utilizes sulfhydryl cotton to enrich organic and inorganic mercury in the seawater. The enriched

organic mercury was first eluted with 10% NaCl + 1N HCl (or 2N HCl) and the inorganic mercury was eluted with 6N HCl saturated with sodium chloride. The eluted organic and inorganic mercury were determined by cold vapour atomic absorption method. Owing to the simplicity of apparatus and convenience of operation, it is available to operate on board ship. The precision of the above method is rather high. The relative standard deviation for 20 ng/l of organic mercury is 6.4% and for 15 ng/l of inorganic mercury is 6.6%. The recovery percentage of methyl-mercury is about 80-100% and of inorganic mercury is about 96-110%. In comparision of this enrichment of sulfhydryl cotton and cold vapour atomic absorption method with reduction-aeration preconcentration at ordinary temperatures, the same results are obtained. The sensitivity of determination reaches 1 ng Hg/l when 1 liter of seawater sample is used for analysis.

KEY determination, mercury, seawater, atomic absorption

LANG Chinese, English abstract

102 AUTH He, Liangbiao; Zhao, Quanji; Zhang, Deyu; Zhao, Kuihuan; Peng, Hanchang; Chen, Suitian

AFFI First Institute of Oceanography, National Bureau of Oceanography, Qingdao

DATE 1982

TITL Volcanic debris and clay minerals in the deep-sea sediments of the Western Central Pacific

CITA Acta Oceanologica Sinica 4, 450-461 (1982)

ABST The analyses on the volcanic debris and clay minerals of about 100 samples taken from 12 stations located in the Western Central Pacific are described in this paper. The volcanic debris is determined by means of microscope in the heavy mineral laboratory, and the clay minerals by X-ray diffraction, thermal analysis and electron microscope in the clay mineral laboratory. The volcanic debris of the area studied

is the product of oceanic volcanic eruption, which constitutes the main component and source of the deep-sea sediments. It has the character of tholeiite and andesite. The mineral association of the volcanic debris becomes complicated and metamorphosed due to the frequent eruptions of oceanic volcano in this area. The clay mineral composition of the said area is composed of montmorillonite, kaolinite, chlorite and illite, with montmorillonite predominant (50-70%). The volcanic debris (especially the volcanic ash) and the wind-transported matter are the main sources of the clay minerals in this area. In this area, the abundant montmorillonite results from the weathering and alteration of volcanic ash at the quite deep-ocean floor where alkaline is weak(pH=7-8), Fe rich and Si:Al ratio high. The alternating changes of the climate from warm to cold during the geological history made the content of montmorillonite in the cores change correspondingly from a lower level to a higher. Therefore the studies of the volcanic debris and clay minerals are of great significance for research on the property, strength, mode of oceanic volcanic action, the character of oceanic crust, on the physico-chemical and geochemical environments which pelagic sediments are in, and on the determination of the sediment character and sediment process of the core.

KEY clay minerals, sediments, Pacific Ocean, kaolinite, chlorite, illite, montmorillonite, pH, volcanic ash, iron, silica, aluminum, X-ray diffraction, air-sea exchange, climate

LANG Chinese, English abstract

103 AUTH He, Mingxia; Liu, Zhishen; Qiu, Zhen

AFFI Department of Marine Physics, Shandong College of Oceanology

DATE 1982

TITL Real-time optical information processing for ocean remote-sensing images

CITA Jouranl of Shandong College of Oceanology 12, 35-38 (1982)

ABST This paper describes a white-light image processing system using new optical method for oceanic remote-sensing images. Landsat photographs and airborne remote-sensing images of Chinese coast area have been processed. The experimental results showed that this technique is very desirable for practical application, in coastal zone survey, for example, length of coastal line, shoal patch in shallow sea areas, silt distribution of river mouth, ocean surface pollution as well as analysis of sea current and ocean wave.

KEY remote sensing, pollution, seawater, river water

LANG Chinese, English abstract

104 AUTH He, Qingxi; Fang, Ping; Zhuang, Jihong; Luo, Weiquan

AFFI South China Sea Institute of Oceanology, Academia Sinica

DATE 1982

TITL Preliminary study on chemical forms of cadmium in the water body of Zhujiang estuarine area and the rule of their distribution

CITA Tropic Oceanology 1, 176-183 (1982)

ABST A preliminary investigation on chemical forms of cadmium, a serious environmental pollutant in the water body of Zhujiang estuarine area was carried out, and the rule of their distribution has been studied. The analytical method in which a Model AD-1 polarograph is used to determine five chemical forms of cadmium - inorganic strongly bound (Cd_{ISB}), inorganic weakly bound (Cd_{IWB}), organic bound (Cd_{OB}), labile(Cd_L) and particulate(Cd_P), is briefly described. Results show that in the water body soluble cadmium species, including Cd_{ISB}, Cd_{IWB}, Cd_{OB}

and Cd_L, account for about 75% of the total, while Cd_P only about 25%, of which Cd_{ISB} is 41%, Cd_L 19%, Cd_{OB} 9% and Cd_{IWB} 6%. However, this is an average calculation of distribution. Each form distributes differently in the different area, i.e. fresh water area, brackish water area and sea water area. For instance, from fresh water area to sea water area, content of Cd_P gradually decreases; Cd_{ISB} content almost remains the same, whereas Cd_L gradually increases. In this paper, we attempt to study, theoretically and practically, the possible causes which bring about the changes when the cadmium species are being transported. In addition, the general survey of cadmium pollution in this estuarine area has also been discussed.

KEY cadmium, distribution, speciation, pollution, estuary, thermodynamics, polarograph, seawater, fresh water

LANG Chinese, English abstract

105 AUTH Hong, Jiazhen; Lin, Shengcai; Li, Faxi

AFFI Department of Oceanography, Xiamen University, Xiamen, China

DATE 1983

TITL Determination of the redox properties of the sediment samples from East China Sea by electrode methods

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise Abstract, 139-140 (1983)

ABST 22 near-shore sediment core samples were collected from the Changjiang Estuary. Eh, pH acid-volatile sulfur content of the sediment samples were measured using Pt, glass, and Ag/Ag_2S electrodes, while conductivity and ammonia in the interstitial waters were determined by conductivity cell and NH_3 electrode respectively. The profiles of these properties show that all of Eh decrease with increasing depth, and

that the oxic-anoxic boundaries are exactly where the water-sediment interfaces are for over half of the stations, and below them for the rest of the stations and that the overlying waters throughout are oxygenated. In most of the cores taken, the minimal Eh value measured for each 20-25 cm core varies between 0 mV and +60 mV. While some cores show lower Eh value, the lowest one even reaches -118 mV. The pH is in the range of 7.0-8.0. The acid-volatile sulfur is rather low. The results suggest that most of sediments are under slightly reducing conditions. The environmental conditions of these sediments were also simulated in the laboratory, and the responsal mechanism of Pt electrode and the application of Ag/Ag_2S electrode were studied. The initial results show that potential of Pt electrode is reversibly responded by $S(s)/SH^-$ couple for the strongly reducing sediment and dominated by $Fe^{++}/Fe_2O_3(s)$ couple for the slightly reducing samples. It is found that Ag/Ag_2S electrode is also useful for redox property determination of sediment.

KEY Eh, pH, Changjiang, sulfur, conductivity, ammonia, interstitial water, sediments, East China Sea, thermodynamics, iron, redox-equilibrium, electrode

LANG Chinese, English abstract

NOTE abstract only; Li Faxi was formerly spelled Li Fa-Si.

106 AUTH Hong, Zhunzhan

DATE 1981

TITL Sound velocity in water

CITA Oral Report of the Western Central Pacific, Ocean Press, 54-62, (1981)

ABST The horizontal and vertical distributions of sound speed and the sound channel are discussed in the Western Central Pacific.

KEY distribution, sound speed, sound channel, Pacific Ocean

LANG Chinese

107 AUTH Hou, Bao-rong
AFFI Institute of Oceanology, Academia Sinica, Qingdao
DATE 1981
TITL Corrosion behavior of zinc coating in marine environment
CITA Transactions of Oceanology and Limnology 2, 16-19 (1981)
ABST Corrosion behavior of zinc coating is investigated with simulative corrosion experimental set-up for marine environment. It is demonstrated that zinc coating has a good corrosion resistance in marine atmospheric zone, tidal zone, submarine zone and splash zone, and is suitable to be applied in marine environments. If steel construction is coated with zinc only in the tidal zone, not in the submarine zone, zinc coating will be rapidly dissolved by macro-cell action, hence it is inapplicable.
KEY corrosion, zinc, coating, steel, seawater
LANG Chinese, English abstract.
NOTE Hou Bao-rong is also known as Hou Baorong

108 AUTH Hou, Baorong
AFFI Institute of Oceanology, Academia Sinica, Qingdao
DATE 1981
TITL An experimental method investigation on corrosion of the structural steel for marine application
CITA Studia Marina Sinica 18, 87-95 (1981)
ABST In present paper, a method was developed to simulate offshore conditions for screening steel materials for marine application. The device used was described. By using the device, the rise and fall of sea water level can be controlled automatically, and waves can be brought about with a simple wave-making machine installed in the cement tank. The experiments were carried out in the tank with flowing sea water. Thus,

in a $3m^3$ tank different marine corrosion environments such as atmospheric zone, splash zone, tidal zone and submerged zone can simultaneously be shown as well as offshore zone. In addition a brief account was given to the long-scale hanging specimens, the separate hanging specimens, and the hanging specimens connected electrically. The results obtained are as follows: 1. The corrosion laws made by this method in 195 days (Fig. 2) are similar to those made by others in Kure beach [16] in 151 days. Those results show that the device may demonstrate offshore conditions. 2. The corrosion law of tape-shaped steel materials in various conditions would be shown by means of the method connecting many small pieces of steel with wires (Fig. 3 and 4). 3. From Fig. 5 we can see that the results obtained are very similar, though the distance between steel pieces is unequal in the long scale hanging specimens connected electrically. 4. A comparison of Fig. 6 and 10 shows that the sequence of the extent of corrosion of steel specimen in present experiments are similar to those made in other sea regions. From above results, therefore, it might be concluded that this method is a simple, convenient and accurate one, and is suitable for screening steel materials for marine application.

KEY steel, seawater, corrosion

LANG Chinese, English abstract

NOTE Hou Baorong is also spelled Hou Bao-rong

109 AUTH Hou, Baorong

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL Comparative studies on the methods of hanging specimens connected electrically, intermittent immerse wheel and individually hanging specimens.

CITA Journal of Marine Science 2, 22-26 (1982)

ABST The experimental method of hanging specimen connected electrically is further introduced in this paper. The results obtained by this method from the 195-day and 400-day tests made in Qingdao area are being compared with those from the 194-day test made earlier in Qingdao and the 400-day test made along the seashore of Beihai, Guangxi province respectively. The correlation of results obtained by this method for ten steels with that from individually hanging specimen has been observed. Experimental results of 8 species of steel specimens are analysed and compared with results obtained by intermittent immerse wheel also.

KEY steel, corrosion, seawater

LANG Chinese, English abstract

NOTE Hou Baorong is also spelled Hou Bao-rong

110 AUTH Hou, Baorong; Zhang, Jingrei

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1980

TITL Corrosion behavior of steel in the tidal and submersible zone

CITA Journal of Marine Science 14, 16-19 (1980)

ABST Corrosion behavior of steel in the tidal zone and the submarine zone was investigated.

KEY seawater, corrosion, steel

LANG Chinese

NOTE Hou Baorong is also spelled Hou Bao-rong

111 AUTH Hou, Ying; Zhang, Yong

AFFI Institute of Geochemistry, Academia Sinica, Guiyang

DATE 1982

TITL Determination of manganese valence and active oxygen and study of mineral equilibrium in manganese ore

CITA Annual Report Institute of Geochemistry, Academia Sinica (1980-1981), 174-175 (1982)

ABST In this paper the method is described for the determination of manganese differing in valence, and active oxygen. The problem of mineral equilibrium is also discussed based on analytical data and thermodynamic approach.

KEY manganese, oxygen, valence, equilbrium, thermodynamics, pH, Eh, resources

LANG Chinese, English abstract

112 AUTH Hu, Ming-hui; Stallard, R.F.; Edmond, J.M.

AFFI Department of Earth and Planetary Sciences E34-201, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139, USA

DATE 1982

TITL Major ion chemistry of some large Chinese rivers

CITA Nature 298, 550-553 (1982)

ABST There is very little information available in the western literature on the chemical compositions of the major rivers of the People's Republic of China. Since these include the largest in terms of sediment transport (Huanghe or Yellow River), the third largest in terms of flow (Changjiang or Yangtze River) and major streams draining the Tibetan plateau, this lack of data represents a significant gap in our knowledge of the chemical denudation rates of the continents as a whole and of south, central and eastern Asia in particular. To begin to rectify this situation, advantage has been taken of recent visits by US scientists to the People's Republic of China to collect suitable samples for analysis. It was found that the chemistry of such rivers is dominated by the weathering of carbonates and evaporites, with no pronounced effects of the degradation of aluminosilicates.

KEY major ions, rivers, Huanghe, Changjiang, compositions, weathering, carbonates, evaporite, aluminosilicate, Yellow River, sodium, potassium, magnesium, calcium, chloride, sulfate, silica, alkalinity

LANG English

NOTE Hu Ming-hui's permanent address is Department of Oceanography, Amoy University, Xiamen, Fujian Province, People's Republic of China. R.F. Stallard's present address is Department of Geological and Geophysical Sciences, Princeton University, Princeton, New Jersey 08544, USA.

113 AUTH Huang, Huarui; Zheng, Shunqin; Gu, Tangxiu; Zhang, Tianfu; Hu, Zhaobin; Liu, Mingxing; Guo, Ruxin

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1981

TITL Identification of marine oil pollution source

CITA Transactions of Oceanology and Limnology 3, 23-27 (1981)

ABST Absorption ratios of ultraviolet spectrograph, total sulphur content and gas chromatogram of normal paraffin (ratios of normal paraffin peak heights) have been used for identification of marine oil pollution sources. These methods have been proved to be successful for the determination of oil pollution source in N.H. Sea and B. Sea. Methods can be used to identify the marine surface oil and the residual oil on the beaches.

KEY pollution, sources, gas chromatography, crude oil, spectroscopy, UV

LANG Chinese, English abstract

NOTE The source regions of the samples were identified only as N.H. Sea and B. Sea in the text, Zhang, Tianfu is also spelled Zhang, Tianfo.

114 AUTH Huang, Qi; Cai, Biqin; Yu, Junqing; Chang, Hong; Pu, Hong

AFFI Qinghai Institute of Saline Lake, Academia Sinica

DATE 1981

TITL The determination of the age of the salt lakes in China

CITA Oceanologia et Limnologia Sinica 12, 41-48 (1981)

ABST The article discusses the benzene synthesis vacuum line for radiocarbon dating. There are three major steps in the chemical conversion of the sample to benzene. They include: (1) the conversion of the sample to CO_2; (2) the conversion of the CO_2 to acetylene and (3) the conversion of the acetylene to benzene. The conversion of the CO_2 to lithium carbide is described in detail. The highly active supported chromia alumina catalyst (CrO_3-Al_2O_3-SiO_2 catalyst) for the synthesis of benzene from acetylene was applied. The optimized chemical output of the synthesized benzene has surpassed 95%; the total recovery of the conversion of the sample to benzene has been more then 80%.

KEY salt lakes, dating, carbon-14

LANG Chinese, English abstract

115 AUTH Huang, Shanggao; Yang, Jiadong; Ji, Weidong; Yang, Xulin; Chen, Guoxiang

AFFI Third Institute of Oceanography, National Bureau of Oceanography, Xiamen, China

DATE 1983

TITL Reactive silicon, nitrogen, phosphorus nutrients in the Changjiang estuarine water

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise Abstract, 42 (1983)

ABST Concentration ranges of NO_3^--N, PO_4^{-3}-P, SiO_3^{-2}-Si in 1981 were 3.8-77.4, 0.09-0.92, 18.6-171 μg-at/l respectively. NO_3^--N was 95-97% of three nitrogen species. Ammonium could be completely converted in

some areas in August, and NO_2^--N in November. Atom ratio of NO_3^--N to PO_4^{3-}-P reached 88-150. Silicate showed positive relationship with nitrate, and both showed negative relationship with salinity. Phosphate appeared to have a buffering effect in November, its concentration maintaining at 0.34-0.06 μg at/l. Runoff of the Changjiang River and the upwelling of eastern bottom water had important effects on the space and time distribution of these constituents. Neither silicon, nitrogen nor phosphorus was the limiting factor for biological growth and their output fluxes were 316 * E+4 Si, 78 * E+4 N, 0.81 * E+4 P tons per year.

KEY silicon, nitrogen, phosphorus, nutrients, Changjiang, ammonia, river water, seawater, estuary, nitrante, nitrite, phosphate, silicate, concentrations, salinity, upwelling

LANG Chinese, English abstract

NOTE abstract only

116 AUTH Huang, Xineng

AFFI South China Sea Institute of Oceanology, Academia Sinica, Guangzhou

DATE 1982

TITL Distribution of the chemical elements in the waters south of Taiwan Strait

CITA Taiwan Strait 1, 11-19 (1982)

ABST Based on the data of salinity, dissolved oxygen, pH, dissolvable inorganic phosphate and active silicate, obtained from 8 stations close to the south of the Taiwan Strait in the northern part of the South China Sea, during the period from June through July, 1979, on board the R/V SHIYAN of the South China Sea Institute of Oceanology, Academia Sinica, the present paper describes their horizontal and vertical distributions and diurnal changes, separately and preliminary analyses of their distributions.

KEY distribution, Taiwan Strait, salinity, oxygen, pH, phosphate, silicate, diurnal changes

LANG Chinese, English abstract

117 AUTH Huang, Yipu; Shi, Wenyuan; Chen, Weiqi; Li, Kunning; Xie, Jianguo

AFFI The Department of Oceanography, Xiamen University, Xiamen, China

DATE 1983

TITL An investigation for the determination of sedimentation rate of continental shelf in the East China Sea using Pb-210 dating technique

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise Abstract, 108-109 (1983)

ABST The Pb-210 profiles have been determined of three sediment cores collected from the Changjiang Estuary and continental shelf in the East China Sea, by using a modified ion-exchange procedure for separation and purification of Pb-210. A low-level-detector of native product was used for the measurement of Pb-210 (Bi-210) activity. The sedimentation rate of two cores were calculated by introducing density in situ for estimating corrected depth. The sedimentation rate, sedimentation flux and input flux of Pb-210 at the station G8133 were 0.64 cm/y, and 2.00 dpm/cm^2/y respectively; the corresponding values at the station G8134 were 0.27 cm/y, 0.19g/cm^2/y and 0.84 dpm/cm^2/y respectively. However, it was found that the sedimentation rate at the station G8140 could not be calculated based on the observed Pb-210 profile within the collected depth. The results show that the Pb-210 dating technique is suitable for the station G8133, and G8134. It is also indicated that the modified ion-exchange procedure for separation of Pb-210 is accurate, reliable and simple.

KEY East China Sea, sedimentation rates, lead-210, continental shelf

LANG Chinese, English abstract

NOTE abstract only

118 AUTH Huang, Yu-yao

AFFI Institute of Zoology, Academia Sinica

DATE 1964

TITL The physical and chemical properties of the water in San-men-xia reservoir

CITA Oceanologia et Limnologia Sinica 6, 97-108 (1964)

ABST San-Men-Xia reservoir is situated at the middle reaches of the Yellow River and at the border region of Shansi, Shensi and Honan provinces. It is one of the largest reservoirs so far built in China, occupying an area over 1,500 square kilometer with a maximum depth over 50 meters. It was filled in September, 1960. Our investigations were carried out once quarterly (except at the Tong-Guan station, where the surveys were made monthly) during the period from March, 1961, to February, 1962, at 13 points. The results of the investigations on the physical and chemical properties of the water are as follow: The transparency of water was rapidly and remarkably increased after the reservoir was filled. The maximum transparency reached up to 160 cm in the lower part of the reservoir, where it was only 4 cm before filling. The water temperature ranged between wide limits, with 1.6 degree C in Febraury and 27.0 degree C in August. The water temperature in the upper part of the reservoir varied more widely than that of the lower part, but not being remarkably different between the surface and bottom water at any time in our investigations. The dissolved oxygen was generally rich: On the surface, it ranged between 6.3 and 12.3 mg/L(degree of saturation 56.4-90.4%); and at the bottom, 5.0-7.5 mg/L (degree of saturation

60.4-74.9%). The free carbon dioxide is generally low, it was from 0 to 5.3 mg/L. The pH values ranged between 7.9-8.3. The dissolved organic matter ranged between 3.8 and 39.7 mg/L, the content at the bottom layer was higher than on the surface. The dissolved nutrient salts are comparatively rich, but quite variable in contents: NO_3^-, 0.12-0.61 mg/L; PO_4^{3-}, 0-0.12 mg/L: Fe, 0.03-0.47 mg/L; SiO_2, 3.3-7.3 mg/L. These salt contents of the lower part of the reservoir were remarkably lower than that of the upper part, particularly before the reservoir was filled. All the salts were very homogeniously distributed in the water from surface layer to the bottom, usually lower in spring and summer, and higher in autumn and winter. The hardness of water was 6.7 degree 12.9 degree. The $K^+ + Na^+$, Ca^{2+}, Mg^{2+}, HCO_3^-, SO_4^{2-}, and Cl^- were considerably high in amount, ranging from 300 to 520 mg/L. According to Aleking's classification, the water of San-Men-Xia Reservoir belongs to the type of "C_I^{Ca}" or "C_{II}^{Ca}".

KEY Yellow River, transparency, oxygen, carbon dioxide, pH, temperatures, organic matter, hardness, lake waters, nitrate, phosphate, silicate, iron, potassium, sodium, calcium, magnesium, bicarbonate, sulfate, chloride

LANG Chinese, English abstract

119 AUTH Huang, Zhansheng; Zhang, Dunhuang

AFFI Xiamen University

DATE 1982

TITL Determination of boron in sea water by spectrometry using the strips of filter paper -- solution technique

CITA Acta Oceanologica Sinica 4, 516 (1982)

ABST Boron in seawater was determined by spectroscopy. An unidentified seawater was found to contain 3.72 ppm boron.

KEY spectroscopy, concentrations, determination, boron, seawater

LANG Chinese

120 AUTH Ji, M. H.

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1963

TITL Studies on the chemical composition of the Chinese economic brown seaweeds II. Seasonal variations in the main chemical components of Laminaria japonica, Sargassum pallidum and Sargassum kjellmanianum from the North China

CITA Oceanologia et Limnologia Sinica 5, 1-10 (1963)

ABST In this paper studies were undertaken on the seasonal variations in the chemical composition of the artificially cultivated Laminaria japonica taken from Tsingtao in 1958-1959 and from Dalian (Talien) in 1959, and of the wild Sargassum pallidum and S. kjellmanianum collected in Tsingtao in 1954-1956 and 1957 respectively. In the Laminaria japonica cultivated in Tsingtao the alginic acid content reached a maximum of 32% in June, 1958, followed by a gradual decrease, the period from Sept. to Oct. being the depressing season in content. Thereafter it increased again with a maximum of 26% in May, 1959, and then declined gradually, from July to Sept. being again the season giving lower content. The mannitol content fluctuated in contrary with the alginic acid. In 1958 a minimum of 11% was found in July and a maximum of 28.4% in Sept., while in 1959 it commenced from April to increase to a maximum of 29.8% again in Sept. The variation of crude protein content differed from the general trend shown by the earlier workers in being contrary to the variation of alginic acid. Its content was in the minimum from May to July and in the maximum in Aug./Sept. 1959. The variation of crude fiber content was not conspicuous, the period from May

to July being a season giving somewhat higher content. A pronounced parallelism was always found between the curves of ash and potassium contents. The iodine content fluctuated irregularly (Tab. 1 and Fig. 1). In the Laminaria japonica taken from Dalian, the variation of alginic acid showed similar tendency as that taken from Tsingtao in 1958, but an inverse tendency took place in 1959. The characteristic feature of Laminaria japonica in Dalian was that its mannitol content was always lower than in Tsingtao (Tab. 2 and Fig. 2). As with the Sargassum pallidum taken from Tsingtao, the fluctuation of alginic acid content resembled in general that shown in the previous work, the maximum occurring in winter and the minimum in summer. The mannitol content varied in inverse relation to the alginic acid and crude protein. The data obtained during the second half of the year 1955, however, appeared to be parallel to the variation of crude protein. The variations of ash and potassium were in coincidence with that of alginic acid, but in contradiction to that of mannitol (Tab. 3 and Fig. 3). In the Sargassum kjellmanianum taken from Tsingtao the variation of alginic acid content was approximately similar to that shown in the earlier work. The mannitol content varied just opposite to the alginic acid content, showing the maximum in spring from Jan. to April, and the minimum in summer from June to August. The crude protein content reached the highest value of about 30% in April/May and the lowest value of 11% in August. One of the outstanding features in Sargassum kjellmanianum is that the crude protein content is always considerably higher than that found in the other species, and the inverse variation of the ash and alginic acid contents forms another characteristic feature in this alga (Tab. 4 and Fig. 4).

KEY compositions, seaweeds, potassium, marine resources, protein, iodine, seasonal variation

LANG Chinese, English abstract

NOTE Ji M.H. is also known as Ji Minghou or Ji Ming-Hou

121 AUTH Ji, M. H.; Zhang, Y. X.

AFFI Insitute of Oceanology, Academia Sinica, Qingdao

DATE 1962

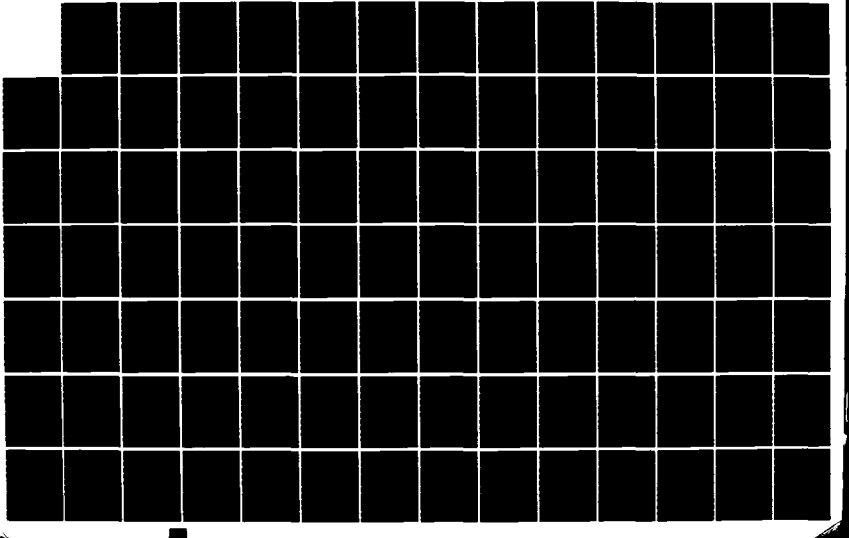
TITL Studies on the trace elements in seaweeds

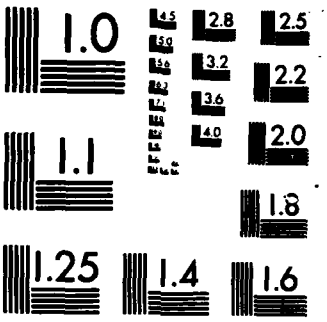
CITA Oceanologia et Limnologia Sinica 4, 38-48 (1962)

ABST 7 samples (5 species) of Chlorophyceae, 13 samples (12 species) of Rhodophyceae and 30 samples of Phaeophyceae (14 sp. and 10 samples determined to the genus only), collected on the China coast, were spectrographically analyzed by using NCπ-22 type Quartz Spectrograph. The results show that Na, Mg, Ca, Fe, Si, K, Al, Ba, B, Be, Ti, V, Sr, Ag, Ni, Zn, Co, Cr, Li, Mn and Cu were found in practically all the samples analyzed and in few samples Sn, Pb, and Cd were also found. In all the samples, the trace elements Sr, Ti, V, Cu, Mn, Ni and Ag were quantitatively analyzed. It has been found that in Chlorophyceae Sr, Ti and Cu are generally more abundant, then Mn, and finally V; Ag and Ni occur in small amounts. It has attracted our attention that Halimeda macroloba, a common tropical seaweed in the South Sea region, contains a considerably high amount of Sr and Cu, reaching 8,200 and 5,500 mg/kg respectively (Table 1). In Rhodophyceae, Gelidium divaricatum, Eucheuma sp., Caloglossa lepriurii and a common calcareous species, Corallina officinalis accumulated comparatively more Sr than the others, being 610-960 mg/kg. It is surprising to find in Caloglossa lepriurii large amounts of Ti and Cu, reaching 1,900 and 2,360 mg/kg respectively (Table 2). Seasonal variation studies of the trace elements in Gelidium amansii showed that all elements determnined

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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

give high values in autumn i.e. in Sept. and Oct., and low values in winter i.e. in Dec. (Table 3 and Fig. 1). In Phaeophyceae, the Sargassums are generally rich in Sr and Cu (Table 4). Although the seasonal variation of trace elements in Sargassum pallidum was in general rather irregular, in the case of the Sr content, however, there was some tendency to be somewhat higher in winter, i.e. from Nov. to Jan., and lower in summer (Table 5 and Fig. 2). The ratios of the trace elements concentration in Sargassum pallidum (fresh weight) to those in sea water were also investigated, and it was found that Sr in the Sargassum was 20-70 times, Ti 900 times, V 2,000 times, Mn 700 times and Cu 400-3,000 times more than those in sea water (Table 6).

KEY trace metals, seaweeds, seawater, marine resources, sodium, magnesium, calcium, iron, silicon, potassium, aluminum, barium, boron, beryllium, titanium, vanadium, strontium, silver, nickel, zinc, cobalt, chromium, lithium, manganese, copper, vanadium, tin, lead, cadmium, seasonal variation, bioaccumulation

LANG Chinese, English asbstract

NOTE See Note 120

122 AUTH Ji, M. H.; Zhang, Y. X.

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1962

TITL Studies on the chemical composition of the Chinese economic brown seaweeds I. Main chemical components of the various species of brown seaweeds

CITA Oceanologia et Limnologia Sinica 4, 161-168 (1962)

ABST With a view to obtaining the necessary, fundamental data for the utilization as well as the physiological and biochemical studies of the brown seaweeds in our country, we have quantitatively analyzed the contents of the main chemical components including ash, iodine, potassium, mannitol, alginic acid, crude protein and

crude fiber in various species of the economic brown seaweeds collected on the China coast. Of the 79 samples analyzed 8 belong to Laminariaceae (4 spp.), 51 to Sargassaceae (40 samples identified to 12 spp. and 11 to genus only), 1 to Fucaceae (1 sp.), 4 to Ishigaceae (2 spp.), 1 to Cystoseiraceae (1 sp.), 10 to Puncuariaceae (4 spp.) and 4 to Dictyotaceae (2 identified to 2 spp. and others to genus only). The results obtained may be summarized as follows (Tab. 1): 1. The alginic acid content in Laminariaceae exhibits about 20-30% on the dry basis, somewhat higher than that in the other brown seaweeds ranging from 15 to 25%. Of the southern spp. Sargassum horneri and Ishige okamurai are higher in alginic acid, reaching 25-31%, and seem to be good raw materials for algin production. 2. The mannitol content is comparatively higher in the northern samples than in the southern ones. In Laminariaceae it exhibits about 10%, a few of them may reach 19%. The northern Sargassums contain about 10%, most of the southern spp., however, are poor in mannitol with values lower than 7%, even only 1-3%. 3. The data of iodine content show the highest value of about 0.3% in Laminaria and Ecklonia, and about 0.03% in Sargassums. It draws our attention that the Sargassums growing on the northern China coast usually contain about 0.03% of iodine, S. vachellianum from Fukien province about 0.1%, and many Sargassums from Kwantung province as high as 0.22-0.32%, exhibiting a tendency of gradual increase from the north to the south. 4. The crude protein content in Laminaria and Undaria varies from 5 to 20%, while in Sargassum kjellmanianum and S. thunbergii a higher content of protein occurs, in most cases exhibiting 17-25%. 5. The ash content in brown seaweeds generally ranges from 25 to 35%, and the

potassium content, as a rule, varies with the ash content. 6. The crude fiber in Laminariaceae usually amounts to 2-5%, and in the Sargassums to 3-9%.

KEY compositions, iodine, potassium, protein, marine resources, seaweeds

LANG Chinese, English abstract

NOTE See Note 120

123 AUTH Ji, Minghou; Cao, Wenda; Han, Lijun

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1981

TITL Determination of uronic acid components in alginic acid

CITA Oceanologia et Limnologia Sinica 12, 240-248 (1981)

ABST The present paper deals with the methods of preparation and determination of mannuronic acid and gluronic acid in alginic acid with reference to Fischer's hydrolysis condition and Haug's fractionation method, and with some improvements. The standard curve of two uronic acids were prepared as follows: 4g. of sodium alginate were hydrolyzed with 80% H_2SO_4 for 18 hrs and then with Nn H_2SO_4 at 100°C for 5 hrs. The hydrosyzate was allowed to pass through a column of Dowex 1X2 anion exchange resin in acetate form and was fractionated by a gradient elution with acetic acid (0.5-2N) (Fig. 3), containing 120ml of eluate in each fraction. The eluates showing two uronic acids after identification by paper chromatography were combined in two portions. Each portion was evaporated under diminished pressure, submitted to a column of cation exchanger, and evaporated again to eliminate the trace of acetic acid. A small amount of anion exchanger were added to the syrup solution to remove the color and the residual anions. The solution after adding an excessive amount of NaOH solution to transform uronic acids into Na salts was passed through a column of

cation exchange resin. A definite volume of effluent was titrated with NaOH solution to determine the contents of two uronic acids, with which the standard curves were prepared. Various colorimetric conditions such as the amount of phenol used, the wave length of absorption, the velocity of the addition of acid and the stability of developed color were ascertained as well. (Fig. 4, 5, 6; Tab. 3). The destroying ratio of M/G was determined as 1:1.46, so the M/G ratios obtained were calibrated by multiplying the correction coefficient 0.68. (Tab. 2). Sodium alginate samples from different species of Chinese brown seaweeds were treated by acid hydrolysis, absorption on resin, elution with acetic acid and fractionation, and their M/G ratios were determined by colorimetry and calculation from the standard curves (Tab. 4).

KEY determination, uronic acid, resin, paper chromatography, ion-exchange, colorimetry

LANG Chinese, English abstract

NOTE See Note 120

124 AUTH Ji, Minghou; Cao, Wenda; Han, Lijun

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL Studies on marine humic substances I. Isolation of humic substances from seawater with an effective adsorbent, GDX-102 adsorption resin

CITA Oceanologia et Limnologia Sinica 13, 370-379 (1982)

ABST The adsorption efficiencies of both GDX-102, a China-made adsorbent, and Amberlite XAD-2 for humic substances from seawater were comparatively investigated. Results obtained indicated that GDX-102 resin adsorbed the hydrophobic organic compounds more effectively than XAD-2 did, and both resins did not adsorb the hydrophilic organic compounds such as amino acids and sugars. After adsorption, the humic substances were eluted with 1N NH_4OH solution from the

resin column, and then the ethanol-soluble and ether-soluble matters containing fatty structure and more hydrophobic organic compounds were eluted with ethanol and ether, successively. Under the same conditions, the adsorption yield of humic substances from seawater by GDX-102 resin was 2.24 times higher and the flow rate through resin column was 1.5 times faster than that by Amberlite XAD-2. The authors, therefore, deem that GDX-102 resin is a more effective adsorption resin than Amberlite XAD-2 for humic substances from seawater. The preliminary chemical characterization of fulvic and humic acids from seawater obtained by both resins on elementary analysis, UV-absorption spectra, IR-absorption spectra and gel electrophoresis was carried out. The elementary composition and the distribution of molecular weight of FA isolated by the authors from seawater are essentially a kin to those of FA from Sargassum Sea, characterized by Stuermer et al., but the IR-absorption spectra of FA accord with that of FA from soil by Schnitzer. The ethanol-soluble matters seem to be a group of organic matters differing from HA and FA in elementary composition and IR-absorption spectra, and containing more hydrophobic portions. The liquid chromatography of the ether-soluble matters shows the presence of a lot of polynuclear aromatic hydrocarbons (PAH), mainly originating from fossil fuel by human activities. The GDX-102 resin might be used as a suitable adsorbent for PAH from seawater as well.

KEY humic material, seawater, adsorbent, adsorption resin, UV, IR, hydrocarbon, fossil fuel, humic acid, fulvic acid, spectroscopy

LANG Chinese, English abstract

NOTE See Note 120

125 AUTH Ji, Minghou; Pu, Shuzhu; Ji, Xiangli

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1980

TITL Studies on the initial products of C-14 metabolism in Laminaria japonica

CITA Oceanologia et Limnologia Sinica 11, 229-240 (1980)

ABST We carried out photosynthetic experiments from 1 hr to 12 hrs with cultivated Laminaria japonica frond in $^{14}CO_2$ gas, in $NaH^{14}CO_3$-containing seawater, and in $^{14}CO_2$ containing seawater, and studied the distribution of alcohol soluble compounds in EtOH extractives and of sugars in the acid hydrolyzates using paper chromatographic and autoradiographic methods. The radioactivities in alcohol soluble fractions in case of both $^{14}CO_2$ gas and $NaH^{14}CO_3$-containing seawater in general increased with the time of illumination. As shown in 1963's experiments the radioactivities in two cases after 12 hrs illumination were seven times and five times greater than that after 1 hr illumination, respectively. The radioactivities in Laminaria residue after alcoholic extraction also increased with the time of illumination. The paper chromatograms of alcohol soluble fractions in case of $^{14}CO_2$ gas showed the presence of free amino acids as Asp, Ala, Glu, Pro, Val and mannitol in 1963's experiments, and with the addition of Tyr, Leu and Ile in 1964's experiments. The order of radioactivities in chromatograms generally was: mannitol > Asp > Ala > Glu. Besides those, radioactive Val, Ile and some unknown compounds also appeared. The radioactivity of mannitol was 92-94% and 59-87% of the total ones in EtOH extracts in 1963 and 1964, respectively. Apart from a small amount of radioactive mannitol, almost no radioactivity was found in other chromatograms in case of 6 hr illumination in $NaH^{14}CO_3$-containing seawater, and even after 12 hrs illumination it still showed only little radioactivity in mannitol, Asp and Ala.

The paper chromatograms of sugars in hydrolyzate of Laminaria residue showed that no C-14 was incorporated into them, and a considerable amount of radioactivities still remained near the original spot in 1963's experiments. But from 1964's experiments it was apparent that some C-14 was incorporated into mannuronolactone and other uronic acids according to the pattern of paper chromatograms of Linkers et al. The acid hydrolyzate of hot water extractive from Laminaria also gave radioactivities in the chromatograms corresponding to fucose and xylose in 1964's experiments.

KEY metabolism, amino acids, radioactivity, paper chromatography, carbon-14, aspartic acid, alanine, glutamic acid, proline, valine, tyrosine, leucine, isoleucine

LANG Chinese, English abstract

NOTE Ji Minghou was formerly spelled Ji Ming-Hou or Ji M.H.

126 AUTH Ji, Minghou; Pu, Shuzhu; Niu, Zhuqing

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1981

TITL Variation in contents of different states of amino acids in Porphyra yezoensis Ueda cultured in different regions

CITA Oceanologia et Limnologia Sinica 12, 522-530 (1981)

ABST Comparative studies were carried out on the seasonal variation of the contents of amino acids in both free and total states in Porphyra yezoensis cultivated in three typical regions with high-, medium- and low-nutrient contents, using the amino acid analyzer. The NH_4-N contents in sea water of three culture regions were in the order: high-nutrient region > medium-nutrient region > low-nutrient region, and the contents of total nitrogen, free amino acids and total amino acids in Porphyra varied in accordance with the

same order. Of the 16 free amino acids tested the remarkable changes in contents are noticed in alanine, glutamic acid and aspartic acid, decreasing with the growing period from Jan. to Apr. These three amino acids appear to be more active in nitrogen metabolism of Porphyra, a characteristic of this alga. Other free amino acids varied not conspicuously. Among the 18 amino acids in total state the remarkable changes in alanine, glutamic acid and aspartic acid are also observed as in free state, depending mainly upon the variation of free amino acids contents. In the high-nutrient region some combined amino acids and total nitrogen contents exhibited a slight increase from Jan. to Feb., showing the increase of protein or chromoprotein, but in the low-nutrient region there was no such evidence. In both alcoholic extractive and acid hydrolyzate taurine and cysteic acid were seasonally and quantitatively determined as well.

KEY amino acids, seawater, ammonia, marine resources, alanine, glutamic acid, aspartic acid, nitrogen, algae, seasonal variation, nutrients, metabolism, protein

LANG Chinese, English abstract

NOTE See Note 125

127 AUTH Jiao, Kui; Gao, Xiaoxia

AFFI Chemistry Department, Peking University, Beijing

DATE 1982

TITL Electroanalytical chemical studies on rare earth elements (V) - Single sweep polarographic studies of yttrium-rhodamine B-diphenyl-guanidine system

CITA Chemical Journal of Chinese University 3, 327-335 (1982)

ABST This paper reports the polarographic behavior of the complex of Y^{3+} with basic dye rhodamine B. Near -1.5V (SCE) rhodamine B has a large adsorptive single sweep polarographic wave in the presence of ammonium

chloride and diphenylguanidine. Y^{3+} decreases the height of this derivative wave. Under the optimum conditions, such as 0.4M ammonium chloride, 8.0x10(E-5)M rhodamine B, 1.0x10(E-4)M diphenylguanidine, pH 4.5-5.0, there is a linear relationship between 1x10(E-7)--1x10(E-6)M Y^{3+} and the decrease of the wave heights. Heavy rare earth elements behave similarly as Y^{3+}, thus the total amount of them may be determined. The mechanism of this system has been studied by means of dc, dpp, single sweep normal and derivative polarographs. The results indicated that Y^{3+} may form an ion-association complex with rhodamine B and diphenylguanidine. The complex adsorbs strongly and occupies the partial surface area of the mercury drop. The complex reduces at more negative potential than rhodamine B, thus the wave height of rhodamine B itself decreases correspondingly. The two steps can't be separated in dc and single sweep normal polarograms and they interfere with each other in dpp owing to the slow scan rate of pulse polarograph; there is no good linear relationship between the concentration and wave height. A sensitive wave only exists in the single sweep derivative polarography.

KEY rare earth elements, yttrium, mechanism, polarography, complex, absorption, analytical chemistry

LANG Chinese, English abstract

NOTE See Note 71

128 AUTH Jing, Zhenhua

AFFI Shandong College of Oceanology, Qingdao

DATE 1980

TITL Study on the required accuracy level of measurements of temperature, salinity and depth in shallow sea waters

CITA Acta Oceanologica Sinica 2, 1-12 (1980)

ABST This paper investigates the accuracy of the measurements of temperature, chlorinity and depth in shallow seas less than 100 meters deep, which are necessary to meet the need of the required accuracies ±1x10(E-5) of the calculated values of the anomaly of specific volume of seawater and of specific volume itself. The ranges of measurements of temperature, chlorinity and depth are -2°C - 30°C, 5°/$_{oo}$ - 20°/$_{oo}$ and 0m-100m respectively. In general, the accuracy of temperature measurement necessary to meet the required accuracy ±1x10(E-5) of the calculated value of anomaly of specific volume, is lower in the low temperature and low chlorinity case than in the high temperature and high chlorinity case; however, the necessary accuracy of the measurements of chlorinity is higher in the low temperature and low chlorinity case than in the high temperature and high chlorinity case. Generally speaking the accuracies necessary to meet the required accuracy ±1x10(E-5) of the calculated value of specific volume of both the temperature and chlorinity increases as the accuracy of measurements of depth decreases either in lower temperature and lower chlorinity case or in higher temperature and higher chlorinity case.

KEY temperature, salinity, depth, seawater, determination, specific volume, chlorinity

LANG Chinese, English abstract

129 AUTH Ke, Liqin; Chai, Pingxia; Feng, Qiangbo

AFFI Institute of Geochemistry, Academia Sinica, Guiyang

DATE 1982

TITL Laser microprobe analysis of minerals - relative ratio method

CITA Annual Reports Institute of Geochemistry, Academia Sinica (1980-1981), 182 (1982)

ABST The laser microprobe-relative ratio method has found its application in semiquantitative or approximately quantitative analysis of minerals with the help of calibration curves. Analytical results are satisfactory. This method has some outstanding advangtages: 1) little sample requirement; 2) sample pretreatment unnecessary; 3) applicable for all solid samples; 4) analytical accuracy independent of the stability of laser energy and the physical and chemical properties of mineral samples; and 5) high accuracy.

KEY laser, microprobe, analytical chemistry

LANG Chinese, English abstract

130 AUTH Laboratory of Ocean Optics

AFFI Department of Marine Physics, Shandong College of Oceanology, Qingdao

DATE 1982

TITL Analysing the results of an airborne test for remote sensing over Jiaozhou Bay

CITA Journal of Shandong College of Oceanology 12, 27-34 (1982)

ABST The Shandong College of Oceanology organized an airborne test of remote sensing over Jiaozhou Bay, in the last week of Sept., 1979. This paper mainly discussed our analytic methods and analysed data and information gained by our test. We have analyzed data from this test, and obtained several results, (a) Hydrologic information of the sea, (b) Pollution of the sea, (c) coastal geomorphology, (d) The radiation image at night, (e) Microwave radiation from sea surface.

KEY remote sensing, Jiaozhou Bay, pollution, temperature, seawater, transparency, petroleum, chlorophyll a

LANG Chinese, English abstract

131 AUTH Lan, Shihou; Lin, Jianyun

AFFI Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE 1983

TITL Direct fluorimetric determination of trace dissolved aluminum in the seawater

CITA Marine Science Bulletin 2, 13-21 (1983)

ABST This paper discusses the direct determination of dissolved aluminum in the sea water by Lumogallion fluorimetry, with special emphasis on the examination of the salinity in the sea water, pH, F^-, Fe^{3+} as well as the impacts of the determination conditions upon the results. Experiments indicate that under established optimum conditions of determination, the method of working curves in place of standard addition method is both simple and quick. Under our experimental conditions, the limit of detection by this method is 0.8ppb. When aluminum content is 8ppb, the standard deviation is ± 0.5ppb; when it is 0.5ppb, the standard deviation is 0.05ppb. The recovery by this method ranges from 94% to 102%. The analytical mehtod thus established may satisfy the requirements in the determination of dissolved aluminium in the nearshore and estuary water.

KEY aluminum, seawater, determination, salinity, pH, estuary

LANG Chinese, English abstract

132 AUTH Ley, Shang-hao; Yu, Mien-kuan; Li, Kuang-cheng; Tseng, Chi-mien; Chen, Chia-yiu; Kao, Pao-yun; Huang, Fong-chin

AFFI Institute of Hydrobiology, Academia Sinica, Wuhan

DATE 1963

TITL Limnological survey of the lakes of Yunnan Plateau

CITA Oceanologia et Limnologia Sinica 5, 87-114 (1963)

ABST There are many lakes upon the Yunnan Plateau of Southwestern China, with an elevation of about 2,000 meters above sea level. They are mostly distributed

over the eastern part of the Plateau, surrounding the Kunming region and forming the Kunming lake group, which consists of 7 lakes, namely Kunminghu Lake, Chuhu Lake, Yanglinhu Lake, Yangchunghai Lake, Fusienhu Lake, Singyunhu Lake and Ch'iluhu Lake. All but the last mentioned lake have their maximum-length axes run south and north, thus coincident with the orientation of the orographic foldings of the Yunnan Plateau uplifted during the Yanshanian and Himalayan orogensis. In 1957, from July to October, we made a general limnological survey of most lakes of the Kunming lake group, as well as Ilunghu Lake and Dat'unhu Lake to the south and Erhai Lake to the west. The morphometric aspects of the lake basins, the physical and chemical properties of lake waters, and the biological conditions, including phytoplankton and zooplankton, benthos, aquatic vascular plants, fishes and the production of lakes have been investigated. In this paper, only the general features of the lakes are given. Detailed report for each lake will be published separately elsewhere. Most of the lakes are shallow, with mean depths less than 15 meters. Yangchunghai Lake is deeper, having a mean depth of 20.27m and a maximum depth of 28m. Outstanding among the group is Fusienhu Lake; its mean depth of 88.7m and maximum depth of 160m make it the second deepest lake in China, next to Tienchih Lake in Kirin Province. The thermal regime of the lake water is very characteristic. The water temperature is higher than 15°C year-round in the lakes of southern part, higher than 10 degree C in the Kunming Lake group and in Erhai Lake. During July to October, thermo-stratification is not so conspicuous in the shallow lakes, but is very distinct in those with mean depth over 15m. However, no thermocline has been observed, except for those that temporarily occur at certain periods of day time. The transparency of the

lake water is less than 200cm in shallow lakes, but reaches 300-600 and 700-850cm in Yangchunghai Lake and Fusienhu Lake respectively. The dissolved oxygen content is very high and generally has a stratified distribution. pH values are more than 8.3, since the lakes are mostly localized in limestone region. The hardness of water is extraordinarily high, mostly higher than 60 degree (German unit), some even as high as 117.23-134.47 degree (Ilunghu Lake). Therefore it is very clear that the lakes of Yunnan Plateau possess the nature of alkaline water of calcium-type. Dissolved biogenic elements are low in content. The NO_3-N is mostly below 0.13 mg/l, PO4-P between 0.012-0.059 mg/l. Erhai Lake and Kunminghu Lake have higher PO_4-P concentration, amounting to 0.026-0.217 and 0.09-0.13 mg/l respectively. The horizontal and vertical distributions of phytoplankton and zooplankton have been studied quantitatively. In some of the lakes, such as Fusienhu Lake and Yangchunghai Lake, diurnal vertical movement of plankton has been observed. Plankton are abundant in shallow lakes, but very poor in deep lakes. The benthos and aquatic plants exhibit the same phenomenon. The fish fauna of these lakes is also very characteristic. A total of 42 species has been collected. The regional distribution is very distinct, especially with reference to the subspecies of the genus Cypinus and the species of the genus Anabarilius. It is clear that the speciation is closely related to the isolation of the water systems concerned. The natural production of fishes of the lakes is less than 40 kg/hectare. Based upon the results of this investigation, we suggest that the lakes of Yunnan Plateau may be classified into two types, namely, Eutrophic type of subtropic limestone region in tectonic basin and Oligotrophic type of subtropic limestone region in tectonic basin. Suggestions on fish-management have also been given.

KEY lake waters, phytoplankton, zooplankton, fish, temperature, transparency, oxygen, pH, limestone, hardness, calcium, nitrate, phosphate, limnology, thermocline

LANG Chinese, English abstract

133 AUTH Li, Fa-si; Wu, Yu-duan; Wang, Long-fa; Chen, Ze-hsia

AFFI Department of Chemistry, Amoy University, Amoy (1,2,3); East-China Institute of Oceanology (4)

DATE 1964

TITL Physico-chemical processes of silicates in the estuarial region I. A preliminary investigation on the distribution and variation of reactive silicate content and the factors affecting them

CITA Oceanologia et Limnologia Sinica 6, 311-322 (1964)

ABST Samples of the water at the mouth of the Jiu-long river in Fujian were taken and analyzed for reactive silicate content. Relationship between reactive silicate content and chlorinity similar to that reported by Bien and his co-workers has been observed. The result once again confirms that the reactive silicate of the river water undergoes, when mixed with sea water, not only a simple dilution process but also a chemical or physico-chemical transformation and other types of removing process to a definite extent. It was also found that the reactive silicate content decreased gradually when unfiltered river water was mixed with de-silicated sea water in the laboratory, but practically no change was observed when using filtered river water. This gives support to Bien's argument that suspended matter is one of the necessary conditions for the removal of silicate. Merely adding electrolytes such as NaCl, $MgCl_2$, and Na_2SO_4 to filtered river water or varying the pH had practically no effect on the reactive silicate content, although they might affect the color density of the solution in colorimetric determination. In the early stages of

our study on the mechanism of silicate removal in the estuarial region, some adsorption isotherms of reactive silicate on colloidal $Fe(OH)_3$ and $Al(OH)_3$ were obtained. This shows that most of the reactive silicate is adsorbed by these adsorbents and that the rate of adsorption increases with increasing chlorinity. It is very probable that adsorption on the surface of suspended and colloidal particles is the first step of the mechanism. Further quantitative study is in progress.

KEY silicate, distribution, rivers, river water, chlorinity, seawater, suspended matter, electrolyte, pH, mechanism, adsorption isotherms, adsorbent, rate, adsorption, sodium chloride, magnesium chloride, sodium sulfate, colorimetry, iron hydroxide, aluminum hydroxide, estuary, colloids

LANG Chinese, English abstract

NOTE Li Fa-si is now spelled Li Faxi, Wu Yu-duan is now spelled Wu Yuduan, Chen Ze-hsia is now spelled Chen Zexia. Wang Long-fa is now spelled as Wang Longfa.

134 AUTH Li, Fan; Lin, Baorong; Zhang, Xiurong; Zhou, Tiancheng; Li, Benzhao

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL Sedimentation and parameter's characteristics of grain size under different sedimentary environments of Fangcheng Bay

CITA Oceanoloiga et Limnologia Sinica 13, 143-153 (1982)

ABST The sea bottom sediments of Fangcheng Bay were investigated in 1976. In this paper, we describe the sources and distributions of sediments. The result of this study shows that distributions of the coarse sediments as a whole were along main channel area, but fine sediments were distributed over the place where the hydro-dynamic conditions were relatively stable. Thus, the distributions of sediments are regarded as

functions of the hydro-dynamic characteristics. At outer zone of this bay, the sand sediments were formed in low sea level period, then reworked continuously. Therefore, the distribution mode of the sediments was veneered by different grain sizes and times of sediments in Fangcheng Bay. In addition, we describe in detail the hydro-dynamic conditions, distributions of the grain size and grain parameters according to geomorphologic patterns and distinguish them by way of analysis of variation and multiple comparison. The investigation shows that, Mz and σ are the most sensible parameters to reflect sedimentary hydro-dynamic environments.

KEY sediments, distribution, grain size, hydrodynamics

LANG Chinese, English abstract

135 AUTH Li, Faxi

AFFI Department of Oceanography, Xiamen University, Xiamen

DATE 1980

TITL Physico-chemical processes of silicates in the estuarial region. IV. An analysis of the mechanism of removal of reactive silicate in the estuarial region.

CITA Acta Oceanologica Sinica 2, 43-56 (1980)

ABST The controversy among recent investigators on the problem whether there is any extent of inorganic removal of reactive silicate in the estuarial regions has been reviewed and discussed on appropriate theoretical, experimental, and also in situ observational bases. A mathematical model based on mixing ratios of different water sources has been proposed, and theoretical equations for reactive silicate vs. Chlorosity relations for various cases have been derived, assuming reactive silicate to be a conservative constituent. The extent of silicate removal may then be estimated. As a typical example, for the case where sea water is mixed with two fresh water sources (e.g. a tributary directly entering the

estuary), the theoretical equation for a conservative constituent concentration of which in the sea water source is negligibly small will be: $C' = [(C'_1 + C'_2r)/C_o(1 + r)]C + [(C'_1 + C'_2r)/(1+r)]$ where C_o, C_1, C_2 and C--the chlorosity of the sea water source, main fresh-water source, tributary fresh-water source, and an arbitrary water sample within the estuary respectively; C'_o, C'_1, C'_2 and C'-the concentration of the conservative constituent in the sea water source, main fresh-water source, tributary fresh-water source, and the arbitrary water sample respectively; r - the mixing ratio between two fresh-water sources in the arbitrary water sample. It has been pointed out that r may vary widely among the estuarial region due to the complication of the hydrographic conditions, thus the equation represents a pencil of straightlines in the reactive silicate vs. chlorosity diagram; the observed data points must diverge in the region between two limiting straight lines (r=0 and r=∞) provided that the constituent is conservative, and do not obey a single-valued functional relation. This mathematical model has been used to explain the observed in situ data rather satisfactorily. Arguments have been admitted about the inference drawn by Wollast and De Broeu, and also by Fanning and Pilson, that the silicate removal is mostly biological. It is suspected whether the results of the laboratory experiments by the above authors can ever rule out the possibility of significant inorganic removal. As that have been reported in part II and III of this series of papers, the simulation experiments showing the occurrence of chemical adsorption of soluble silicate on colloidal $Fe(OH)_3$ and $Al(OH)_3$ precipitates, and the analytical data of the suspended matter in the estuarial waters showing the stoichiometric ratios between the "authigenic" Si, Fe and Al contents and the smaller amount of organic

Si than that of "authigenic" inorganic Si in the suspended matter, have given good evidences for the occurrence of inorganic removal of reactive silicate and also the possibilty of transforming into certain kinds of more stable silicate compounds of Al and or Fe after removal - a geochemical picture proposed previously by the present author and his colleagues.

KEY silicate, mechanism, mixing ratio, chlorosity, seawater, fresh water, estuary, conservative, adsorption, suspended matter, ferric hydroxide, aluminum hydroxide, colloids

LANG Chinese, English abstract

NOTE Li Faxi was formerly spelled Li Fa-si

136 AUTH Li, Faxi

AFFI Department of Oceanography, Xiamen University, Xiamen, China

DATE 1983

TITL Two physico-chemical problems in the sedimentation process studies

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise Abstract, 35-36 (1983)

ABST Based on some results worked out by the research groups in our department, (1) the physico-chemical processes of the authigenic silicate formation by adsorption and structural rearrangement during river/sea water mixing and (2) the thermodynamics and kinetics of the redox processes in seawater and sediment systems are discussed in order to find out the possible ways to study quantitatively some geochemical processes in ocean system, by using physico-chemical principles and methods. The paper summarizes the experimental results concerning the adsorptions of dissolved silicate and some heavy-metal ions such as Cu^{2+} etc. by the Fe(Al) hydrous oxides

newly formed during river/sea water mixing. It shows that the presence of dissolved silicate can enhance the irreversibility of the adsorption process of Cu^{2+} ion on the hydrous oxides. Besides, the adsorption complexes can transform into insoluble authigenic silicate crystals after aging, and also incorporate with certain amount of the heavy-metal ions. The results give some informations on the mechanism of the formation of authigenic silicate minerals through "supergene precipitation" in the sea, and also give some ideas about the possible mechanism of the "scavenging" action of the Fe(Al) hydrous oxides on heavy-metal ions and the accumulation of heavy metals into the ferro-manganese nodules. In seawater and sediment systems, there co-exist many redox couples, but usually are not all in thermodynamical equilibria. Thus the conventional Eh measurement using Pt electrode and the application of Eh-pH diagrams had their limitations. Kinetic studies are needed. Some recent results of the kinetic studies of redox processes in ocean system are reviewed. A concept of "the independency of each redox couple" is emphasized and discussed in comparison with some measurements in seawater and sediment systems.

KEY silicate, adsorption, seawater, thermodynamics, kinetics, sediments, manganese nodules, pH, particulates, heavy metals, copper, iron, aluminum, river water, seawater, redox equilibrium, Eh, electrode

LANG Chinese, English abstract

NOTE unpublished paper available for distribution

137 AUTH Li, Feiyong; Chen, Jinsi; Wang, Zhaoding; Zhu, Zhuohong; Li, Zijiang; Zheng, Jianlu

AFFI South China Sea Institute of Oceanology, Academia Sinica, Guangzhou

DATE 1981

TITL Distribution and behaviour of Cu, Pb, Zn dissolved in the water phase and suspended particulate phase in Zhujiang River estuarine area

CITA Acta Oceanologica Sinica 3, 423-433 (1981)

ABST Water samples collected at 14 sample-collecting stations during 2 survey cruises were filtered, and dissolved oxygen, salinity, pH and temperature were measured in situ. Based on the analysis of the samples in the laboratory, the distribution and behaviour of the heavy metal elements Cu, Pb and Zn dissolved in the water phase and apparent in the suspended particulate phase in the estuarine mixing zone of the Zhujiang River and adjacent rregions have been studied. The Zhujiang River is one of the three longest rivers in our country. The estuary studied is located in the subtropical zone and shaped like a trumpet. It has many sources and a large volume of flow. In the waters studied the salinity ranges from 2.99-34.28‰. The concentration of dissolved oxygen ranges from 5.02-6.42 ml/l, pH ranges from 7.54-8.22. The water temperature ranges around 20 degree C. The analysis was made with anodic strpping voltammetry and spectrophotometry. The concentration range and the average concentration of the 3 metal elements Cu, Pb and Zn dissolved in water phase and suspended particulate phase are reported. The results demonstrate that the order of concentration in the water phase and the suspended particulate phase is Zn>Pb>Cu, corresponding to the order of the metal elements which drain into the Zhujiang River; in comparison with reference data the levels of these 3 metal elements are relatively high in the water phase, but relatively low in the suspended particulate phase; the order of their enrichment capacity in suspended particulate phase is Cu>Pb>Zn. In addition, the levels of the metal elements in the bottom water are higher than those in the surface water. As for the

horizontal distribution of these 3 metal elements in the estuarine mixing zone, their concentration generally tends to decrease with the increase of salinity, but there are peak values in the range of salinity from 10-15 $S°/_{oo}$. In the offshore area beyond the Zhujiang River estuary, the horizontal distribution of these 3 metal elements is rather uniform except for higher levels near Hong Kong. This report discusses some factors which apparently influence the distribution and behaviour of the 3 metal elements in the Zhujiang River estuary. They are physical processes such as mixing and diluting, and various chemical processes. The main reasons for the appearance of the peak values in the water phase and the suspended particulate phase, where salinity ranges from 12-15$°/_{oo}$ are: the resuspending action of deposits, the formation of soluble complex compounds, and the ion-exchange of metals. The principal ways of transportation of metal elements from the water phase to the solid phase are adsorption and co-precipitation. Hydrate iron oxide is an important adsorbing and co-precipitating reagent. Organic materials can form colloid and flocculent deposits through complexation or association with metals. However, the solubility of the product does not affect distribution and behaviour, and the biological processes perhaps are possibly unimportant.

KEY distribution, oxygen, salinity, pH, temperature, particulates, anodic stripping voltammetry, spectroscopy, concentration, copper, lead, zinc, seawater, estuary, river water, complex, ion-exchange, adsorption, precipitation, organic matter, colloids, solubility, Zhujiang, flocculation

LANG Chinese, English abstract

138 AUTH Li, Bingming; Yang, Zhenli; Piao, Hechun; Zhai, Shenghua

AFFI Institute of Geochemistry, Academia Sinica, Guiyang

DATE 1982

TITL Studies of pollution, transportation, transformation and control of Cd in the southeastern suburbs of Beijing

CITA Annual Reports Institute of Geochemistry, Academia Sinica (1980-1981), 103-105 (1982)

ABST Field investigations, chemical analyses, simulation experiments and cultivation experiments in small regions or pots provide evidence suggesting that Cd in the environment surrounding the southeastern suburbs of Beijing is mainly derived from industrial sewage. Most of the Cd in water, sediments, soils and crops only cause light pollution. The concentration of Cd in streams decreases during runoff, reflecting the effects of dilution and adsorption. After entering soils, Cd tends to accumulate on the surface of them. The concentration of Cd in the soil has a close bearing on that in crops growing there. The migration of Cd in the water sediment-soil or the sludge-soil-crop system is controlled by pH values. It is found that the migration capacity of Cd in the environment and its accumulation in crops may increase with the increase of Cl^-.

KEY pollution, sewage, sediments, adsorption, cadmium, river water, pH, soil, chloride

LANG Chinese, English abstract

139 AUTH Li, Hu-hou; Sun, Jian-zhong

AFFI Institute of Archaeology, Chinese Academy of Social Sciences (1); Institute of Geology, State Bureau of Seismology (2)

DATE 1982

TITL Age of loess determined by thermoluminescence (TL) dating of quartz

CITA Quaternary Geology and Environment of China, 39-42 (1982)

ABST The displaced electrons in quartz lattice can be transferred by sunlight. This is a basic characteristic of quartz for the use of TL technique to date the age of loess. We have tested this property of quartz and found it useful for the development of TL technical applications. The main points in dating technique are mentioned, which include: 1. Shine fading; 2. Revision of the annual dose. For explanation, an age determination of loess samples in Yuangou profile is presented as an example.

KEY dating, quartz, age, loess

LANG English only

140 AUTH Li, Peiquan; Kang, Xinglun; Lu, Guangshan; Yuan, Yi

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL The determination of the gross beta radioactivity in East China Sea and its adjacent region

CITA Marine Science No.2, 30-33 (1982)

ABST The determination of the gross beta radioactivity in the waters of East China Sea and adjacent region (E 123 degree 00' - 129 degree 00', N 26 degree 28' - 32 degree 33') was carried out in 1978. The gross beta radioactivity varies from 0.32 to 3.44 pCi/L, with a mean activity of 1.73 pCi/L. It shows that there was no new source of contamination entering this area at that time. The different horizontal distribution of the gross to the air deposition and the mass of Break Stream as well as the transfer of isotope by silts and suspension. The vertical distribution of the gross beta radioactivity shows a tendency increase from surface to bottom in shallow water area, resulting in a higher concentration in mud and sand. But in deep water the situation is different in that it decreases

gradually from surface to bottom. This shows that some isotopes can't penetrate into deep water because of stratification of the sea water.

KEY radioactivity, East China Sea, seawater, pollution, distribution, isotopes, particulates, sand

LANG Chinese, English abstract

NOTE Li Peiquan was formerly spelled Li Pei Quen

141 AUTH Li, Peiquan; Li, Jinling

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1981

TITL The determination of Sr-90 and gross beta in surface seawater in Chinese coasts

CITA Oceanologia et Limnologia Sinica 12, 332-340 (1981)

ABST The concentration of Sr-90 and the gross beta in surface sea-water in East China Sea, Huanghai Sea (Yellow Sea) and Bohai sea were determined in 1963-1964. The values of Sr-90 varied from 0.04 Pci/1 to 0.74 Pci/1 in a period of two years. The mean value was 0.27 and 0.10 Pci/1 in 1963 and 1964 respectively. The values of the gross beta varied from 0.45 to 5.87 Pci/1 in the same period. The mean value was 2.32 and 1.92 Pci/1 in 1963 and 1964 respectively. The latter value was got in one month only. The fluctuation of these values showed a tendency to decline from 1963 to 1964. It seemed to be correlative with the decrease of nuclear weapon tests. The difference in horizontal distribution of Sr-90 and gross beta in East China Sea, Huanghai Sea and Bohai Sea may also be related to the capability of the dilution and diffusion of fresh and sea waters.

KEY seawater, concentrations, East China Sea, Yellow Sea, Bohai, strontium-90, pollution, radioactivity, fresh water, distribution, diffusion

LANG Chinese, English abstract

NOTE See Note 140

142 AUTH Li, Peiquan; Li, Jinling

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1978

TITL A study of the method of the determination of the gross beta radioactivity in sea water with barium chloride-ferric ammonium alum

CITA Oceanologia et Limnologia Sinica 9, 43-48 (1978)

ABST The method of determination of the gross beta radioactivity in sea water was studied using the radioactivity of fall-out as an isotopic tracer. Experiments showed that it was feasible to concentrate radionuclides in sea water with barium chloride-ferric ammonium alum. The related factors in this determination were studied and the results obtained are summarized as follows: 1. The recovery of radioactivity varies with the changes of pH: 20-30% is obtained with pH from 4.0 to 4.8, 95% with pH 6.0-7.8, 80% with pH 8.2-9.2, 95% with pH 9.5 or over. The 70-80% recovery as reported by Miyake[1] corresponds to that between pH 8.2 and pH 9.2, because at 9.5 or over a heavy whitish $Mg(OH)_2$ precipitate formed, making the determination more difficult, although the recovery obtained may be high. 2. Heating increases the rate of recovery considerably. 2-6 hours of settling after boiling give a recovery of 95%, while recovery is only 80% at 15-25% C for the same period of settlement. A recovery of 88% was given at room temperature after standing for 24 hours. So the heating process may be omitted on shipboard. 4. The effect of the amount of precipitant used on the recovery rate is to a considerable extent not appreciable. In order to increase the volume of sea water to be determined and save more time on determining, a minimum amount of precipitant to be used must be sought for. Experiments show that the addition of 2.5mg Fe^{3+} and 2.5mg Ba^{2+} in 1 liter sea water may increase the amount of sea water from 1 to 4

liters, with recovery 88% as a checking reference. This method is simple enough to be used in determining the gross beta radioactivity in polluted sea water.

KEY radioactivity, seawater, fall-out, tracer, radionuclides, pH, temperatures, iron, barium, pollution

LANG Chinese, English abstract

NOTE See Note 140

143 AUTH Li, Quansheng; Shen, Wanren; Ma, Xinian

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL The total dissolved inorganic arsenic in the water of Bohai Bay

CITA Marine Science, 2, 27-30 (1982)

ABST This paper reports the distribution and the contents of the total dissolved inorganic arsenic in the surface waters of the 40 stations and bottom waters of several typical stations in Bohai Bay from August 28 to September 4, 1980. The results indicate that the range of concentration of total dissolved inorganic arsenic varied from 1.0 to 2.7 μg/l with an average of 1.73 μg/l, and its horizontal distribution has an evident gradient. There is a good relationship between the content of arsenic and salinity in the surface waters of the Bay, suggesting that the arsenic in Bohai Bay exhibits a similar conservation tendency as the salinity does.

KEY arsenic, Bohai, distribution, seawater, salinity, concentrations

LANG Chinese, English abstract

144 AUTH Li, Ruiliang; Gao, Xiaoxia

AFFI Department of Chemistry, Beijing University, Beijing

DATE 1981

TITL Electrochemical studies of rare earth elements - I. Polarographic study of europium

CITA Chemical Journal of Chinese Universities 2(1), 25-36 (1981)

ABST The ac polarographic behavior of Eu^{3+} ions in three base solutions (NH_4SCN, EDTA-NaCl, DTPA-NaCl) has been compared. In DTPA-NaCl solution the polarographic reversibility of Eu(III) is the best among them. The optimum conditions for the polarographic determination of Eu(III) are: pH>6.5, NaCl concentration≥0.3M, the concentration of DTPA should be slightly higher than the total concentration of all the metal ions which can form complexes with DTPA. Under these conditions, the lower limit of detection of Eu(III) is 2(E-6)M by ac polarography or single-sweep oscillographic polarography, or 2(E-7)M by differential pulse polarography. Other rare earth ions do not interfere. Small amounts of Eu in samples of mixed rare earth oxides were determined by this method with satisfactory results. In the acidic Eu(III)-$VOCl_2$-KI solutions, based on the reaction between Eu(II) and VO^{2+} to regenerate Eu(III), a well defined dc polarographic catalytic wave of Eu(III) was observed. The presence of 0.1M KI is necessary for the catalytic wave to be separated from the reduction wave of VO^{2+}. The catalytic wave height is proportional to the concentration of Eu(III) and to the square root of the concentration of VO^{2+} and is independent of pH in the range from 1 to 3.7. The catalytic wave was proved to be a chemically parallel catalytic wave without the complexity due to adsorption. The electrode and chemical reactions involved may be summarized as follows: $Eu^{3+} + e = Eu^{2+}$ (1) $VO^{2+} + Eu^{2+} = [VOEu^{4+}]$ (2) $[VOEu^{4+}] + 2H^+ = V^{3+} + Eu^{3+} + H_2O$ Reaction(2) is the rate determining step and its rate constant was determined to be $1840M^{-1}$ Sec^{-1} by dc polarography.

KEY rare earth elements, europium, pH, adsorption, electrode, rate, rate constant, polarography, sodium chloride, mechanism, complex, analytical chemistry

LANG Chinese, English abstract

NOTE See Note 71

145 AUTH Li, Shixiao; Wang, Renmei

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL Study on bio-accumulation and excretion of zinc-65 in mussel Mytilus edulis and their mechanisms

CITA Journal of Marine Science 3, 26-28 (1982)

ABST Bio-accumulation and excretion of Zn-65 in mussel Mytilus edulis and its distribution in substances of cells with different molecular weights have been studied. Mechanisms of the bio-accumulation and the excretion are discussed.

KEY bioaccumulation, zinc-65, mussel

LANG Chinese, English abstract

146 AUTH Li, Xuanru; Liu, Shiyu; Chen, Lianzhi; Hong, Yuying

AFFI Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE 1981

TITL The reaction order and activation energy of basic zinc carbonate and uranium in seawater

CITA Acta Oceanologica Sinica 3, 247-254 (1981)

ABST At present, the information about absorption of uranium from seawater by basic zinc carbonate is scarce, and literature about the determination of reaction order and activation energy of basic zinc carbonate and uranium in sea water is not available. This paper attempts to tackle these problems by using three-necked flask and spectrophotometry. Satisfactory results were obtained. Basic zinc carbonate absorbent was prepared and rapidly added into seawater under constant temperature and stirring. Samples of seawater were taken at intervals and the concentration of uranium was determined by spectrophotometry. The reaction order and activity

energy were obtained from the experimental data treated with chemical kinetic methods. According to the experimental results, the reaction of basic zinc carbonate and uranium in seawater is of first order and the temperature dependence of the specific rate of reaction is as follows: When T_1 = 308°K, K_1 = 0.0239(min.$^{-1}$); T_2 = 333°K, K_2 = 0.0256(min.$^{-1}$). If the absorbent for absorption of uranium from seawater obeys the Arrhenius Equation, then the activity energy of the reaction can be obtained: E=559.3 cal/mol.

KEY activation energy, absorption, uranium, seawater, basic zinc carbonate, reaction order, spectroscopy, concentrations, kinetics, Arrhenius Equation, marine resources

LANG Chinese, English abstract

147 AUTH Li, Yan

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1963

TITL Studies on the determination of nitrate in sea water with sodium diphenylbenzidine sulfonate

CITA Oceanologia et Limnologia Sinica 5, 115-123 (1963)

ABST The determination of nitrate in sea water both in the study of primary productivity and in that of nitrogen cycle in the seas is quite significant. A new reagent, sodium diphenylbenzidine sulfonate, for nitrate determination was prepared from sodium diphenylamine sulfonate. The latter was first oxidized by $K_2Cr_2O_7$ to diphenylbenzidine sulfonic acid violet in 10% H_2SO_4, followed by the reduction with Na_2SO_3 to diphenylbenzidine sulfonic acid, and then a powdery product was precipitated by salting-out procedure. Some properties of this compound were studied. The potential titration curves of sodium diphenylamine sulfonate and the product showed that the sodium diphenylbenzidine sulfonate obtained was really an intermediate product of sodium diphenylamine

sulfonate in the oxidation process. A method for the determination of nitrate contents in sea water with the prepared reagent was developed, which appeared to be more sensitive than that with sodium diphenylamine sulfonate directly. An analytical procedure recommended is as follows: Add 2.5ml of nitrogen-free conc. H_2SO_4 rapidly (about 3-4 sec.) to a test tube containing 3ml of sea water sample, mix and cool at room temperature for 40 minutes, and then one drop of the reagent aqueous solution 0.2% is added. After shaking thoroughly and standing 40 minutes, the optical density of the solution is measured spectrophotometrically at 566 mu with a 1-cm cell. The method is suitable for the range of nitrate concentrations from 5 to 100 mg NO_3-N/m^3, with an average error of 5%. Though the optical density and the nitrate contents are not in linear relationship, yet from the recovery and the results obtained as compared with hydrazine sulfate method it was shown that this method is satisfactory and convenient in the routine analysis of sea water samples.

KEY determination, nitrate, seawater, primary productivity, cycle, nitrogen

LANG Chinese, English abstract

148 AUTH Li, Yan

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1979

TITL Further studies on the determination of nitrate in sea water with BSPB

CITA Oceanologia et Limnologia Sinica 10, 112-118 (1979)

ABST In this paper a simple rapid colorimetric method for determining the nitrate in sea water with BSPB [N,N'-bis (p-sulphophenyl) benzidine disodium salt] is recommended. It was developed by further improving the conditions reported in the previous paper published in 1963 by the author, and was shown to be

more stable, sensitive and suitable for the routine analysis of sea water. The procedure of the determination is as follows: to 2 ml of sea water sample add 0.05ml of 0.005 M $CuSO_4$ solution, 5ml of H_2SO_4 (4:1) and 1 drop of 0.4% BSPB solution, mix, and allow to develop for 25 min. Then add 1 drop of 0.05M hydrazine sulphate solution and submit to colorimetric determination after thoroughly mixing. The measurable range of the determination is from 1 to 100 microgram NO_3-N l^{-1} with an average error 4%. This method has been tested in the oceanographic research of the East China Sea in 1966. Studies were also carried out on the purification of BSPB by recrystallization and some properties of its solution. Recently, instead of the copper/cadmium reductor column method, the BSPB method has been used in Auto-Analyzer, and some satisfactory data on nitrate in the East China Sea and its coastal regions are obtained.

KEY determination, nitrate, seawater, East China Sea, colorimetry

LANG Chinese, English abstract

149 AUTH Li, Yan; Wang, Qingzhang

AFFI Institute of Oceanology, Academia Sinica, Qingdao (1); Department of Marine Chemistry, Shandong College of Oceanology, Qingdao (2)

DATE 1981

TITL Redox equilibrium distribution in the East China Sea sediments

CITA Oceanologia et Limnologia Sinica (supplement), 79-91 (1981)

ABST Such parameters as Eh, pH, Es and conductivity of surface layer sediments in the East China Sea (including shallow sea area, the Okinawa Trough and its southeast side) have been primarily measured, and pS^{2-} values of the sediments and their bacterial sulfate reduction have been also calculated and made

respectively. The results clearly show that the distribution law of these parameters measured in the sediments agrees with the geological environments and hydrological conditions of these three areas. According to the relative chemical compositions of the East China Sea sediments, the -pE/pH equilibrium diagram, which relates to sulfur, iron and manganese systems, was proposed. The redox equilibrium of the Okinawa Trough sediments containing sulfide was also studied; the results indicate that the Eh controlling mechanism is a reaction process as $S_5^{2-} = 5s^0 + 2e^-$, and the ΔpM (degree of complex formation) order of five heavy metal sulfides in interstitial waters of the reductive sediments is found to be in the sequence of $Zn^{2+} < Pb^{+2} = Cd^{+2} < Cu^{+2} < Bi^{+3}$. In this paper a sulfide-selective membrane electrode has been prepared electrochemically, and the electrochemical behaviours of three electrodes, sulfide-selective, platinum and glassy carbon electrode, in the oxidative and reductive sediments have been also compared with one another.

KEY redox equilibrium, sediments, Eh, pH, sulfur, conductivity, East China Sea, reduction, iron, manganese, zinc, lead, cadmium, copper, sulfide, bismuth, oxidation, sulfate, bacteria, interstitial water, electrode

LANG Chinese, English abstract

150 AUTH Li, Zhaolong

AFFI unknown

DATE 1982

TITL Trace metals in the surface microlayer

CITA Journal of Marine Science 4, 64 (1982)

ABST Sampling techniques and enrichment factors of trace metals in the surface microlayer are discussed.

KEY surface, pollution, scandium, lead, cobalt, zinc, lanthanum, bromine, cerium, uranium, sodium, potassium, chlorine, magnesium, calcium, enrichment

LANG Chinese

151 AUTH Liao, Yunhe

AFFI Institute of Oceanographic Instrumentation, National Bureau of Oceanography, Tianjin

DATE 1982

TITL Design of calibration method for an airborne infrared radiation thermometer

CITA Ocean Technology 1, 63-67 (1982)

ABST In this paper some problems in designing calibration method for an airborne infrared radiation thermometer are discussed. These problems include those caused by the effect of environment, by target and by the temperature of target. The limits of errors are calculated. Some results of calibration and field tests are given.

KEY remote sensing, temperatures

LANG Chinese, English abstract

152 AUTH Lin, Huiyong

AFFI Institute of Oceanographic Instrumentation, Tianjin

DATE 1983

TITL Current status of oceanographic instrumentation in USA

CITA Ocean Technology 1, 15-20 (1983)

ABST This paper introduces the current status of oceanographic instrumentation in USA. An analysis of the tendency and features of its development in this field is presented herein. Performances of some advanced oceanographic instruments are briefly outlined. Suggestions on how to speed up the development of marine instrumentation in our country are also given.

KEY instrumentation

LANG Chinese, English abstract

153 AUTH Lin, Minji; Lin, Zhifeng; Zheng, Wenqing; Zhao, Rongping; Chen, Shumei

AFFI Third Institute of Oceanography, National Bureau of Oceanography, Xiamen, China

DATE 1983

TITL The sedimentation and transfer mechanism of chlorinated hydrocarbons in the estuary-continental shelf area I. The spatial distribution of BHC in the sediments over the East China Sea continental shelf off Changjiang Estuary and an initial report on the use of BHC for the determination of the sedimentary rates

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise Abstract, 149-150 (1983)

ABST The gas-liquid chromatographic determination of BHC (Benzene hexachloride) in the cores from seven stations over the East China Sea Continental Shelf off Changjiang Estuary indicates the spatial distribution of BHC in the upper sediments of 35 cm over the inner continental shelf of Changjiang Estuary is related to the depth only. There are evidently three peaks for the BHC in the sediments of 30 cm over its outer continental shelf. BHC, a persistent compound with a stable molecular structure, is a kind of marine pollutant wholely produced by human activities over a long time. It is possible to use the distribution of BHC in the cores for estimating rates of modern sediments over the continental shelf and in the estuary. Based on this estimation, the sedimentary rates of the stations of G8103, G8140, G8126, G8133, G8138 were respectively 1.1, 3.5, >= 2.4, 0.76 and 0.55 cm/y. In the estimation, the effects of

biological activities on the transfer of BHC have been considered. The results approximate those of Pb-210 data.

KEY chlorinated hydrocarbons, sediments, East China Sea, continental shelf, Changjiang, estuary, sedimentation rates, chromatography, pollution, lead-210

LANG Chinese, English abstract

NOTE abstract only

154 AUTH Lin, Ruifen; Wei, Keqin; Wang, Zhixiang

AFFI Institute of Geochemistry, Academia Sinica

DATE 1982

TITL The isotope composition of meteoric precipitation in Beijing and Shanghai areas

CITA Annual Reports Institute of Geochemistry, Academia Sinica (1980-1981), 39-41 (1982)

ABST Tritium concentrations, and δD and δO-18 values of monthly average precipitation samples from Beijing and Shanghai areas were determined. The δD--δO-18 equations give D = 7.3 δO-18 + 9.7 and D = 8.2 δO-18 + 15.8, respectively. The lower concentration of heavy isotopes in summer rainwater samples from Beijing area is considered as the result of continental effect. The correlation between the δ O-18 of precipitation and the average air temperature in Shanghai area is opposite to that in most localities throughout the world, but similar to that in Hong Kong and Pohang (Korea). On the basis of tritium data the mean residence time of tritium in the atmosphere is estimated to be 1.3-1.4yr.

KEY compositions, precipitation, tritium, isotopes, residence time, deuterium, oxygen-18, rain water

LANG Chinese, English abstract

155 AUTH Lin, Zhenhong; Lu, Yanan

AFFI Department of Marine Geology, Shandong College of Oceanology, Qingdao

DATE 1981

TITL Mineralogical evidence of the source and dispersion of the surface sediments in Shijiusuo nearshore zone, Shandong Province

CITA Oceanologia et Limnologia Sinica (Supplement), 92-104 (1981)

ABST According to the study of the mineral composition of the 0.063-0.125 mm fraction (3-4ϕ) of 41 surface sediment samples from rivers and nearshore zone of Shijiusuo, three provinces have been defined based mainly on the heavy mineral association. The sources of sediments and the distributive patterns of mineral in the nearshore zone are discussed. The sediments are composed of quartz, orthoclase, plagioclase, biotite, muscovite, serpentine, magnetite, hematite, limonite, ilmenite, hornblende, actinolite, epidote, titanite, garnet, apatite, tremolite, diopside, zircon, rutile, zoisite, tourmaline, brookite, thorianite, topaz allanite and framboidal pyrite. Throughout the area, the composition of the minerals is mainly determined by their sources. The mineral composition, mineral distribution and characteristic mineral association strongly reflect different sources that depend on the geology of the coastal areas. On the basis of the distinctive mineral association Shijiusuo nearshore surface sediments can be divided into three provinces: Shore apatite-magnetite-hornblende province, Central epidote-tremolite-pyrite province and Eastern epidote-tremolite-zircon province. Sediments in the shore area come from marine erosion of the coast. They are mainly derived from granodioritic source and reworking pre-bars, and only a small part from metamorphic rocks. As a result of the action of the wave and current, the dispersion direction of these sediments may be believed to be southwest and seaward. However, the sediments of the central area are derived

from Liangcheng-Baima drainage basin where metamorphic rocks of the Pinson series and Mesozoic granitic intrusions are found. They are derived neither from erosion of the sea cliffs nor from the rivers of the southern region. Owing to the transport of the current the dispersion of the sediments from northeast to southwest is predominantly paralled to the coastal line. Transverse movement is not apparent. The bottom sediments of the Eastern area may be complex mixtures of the relict and modern components. The observations of the wave and current, coastal geomorphological investigation and sediment size analysis support the view proposed from the mineralogical studies.

KEY sediments, compositions, distribution, grain size, rivers, coastal water, minerals, geochemistry, quartz, pyrite, Mesozoic, sources

LANG Chinese, English abstract

156 AUTH Lin, Zhiqing; Zheng, Jianlu; Wang, Zhaoding; Chen, Jinsi

AFFI South China Sea Institute of Oceanology, Academia Sinica, Guangzhou

DATE 1982

TITL A study of estuarine chemistry in the Zhujiang river II. Chemical forms of heavy metals in the suspended particulate

CITA Oceanologia et Limnologia Sinica 13, 523-530 (1982)

ABST Five chemical forms of Cu, Pb, Zn, Cd, Fe, Al, Mn and Si in the suspended particulate in the estuary of Zhujiang River have been determined for the first time by the chemical sequential extraction procedure and ASV and spectrophotometry. The laws of change and distribution in levels from fresh water to salt water have been discovered of the exchangeable form, the bound form to carbonates, the bound form to Fe-Mn oxides, the bound form to organic matters and the

residual form of the 8 elements. The salinity at the stations 1-7 from Humen to Wanshan Isles ranges from 0.03°/$_{oo}$ to 26.27°/$_{oo}$. Within the salinity range of 0.03°/$_{oo}$ to 2°/$_{oo}$, the levels of the suspended particulate decrease sharply, and most of the suspended particulate (nearly 80%) are removed by precipitation in the corresponding areas. During this process, the percentages of these elements against the suspended particulate are not obviously varied, which implies that the suspended particulate does not enrich or release those elements when it deposits in large amounts. It is generally estimated that among the suspended particulates Cu, Zn, Cd and Al exist mainly in residual form (about 60%), Fe and Mn in the bound form to Fe-Mn oxides (about 60%) and Pb in the bound form to carbonates (40%). The variation of the forms of these elements in the suspended particulate is complicated with the increase of salinity from 0.03°/$_{oo}$ for fresh water to 26.27°/$_{oo}$ for salt water, for which we find: Zn, Cd, Al remain in residual form; Fe mainly remains in Fe-Mn oxides and residual form; Si changes from the residual form to the bound form to Fe-Mn oxides; Pb from the residual form to the bound form to Fe-Mn oxides and to carbonates; Mn from the residual form to the bound form to Fe-Mn oxides; the exchangeable form of Cu and its residual form change to the bound form to Fe-Mn oxides.

KEY heavy metals, particulates, anodic stripping voltammetry, spectroscopy, fresh water, carbonates, oxide, organic matter, salinity, precipitation, copper, lead, zinc, cadmium, iron, aluminum, manganese, silica, seawater, complexation, estuarine water, Zhujiang, speciation

LANG Chinese, English abstract

157 AUTH Ling, Beibei

AFFI Harbin Shipbuilding Engineering Institute

DATE 1981

TITL A study of the laws of small-scale horizontal turbulent diffusion and the predictions of pollution near the Chinese coastal areas

CITA Acta Oceanologica Sinica 3, 165-183 (1981)

ABST From the simplified mechanism of two-dimensional turbulent diffusion field of the sea, the turbulent diffusion equation is derived and a mathematical model is developed in this paper. The fundamental parameters of horizontal turbulent diffusion due to isotropic small-scale eddies are obtained from regression analysis of experimental data of thirty observations in eight areas along Chinese coastal waters. Furthermore, the basic laws of turbulent diffusion in sea water off the Chinese coast are derived as $K=0.0025U^{2+}$ t and K=0.05Ul, showing that the relationship between the coefficient of diffusion and the dimension of the cloud released is a linear one, contrary to the usually accepted 4/3 power law. Pollution of waste disposal into the sea is also discussed and the prediction formula for China coastal waters is derived. Finally, the problems of volume and continual waste disposal into the sea are discussed.

KEY diffusion, pollution, waste disposal, coastal waters

LANG Chinese, English abstract.

158 AUTH Ling, Honglie; Wang, Zhicheng; Hua, Zugeng

AFFI East-China Sea Laboratory, Institute of Acoustics, Academia Sinica, Ningbo (1, 2); The Second Institute of Oceanography, National Bureau of Oceanography, Hangzhou (3)

DATE 1983

TITL Experimental investigation of acoustic transmitting characteristics for underwater spark discharge

CITA Ocean Technology 1, 44-54 (1983)

ABST The electrical spark sound source described in the paper is the main part of a newly-designed deep-stratigraphical seismic profiler, which consists of a control console, a high voltage cupboard, four energy storing devices (the capacity of each is about 8500 Joules), a switchboard, an alarm-control box and an underwater spark electrode, etc.. It is safe and easy to operate and maintain. The maximum storage capacity is 34000 Joules. The maximum voltage is 9 kv. The maximum discharge current is more than 20000 Amp. The underwater spark electrode is newly-designed, of "empennage-like" equally-spaced coaxial construction, and have features in stable discharging characteristics and high conversion efficiency. In order to study the relation between the acoustic radiation of underwater park discharge and the electrical parameters, the structural parameters of the sound source system, a great number of measurements have been made at sea. The relation between the electric-sound conversion efficiency, the transmitted sound energy spectrum of underwater spark discharge and the underwater spark electrode configuration, operating voltage, storage capacity, depth of spark discharge, etc. has been obtained. A sound base has been provided for future engineering design.

KEY acoustics

LANG Chinese, English abstract

159 AUTH Liu, Bayoshan

AFFI Institute of Oceanology, Academia Sinica

DATE 1980

TITL A study on the method of quantitative spectrometric determination of some minor elements in marine sediments

CITA Studia Marina Sinica 16, 67-70 (1980)

ABST The small hole electrodes, silicon controlled D. C. light source and pure graphite powder two times the amount of the sample are used in the determination. Such amount of graphite may act both as a buffer and a carrier, diminishing the influence of increased intensity caused by the impurities of the additional buffer and carrier, increasing the intensity of spectral line of V and Ni and decreasing the differences in the fundamental elements between the base and the sample at the same time. The error of average square-root for Ga, Ti, Ba, V, Ni, Cu, Mn and Cr are ± 5.4, ± 5.4, ± 5.0, ± 10.4, ± 7.8, ± 9.0, ± 10 and ± 8.1% respectively.

KEY determination, sediments, trace metals, vanadium, nickel, gallium, titanium, barium, copper, manganese, chromium, spectroscopy

LANG Chinese, English abstract

160 AUTH Liu, Chongxi

AFFI Group 101, Petroleum Geological Synthetical Team, Ministry of the Geology, China

DATE 1982

TITL The distributional characteristic of dissolved hydrocarbon gas in the South Yellow Sea

CITA Journal of Marine Science 4, 26-29 (1982)

ABST The results of determination show that dissolved hydrocarbon gas is formed by methane, ethane and ethylene in the South Yellow Sea; the total hydrocarbon contents increase with the increasing of depth in the north section to Chengshantou, while the contrary is true in the south section. The distribution of the ethane and its homologue shows that petroleum pollution is heavier in the north section but lighter in the south section.

KEY Yellow Sea, determination, methane, ethane, ethylene, distribution, petroleum, pollution, hydrocarbons

LANG Chinese, English abstract

161 AUTH Liu, Liansheng; He, Benmao; Wei, Manxin

AFFI Department of Oceanological Chemistry, Shandong College of Oceanology, Qingdao

DATE 1979

TITL Ion exchanger colorimetry in direct determination of minor elements in sea water - Micro determination of cadmium and chromium in sea water

CITA Acta Oceanologia Sinica 1, 90-102 (1979)

ABST This article is a study of the new method of direct determination of minor cadmium and chromium in seawater by means of colorimetry, using resine of Chinese manufacture. The basis of this method is that ion exchanger is a translucent body, which enriches in diluted solutions and can be subjected to direct spectrophotometric determination, under certain conditions, after colouring appears on it, making it unnecessary to get its eluate for examination. Experiments prove that as to systems with high distribution ratio, their density as against the concentration of resin-phase sample complex to be identified shows a straight line relationship, and similarly with their density against the primary concentration in liquid phase. This is the basis of the quantitative analysis of this new method, which is tens of times higher in sensitivity than the conventional colorimetry of liquid. Its ease of manipulation, elimination of the use of expensive instruments (e.g. in our experiments spectrophotometer type 721 of Chinese manufacture was used) and poisonous reagents makes it suitable for extensive adoption with promising prospects, such as for environmental analysis. For determining cadmium in sea water by this method an experiment takes no more than two hours. The minimum concentration found by this method is 0.02 microgram/l, recovery - 95% or over; for chromium in sea water, an hour and a half,

recovery-95% or over. The minimum concentration is 0.02 microgram/l, far more accurate than the conventional spectrophotometric method, comparison with atom absorption method and polarographic method shows results in accord with each other, with good accuracy.

KEY ion-exchange, colorimetry, seawater, cadmium, chromium, concentrations, environment, spectroscopy, resin, determination

LANG Chinese, English abstract

NOTE See Note 15

162 AUTH Liu, Liensen; Chang, Chenping; Li, Kewei; Chang, Xinguo; Chen, Riguang

AFFI Department of Oceanological Chemistry, Shandong College of Oceanology, Qingdao

DATE 1980

TITL A study of the mutual non-interference effect of inorganic ion exchange in seawater I. Ion exchange reactions of U(VI), Cr(III), Ca, Mg with hydrous titanium oxide in seawater.

CITA Journal of Shandong College of Oceanology 10, 63-80 (1980)

ABST The results obtained in this article by study of mutual non-interference effect of inorganic ion exchange in sea water are: 1. On the basis of experiments conducted in this article, we propose that in the inorganic ion exchange reaction in sea water there is a mutual non-interference effect, viz. the presence of other ions in seawater has no effect on the final exchange quantity of the ion under consideration on the inorganic exchange. During the reaction the ion exchange exhibits an "independent", mutually non-interfering action. The systems studied in our experiment are: (1) ion-exchange reaction of uranium (under conditions of a large quantity of chromium) with hydrous titanium oxide. (2) ion-

exchange reaction of chromium (under conditions of a large quantity of uranium) with hydrous titanium oxide. (3) ion-exchange reaction of uranium (under conditions of a large quantity of calcium) with hydrous titanium oxide. (4) ion-exchange reaction of uranium (under conditions of a large quantity of magnesium) with hydrous titanium oxide. 2. The mechanics of the reaction of chromium (III) with hydrous titanium oxide in seawater have been studied in detail. It has been determined that one of the steps in the chemical reaction is that of cation ion exchange. From the "ratio of exchange(%)--pH graph" it is possible to deduce further that the reaction is in the form of monovalence cation exchange: R--OH + $Cr(OH)_2$ ==R-O-$Cr(OH)_2$ +H^+. In addition, the reaction can also be explained by the mechanics of "complexation-dewater" reaction: R-OH + OH--$Cr(OH)_2$ ==R-OCr(OH) +H_2O. 3. The stepwise equilibrium constants of Chromium (III) with hydrous titanium oxide in seawater have been determined by experiments, the results being: K_1==10000(microgram/g extracting agent.-ppm); K_2==3.5x10(E+6)(microgram/g extracting agent. ppm^2). These result well agree with Keen's enrichment coefficients. 4. The mechanics of the reaction of Chromium(VI) with hydrous titanium oxide in seawater also have been studied. From the "ratio of exchange (%) - pH graph" it is possible to deduce further that the reaction is in the form of anion ion exchange: 2R-OH+CrO_4^{-2}==R_2CrO_4 + $2OH^-$. The equilibrium constant of chromium(VI) with hydrous titanium oxide in seawater have been determined by experiments, the results being: K_1==1.9(microgram/g extracting agent. ppm). 5. The above results will exhibit its theoretical guiding effect in the marine geochemistry of chromium.

KEY inorganic ion exchange, seawater, hydrous titanium oxide, uranium, chromium, pH, enrichment, geochemistry, equilibrium constant, calcium, magnesium, interference

LANG Chinese, English abstract.

NOTE See Note 15

163 AUTH Liu, Min-hou

AFFI First Institute of Oceanography, National Bureau of Oceanography

DATE 1982

TITL Fossil soil layer in Pleistocene sediment of Huang Hai Sea

CITA Quaternary Geology and Environment of China, 143-146 (1982)

ABST The preliminary physico-chemical analyses of so-called "hard mud layer" or "hard clay layer" in cores of late Pleistocene in Huang Hai Sea (Yellow Sea) indicate that they actually represent buried fossil layers in three different periods. Their common characteristic is that none of them has formed inherent stratified units of typical fossil soil section, but only stopped at the early period of soil development, similar with buried weathering layer in loess. But according to the analysis of organic materials there exists another possibility, i.e. owing to the later transgression, the most part of the well developed fossil soil layer at that time had been washed away, and only the relict part and its parent material layer left there.

KEY sediments, Huanghai, organic matters, East China Sea, compositions, pH, Pleistocene, soil, loess

LANG English only

164 AUTH Liu, Mingxing; Bao, Wanyou; Gu, Hongkan

AFFI Institute of Oceanology, Academia Sinica

DATE 1981

TITL The analysis of Zn, Cd, Pb, Cu in marine organisms by anti-adsorption physical coating mercury electrode inverse polarography

CITA Transactions of Oceanology and Limnology 2, 9-15 (1981)

ABST Inverse polarography (Anodic stripping voltammetry) with anti-adsorption physical coating mercury electrode is a convenient and highly sensitive technique for the determination of trace metals. It is more advantageous than other methods in the analysis of trace elements in marine organisms. It requires only a small amount of samples and analytical solution without any filtration or adding any supporting electrolyte. The seawater diluted samples can be directly determined for Zn, Cd, Pb and Cu. To test the possible loss of volatile metals during muffle ashing, the dried marine organisms are ashed by two different techniques: in muffle furnace at 450 degree C and in oxygen plasma furnace. The results obtained by using the above two methods were almost in agreement, but the latter method will consume a great deal of ashing time. The errors of the ashed Cypselums poeciloerws determination is < ± 15% using this method.

KEY marine organisms, electrode, polarography, anodic stripping voltametry, trace metals, analytical chemistry, zinc, lead, cadmium, copper, seawater, bioaccumulation

LANG Chinese, English abstract

NOTE Gu Hongkan was formerly Gu Hong-Kan or Koo H.K.

165 AUTH Liu Mingxing; Bao Wanyou; Zhang Shoulin

AFFI Institute of Oceanology, Academia Sinia

DATE 1983

TITL The seasonal variation of some trace metals in the Ruditapes Philippinus in Jiaozhou Bay

CITA Oceanologia et Limnologia Sinica, 14, 22-29

ABST This paper deals with the seasonal variation of Zn, Cd, Pb, Cu in Ruditapes Philippinus as determined by inverse polarography (Anodic Stripping Voltammetry) with anti-adsorption physical coating mercury electrode. The samples were collected once seasonally from November 1979 to August 1980 from 14 stations in the east part of Jiaozhou Bay. Though there was significant variation in individual Ruditapes philippinus, the variation of trace metals content in Ruditapes philippinus as a whole from southern stations was higher than from northern ones. This is possibly due to the effect of industrial and domestic discharges near the southern stations. In general, the highest values were found in the months of Summer and Autumn. The mean contents of Zn, Cd, Pb, Cu in Ruditapes philippinus are 16.4--54.9 μg/g, 0.20--1.38 μg/g, 0.48--2.18 μg/g, 0.57--8.67 μg/g dry weight respectively.

KEY trace metals, seasonal variation, polarography, anodic stripping voltammetry, electrode, concentrations, zinc, cadmium, lead, copper, seawater, sediments, marine organisms, pollution, bioaccumulation

LANG Chinese

166 AUTH Liu, Mingxing; Bao, Wanyou; Zhang, Shoulin

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1981

TITL The concentrations of trace metals of animals such as the Arca subcrenata in Bohai Bay

CITA Chinese Environmental Science 5, 29-36 (1981)

ABST This paper deals with the concentrations of zinc, cadmium, lead and copper in Arca subcrenata and other animals in Bohai Bay. The seasonal variations are determined and discussed.

KEY Bohai, trace metals, concentrations, environment, pollution, zinc, cadmium, lead, copper, seasonal variation, polarography, bioaccumulation

LANG Chinese

167 AUTH Liu, Mingxing; Gu, Hongkan

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1980

TITL Trace metal concentration of the fishes and benthos from the outer continental shelf and the northern Diaoyu Dao (Tiaoyu island) of the East China Sea

CITA Acta Oceanologica Sinica 2, 68-78 (1980)

ABST This paper describes the application of the technique of inverse polarography (anodic stripping voltammetry) with antiadsorption physical coating mercury electrode, which is convenient and highly sensitive for the determination of seawater, fishes, benthos, and other marine organisms, giving precise and rapid results. The technique has an advantage over other methods in that it requires only a small amount of sample and analytical solution. Neither filtration nor the addition of supporting electrolyte is needed. Ashed samples diluted by seawater can be directly used for the determination of Zn, Cd, Pb, and Cu. Detailed analytical procedures are given. The concentration factors of trace metal in marine organisms to that of sea water was calculated. The Zn, Cd, Pb, and Cu concentration of determined marine organisms (fishes and benthos) give values ranging 3--212 μg/g, 0.3--7.2 μg/g, 0.1--7.5 μg/g, and 0.06--8.8 μg/g dry weight. Biological concentration factors are at 600--40000,, 600--50000, 4000--500000,and 60--20000, respectively.

KEY trace metals, concentrations, fish, benthos, continental shelf, East China Sea, polarography, anodic stripping voltammetry, electrode, determination, seawater, marine organisms, zinc, cadmium, lead, copper, enrichment, bioaccumulation

LANG Chinese, English abstract

NOTE Gu Hongkan was formerly Gu Hong-Kan or Koo H.K.

168 AUTH Liu, Mingxing; Gu, Hongkan

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL Trace metal in fishes and benthos in East China Sea

CITA Acta Oceanologica Sinica 1, 221-224 (1982)

ABST The application of inverse polarography with anti-adsorption physically coated mercury film electrode to analysis of fishes and benthos is described. The Zn, Cd, Pb and Cu concentrations of determined marine organisms are 3-212 μg/g, 0.3-7.2 μg/g, 0.1-7.5 μg/g, and 0.06-8.8 μg/g respectively.

KEY East China Sea, polarography, marine organisms, zinc, cadmium, lead, copper, pollution, determination, analytical chemistry, benthos, fish, bioaccumulation

LANG English

NOTE Gu Hongkan was formerly Gu Hong-Kan or Koo H.K.

169 AUTH Liu, Mingxing; Gu, Hongkan

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1981

TITL The concentrations of some trace metal ions in interstitial waters from the East China Sea

CITA Oceanologia et Limnologia Sinica 12, 53-60 (1981)

ABST The concentrations of Zn, Cu, Pb, Cd, Sn, and Bi ions in interstitial waters from the East China Sea have been measured. The "antiadsorption physical coating mercury film electrode inverse polarography system" was used for the measurement. The "dilution method" was used to obtain the interstitial water. The concentrations of the above ions in the interstitial waters are about 2-6 times higher than that in the sea water. The high ion contents are in the muds in which the Eh was negative and the pH was around 7.6. The low ion contents are in the sand. Obviously, it was caused by decomposition of bio-organic matter in mud, and the low pH and negative Eh transfer the Zn, Cu, Pb, Cd, Sn and Bi into the interstitial water.

KEY concentrations, trace metals, interstitial water, East China Sea, electrode, polarography, seawater, Eh, pH, zinc, copper, lead, cadmium, tin, bismuth

LANG Chinese, English abstract

NOTE Gu Hongkan was formerly Gu Hong-Kan or Koo H.K.

170 AUTH Liu, Mingxing; Li, Guoji; Bao, Wanyou; Zhang, Shoulin

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL The concentrations of trace metals of the Arca subcrenata in Bohai Bay and Jiaozhou Bay

CITA Transactions of Oceanology and Limnology 2, 11-17 (1982)

ABST This paper deals with the concentrations of Zn, Cd, Pb and Cu in Arca subcrenata. The samples of two stations were collected from Bohai Bay and Jiaozhou Bay. The concentrations of trace metals of sediment at two stations were also determined. A comparison has been made between the concentrations of trace metals of body fluid, adductor, foot, mantle, gills, liver and other tissue in the Arca subcrenata. The highest values are found in gills, liver and mantle, the concentration factors of trace metals in soft tissues are calculated. The range of trace metals are in Zn 4.4-22.5, Cd 0.10-1.96, Pb 0.68-2.45, Cu 1.48-5.16 μg/g dry weight.

KEY trace metals, Bohai, Jiaozhou Bay, polarography, concentrations, sediments, zinc, cadmium, lead, copper, pollution, environment, bioaccumulation

LANG Chinese, English abstract

171 AUTH Liu, Wenyuan; Cai, Xingyuan

AFFI Xiamen University, Xiamen

DATE 1982

TITL A study of molybdosilicic acid method of silicate in sea water

CITA Acta Oceanologica Sinica 4, 384-389 (1982)

ABST Here proposed is a modified molybdosilicic acid method for the determination of silicate in sea water. A suitable acidity is used to obtain higher sensitivity and stability. At this acidity, the salt effect coefficient is lowered to about 4%. To eliminate the calibration of salt effect, artificial sea water is applied. In order to simplify the method and to diminish the work on ship, the mixed reagent is introduced. The precision and accuracy of the modified method is satisfactory. The standard solution of silicate prepared by this method is stable within one year.

KEY silicate, seawater, determination, colorimetry

LANG Chinese, English abstract

172 AUTH Liu, Yupin; Wei, Xiuhua; Zhang, Zizhong

AFFI First Institute of Oceanography, National Bureau of Oceanography, Qingdao

DATE 1982

TITL The determination of micro-uranium in seawater

CITA Journal of Marine Science 4, 20-25 (1982)

ABST In present paper the technique of extracting and isolating uranium by TRPO directly from seawater and the optimum requirements for Br-PADAP color reaction have been reported. Some effects of coexisting ions on the determination are discussed. Therefore a photometric procedure after extraction for the determination of micro-uranium in seawater has been established. This method is easy, simple and rapid in operation, and its sensibility is about 1.7 * E-7 /l, chemical recovery of uranium being 84% and relative error being less than 2%.

KEY determination, uranium, marine resources, analytical chemistry, extraction, colorimetry

LANG Chinese, English abstract

173 AUTH Lu, Daren; Zhou, Xiuji; Qiu, Jinheng

AFFI Institute of Atmospheric Physics, Academia Sinica, Beijing

DATE 1982

TITL Principle of remote sensing of atmospheric aerosol size distribution by combined solar extinction and forward scattering method and numerical experiment

CITA Scientia Sinica (series B) 25, 745-755 (1982)

ABST In this paper, the principle of inverting aerosol size distributioin by solar spectral extinction-forward scattering measurements is proposed and analyzed. Two methods of inversion---the segmental inversion and the combined one---are presented. Numerical experiments show that this method is quite successful in improving the accuracy of retrieved aerosol size distribution in both smaller part ($r < 1\mu m$) and larger part ($r > 1\mu m$) of aerosol size ranges.

KEY remote sensing, aerosol, grain size, distribution, atmosphere, scattering

LANG English

174 AUTH Lu, Fen-ying; Zhang, Zong-she; Qiu, Chang-qiang; Wu, Zhao-tian; Wang, Guang-shi

AFFI Institute of Hydrobiology, Academia Sinica, Wuhan

DATE 1964

TITL A preliminary report on the hydrobiological conditions and recent sediment of Lake Datung

CITA Oceanologia et Limnologia Sinica 6, 323-330 (1964)

ABST Lake Datung is an embanked part of the former Dong-ting Lake, enclosing an area of about 185 km^2. Water samples collected at 5 stations were analyzed in November and December, 1960. The following average values were obtained: PO_4^{-3} 0.033, NH_4^+-N 0.18, NO_3-N 1.78, SiO_2 3.5, Ca^{+2} 32.7, permanganate oxygen consumption (organic matter) 2.0mg/l; phytoplankton 2.18 [E+6] cells per liter, zooplankton 371 individuals (rich in Calanoids) per liter; aquatic higher plants 94.0 g/m^2; zoobenthos 232 individuals

per square meter, with a biomass of 97.7 g/m^2, of which the bulk came from molluscs. Accordingly, Lake Datung is considered to be of the eutrophic type. Eighteen samples of the recent sediment of this lake were collected through 3 cores and were analyzed with reference to organic carbon, alcohol-benzene extract, protein, redox potential and other items. The average results are given in Table 1. The very low content of the organic matter and the evenness in its vertical distribution are attributed to a vigorous oxidation process prevailing at the lake bottom.

KEY lakes, organic matter, phytoplankton, oxygen, zooplankton, organic carbon, protein, redox potential, sediments, phosphate, nitrate, ammonia, silicate, calcium, biological oxygen demand, eutrophication, chemical oxygen demand

LANG Chinese, English abstract

175 AUTH Lu, Rongzhao; Wang, Shuzhi; Yang, Wanjing; Zhou, Baicheng

AFFI Institute of Botany, Academia Sinica (1,2,3); Institute of Oceanology, Academia Sinica, Qingdao (4)

DATE 1980

TITL Preparation of phycoerythrin from Porphyra yezoensis

CITA Hai Yang Ke Xue 4, 32-33, 1980

ABST Phycoerythrin is an important pigment in photosynthesis. The extraction, separation and purification of phycoerythrin from Porphyra yezoensis are discussed in this paper. Ammonium sulfate gradient precipitation method was used, which is a simple method and gives high yield of phycoerythrin. Authors suggest that this method should be the preliminary step in the purification of phycoerythrin.

KEY pigment, photosynthesis, extraction, marine resources

LANG Chinese

176 AUTH Lu, Saiying; Niu, Junhao; Tong, Junan

AFFI First Institute of Oceangraphy, National Bureau of Oceanography, Qingdao

DATE 1981

TITL Determination of trace mercury in seawater by cool atomic fluorescence photometry

CITA Acta Oceanologica Sinica 3, 58-588 (1981)

ABST The paper presents a method of measuring mercury, using YYG-77 cool atomic vapour fluorimeter. The sample and reagents are injected into an air-tight system and the reducer is also modified, and thus quenching of fluorescence and external contamination caused by entering air can be eliminated. After experiment the following optimum conditions have been selected: a flux of N_2 stream 0.35 lm^{-1} the amount of stannous chloride 3ml, stirring time 30 seconds, and volume 50ml; including sample and reagents, by establishing the air-tight injection system and using optimum conditions,the detection limit is decreased from original 0.05μgl^{-1} to 0.002μgl^{-1} (mercury). The precision of the method is + or - 1.6% or so in 0.10μgl^{-1} sample solution and + or - 3.2% or so in 0.030μgl^{-1} sample solution. The advantages of this method lie in the simple equipment and rapid procedure. It takes only 40-60 sec to measure a sample. It can be used to determine trace mercury in sea water or fresh water and is convenient to operate on board ship. Experiments of the influence of various mediums and chlorinities of sea water on measuring have been made. The results show that the chlorinities have no influence and a concentration of nitric acid within 1-5% is optimum. The advantage of the air-tight injection system mentioned above has been checked. The results indicate that the air-tight injection system can get much more precision than the opening system. The precision of the former is + or - 2.2% and the latter + or - 8.1% at 0.1μgl^{-1} mercury

concentration. In the meantime, measuring readings of the former is 37% or so higher than the latter. Air-tight injection, therefore, lowers the detection limit significantly. Finally, the detection limit can be further decreased if the resistance connected with the recorder is better regulated.

KEY determination, mercury, seawater, fresh water, chlorinity, fluorescence

LANG Chinese, English abstract

177 AUTH Lu, Yanan

AFFI Department of Marine Geology, Shandong College of Oceanology, Qingdao

DATE 1982

TITL Distribution and provenance of heavy minerals in Rizhao nearshore sediments, Shandong

CITA Journal of Shandong College of Oceanology 12, 43-52 (1982)

ABST In 1978-1979, heavy minerals in Rizhao nearshore sediments between Liangcheng-Baima and Xiuzhen rivers were studied in order to build up Shijiusuo deep-water wharf. Based on heavy mineral composition, variation and associated characteristics in the very fine sand fraction (0.125-0.063 mm) of 80 samples, the provenance and distribution of the heavy minerals are discussed. The extent of the heavy mineral concentration parellels the shoreline and the heavy mineral content appears as high-low-high variation from the beach toward the sea. The modern rivers, coastal erosion and authigenic sedimentation supply heavy minerals to the nearshore zone. The distribution of the heavy minerals is related to the source, water depth, sediment type and bottom topography. The distribution is controlled by the factors of geology, geomorphology, wave and current in the nearshore area. There is probably a residual beach deposit in the deep water area (-10-15 m), in

which heavy minerals were derived from the igneous-metamorphic rocks in the northern drainage area and concentrated as a result of the wave action when the sea level was lower.

KEY distribution, minerals, sediments, sand, sources, sedimentation, sea level

LANG Chinese, English abstract

178 AUTH Ma, Guiwu

AFFI Zhanjiang Fisheries College

DATE 1982

TITL A study on manufacture techniques of high strength gracilaria agar

CITA Journal of Marine Science 5, 21-25 (1982)

ABST Referring to various manufacture techniques at home and abroad, this work suggests the way to raise agar strength after comparing the effects of different bleaching agents on the quality and the yield of the agar products and doing optimizing of technique conditions of production of agar from G. tenuistipitata and G. verrucosa in Guangdong and Guangxi by the help of gradient method.

KEY agar, marine resources

LANG Chinese, English abstract

179 AUTH Ma, Tehsiu; Fang, Tsungci; Dai, Jixun; Ho, Jialung; Cheng, Dengqin; Zhou, Ruluen; Lin, Guangheng

AFFI Western Illinois University, U. S. A. (1); Shandong College of Oceanology (2, 3, 4, 5, 6); Institute of Oceanology, Academia Sinica, PRC. (7)

DATE 1982

TITL Tradescantia micronucleus bioassay of environmental mutagens in air and water samples from some industrial areas of Qingdao, and on the pesticide-DDV

CITA Journal of Shandong College of Oceanology 12, 51-54 (1982)

ABST Tradescantia Micronucleus Bioassay was used to conduct in situ monitoring of air pollution in two industrial districts of Qingdao and laboratory test on water samples collected from a river (Haipo River) and on a popular pesticide, DDV. Results from repeated monitoring of 4 sites, one near a chemical plant, showed significant (0.01) higher micronucleus (MCN) frequency over both home and field controls. Another site, near a rubber company, showed higher MCN frequency only over the home control. Laboratory tests on water and DDV were all treated For 6 hr and allowed 24 hr for recovery. Results of full-strength water testings showed positive results in sample #2 out of 3 samples collected from different sites, and all samples showed high toxicity which was indicated by burning stems and dead cells in tetrads and microspores. When water sample #2 was separated into liquid and solid portions through filtration, test on the liquid portion, after buffering (pH 6.8), showed clear related positive responses. The solid portion which was soluble in dimethyl sulfoxide (DMSO) was diluted in water into 1.72, 17.2 and 172 ppm concentrations. Test results showed negative responses in all three concentrations. When 5 ml of DDV-water mixture of the concentrations ranging from 0.03 to 0.4% was sprayed on the inflorescences of Tradescantia, no clear positive result was obtained. While DDV which was dissolved in DMSO and diluted with water was used to treat inflorescences through absorption, positive dose-responses were obtained from three concentrations.

KEY monitoring, pollution, rivers, pesticides, river water, toxicity

LANG Chinese, English abstract

180 AUTH Ma, Xinian; Li, Quansheng; Hua, Wenzhen; Huang, Huarui

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1981

TITL Iron in sea water of Jiaozhou Bay

CITA Studia Marina Sinica 18, 49-71 (1981)

ABST Iron in sea water of Jiaozhou Bay was investigated from June, 1964 to June, 1965, at intervals of a month at 8 stations. Water samples were filtered with No.4 sintered glass filters (in the last month with 0.5μ membrane filters) and 'active' iron, total iron and particulate iron (in the last month) have been determined. The conclusions are as follows: 1. The origin of iron in sea water of Jiaozhou Bay is mainly from rivers and other effusions from land. 2. The iron in sediment interstitial water of Jiaozhou Bay is in reduction state. The higher the level in the sediment interstitial water, the higher the concentration of iron. 3. Sea water surface of Jiaozhou Bay contains higher concentration of 'active' iron and particulate iron than the sublayer sea water does. 4. Dissolved iron rather than particulate iron might be assimilated by phytoplankton.

KEY iron, seawater, Jiaozhou Bay, rivers, sediments, interstitial water, concentrations, colorimetry, phytoplankton, particulates

LANG Chinese, English abstract

181 AUTH Ma, Xinian; Li, Quansheng; Huang, Huarui; Hua, Wenzhen; Shen, Wanren; Li, Guoji; Jiang, Chuanxian

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL Iron in sea water of the region off Changjiang River estuary

CITA Oceanologia et Limnologia Sinica 13, 241-253 (1982)

ABST Iron is one of the micro-nutrient elements for phytoplankton. Observations were carried out for total iron, particulate iron and reactive iron in the sea water of the region off Changjiang River (Yangtze

River) estuary in four cruises from May to Feb. next year. The results are described as follows: Iron content in this region is particularly high and the particulate iron is in large fraction. The average concentration of total iron was 1.02*10(E+3), 362, 3.63*10(E+3) and 3.72*10(E+3)μg/l in May, Aug., Nov. and Feb. respectively. The fraction of particulate iron was 91.2, 71.3, 93.2 and 68% respectively. Concentration of reactive iron varies from a few μg/l to tens of μg/l. In Aug. the average concentration was 15μg/l, the lowest value in the four cruises. In Feb. it was 52μg/l, the highest value. Total and particulate irons showed similar trend of horizontal distribution in this region. The concentrations of them were higher near coast than far off coast. There was no obvious gradient in distribution of reactive iron. The concentration of total and particulate irons increases gradually with depth of water. No regularity was found in vertical distribution of reactive iron. Reviewing above results, we can summarize as follows: 1. The Changjiang River is the main source of iron in the East China Sea. In rough estimate, the Changjiang River effuses total iron as high as more than 20 million tons per year and the fraction of particulate iron is over 98%. 2. Flocculation occurs in the process of mixing of the fresh water of Changjiang River with sea water. It is interesting to note that the average concentration of each station's total and particulate irons and the concentration of total and particulate irons of each station's bottom layer sample are negatively correlated to the salinity of corresponding surface water. 3. The average concentration of total and particulate irons in the region off Changjiang Estuary is not only related to the iron flux from Changjiang River but also to the pattern of current. In summer the direction of coastal current in this region is the

same as Taiwan Warm Current, from SW to NE, and the diluted water of Changjiang River is consequently forced to pour into the region over 32°N, out of our observed region. Although flux of the Changjiang River in Aug. is the largest in whole year, the concentration of iron in Aug. was the lowest in our four cruises because of the reason described above. In winter, the direction of coastal current in this region is different from Taiwan Warm Current, from NE to SW, and the diluted water of Changjiang River pours into our observed region, so the value of Feb. was the highest in the four cruises. 4. Comparing the vertical distributin of reactive iron with the vertical distribution of phosphate, it can be seen that in this region, vertical distribution of reactive iron is not similar to that of the phosphate, which is usually the minimum in euphotic zone, but increases obviously in water below the euphotic zone. This phenomenon indicates that, the reactive iron is not a limiting element for the growth of phytoplankton in this region because of the amount of the iron utilized by phytoplankton is too small as compared with that present in the sea water.

KEY iron, seawater, Changjiang, concentrations, particulates, phytoplankton, primary production, colorimetry, sources, flocculation, fresh water, salinity, seasonal variation, phosphate

LANG Chinese, English abstract

182 AUTH Ma, Xinian; Li, Wenwei; Shen, Wanren

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1965

TITL Construction of shipboard photo colorimeter

CITA Oceanologia et Limnologia Sinica 7, 195-198 (1965)

ABST A photo colorimeter for shipboard nutrient analysis was construsted. Calibration curves for phosphate and silicate were shown.

KEY colorimetry, silicate, phosphate, ammonia, nitrite, nitrate

LANG Chinese

183 AUTH Martin, Jean-Marie

AFFI Laboratoire de Geologie, E.N.S., 75230 Paris, France

DATE 1983

TITL The fate of chemical elements during estuarine mixing

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise Abstract, 16-17 (1983)

ABST The significance of estuarine machinery upon the actual flux of terrigenous material discharging to the ocean system is discussed. Major physico-chemical reactions and biological processes are described. The global significance of man's influence upon ocean chemistry is discussed taking into account the resulting effects of these reactions. With regards to river suspended sediment (R.S.M.) more than 90% settled in estuarine and near shore areas. Consequently, due to the strong association of chemical elements with R.S.M., only a small fraction of them will reach the open ocean. However the comparison of R.S.M. with deep sea clays composition emphasizes the prime influence of river input on oceanic sediment composition over a long term period for most elements. Concerning the dissolved phase, for the elements which exhibit a conservative behaviour during estuarine mixing (river concentration Cr < oceanic concentration Co) corresponding to large oceanic residence time, the influence of anthropogenic discharge on the global ocean will not be readily noticeable although significant changes may be observed in the coastal zone. For those elements which show "unchanged" (Co ≈ Cr) or "depleted" (Co < Cr) concentrations in the ocean, the influence of

industrial contamination can not be significantly observed in the open ocean, because of their rapid removal in the estuarine and coastal zone. Finally river input of chemical element to the ocean is compared to atmospheric and volcanic sources of material.

KEY sediments, rivers, particulates, estuary, river water, seawater, pollution, chromium, cobalt, air-sea exchange, mixing, sources, coastal water

LANG Chinese, English abstract

NOTE abstract only

184 AUTH Mckee, Brent; DeMaster, David; Nittrouer, Charles; Qian, Jiangchu; Zhao, Yiyang

AFFI Department of Marine, Earth and Atmospheric Sciences North Carolina State University, Raleigh, NC, U.S.A. (1, 2, 3); Second Institute of Oceanography, National Bureau of Oceanography, Hangzhou, China (4); Institute of Oceanology, Academia Sinica, Qingdao, China (5)

DATE 1983

TITL The use of Th-234/U-238 disequilibrium in examining particle scavenging near the Changjiang River mouth

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise Abstract, 106-107, (1983)

ABST Naturally occurring Th-234 ($t_{1/2}$ = 24 days) has been measured in surface waters (dissolved and particulate phases) from 5 stations near the Changjiang River mouth. The stations (occupied during November, 1981) form a shore perpendicular transect over the inner shelf mud deposit. Th-234 is continually produced from the radioactive decay of U-238 in continental shelf waters and can serve as a chemical analog to other particle reactive elements (e.g., certain trace metals, pesticides, or nuclear wastes). Based on Th-234 measurements and production rates, the time

required for the adsorption of dissolved thorium onto suspended particles was calculated. In the highly turbid waters near the Changjiang River mouth, dissolved thorium is adsorbed onto suspended matter in less than a day. In offshore waters with lower turbidity the adsorption process can take as long as 5 to 10 days. The time required to completely remove thorium from the water column was also calculated for the continental shelf stations. The total removal times, however, are sensitive to resuspension events (usually produced by strong winds or storms) in which particles from the seabed (high in Th-234 activity) are brought up into the water column.

KEY scavenging, Changjiang, trace metals, adsorption, thorium-234, uranium-238, particulates, continental shelf, turbidity, resuspension

LANG Chinese, English abstract

NOTE abstract only

185 AUTH Min, Xueyi(the Late); Chen, Guohua; Li, Feiyong; Yu, Chunxiu

AFFI Shandong College of Oceanology, Qingdao

DATE 1980

TITL Determination of specific gravity of sea water from the estuary of Changjiang River

CITA Acta Oceanologica Sinica 2, 86-92 (1980)

ABST The specific gravity of 13 sea water samples from the estuary of Changjiang River at 25°C has been determined by the pycnometer method. The results are consistent with the values computed from Knudsen's cholorinity tables within the experimental error of the method and are lower on an average of about 0.02 in sigma-25 than the values computed from the salinity by Cox, et al. equation (1970). The standard deviation of our measurements was estimated to be + or -0.01 in sigma-25. The differences between the present results and the values computed from the

chlorinity by Cox et al. equation (1970) may imply that, for water of the same chlorinity, the sea water at the estuary of Changjiang River tends to have a lower concentration of dissolved substances than that of the ocean water. Our work shows that the Knudsen's tables may apply to the sea water at the estuary of Changjiang River, and also provides experimental evidence that the new oceanographic tables can be applied in studies on the sea water of China Sea areas.

KEY determination, specific gravity, seawater, estuary, Changjiang, chlorinity, salinity, density, equation of state

LANG Chinese, English abstract

186 DELETED

187 AUTH Min, Xueyi (the late); Chen, Guohau; Li, Feiyong; Yu, Chunxiu

AFFI Shandong College of Oceanography, Qingdao

DATE 1982

TITL Specific gravity of seawater from estuary of Changjiang River

CITA Acta Oceanologica Sinica 1, 214-220 (1982)

ABST The specific gravity of 13 sea water samples at 25 degree C from the estuary of the Changjiang River has been determined by the pyconometer method. The results are consistent with the values computed from chlorinity by Knudsen's tables within the experimental error of the method, and are lower on an average of about 0.02 in sigma-25 than values computed from salinity by the equation of Cox et al. (1970). The standard deviation of our measurements is estimated at + or - 0.01 in sigma-25. The differences between the present results and the values computed from chlorinity by the equation of Cox et al. (1970) imply that, for water of the same chlorinity, the sea water

at the estuary of the Changjiang River tends to have a lower concentration of dissolved substances than that of the ocean water. Our work shows that the Knudsen's tables may apply to the sea water at the estuary of the Changjiang River and also provides experimental evidence that the new oceanographic tables can be applied to the studies on the sea water of China Sea areas.

KEY specific gravity, seawater, estuary, Changjiang, chlorinity, equation of state, density

LANG English

188 AUTH Mo, Jinyuan; Cai, Peixiang; Niu, Fengxian; Ou, Zhaowen

AFFI Sun Yatsen University, Guangzhou

DATE 1980

TITL Stripping voltammetry with rapid-scan polarography on the solid glassy carbon electrode to the determination of trace copper in natural water

CITA Sun Yatsen University Sinica 2, 67-69 (1980)

ABST A method is described for the determination of copper ion in natural water by stripping voltammetry with rapid-scan polarography. Pre-electrolysis of the sample with pH 3 is carried out directly on the stationary solid glassy carbon electrode combined with a rotating cell at -0.6v (for tap water) or -0.8v (for sea water) for 1 to 5 min. Then the stripping curve is recorded. The peak current is proportional to the copper ion concentration in the ranges 10(E-7)M to 10(E-10)M. This method is simple, rapid and the relative standard deviation is + or -8% for 10(E-8)M. The effect of pH, peak potential, multi-peak, various foreign ion, pre-electrolysis time and potential have also been investigated.

KEY anodic stripping voltammetry, polarography, determination, copper, natural waters, electrode

LANG Chinese, English abstract

189 AUTH National Bureau of Oceanography, The People's Republic of China

AFFI National Bureau of Oceanography, The People's Republic of China

DATE 1981

TITL Atlas of the Western Central Pacific

CITA Ocean Press (1981), 117 pp.

ABST This is an atlas presenting the results of R/V "Xiangyanghong 09" in the Western Central Pacific in 1978-1979. Cross sections are given for temperature, salinity, density, sound speed, sound channel depth and phytoplankton.

KEY atlas, Pacific Ocean, temperature, salinity, density, sound speed, sound channel, phytoplankton

LANG Chinese

190 AUTH National Bureau of Oceanography, The People's Republic of China

AFFI National Bureau of Oceanography, The People's Republic of China

DATE 1981

TITL Atlas of the Western Central Pacific

CITA Ocean Press (1981), 128 pp.

ABST This is an atlas showing the results of "R/V Shijian" in the Western Central Pacific in 1978-1979. Properties including temperature, salinity, density, sound speed, sound channel, depth and phytoplankton distributions are plotted.

KEY atlas, temperature, salinity, density, sound speed, sound channel, phytoplankton

LANG Chinese

191 AUTH National Bureau of Oceanography, The People's Republic of China

AFFI National Bureau of Oceanography, The People's Republic of China

DATE 1981

TITL Observational data of the Western Central Pacific

CITA Ocean Press, Beijing, 258 pp. (1981)

ABST This is a data report of the Western Central Pacific observed by the R/V "Xiangyanghong 09" as part of the FGGE program in 1979. Bottom depth, water temperature, salinity, sound speed, water color, transparency, surface fluoresence, phytoplankton, and meteorological observations were reported.

KEY Pacific Ocean, temperature, salinity, sound speed, color, transparency, fluorescence, phytoplankton

LANG Chinese

192 AUTH National Bureau of Oceanography, The People's Republic of China

AFFI National Bureau of Oceanography, The People's Republic of China

DATE 1981

TITL Observational data of the Western Central Pacific

CITA Ocean Press, 130 pp. (1981)

ABST This is a data report of the Western Central Pacific observed by the "R.V. Shijian" in 1978 and 1979 as part of the FGGE program. Temperature, salinity, water color, transparency, fluorescence, phytoplankton and meteorological observations were reported. In addition, bottom sediments were analyzed for $CaCO_3$, SiO_2, Fe_2O_3, CaO and MgO.

KEY temperature, salinity, color, transparency, fluorescence, phytoplankton, sediments, calcium, silicate, iron, magnesium

LANG Chinese

193 AUTH Peking Chemical Works

AFFI Peking Chemical Works

DATE 1977

TITL pH-test paper in progress

CITA Huaxue Tongbao 6, 365-366 (1977)

ABST The development of the pH-test paper is reviewed.

KEY pH, indicator

LANG Chinese

194 AUTH Peng, Hanchang; Zhao, Kuihuan; Chen, Suitian

AFFI First Institute of Oceanography, National Bureau of Oceanography

DATE 1982

TITL A preliminary study on deep-sea cosmic dust

CITA Collected Oceanic Works 5, 145-149 (1982)

ABST Surface and core sediment samples were collected from several thousand meters deep in the west of the Central Pacific Ocean. These samples contain many iron, silicate and glassy silicate spherulites, considered to be cosmic dust coming from outside the earth. The microscopic characteristics, chemical and mineral ingredients, and microstructure of these particles were analyzed.

KEY cosmic, sediments, Pacific Ocean, silicate, iron, particulates, sedimentology, magnesium, aluminum, potassium, sodium, calcium, titanium, manganese, nickel, scanning electron microscope, tektites

LANG English

195 AUTH Ping, Zhongliang

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL Mathematics model for visible remote sensing of water depth

CITA Oceanologia et Limnologia Sinica 13, 225-230 (1982)

ABST This article is based on the fact that the density slicing figure of ERTS-1 image of Jiaozhou Bay is quite similar to the isobath figure. The author deduced the theoretical formula for visible remote sensing of water depth from the factors of the transmittance of sea water and the reflectances of the sea bottom and the whole water column. The

mathematical equation indicates the relationship between the ERTS-1 image density and sea water depth. The work affords to estimate the theoretical limit of visible remote sensing of water depth. The formula deduced has been tested through simulation experiments.

KEY remote sensing, transmittance, seawater, refractive index, transparency

LANG Chinese, English abstract

196 AUTH Postma, H.

AFFI Netherlands Institute for Sea Research, Texel

DATE 1983

TITL Estuarine sedimentation and sediment transport

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise Abstract, 7-8 (1983)

ABST The main role of estuaries in continental shelf sedimentation is two-fold. First, estuaries may act as sediment traps and, as long as sufficient storage space is available, prevent export to the continental shelf and beyond. Secondly, depending on several factors such as tidal energy, river flow, sediment sources, biological activity a. o. - estuaries modify particle characteristics such as grain-sizes, settling velocities, aggregate variability and chemical composition; these modifications will influence the fate of particles on the shelf. Progress in our understanding of estuarine transport systems has been faster in a qualitative than in a quantitative sense. Two gaps of knowledge seem especially striking. One is that of the natural rate of filling up with sediment in the past and projected into the future, eventually to saturation. This knowledge is also important for harbour construction, which often by creating new deep basins accelerates sedimentation.

The second is the physics of estuarine circulation patterns related to particle movement. This knowledge is essential for predicting the effects of (man-made) changes in estuarine morphology and of changes in input either from the sea or the hinterland.

KEY sediments, transport, rivers, compositions, particulates, estuary, sedimentation, grain size, settling velocity

LANG Chinese, English abstract

NOTE abstract only

197 AUTH Qian, Wanying; Zhou, Jiayi; Cui, Junzhi; Wang, Mingbiao; Huang, Minfen

AFFI Department of Oceanological Chemistry, Shandong College of Oceanology, Qingdao

DATE 1978

TITL Cold vapour atomic absorption determination of mercury at sub-ppb levels in seawater and natural waters

CITA *Oceanologia et Limnologia Sinica* 9, 141-150 (1978)

ABST A rapid and extremely sensitive method for the direct determination of mercury concentrations as low as 5 ppt in waters is described. The cell volume (ca. 133 ml) being much larger than that of the normal apparatus is one of the characteristics of Model 590 Mercury Vapour Measuring Apparatus. In order to increase and fully utilize the high sensitivity of this apparatus and to lower its detection limit, improvements have been achieved by selecting the optimized plug (the volume of carrier gas which contains mercury is denoted by the plug) cell volume ratio and therefore getting the plug completely into the cell to form a most concentrated mercury plug, and by taking measures to minimize the noise. The optimized measuring parameters such as flow rate, medium effect, reductant amount, shake and equilibrium time have also been investigated. Calibration curve can be made by using a 10‰ NaCl solution instead of

sea water free from mercury. With above procedure, for a 250 ml sample the concentration detection limit is 5 ppt Hg(II) for this apparatus. The relative deviation for 0.03 and 0.2 ppb of inorganic mercury is 6.8% and 3.0% respectively. The time of analysis has been greatly reduced, because the determination is free from preconcentration procedure. Owing to the simplicity of instrumentation Model 590 Mercury Vapour Measuring Apparatus can be used for the direct measurement of sub-ppb levels for both inorganic and total mercury in batches of seawater and natural water samples. The mercury concentration of hundreds of sea water sample has been successively determined by this apparatus with above procedure.

KEY atomic absorption, mercury, seawater, natural waters

LANG Chinese, English abstract

NOTE Zhou Jiayi was formerly spelled Chow Chia-yi

198 AUTH Qian, Wanying; Zhou, Jiayi; Li, Jiliang; Yao, Yunling; Qiu, Lisheng

AFFI Department of Chemistry, Shandong College of Oceanology, Qingdao

DATE 1978

TITL Reduction-aeration preconcentration at ordinary temperature and cold vapour atomic absorption method for the determination of mercury at ppt level in sea water and natural waters

CITA Oceanologia et Limnologia Sinica 9, 36-42 (1978)

ABST A reduction-aeration preconcetration procedure employing a porous globulous glass bubbler and using $KMnO_4$-H_2SO_4 as a trapping solution at room temperature (8-20 degree C) together with a flameless cold vapour atomic absorption method (using model "590" mercury vapour measuring apparatus) has been developed for the determination of mercury at ppt level in sea water and natural waters. The reduction-aeration preconcentration procedure at room temperature is

convenient for laboratory staff operating on board ship and in the shore laboratory owing to the simplicity of instrumentation. This simple technique can be used successively for the determination of extremely low mercury level in sea water and natural waters. This technique permits water samples to be analyzed for mercury down to 2 ng Hg liter^{-1} with a 1-liter sample and an aeration time of 30 minutes. The precision of analysis reported as a coefficient of variation is 18-22% at 5-10 ng Hg liter^{-1}, 16% at 15 ng Hg liter^{-1}, and 5-10% at 35-164 ng Hg liter^{-1}. The determinations of both inorganic and total mercury in sea water with this technique show that the recovery percentage is satisfactory.

KEY mercury, determination, seawater, natural waters, atomic absorption

LANG Chinese, English abstract

NOTE Zhou Jiayi was formerly Chow Chia-Yi

199 AUTH Qian, Xingzhen; Mao, Xueying; Chai, Zhifang; Li, Xiuxia

AFFI Institute of High Energy Physics, Academia Sinica

DATE 1983

TITL Preconcentration by absorption of activated charcoal and neutron activation analysis of trace elements in seawater

CITA Journal of Marine Science 2, 25-28 (1983)

ABST The optimized conditions are investigated for preconcentration of trace elements contained in seawater by activated charcoal absorption. By apparatus neutron activation analysis under the optimized conditions, we have successfully determined the concentrations of 21 trace elements contained in the seawater of Bohai Bay and 26 trace elements in suspensions. The sensitivity and degree of accuracy of the method are reviewed.

KEY absorption, neutron activation, seawater, silver, arsenic, gold, cerium, cobalt, chromium, europium, iron, hafnium, lanthanum, neodymium, nickel, scandium, selenium, samarium, terbium, thorium, uranium, tungsten, ytterbium, zinc, zirconium, analytical chemistry

LANG Chinese, English abstract

200 AUTH Qian, Zhengxin; Chen, Kaiyao; Zhang, Yong

AFFI Institute of Oceanology, Academia Sinica

DATE 1978

TITL The preliminary observation of suspended deposit in sea water with in-line holography

CITA Studia Marina Sinica, 13, 8-15 (1978)

ABST This paper proposes to use the method of in-line holography to study the motion of suspended deposit in sea water. Data of particle size distribution of deposit in water and its content can be obtained, and a quantitative description of velocity of such particles can also be made by this method. The paper discusses the general relation of the in-line holography and the particle density in water and the velocity of water movement, and describes the in-line hologram of sand particles with diameters between 0.025 to 0.5 mm obtained by pulsed ruby laser, and the experimental results of wavefront reconstruction with industrial television.

KEY seawater, holography, particle size, suspended matter, laser

LANG Chinese, English abstract

201 AUTH Qin, Yunshan; Li, Fan

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL Study on the suspended matter of the sea water of the Bohai Gulf.

CITA Acta Oceanologica Sinica 4, [illegible]-200 (1982)

ABST We investigated re-suspended matter of the sea water of Bohai Gulf in different seasons from 1958 to 1962. About 600 water samples were collected using a reversed water bottle(1 liter in volume). The samples were filtered, dried and weighted separately. The content of the suspended matter was calculated by mg/l, and horizontal and vertical distribution figures of concentration were plotted. Parts of the samples were burned at 500°C and the residues of noncombustible components were weighted again after the burning, and the weights lost would be the weights of organic matters. Other parts of the samples were identified by optical microscope. In addition, we analyzed chemical components of the suspended matter by spectrum. The highest concentration of the suspended matter in this region occurs near the river mouth, and the concentrations are comparatively low with an average of 60 mg/l in other areas. Near the mouths of the Huanghe (Yellow River) and Liaohe (river) the concentrations exceed 150 mg/l, but they decrease sharply off the mouths. The comparison of average concentrations of different areas of the Bohai Gulf indicates that the highest occurs in the Bohai Bay, amounting to 45 mg/l; Liaodong and Laizhou Bays come next, amounting to 30 mg/l; central part and the strait of Bohai Gulf rank the third. The data obtained in April, July and October from 1958 to 1962 demonstrate that the concentration for April is higher than that for July and for October, because of the influence of storm. At the mouth of the Huanghe the vertical distribution gradient of the concentration of suspended matter then was very steep. The bottom concentration was so high that it formed a tongue extending over 20 km towards the northwest. The components of suspended matters of the Bohai Gulf are different from those of the ocean. Terrigenous and inorganic sediments are dominant in this area,

consisting of mineral fragments, clay and clay floccules; plankton, however, is less than 1%. In this area, the suspended matter comes mainly from two sources: solid runoff of rivers and resuspension of bottom sediments. In addition, there are small amounts of deposit of wind-blown dust and plankton, etc. Solid discharge injected into the Bohai Gulf are estimated at about 1300 million tons annually, about 1200 million tons of which come from the Huanghe. Carrying a huge amount of silt and clay into the Bohai Gulf, the discharge of the Huanghe extends in three different directions: one to the northeast flowing to the central part of the Bohai Gulf, another one to the east to outside the Laizhou Bay, still another one turns to the northwest entering to the Bohai Gulf. According to a rough estimate about 79% of discharge of the Huanghe settle down at the mouth of the delta. In addition, we have also studied the colour and transparency of the sea water, and used experimental formula to show the relationship between the concentration of s spended matters and transparency of the sea water.

KEY Bohai, seawater, seasonal variation, distribution, concentrations, Huanghe, Yellow River, rivers, suspended matter, resuspension, dust, plankton, transparency, organic matter, clays, air-sea exchange, color

LANG Chinese, English abstract

NOTE Qin Yunshan was formerly Y.S. Chin

202 AUTH Qin, Yunshan; Li, Fan

AFFI Institute of Oceanology, Academia Sinica, Qingdao, China

DATE 1983

TITL The effect of sediment loads discharged by Huanghe River on sedimentation in Bohai Sea and Huanghai Sea

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise Abstract, 14-15 (1983)

ABST The average amount of sediment loads carried by Huanghe River is 1150 million T/y, of which loess with diameter smaller than 0.032 mm is about 70% or more. According to historical information, the course of Huanghe River has undergone major changes back and forth for nine times. To the east of Mengjin, the channel of Huanghe River has shifted up and down between Tianjin in the north and Huaiyin in the south and runs mainly into Bohai Sea since 1855. Nowadays, nearly 70% of running sediment loads set down at the mouth of Huanghe River and shallow sea area nearby the mouth while the rest of them being dispersed off mainly affect the Bohai Gulf, the central area of the Bohai Sea and the Laizhou Bay. Under the influence of Bohai Sea circulation system and western coastal current of Huanghai Sea, a part of fine grain sediment loads carried by Huanghe River runs into the Huanghai Sea via the strait of the Bohai Sea and forms fine grain sediments rich in carbonate. Characteristics of sediment and geomorphology at the mouth of old Huanghe River located in the south of Lianyun Port are evident for the old Huanghe River flowing into Huanghai Sea. There is submarine paleo-delta of old Huanghe River there with its southern part being overlapped with delta of old Changjiang River. Sediments carried there by old Huanghe River has been reworked in various degrees. Some relicts and sediment cores containing carbonate and calcareous nodules show that since Pleistocene, sediment loads carried by Huanghe River are very important to sedimentation in the Bohai Sea and Huanghai Sea.

KEY sediments, Huanghe, Bohai, Huanghai, carbonates, Changjiang, Pleistocene

LANG Chinese, English abstract

NOTE abstract only, Qin Yunshan was formerly spelled Chin Yun-Shan

203 AUTH Qiu, Xiuhua

AFFI Institute of Geochemistry, Academia Sinica, Guiyang

DATE 1982

TITL Determination of oxygen and carbon isotopes in carbonates

CITA Annual Reports Institute of Geochemistry, Academia Sinica (1980-1981), 45-47 (1982)

ABST A classical method for determining oxygen and carbon isotopic compositions of carbonates has proved to be highly effective by using 100% phosphoric acid to dissolve samples at the temperature of 25 degree C. Its advantage is that oxygen and carbon isotopes can be determined simultaneously and the measurements are highly reliable. In order to establish the method and check its reliability, more than 200 tests were run. On the premise that the recovering rate of CO_2 reaches 100 ± 2%, the following experimental conditions are recommended: reacting temperature, 25 + or - 1 degree C; and reacting time, 3-4 hours. Our laboratory standard has been already established and also compared with international standards sent by Roter Blattner in New Zealand (TKL-1 and K-2), from which the acquired value of δO-18 is in consistency with the average value on the measurements by 19 laboratories in the world. The method has a precision of better than ± 0.2%.

KEY determination, oxygen, carbon, isotopes, carbonates, compositions, oxygen-18, carbon dioxide, carbon-13

LANG Chinese, English abstract

204 AUTH Riley, J.P.; Gu, Hongkan

AFFI Department of Oceanography, The University of Liverpool, Gt.Britain

DATE 1981

TITL A physically-coated mercury film electrode for anodic stripping voltammetry

CITA Analytica Chimica Acta 130, 199-201 (1981)

ABST The physically-coated Ag/AgHg/Hg film electrode described is easy to prepare and durable, and has excellent stability even when rapid stirring is used. It gives high sensitivity and provides well-defined voltammograms for zinc 1.8 ± 0.06 µg/l cadmium (8.8 ± 0.6µgl) and lead (0.2 ± 0.008µgl) in 6 ml samples of sea water after a deposition time of 3 min.

KEY electrode, anodic stripping voltammetry, zinc, cadmium, lead, seawater

LANG English

NOTE Gu Hongkan was formerly Ku Hong-Kan or Koo H.K.

206 AUTH Ryzhova, L.V.

DATE 1982

TITL Determination of uranium in seawater by pre-concentrating with chelating absorbent

CITA Journal of Marine Science 2, 69-71 (1982)

ABST The pre-concentrating of uranium from seawater was accomplished by an azo-assinate chelating agent. The effect of pH on the uranium absorption was studied.

KEY determination, uranium, seawater, chelation, extraction, pH, absorption, marine resources

LANG Chinese

NOTE translated form Radio Khimiya 22, 184 (1980) by Li, Zhaolong.

207 AUTH Saburo, Aoki; Kaoru, Oinuma; Kanau, Matsuike

AFFI Natural Science Laboratory, Yoyo University, Japan (1, 2); Marine Instrumental Engineering Laboratory, Tokyo University of Fisheries, Japan (3)

DATE 1983

TITL Clay mineral compositions in surface sediments and the concentration of suspended particulate matter of East China Sea

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise Abstract, 79-80 (1983)

ABST Clay mineral compositions in surface sediments of more than sixty stations taken from East China Sea and its adjacent sea were in detail observed by X-ray diffraction method. The location of samples is widely distributed from the mouth of Changjiang River (47 m deep) to Ryukyu trench (7400 m deep). The most outstanding feature of the clay mineral compositions in sediments under the study area is the predominance of illite. The next abundant clay mineral is chlorite. Smectite and kaolinite are small constituents of the clay mineral assemblage. Kaolinite tends to increase in sediments of shallow water than that in deep water. On the other hand, smectite abundance tends to increase in deep-sea sediments. These clay minerals have been mostly transported from the mainland of China but some seems to have been transported from Taiwan and Ryukyu Islands. The mechanism of transportation to East China Sea of these clay minerals is mostly due to runoff from Changjiang River. The distribution of clay minerals in East China Sea is mainly influenced by Kuroshio current. In addition to the clay mineralogy stated above, we are to mention about the concentration of suspended particulate matter in water close to the mouth of Changjiang River observed during Sept. 4 to Oct. 1, 1981 by R/V Umitaka-Maru of Tokyo University of Fisheries.

KEY clays, compositions, sediments, concentrations, particulates, East China Sea, Changjiang, chlorite, illite, smectite, kaolinite, X-ray diffraction, Kuroshio

LANG Chinese, English abstract

NOTE abstract only

208 AUTH Samoilov, L V

AFFI Department of Geography, Moscow University, USSR

DATE 1958

TITL On the development of limnology and hydrochemistry in China

CITA Oceanologia et Limnologia Sinica 1, 153-166 (1958)

ABST Large countries in their development of general hydrology, generally develop first hydrology of the rivers, then limnology and finally hydrochemistry. In China the trend is also the same. At present, hydrological studies of the rivers in China are already in big stride, but limnological and hydrochemical studies are comparatively undeveloped. The development of limnology and hydrochemistry is necessarily based on the development of production and the need of national economy. Therefore, in different countries, such studies have different developmental directions. In capitalistic countries, the aims of the studies are necessarily limited to the economic interests of the particular corporations concerned, but in socialistic countries, such studies must be of a comprehensive nature, aimed at solving the most important problems of the country. It is, therefore, the object of the present discussion to present my suggestions as to how limnology and hydrochemistry in China should be developed. Limnology serves in various different fields of the national economy, such as navigation, fisheries, water supply, irrigation, water power, salt production and health resorts. Development of Limnology in China must be in

accordance with the need of the national economy and the 12 year-science-development plan. Classification of Chinese lakes and ponds and their methods of studies, with special emphasis on reservoirs are suggested. Hydrochemistry serves in water supply, navigation, fisheries, anti-contamination and mineral prospecting. An attempt has been made to classify the natural waters of China and suggestion as to the organization of the work has been made.

KEY resources, pollution, lakes, natural waters, limnology, rivers

LANG Chinese, English abstract

209 AUTH Sha, Qingan; Pan, Zhengpu; Wang, Yao

AFFI Institute of Geology, Academia Sinica, Beijing

DATE 1979

TITL Recent dedolomitization in the vadose zone

CITA Scientia Geologica Sinica 4, 378-383 (1979)

ABST This article describes and discusses the dedolomitization developed along joints of two outcrops of limy dolomite (Middle Ordovician). The maximum width of the two dedolomitized zones reaches 20cm and 7cm respectively. According to the occurrence and other evidences of dedolomitization, it is supposed that the dedolomitization resulted from the action of sub-recent/near-surface vadose water. The rock fabrics produced by dedolomitization are characterized by: (1) replacement of the surrounding dolomite by the calcite, by which the dolomite may either remain as a small inclusion or disappeared altogether; (2) the contact boundaries of calcite crystals are at first sinuous, intersecting each other, but later on, the calcite crystals are gradually recrystallized with perfect crystal faces. In fact, this kind of dedolomitization may be regarded as a metaso-replacement-recrystallization under normal pressure and temperature.

KEY dolomite, calcite, pressure, temperature

LANG Chinese, English abstract

210 AUTH Shen, Jijun

AFFI Shandong College of Oceanology, Qingdao

DATE 1962

TITL Some characteristics of sound channel in the Northwest Pacific Ocean

CITA Oceanologia et Limnologia Sinica 4, No.1-2, (1962)

ABST The distributions of sound channels in the Northwest Pacific Ocean were evaluated. They were found to correlate with the distributions of the three major water masses: the subarctic water, the northern intermediate water and the Western central water.

KEY sound channel, Pacific Ocean

LANG Chinese

211 AUTH Shen, Shize; Sun, Guoyu

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1983

TITL Purification of industrial chromic wastes by chromate reducing bacteria

CITA Journal of Marine Science 2, 22-24 (1983)

ABST In this paper we report a chromate reducing bacteria. It is a facultative anaerobic, Gram-negative, heterotrophic-rod possessing the ability of reducing chromate and bichromate at high rate under the conditions of pH 7.5-8.5, ...and so on. The pure culture of these bacteria No. 81001 is deposited in our laboratory for identification. A simple and inexpensive process for the purification of industrial chromic wastes by these bacteria is introduced.

KEY bacteria, pH, pollution, chromium, speciation

LANG Chinese, English abstract

212 AUTH Shen, Yunfen; Jiang, Xiezhi

AFFI Institute of Hydrobiology, Academia Sinica, Wuhan

DATE 1979

TITL Evaluation of the self-purification effects of water bodies through zooplankton

CITA Oceanologia et Limnologia Sinica 10, 161-173 (1979)

ABST The present paper embodies the results of the faunistic studies of zooplankton collected from the Lianhwa-Liangshui River, Beijing, during July 29-30, 1974 and from the lagoon and the Nunjiang River in the vicinity of Chichihar during September 3-5, 1976 respectively (Text-figs. 1-2). Along the Lianhwa-Liangshui River, there are four main pollution sources which discharge a great deal of waste waters of coking refinery, iron and steel plant, pesticide factory, chemical and smelter works. In Chichihar, both the industrial and domestic waste waters poured entirely into the lagoon through three natural pools and a canal of considerable length. Examination of the zooplankton samples revealed a total of 34 Protozoan species in Beijing and 18 species of Protozoa, 31 species of Rotifera, 8 species of Cladocera and several unidentified species of Copepoda in Chichihar (Tables 1 & 3). An analysis of species make-up of zooplankton indicates that the community composition may be used to evaluate the degrees of saprobity and the effects of self-purification of the water bodies. The authors consider that the self-purification of the lagoon was effectual, and it played a major role in improving the water quality of the Nunjiang River around Chichihar. Since the Lianhwa-Liangshui River was polluted by industrial waste discharges in succession, the self-purification process was also disturbed again. It was not until the waste waters flowed 73 km away from the source of pollution that the purification began to change for the better. In connection with the method of evaluation, it seems necessary for us to replace the indicator species approach (s.str.) by the community

composition approach. Apart from the aquatic oligochaetes, the peritrichous ciliates may also be used in estimating the degree of water pollution in the Lianhwa-Liangshui River. The community structure of the surface slimes in this river is similar to that in the waste-water treatment plants. The effectiveness of the self-purification process in the River seems to be correlated with the presence of a large amount of surface slimes formed by sessile peritrichous ciliates.

KEY zooplankton, iron, pollution, rivers, pesticides, sources

LANG Chinese, English abstract

213 AUTH Shi, Dianzu; Wu, Houyu; Zhu, Jinzhao

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1981

TITL Studies on the mechanism of marine fouling prevention with organotin compounds I. The effect of triphenyltin chloride on the mitochondria in cirri muscle of balanus amphitrite amphitrite Darwin

CITA Oceanologia et Limnologia Sinica 12, 422-426 (1981)

ABST 1. The mitochondrial suspensions prepared from the cirri muscle of barnacle were found to oxidize sodium succinate more rapidly than sodium glycerophosphate and sodium pyruvate. 2. The rates of oxidative phosphrylation of the mitochondria were significantly inhibited by TPTC in vitro and in vivo. In cases where sodium succinate was used as substrate, the inhibition of barnacle mitochondria on respiration and on phospherylation caused by TPTC (1.9 * E-4 M) in vitro were 54% and 100% respectively. Compared to the mitochondria prepared from culturing sea water with TPTC (6.7 * E-6 M) to the control, the activities of oxidation and phosphorylation lose 26.3% and 90% respectively. 3. An electron microscopic examination

on the fine structure of cirri muscle mitochondria from toxical barnacle by TPTC shows crista being damaged.

KEY fouling, prevention, seawater

LANG Chinese, English abstract

214 AUTH Shi, Zhili; Dai, Guosheng; Wang, Hong; Huang, Yuepan; Ju, Anyu; Sun, Bingyyi

AFFI Department of Marine Chemistry, Shandong College of Oceanology, Qingdao

DATE 1980

TITL Determination of nitrate in sea water by cadmium-copper reduction method

CITA Journal of Shandong College of Oceanology 10, 53-63 (1980)

ABST The method based on that described by Crasshoff has been tested and the condition of method has been modified. The results show that temperature and salinity do not influence the determination of nitrate. The diameter of cadmium grain was selected. If a suitable flowing rate, reductive column length and cadmium grain diameter from 7 to 60 mesh are controllable, it can get an excellent recovery of more than 95% and high precision and sensitivity. This method would be suitable for routine analysis of nitrate content in sea water on board.

KEY determination, nitrate, temperature, salinity, seawater

LANG Chinese, English abstract

215 AUTH Shi, Zhili; Sun, Bingyi; Wang, Shuchang; Yu, Shengrui; Hao, Enliang; Wang, Yongchen; Dai, Guosheng

AFFI Department of Chemistry, Shandong College of Oceanology, Qingdao

DATE 1982

TITL A study of zinc and lead in surface sediments of the northeast Jiaozhou Bay

CITA Journal of Shandong College of Oceanology 12, 27-36 (1982)

ABST The contents of zinc, lead, organic matter and iron in surface sediments (33 stations) of the Northeast Jiaozhou Bay were measured. The results obtained are summarized as follows: 1. The highest concentration of zinc and lead in sediments occurred in the estuarine areas. 2. The relationships between the concentration of zinc (or lead) and either organic matter or iron content in sediments are as follows: Zn (ppm) = 18.63 + 52.94 Organic matter (%);Zn (ppm) = -9.38 + 35.31 Iron (%);Pb (ppm) = 21.11 + 5.23 Organic matter (%);Pb (ppm) = 14.67 + 7.23 Iron (%);Pb (ppm) = -0.3312 + 0.3488 Zn (ppm) 3. The rates of zinc and lead removed from sea water into sediments were estimated by means of zinc concentration variation in sea water with tide at a station and TDL of lead concentration vs chlorinity in sea water respectively. The removal rate of lead is higher than zinc, and the difference is concerned with the forms of zinc and lead in sea water. 4. The zinc and lead introduced by rivers into sea water are mainly removed with flocculation of organic matter in the estuarine areas at first and then with precipitation of iron in the offshore areas.

KEY lead, sediments, Jiaozhou Bay, seawater, organic matter, speciation, river water, estuary, zinc, flocculation, iron, chlorinity, precipitation

LANG Chinese, English abstract

216 AUTH Su, Xianze; Zou, Hanyang; Zeng, Wenyi

AFFI Third Institute of Oceanography, National Bureau of Oceanography, Xiamen, China

DATE 1983

TITL Recent sedimentation rates and process in the Changjiang Estuary and on its adjacent continental shelf

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise Abstract, 104-105 (1983)

ABST Recent sedimentation rates of muddy deposits in the Changjiang Estuary and on its adjacent continental shelf have been determined by Pb-210 dating. The results obtained by the Pb-Bi and Pb-Po methods are identical. The excess Pb-210 distribution decreased exponentially with depth in all the cores taken from the region to the southwest of the Chejudo. The sedimentation rates in this region are on the order of mm/yr. The correlation between the excess Pb-210 distribution and its depth is undistinguished in all the cores from the Changjiang Estuary. Following conclusions have been obtained on the basis of the Pb-210 dating and the environmental analysis: (1) The estuary is a region of high sedimentation rate for silts with a considerable complex process. Indications show that a distinct change of sedimentation process have taken place in 1954 in subwater delta of the Changjiang River. The deposition of silts has greatly increased since 1954 on the bed of northern branch and the northern shoal right at the Changjiang River mouth. (2) The sedimentation is stable in the region to the southwest of the Chejudo. Its southeastern part, which is centered at 31°30'N, 126°00'E, has a higher sedimentation rate, probably due to the existence of a cyclonic current in this area.

KEY sedimentation rates, estuary, continental shelf, Changjiang, lead-210

LANG Chinese, English abstract

NOTE abstract only

217 AUTH Sui, Yongnian

AFFI Shandong College of Oceanography, Qingdao, China

DATE 1983

TITL The inorganic carbon content in pore water of the East China Sea

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise Abstract, 138 (1983)

ABST The various equilibrium concentration of carbonate species in pore water in the surface marine sediments (0-3 cm) were calculated using the data obtained from CHINA-US Joint Study during the Nov. cruise in 1981. The results show that the total carbon dioxide concentration is of 2.16 to 4.17 mm in which the bicarbonate ion content prevails over others (92-94%). The free carbon dioxide concentration is in great excess while the carbonate ion content is very low. The partial pressure of CO_2 in pore water is several to ten times higher than that in the air. The calculations indicated that calcium carbonate may be solubilized near the surface sediments. On the contrary, it will be removed from pore water at the deeper layers. The production of methane is possible below the depth where the dissolved sulfate approaches zero.

KEY East China Sea, equilibrium, carbonates, sediments, total carbon dioxide, calcium carbonate, methane, sulfate, pCO_2, interstitial water, bicarbonate

LANG Chinese, English abstract

NOTE abstract only

218 AUTH Sun, Bin-Yi; Cheng, Chi-Yun; Tan, Yau-Hua

AFFI Department of Oceanographic Chemistry, Shandong College of Oceanology, Qingdao

DATE 1961

TITL The determination of nitrate in sea water

CITA Journal of Shandong College of Oceanography 1, 68-77 (1961)

ABST The method for determination of nitrate in seawater have been studied. Nitrate is reduced to nitrite with zinc powder and manganese sulphate. Optimum pH is about 1.7-2.2. The suitable quantity of zinc powder for 100 ml. sea water is 0.07g. It shows good conformity to Beer's law for the concentration of nitrate from 0 to 300 mg. NO_3-N/cube m with a green filter (530mμ). The formed nitrite yielded only about 10% of nitrate contents but it is also possible to determine as little as 5 mg NO_3-N/cube m in sea water by this method.

KEY determination, nitrate, seawater, pH, nitrite, colorimetry

LANG Chinese, English abstract

NOTE Sun Bin-Yi is now spelled Sun Bingyi, Tan Yan-Hua is now spelled Tan Yuehua

219 AUTH Sun, Bingyi; Shi, Zhili; Wang, Shuchang; Yu, Shengrui; Wang, Yongchen; Dai, Guosheng; Fang, Ping; Cui, Liuji

AFFI Department of Marine Chemistry, Shandong College of Oceanology, Qingdao

DATE 1980

TITL The chemical forms and distribution of lead in the Northeast Jiaozhou Bay.

CITA Journal of Shandong College of Oceanology 10, 79-89 (1980)

ABST The chemical forms and distribution of lead in the surface water of the Northeast Jiaozhou Bay (24 stations) have been studied. The ASV method were employed to estimate the chemical forms of lead in both untreated and treated seawater. It can be divided into five forms which were Pb_{ASV} (labile lead plus ionic lead), weakly bound lead (Pb_{WB}), bound lead (Pb_B), particulate lead (Pb_P), total soluble lead (Pb_{TS}) and total lead (Σ Pb=Pb_{TS} + Pb_P). The results showed high values near coast area. The mean total Pb was 4.0μg/L(2.0-6.7μg/L); Pb_P 1.2μg/L (0.4-2.7μg/L),

$Pb_P/\Sigma Pb$=30%; Pb_{ASV} 0.37μg/L (0.19-0.80μg/L), $Pb_{ASV}/\Sigma Pb$=9%; Pb_{WB} 1.1μg/L (0.23-2.70μg/L), $Pb_{WB}/\Sigma Pb$=26%; Pb_B 1.4ug/L (0.4-3.8μg/L), $Pb_B/\Sigma Pb$=35%. The data indicated that Pb_B and Pb_P were the main forms in sea water. The relationships between some forms of lead and values of $Cl^o/_{oo}$ (pH,COD) were discussed also.

KEY distribution, lead, Jiaozhou Bay, speciation, pH, chemical oxygen demand, anodic stripping voltammetry, particulates, chlorinity

LANG Chinese, English abstract

NOTE Sun Bingyi was formerly spelled Sun Bin-Yi. Same paper was published in Collected Oceanic Works 3, 49-58 (1980)

220 AUTH Sun, Bingyi; Shi, Zhili; Wang, Shuchang; Yu, Shengrui; Wang, Yongchen; Dai, Guosheng; Fang, Ping; Cui, Liuji

AFFI Department of Marine Chemistry, Shandong College of Oceanology, Qingdao

DATE 1980

TITL The chemical forms and distribution of lead in the Northeast Jiaozhou Bay

CITA Collected Oceanic Works 3, 49-58 (1980)

ABST The chemical forms and distribution of lead in the surface water of the Northeast Jiaozhou Bay (24 stations) have been studied. The ASV method were employed to estimate the chemical forms of lead in both untreated and treated seawater. It can be divided into five forms which were Pb_{ASV} (labile lead plus ionic lead), weakly bound lead (Pb_{WB}), particulate lead (Pb_P), total soluble lead (Pb_{TS}) and total lead (Sum of Pb = Pb_{TS} + Pb_P). The results showed high values near coast area. The mean sum of Pb was 4.0μg/L(2.0 ~ 6.7μg/L); Pb_P 1.2μg/L (0.4 - 2.7μg/L), Pb_P/sum of Pb = 30%; Pb_{ASV} 0.37μg/L(0.19 - 0.80μg/L), Pb_{ASV}/sum of Pb = 9%; Pb_{WB} 1.1μg/L(0.23 -

2.70μg/L), Pb_{WB}/sum of Pb = 26%;Pb_B 1.4μg/L(0.4 3.8ug/L), Pb_B/sum of Pb = 35%. The data indicated that Pb_B and Pb_P were the main forms in sea water. The relationship between some forms of lead and values of $Cl°/_{oo}$ (pH, COD) were discussed also.

KEY distribution, lead, Jiaozhou Bay, speciation, seawater, pH, chlorinity, particulates, anodic stripping voltammetry, chemical oxygen demand

LANG Chinese, English abstract

NOTE Sun Bingyi was formerly spelled Sun Bin-Yi. Same article was also published in Journal of Shandong College of Oceanology 10, 79-89, 1980.

221 AUTH Sun, Bingyi; Wang, Shuchang; Wang, Yongchen; Shi, Zhili; Dai, Guosheng

AFFI Department of Marine Chemistry, Shandong College of Oceanology, Qingdao

DATE 1980

TITL Zinc hydroxide complexes in sea water

CITA Oceanologia et Limnologia Sinica 11, 109-114 (1980)

ABST The shift of Potential(Ep) with zinc stripping current maximum is utilized to determine the zinc hydroxide complexes in sea water. The sea water chlorinity is $17.96°/_{oo}$, zinc concentration is 12 μg/L. According to the diagram of Ep to pH values (5-9.5), three sections of straight lines intersect at pH 8.08 and 8.73 (Fig.1). The slopes of the last two sections are 25.8 and 61.7 mv/pH respectively, it is evident there exist ($Zn(OH)^+$) and $Zn(OH)_2$ complexes. The apparent stability constants of log K_1 and log β_2 calculated are 5.78 and 10.70, which agree with the several published values. This proves that Zn^{2+} and $Zn(OH)^+$ are the main species of zinc in sea water at pH range of about 8.0.

KEY zinc, seawater, pH, apparent stability constant, speciation, Eh, anodic stripping voltammetry, chlorinity

LANG Chinese, English abstract

NOTE See Note 219

222 AUTH Sun, Bingyi; Yu, Shengrui

AFFI Department of Marine Chemistry, Shandong College of Oceanology, Qingdao

DATE 1980

TITL Oxygen exchange between air and sea in the South Yellow Sea

CITA Journal of Shandong College of Oceanology 10, 91-100 (1980)

ABST Oxygen exchange between air and sea in the South Yellow Sea (two stations) has been studied based on the seasonal variation of dissolved oxygen in sea water. The oxygen exchange rate was obtained according to the variation of amount of oxygen in the mixed layer column from surface to thermocline layer of sea water. It showed that oxygen transferred from the atmosphere to the sea water with an average exchange rate 5.2*10(E-7)ml cm^{-2} sec^{-1} during September to February of next year was equal to loss of oxygen from sea water during March to August. The values of exchange coefficient ranged about from 0.5 to 9.5cm/ sec (mean value 4.5*10(E-3)cm/sec). The thickness of the laminar layer was about from 16 to 244 μm (mean value 75 + or -69 μm).

KEY oxygen, Yellow Sea, rate, air-sea exchange, thermocline, seasonal variation

LANG Chinese, English abstract

NOTE See Note 219

223 AUTH Sun, Jitao; Zhao, Shuquan; Yang, Xiaomei

AFFI Provincial Sanitation and Anti-epidemic Station, Shandong (1); Provincial Medical Research Institute, Shandong (2); Municipal Sanitation and Anti-epidemic Station, Tianjin (3)

DATE 1982

TITL Hydrochloric acid reflux method for extraction of cesium-137 from sediment and soil

CITA Journal of Marine Science 6, 25-27 (1982)

ABST Hydrochloric acid or ammonium acetate solution is routinely used for extracting cesium-137 from sediment and soil. Both these two extraction methods take a relatively long time of manual or mechanical stirring, and the extraction rate is low. Another method for extracting Cs-137 from sediment and soil by reflux with HCl (1:1) is discussed in this paper. The results show that this method has several advantages. It needs a shorter duration (3-5 hrs.) for extraction without disturbance. The extraction rate is up to 80%, and the evaporation of acid which usually occurs, may be avoided. This method is suitable for large scale treatment.

KEY extraction, cesium-137, soil, sediments

LANG Chinese, English abstract

224 AUTH Sun, Mingkun; Qian, Zuoguo; Hu, Wei

AFFI Department of Marine Chemistry, Shandong College of Oceanology, Qingdao

DATE 1982

TITL On the method for determination of dissolved carbohydrates in seawater - Temperature effect of phenol-sulphruic acid method

CITA Journal of Shandong College of Oceanology 12, 48-52 (1982)

ABST The temperature effect of phenol-sulphuric acid method for the determination of total dissolved carbohydrates in seawater has been investigated. It is proved that the temperature coefficient of the method is relatively high, so the color developing step should have proceeded with strict control of temperature. The optimum temperature and time for the color

development have been found, and the reproductive measurements can be obtained, hence a procedure with some modification has been proposed.

KEY determination, carbohydrates, seawater, temperature, analytical chemistry, colorimetry

LANG Chinese, English abstract

225 AUTH Sun, Yuanfu; Zheng, Quanan

AFFI First Institute of Oceanography, National Bureau of Oceanography, Qingdao

DATE 1980

TITL Preliminary application of 3cm scan-imaging microwave radiometer to remote sensing oceanography

CITA Acta Oceanologica Sinica, 3, 400-409, (1981)

ABST The microwave data obtained from the experiment of remote sensing oceanography in 1979 are analyzed and expounded in this paper. The subjects include marine oil pollution, coastal geology and geomorphology, and observation results of the microwave emission on some terrain in site. The experiments show that the instrument performance is higher and the data obtained are valuable to the study of oceanography.

KEY remote sensing, pollution, oil

LANG Chinese, English abstract

NOTE Sun Yuanfu is also spelled Shun Yuan-fu

226 AUTH Sun, Yushan

AFFI Department of Chemistry, Shandong College of Oceanology, Qingdao

DATE 1982

TITL The semiconductor behaviour and amphoteric-ionic structure of 3,4-cyclotetramethylenepyrazolone-5

CITA Journal of Shandong College of Oceanology 12, 21-26 (1982)

ABST The semiconductor behaviour of crystalline 3, 4-cyclotetramethylenepyrazolone-5 (I) is investigated by measuring the variations of its specific resistance

under various temperatures. Experimental evidences have been provided which indicate that within the temperature range 159 degree - 245 degree C, where conductivity of (I) increases so rapidly that its conductance ratio is many orders of magnitude greater than that in range 21 degree 159 degree C from the slope of lnp-1/T curve of solid sample (I), the energy gap Eg between the filled valence band and the conduction band in range 159 degree -245 degree C is found to be 2.03 eV. The crystal of (I) is found to possess other physical properties such as electrostatic effect and luminescent effect under irradiation of ultraviolet rays similar to those of the solid aromatic hydrocarbons. Its infrared absorption spectra indicate that the covalent formulas (I) (A) and (B) do not correspend to spectral distributions given (e.g. no typical $\nu^{C=O}$, ν^{N-N} and ν^{O-H}). Based upon the observations of infrared absorption spectra and other physical properties, we consider that the proposed amphoteric-ionic structure (III) of 3,4-cyclotetramethylenepyrazolone-5 seems reasonable. The interrelations between the semiconductor behavior and the amphoteric-ionic structure of this pyrazolone-5 have been discussed.

KEY conductivity, inorganic chemistry, temperature, molecular structure, covalent bond

LANG Chinese, English abstract

227 AUTH Sun, Yushan; Zhao, Hongben; Chen, Dechang; Tang, Siqi; Liu, Xiangzhen

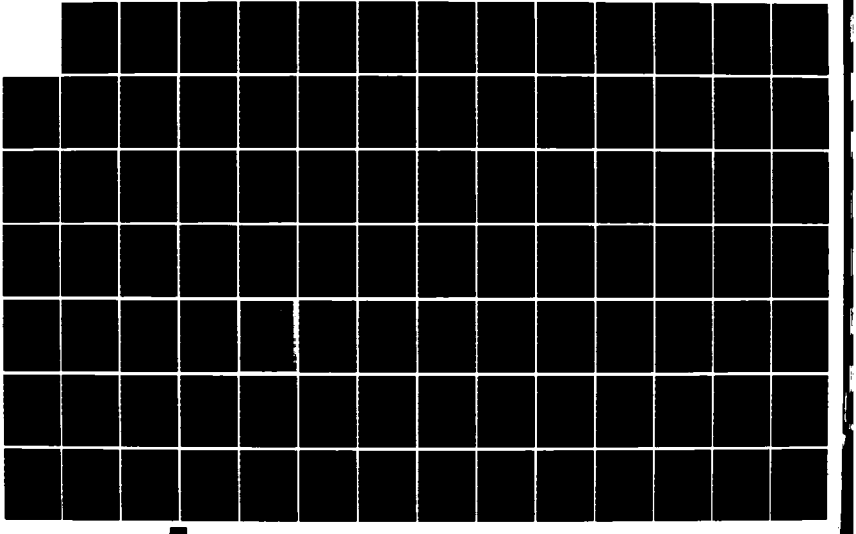
AFFI Department of Chemistry, Shandong College of Oceanology, Qingdao

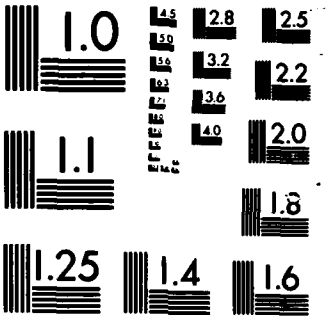
DATE 1983

TITL Chemistry of marine resources II. A new type of chemisorbent for direct recovery of bromine from sea water

AD-A163 254 MARINE CHEMISTRY IN THE PEOPLE'S REPUBLIC OF CHINA(U) 4/11
OREGON STATE UNIV CORVALLIS COLL OF OCEANOGRAPHY
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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

CITA Journal of Shandong College of Oceanology 13, 32-38 (1983)

ABST This paper presents the chemical-adsorption behavior of crystalline grains of silver chloride used as a new type (i.e., JA-2 type) chemisorbent of bromide ion in sea water. This is a new method for direct recovery of bromine from sea water. Experimental evidence shows that under natural conditions in marine environments the JA-2 type chemisorbent is able to concentrate low concentration bromine so that the element appears in adsorption residues in concentrations many orders of magnitude greater than in sea water. from the saturation value of bromine adsorbed by JA-2 type chemisorbent, the adsorption capacity, enrichment factor compared with the marine environment and selectivity coefficients of the former chemisorbent at 22, are found to be 1.75 mgM/g-2d., $D_{(Br^-)}$ = 2154, $K_{(Br^-/Cl^-)}$ = 328 and $K_{(I^-/Br^-)}$ = 105.5, respectively. The investigated chemisorption process may be interpreted in terms of an exchange reaction via partial transition of bonds; from ionic to covalent as expressed by the following equation: $Ag^+Cl^-(s) + Br^-(aq) \rightarrow Ag - Br(s) + Cl^-(aq)$. The chemical-adsorption power of investigated JA-2 type chemisorbent for iodide ion and bromide ion in sea water has been discussed.

KEY marine resources, bromine, seawater, adsorption, thermodynamics, ionic bond, covalent bond, capacity, enrichment

LANG Chinese, English abstract

228 AUTH Sun, Yushan; Zhao, Hongben; Chen, Dechang; Tang, Siqi; Liu, Xiangzhen

AFFI Shandong College of Oceanology, Qingdao

DATE 1981

TITL Chemistry of marine resources I. An inorganic chemisorbent for direct recovery of iodine from sea water

CITA Acta Oceanologica Sinica 3, 563-570 (1981)

ABST This paper presents the chemical-absorption behavior of crystalline grains of silver chloride used as a new type (i.e., JA-2 type) chemisorbent of low concentration iodide ion in sea water. This is a new method of direct recovery of iodine from seawater. Experimental evidence shows that under natural conditions in marine environments the JA-2 type chemisorbent is able to concentrate trace iodine so that the element appears in adsorption residues in concentrations many orders of magnitude greater than in sea water. From the saturation value of iodine adsorbed by JA-2 type chemisorbent, the adsorption capacity, enrichment factor compared with the marine environment and selectivity coefficient of the former chemisorbent at 22°C, were found to be 22.6μm/g-ad., D_{I^-} = 229600 and $K(I^-/Cl^-)$ = 17590, respectively. The observed adsorption capacity of JA-2 type chemisorbent for iodide ion in sea water is about 3.6 times that of the fresh Laminaria japonica. The investigated chemisorption process may be interpreted in terms of an exchange reaction via transition of bonds from ionic to covalent as expressed by the following equation: $A^+B^-(s) + C^-(aq) \rightarrow A{:}C(s) + B(aq)$. Such a concept can also be used for further studies of recovery of chemicals from the sea in cases other than that described above.

KEY marine resources, iodine, seawater, adsorption, enrichment, capacity, covalent bond, ionic bond

LANG Chinese, English abstract

229 AUTH Sverdrup, H.U.; Johnson, M.W.; Fleming, R.H.

DATE 1957

TITL Current status of oceanography and its development

CITA Oceanologia et Limnologia Sinica 1, 144-148 (1957)

ABST This is a translation of the first chapter (introduction) of the book "The Oceans" by Sverdrup, Johnson, and Fleming.

KEY oceanography

LANG Chinese

NOTE Portions of an English book translated by H.L. Mao

230 AUTH Tang, Yunqian; Gong, Min; Zhu, Fengguan

AFFI Second Institute of Oceanography, National Bureau of Oceanography, Hangzhou, China

DATE 1983

TITL Study on organic matter of surficial sediment from East China Sea

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Trestise Abstract, 147-148 (1983)

ABST Lipids and humic substances (humic acid and fulvic acid) isolated from East China Sea sediment were characterised by chemical and physical methods. Sediments contained three types of lipids: Lipid I (free lipid) was readily extractable, Lipid II was associated with carbonate minerals, and Lipid III was associated with part of silicate. The infrared spectra indicated: Lipid I was predominantly aliphatic, Lipid II and III have more carboxylic acid than Lipid I. The three types of lipids for seven stations were calculated by duster analysis. The regression relation between organic matter and clay were $y = 1.212 + 0.006x$, the regression relation between organic matter and montmorillonite and illite were $y = 2.100 + 0.016x_1 - 0.012x_2$. Lower ratio of carbon vs hydrogen and higher value of hydrogen are characteristic of oceanic humic substances. The

hydrolyzate of humic acids consists of eighteen amino acids, with their total amount in Changjiang River mouth twice as that in shallow shelf area.

KEY humic acid, fulvic acid, East China Sea, sediments, lipids, organic matter, amino acids, Changjiang, silicate, clays, montmorillonite, illite

LANG Chinese, English abstract

NOTE abstract only

231 AUTH Tang, Yunqian; Gong, Min; Zhu, Fengguan

AFFI Second Institute of Oceanography, National Bureau of Oceanography

DATE 1983

TITL Study on lipids and humic substances of the East China Sea shelf

CITA Acta Sedimentologica Sinica 1, 118-130 (1983)

ABST The surficial sediments of the East China Sea shelf consist mainly of muddy silts and silty muds. The regression equation between organic matters and clay minerals is $Y = 1.212 + 0.006X$. The regression equation among organic matters, montmorillonite and illite can be expressed as $Y = 2.100 + 0.016X_1 - 0.012X_2$. The lipid compounds in clay minerals may be correspondingly divided into three parts: Lipid I (free lipid) and lipid II, III(bound lipids). The Lipid I is readily extractable, and Lipid II is associated with carbonate minerals and Lipid III with part of silicate minerals. The comparison between them shows: (i) Lipid I is predominantly aliphatic compound, and (ii) Lipid II and III have more carboxylic acid than Lipid I. Humic substances are separated into humic acid and fulvic acid. The fulvic acid is further purified by absorption, then eluted with ammonium hydroxide and ethyl alcohol. The chemical property of marine humic acid is different from that of land humic acid, i.e. the former with lower carbon content, higher hydrogen content and

lower C/H atomic ratio. After the three lipids have been removed, the property of clay residue is compared with that of the raw clay minerals by X-ray diffraction and infrared spectra. The results indicate: the peak at 14.25A shrinks towards 10A. Infrared spectra for the montmorillonite and illite show a well defined peak at 1030 cm^{-1}. The absorption band at 3697 cm^{-1} does not appear in the kaolinite. It has also been found that the surface absorption of clay minerals may result in the combination of organic matters and clay.

KEY lipids, East China Sea, sediments, organic matter, montmorillonite, illite, clay minerals, humic acid, fulvic acid, carbonates, X-ray diffraction

LANG Chinese

232 AUTH Tao, Zuyi; Zhao, Aimin; Tong, Wengong

AFFI Department of Modern Physics, Lanzhou University, Lanzhou

DATE 1983

TITL Ion-exchange of uranium II. Uranyl species sorbed on cation exchanger from sulfuric and hydrochloric acid

CITA He Huaxue Yu Fangshe Huaxue 5, 18-24 (1983)

ABST Uranyl species sorbed on cation exchanger from H_2SO_4 and HCl solution are thoroughly studied by IR spectra and equivalent accounting. The spectra are recorded with DIGILAB FTS-15C infrared spectrometer. The assymetric stretch, ν_3 of the uranyl group is infrared active. UO_2^{2+} and $(UO_2HSO_4)^+$ from H_2SO_4 solution and UO_2^{2+} and $(UO_2Cl)^+$ from HCl solution are found to be sorbed on the cation resin. The species sorbed on cation exchanger shows only a single band at 945.3 cm^{-1} or 949.2 cm^{-1} when the equilibrium is carried out in the solution with very low concentration of H_2SO_4 or HCl respectively. The species should be UO_2^{2+}. However, a new band at 902.9 cm^{-1} or 906.6 cm^{-1} is found when the equilibrium is carried out in the

solution with high concentration of H_2SO_4 or HCl respectively. With increasing the acidity of the equilibrium solution the gradual increase of intensity of the new band and the gradual decrease of intensity of the original one can be observed. As a cation exchanger selectively sorbs cation, the species now sorbed should be either $(UO_2HSO_4)^+$ or $(UO_2Cl)^+$. But the amount of $(UO_2HSO_4)^+$ or $(UO_2Cl)^+$ on the cation exchanger can be ignored with a concentration of acids less than 0.5 N. The equivalent accounting method is applied to the resin loaded with uranyl ion and hydrogen ion, together with cation uranyl complex species, under the conditions of negligible invasion of uranyl species. A known amount of resin in hydrogen form is equilibrated in a batch process with a solution containing uranyl and sulfuric acid (or hydrochloric acid) at various ratios. It is found experimentally that the amount of $(UO_2HSO_4)^+$ or $(UO_2Cl)^+$ sorbed on exchanger is so low that they can not be observed by the method within experimental errors. It may be concluded that the $(UO_2HSO_4)^+$ or $(UO_2Cl)^+$ sorbed on cation exchanger can be overlooked under the general conditions of the experiment.

KEY ion-exchange, uranium, uranyl, equilibrium, marine resources, absorption, speciation, resin, IR, spectroscopy

LANG Chinese, English abstract

233 AUTH Teng, Xu-yan; Xiao, Jin-kai; Shun, Yuan-fu; Zou, Xing-chang; Shi, Chang-qing

AFFI Changchun Institute of Physics, Chinese Academy of Sciences

DATE 1981

TITL Passive microwave radiometry for soil moisture and marine oil spills

CITA Proceedings of the Second Asian Conference on Remote Sensing, G 3-3 (1981)

ABST Microwave radiometric images were taken from the test field at Changchun and Qingdao respectively, in August and September, 1979, with airborne 3cm imaging microwave radiometer. This paper gives microwave emissivity for water bodies and some typical materials in terms of images and ground truth acquired from tests. The preliminary results of detecting soil moisture and marine oil spills is briefly analysed.

KEY remote sensing, pollution, oil

LANG English

NOTE Shun Yuan-fu is also spelled Sun Yuanfu

234 AUTH Wan, Weiqun

AFFI Northsea Sub-bureau of Oceanography, NBO, Qingdao

DATE 1982

TITL Modification of the triggering mechanism for Model HQM 1-2 Water Sampler

CITA Ocean Technology 2, (1982)

ABST Model HQM 1-2 Water Sampler developed by Shandong Instruments and Meters Research Institute has a number of features and find wide applications in ocean survey. Yet problems were encountered in the triggering mechanism. Modification of this mechanism is described. Successful result has been obtained.

KEY sampler, seawater

LANG Chinese, English abstract

235 AUTH Wan, Zhaozhong

AFFI Institute of Environmental Protection, Guangdong

DATE 1982

TITL A study on the diffusion and drift of oil on the sea

CITA Journal of Marine Science 6, 19-24 (1982)

ABST The thickness, the spreading area and the model of diffusion of an oil spill from a discontinuous point source were observed through the experiments. Then the model of diffusion and drift of a continuous oil spill from a point source (fixed and unfixed) was

derived. By this model we could find the pathway of the pollutants and determine the species being polluted and the range of influence of the oil pollutants, thus attaining the purpose of protection.

KEY diffusion, oil, pollution

LANG Chinese, English abstract

236 AUTH Wan, Zhen; Yang, Sunkai; Huang, Huiliang

AFFI Xiamen University, Xiamen

DATE 1982

TITL Studies on catalytic current of titanium(IV) in polarography--Determination of trace amounts of titanium in natural waters

CITA Acta Oceanologica Sinica 4, 183-190 (1982)

ABST The polarographic behavior of the titanium(IV)-amygdalic acid-chlorate system has been studied. In 0.02M amygdalic acid 4% chlorate medium titanium(IV) gives a simple kinetically controlled wave with Ep at -0.89 V vs. the S.C.E. The titanium wave is particularly interesting, because of its catalytic nature. As happens with other complexing and oxidizing agents, the titanium (III) formed at the dropping mercury electrode is oxidized back to titanium(IV). The resulting catalytic current depends on the rate of this subsequent oxidation. The titanium current allows the determination of titanium at concentrations as low as 10(E-9)g/ml, Cu(II), Pb(II), Mn(II), Cr(III), Zn(II) 1000-fold and Mo(VI), V(V) 100-fold excess does not interfere. This method is suitable for the determination of trace amounts of titanium in natural waters (sea water, estuarine water, well water, etc.).

KEY titanium, polarography, natural waters, determination, seawater, estuarine water, interference

LANG Chinese, English abstract

237 AUTH Wang, Benshan; Fu, Jiamo; Min, Yushun

AFFI Institute of Geochemistry, Academia Sinica, Guiyang

DATE 1982

TITL Generation and evolution of petroleum in the central depression of the Beibu Gulf in the South China Sea

CITA Annual Reports Institute of Geochemistry, Academia Sinica (1980-1981), 73-76 (1982)

ABST Geochemical characteristics of the sedimentary rocks in the Central Depression of the Beibu Gulf have been investigated. In this paper it is suggested that the sedimentary basin has evolved from a deep water lake to a shallow water basin, indicating the influence of sedimentary environment on both quantity and quality (type) of organic matter. In order to evaluate and assess the source rocks in this area, the authors have investigated the drill cores from well Wan-2 from the viewpoints of organic geochemistry. According to organic carbon contents and kerogen types we have suggested that the Liushagang dark shale in the Oligocene Series and the Juewei grey mudstone in the Miocene Series are possible source rocks. Based upon the changes of the content of chloroform bitumen A and its composition in organic matter, the relative content of each component in chloroform bitumen A, the chromatographic distribution of saturated hydrocarbons and the vitrite reflectance with increasing burial depth we have justified that the oil-generating threshold of the Eogene System in this area is at a depth of 2,500 m or so. That is to say, the potential source rocks only below 2,500 m are the exact ones. Incidentally, this conclusion has been tested by the correlation data for oil/source beds in this area.

KEY petroleum, South China Sea, sedimentary rocks, organic carbon, kerogen, geochemistry, organic matter, oil

LANG Chinese, English abstract

238 AUTH Wang, Chenghou; Jin, Jiancai

AFFI Second Institute of Oceanography, National Bureau of Oceanography, Hangzhou, China

DATE 1983

TITL Chemical diagenesis of sulfur and mineralization of carbonate in continental shelf of East China Sea

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference on the East China Sea, Hangzhou, China, Treatise Abstract, 136-137 (1983)

ABST The spatial changes of SO_4^{2-} concentration profiles in surface sediment and the relations of SO_4^{2-} reduction with the mineralization of carbonate were studied, through the sampling of four gravity cores and more than twenty box cores and the analysis of SO_4^{2-}, Ca^{2+} and Mg^{2+} in pore water and of sulfuret and carbonates in solid phase on the continental shelf near the Changjiang Estuary. The results indicate that the SO_4^{2-} concentration is lower in overlying water than in pore water near interface in summer (in June), owing to the influence of fresh water from Changjiang River. The differences between them is about 5-10 mm, the relations among the concentrations of SO_4^{2-} and Ca^{2+}, Mg^{2+} are positive with the depth of gravity cores but it is negative with the changes of alkalinity. It is deduced preliminarily that the dolomitization and the calcitization are characteristic of mineralization during the diagenetic process in the study area, according to the thermodynamic relations of ionic activity and solubility products. In addition, the diffusion of SO_4^{2-} and its relation with benthic bioturbation were also discussed.

KEY diagenesis, sulfur, East China Sea, carbonates, Changjiang, estuary, sulfate, calcium, magnesium, river water, thermodynamics, alkalinity, activity,

solubility products, bioturbation, interstitial water, continental shelf, interface, dolomitization, diffusion

LANG Chinese, English abstract

NOTE abstract only

239 AUTH Wang, Huatong; Fang, Xinhua; Yang, Dianrong; Kuang, Guorui; Chen, Shijun

AFFI Department of Physical Oceanology, Shandong College of Oceanology, Qingdao

DATE 1980

TITL Numerical modeling of the circulation and the pollutant dispersion in Jiaozhou Bay I. Numerical computation of tidal currents

CITA Journal of Shandong College of Oceanology 10, 26-63 (1980)

ABST The paper deals with numerical computation of the tidal currents in Jiaozhou Bay, the first part of numerical study of both the circulation and the pollutant dispersion there. A two-dimensional nonlinear model is used. Only two tidal constituents M2 and S2 being taken into account, their oscillation at the bay mouth is taken as input data for computation. The time-step of 60 sec. and the grid-step of 500 m are reasonably chosen. The computation is carried out on an IRIS-60 computer. The comparison between simulation and field observation exhibits excellent agreement, suggesting that the model employed here is satisfactory enough to serve our purpose. From the computations we can come to the following conclusions: 1. In the residual current field of the bay, there exist nine gyres and a "semi-gyre", six of them, including the "semi-gyre", being cyclonic, and other four anticyclonic. Only three gyres and the "semi-gyre" are remarkable. The maximum speed of residual current, occurring at the north end of the bay mouth, is about 21cm/sec. 2. The

tidal currents orientate outgoing directions throughout the bay during ebb, while during flood they behave in a more complicated way owing to the existence of gyres. During the period of tide change, tidal currents exhibit a pattern of "∞" or "8" in the entrance part and near the boundaries, while in the open area they show a simple counterclockwise or clockwise rotation pattern. The maximum speed of flooding currents, occurring at the north end of the bay mouth, is 120 cm/sec, and the maximum speed of ebbing currents, appearing west of Tuandao, 77cm/sec. 3. The cotidal chart indicates that only seven minutes after the occurrence of high water at the bay mouth does it take place in the west shallow water area. From the co-range lines it can be concluded that the maximum tidal range, 23cm higher than the tidal range at the bay mouth, occurs at the northeast end of the bay. 4. The numerical computations suggest that the nonlinear terms seem to be of less importance to the change in tidal level of Jiaozhou Bay. Nevertheless, the nonlinear equations should be used because nonlinear terms have a great infulence on the residual currents, which are of significance to our study.

KEY modeling, circulation, pollutant, Jiaozhou Bay, pollution, environment

LANG Chinese, English abstract

240 AUTH Wang, Longfa; Wu, Yuduan

AFFI Department of Oceanography, Xiamen University, China

DATE 1983

TITL Sedimentation geochemistry of heavy metal in the East China Sea off Changjiang Estuary

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise Abstract, 141-142 (1983)

ABST This paper has synthesized the data collected from observation on geochemical behaviour of Cr, Cu and Hg in the East China Sea off Changjiang Estuary in 1980 to 1981, from which four conclusions have been drawn: 1. Along the nearshore profile from station E8101 to E8116 we observed that the heavy metal contents in the surface sediment decreased with the distance from E8101 to E8116 then it began to increase from E8102 to E8109, and then decreased again. 2. The allocation ratio of heavy metal contents of different geochemical facies act as an indicator of the sources of sediment. It showed that the composition of sediment in these areas could be divided into Changjiang River's type and Huanghe River's type. 3. The figure of vertical distribution of heavy metal contents in sediment shows obviously that the accumulation rate of the deposit nearshore station G8140 was much larger than that offshore station G8138. 4. We obtained two strictly closed positive relation lines which represent the relationship between the heavy metal contents of sediment and the sedimentary environmental parameters such as $Fe_2O_3 \cdot XH_2O$ and organic matters.

KEY Changjiang, estuary, East China Sea, chromium, copper, mercury, sedimentation rates, organic matter, sediments, Huanghe

LANG Chinese, English abstract

NOTE abstract only

241 AUTH Wang, Pinxian; Min, Qiubao

AFFI Tongji University

DATE 1981

TITL A preliminary study of calcareous nannoplankton in bottom sediments of the East China Sea

CITA Acta Oceanologica Sinica 3, 188-190 (1981)

ABST Calcareous nannoplankton from surface sediments of the East China Sea was investigated for the first time. As revealed by the preliminary study, coccoliths are

highly concentrated in sediments at the outer edge of the continental shelf and on the continental slope, decreasing in number towards deeper (bottom of the Ryukyu Trench) and shallower water area. The calcareous nannoplankton of the northern part of the East China Sea is dominated by wide-spread species such as Gephyrocapsa oceanica Kamptner and Emiliania huxleyi(Lohmann)Hay and Mohler. The species diversity is rising southwards, with appearence of some warm-water species, as Helicopontosphaera kamptneri Hay and Mohler, Umbilicosphaera mirobilis Lohmann, Ceratolithus cristatus Kamptner, Rhabdosphaera stilifer Lohmann, Thoracosphaera sp., Syracosphaera sp. and Braarudosphera bigelowi (Gran and Braarud) Deflandre etc. It is suggested, therefore, the main part of the East China Sea belongs to the North subtropic zone in the Pacific biogeography zonation of nannoplankton, but its northernmost part to the Boreal zone.

KEY sediments, East China Sea, coccoliths, continental shelf, continental slope, calcium carbonate

LANG Chinese, English abstract

242 AUTH Wang, Pinxian; Min, Qiubao; Bian, Yunhua; Zhang, Jijun

AFFI Tongji University (1,2,3); Second Institute of Oceanography, National Bureau of Oceanography (4)

DATE 1980

TITL Micropaleontologic characteristics of relict sediments of the East China Sea

CITA Acta Oceanologica Sinica 2, 67-78 (1980)

ABST Up to now, in literature, the paleontologic characteristics of relict sediments concern mainly macrofossils. Micropaleontologic analysis of relict sediments in the East China Sea has revealed some distinctive features in their associated microfossils: 1. unusual state of preservation, 2.

low content of tests and 3. environmental conditions reflected by the faunal assemblage different from those of the modern environment. According to microfauna, five types of formation of relict sediments may be recognized: 1. brackish-water nearshore area, 2. shell beach, 3. estuaries, 4. littoral marsh, and 5. continental environments. As shown by the analysis of the East China Sea's core samples, remnant microfossils in relict sediments are mixed with recent tests and the number of recent tests is gradually decreasing downward in cores. It has provided a new evidence for the dynamic nature of the relict sediments and indicated that all the relict sediments in the East China Sea have undergone modifications in varying degrees in response to the present environments. Two directions of modification have led to two types of sediments: removal of fine grains resulted in "relict" sediments, introduction of material from outside resulted in "palimpsest" sediments. Using the micropaleontologic criteria, the relict, palimpsest and modern sediments may be differentiated.

KEY sediments, East China Sea, palaeontology, shells estuary, fossils

LANG Chinese, English abstract

243 AUTH Wang, Pinxian; Zheng, Lianfu

AFFI Tongji University, Shanghai (1); Third Institution of Oceanography, National Bureau of Oceanography, Xiamen (2)

DATE 1982

TITL A preliminary study on deep-sea carbonate dissolution cycles in Melanesia Basin, Pacific Ocean

CITA Oceanologia et Limnologia Sinica 13, 389-394 (1982)

ABST Deep-sea carbonate dissolution cycles in Melanesia Basin, Western Equatorial Pacific, are investigated on basis of two cores and 18 surface sediment samples.

In this basin, CCD is estimated to be about 5000m, and lysocline about 4000-4500m water depth. As revealed by chemical and micropaleaontological analyses (foraminifera and calcareous nannofossils), C-14 dating and correlation of sediment cores, carbonate dissolution cycles in Melanesia Basin correspond well to paleoclimatic cycles, that is, dissolution process strengthens during glacial stage, and weakens at interglacial time. The sediment core L1007 taken from ocean bottom above lysocline (169 degree 57'E, 6 degree 01'S, water depth 3434.6m, 416cm in length) is composed of uniform white calcareous ooze without obvious fluctuation in carbonate content. But foraminiferal dissolution index has displayed two carbonate dissolution cycles in this core, representing sediments of more than one hundred thousand years. The core L1026 from beneath CCD (173 degree 18'E, 8 degree 01'S, water-depth 5373m, 422cm in length) consists of intercalation of red clay and white calcareous ooze. Three and a half dissolution cycles are observed in L1026 core, of which the upper two cycles correspond to Brunhes epoch, i.e. about 700,000 years. Comparing the cores from Melanesia Basin with those from the East Equatorial Pacific, we may conclude that records of Quaternary carbonate cycles between cores may be easily correlated with similar carbonate dissolution depth position even if they are far separated geographically. But in cores taken from different dissolution depth positions, the records of dissolution cycles are quite different even if they are situated in one and the same basin.

KEY dissolution, Pacific Ocean, lysocline, foraminifera, dating, glacier, interglacial, carbonates, calcium carbonate, compensation depth, carbon-14, sediments, climate, fossil, palaeontology, Quaternary

LANG Chinese, English abstract

244 AUTH Wang, Qi; Yang, Zuosheng

AFFI Shandong College of Oceanology

DATE 1981

TITL Authigenic pyrite in the surface sediments of the Southern Huanghai Sea

CITA Oceanologia et Limnologia Sinica 12, 25-32 (1981)

ABST 73 surface sediment samples taken from the southern Huanghai Sea (Yellow Sea) have been studied. The result shows that the authigenic pyrite is present extensively in the muddy sediments of the Southern Yellow Sea. Within a little sampling depth (1.5m), the abundance of the pyrite increases slightly from top to bottom. There are mainly three different forms of the authigenic pyrite in the samples: The fillings within the shells of microscopic organism, the cements among the sedimentary fragments, and the framboid, the first two of which are more in abundance than the third. Octahedromicrocrystals are the basic unit to build these forms of the authigenic pyrite. The shape system of the shell-filling pyrite is more complicated than those of the others. The differences between the euhedral degree and size of octahedromicrocrystals and the shape system among the pyrite grains indicate that the characters of microenvironment controlling the mechanism of crystallization are unlike.

KEY Huanghai, Yellow sea, pyrite, mechanism, crystallization, iron, sulfur, sediments

LANG Chinese, English abstract

NOTE Yang Zuosheng was formerly Yang Zuo-sheng

245 AUTH Wang, Qingzhang; Chen, Dechang

AFFI Department of Marine Chemistry, Shandong College of Oceanology, Qingdao

DATE 1982

TITL Electrochemical measurement of kinetic analysis--automatic determination of trace iodine in natural waters

CITA Kexue Tongbao 27, 1283-1288 (1982)

ABST This paper is an account of catalytic analysis of total iodine in seawater, interstitial water and artificial rain by using glassy carbon electrode and auto-potentiometer. The results obtained by electrochemical and spectrophotometric techniques are in agreement with each other.

KEY determination, iodine, natural waters, interstitial water, rain water, analytical chemistry, kinetics, seawater, potentiometry, electrode

LANG English

246 AUTH Wang, Qingzhang; Tan, Yuehua

AFFI Department of Marine Chemistry, Shandong College of Oceanology, Qingdao

DATE 1981

TITL Determination of sulfide in sea water by electrochemical membrane sulfide electrode

CITA Collected Oceanic Works 4, (1981)

ABST A method is described for the detemination of sulfide in sea water by ion selective electrode in which the electroactive membrane is made out of Ag_2S formed by electrochemical technique. The backgroud electrolyte solution is 1M NaOH containing 5mg/ml ascorbic acid as antioxidant reagent. A linear near-Nernst response with the slope of 29.8 + or -0.2mv/logC_{ST} is obtained over the total sulfide concentration range from 1 * E-3 M to 1 * E-7 M for the sea water having different salinity (5-35%). The average standard deviation of the observed potentials is 0.6 mv, and the relative standard deviation of the sulfide concentration is 5%. The experimental recovery of sulfide is 101 + or - 5%. The detection limit of sulfide is about 6 * E-8 M. The interferences of some heavy metals on the electrode response were tested; the obvious interferences of Cd, Pb and Cu can be eliminated by addition of Na_2H_2EDTA and NaDDTC respectively. Data

obtained for the sea water samples by calibration curve, standard addition and graphical method are in good agreement.

KEY determination, sulfide, seawater, electrode, salinity, cadmium, lead, copper, specific ion electrode, interference

LANG Chinese, English abstract

NOTE Tan Yuehua was formerly Tan Yau-Hua

247 AUTH Wang, Qingzhang; Wang, Weixin

AFFI Department of Marine Chemistry (1); Department of Marine Physics (2), Shandong College of Oceanology

DATE 1982

TITL Model AD-2 polarograph

CITA Journal of Shandong College of Oceanology 12, 69-75 (1982)

ABST Model AD-2 polarograph constructed from operational amplifier is detailed in this paper. It has broader range of variable sweep voltage, adjustable linear scan velocity, comprehensive compensators and a potentiostat for compensating voltage drop as iR and electrode polarization. Therefore besides general two-electrodes system, it can also be used for the three-electrodes system, which is needful when analysis has to proceed in very dilute solutions, or in a bit of sample, and specially when the peak potential is needed to be measured accurately. Model AD-2 polarograph is equipped with a Model TJ-1 Electroanalytical Table, which includes nine electrodes and can be used in most voltammetries.

KEY polarography, analytical chemistry, natural waters, organic matter, electrode

LANG Chinese, English abstract

248 AUTH Wang, Shuchang; Shi, Zhili; Sun, Bingyi; Wang, Yongchen; Yu, Shengrui; Dai, Guosheng; Li, Liangzhong; Chang, Fenglan; Ke, Dongsheng; Chang YuenLi

AFFI Department of Marine Chemistry, Shandong College of Oceanology

DATE 1980

TITL The chemical forms of zinc and its distribution in the Northeast Jiaozhou Bay

CITA Collected Oceanic Works 3, 51-63 (1980)

ABST The chemical forms of zinc and its distribution in the surface water of the Northeast Jiaozhou Bay (25 stations) have been studied. The ASV method and spectrophotometry with dithizone extraction were employed in untreated and treated sea water to identify forms of zinc in sea water. We suggest that zinc in sea water can be divided into five forms by following ways. Particulate zinc (Zn_P). One liter sea water sample was filtrated through a membrane filter. The remains on the filter was digested in a mixture of HNO_3 and $HClO_4$, and then the content of particulate zinc was obtained by ASV. Zn_{ASV} represents labile zinc plus ionic zinc. They were determined by ASV method directly. ZnH_2D_z represents weak bound zinc (Zn_w) plus Zn_{ASV}. They were obtained by spectrophotometry with dithizone extraction directly. Zn_{ASV} plus Zn_{WB} and bound zinc (Zn_B) are the total soluble zinc Zn_{TS}. The water sample was digested with HNO_3 and heated till boiling, and the Zn_{TS} was obtained by spectrophotometry. $Zn_{WB} = ZnH_2D_z - Zn_{ASV}$, $Zn_B = Zn_{TS} - ZnH_2D_z$, sum of Zn = $Zn_{TS} + Zn_P$. Results shows high values near the coast area. The sum of Zn mean value is 20.7μg/L(6.9 39.6 μg/L); Zn_P 2.70μg/L(0.4 - 6.5μg/L), Zn_P/sum of Zn = 13.0%; Zn_{ASV} 4.13μg/L(1.7 9.6μg/L), Zn_{ASV}/sum of Zn =20.0%; Zn_{WB} 5.49μg/L(1.3 19.6μg/L), Zn_{WB}/sum of Zn = 26.5%; Zn_B = 8.42μg/L(1.47 20.3μg/L), Zn_B/sum of Zn = 40.7%; Zn_{TS} 18.0μg/L(5.3 34.5μg/L), Zn_{TS}/sum of Zn = 87.0%. The results show that bound zinc is the main form among the whole sea water of the Northeast Jiaozhou

Bay, and its content is about half of total soluble zinc (Zn_B/Zn_{TS} = 46.7%), which is in agreement with Fukai's results.

KEY zinc, distribution, Jiaozhou Bay, speciation, anodic stripping voltammetry, particulates

LANG Chinese, English abstract

NOTE Same paper published in Journal of Shandong College of Oceanology 10, 64-78 (1980); and Sun Bingyi was formerly Sun Bin-Yi

249 AUTH Wang, Shuchang; Wang, Youngchen; Sun, Bingyi

AFFI Department of Marine Chemistry, Shandong College of Oceanology, Qingdao

DATE 1981

TITL Stability constants of hydroxide complexes of Zn, Pb and Cd in KNO_3 solution

CITA Journal of Shandong College of Oceanology 11, 15-21 (1981)

ABST Anodic stripping voltammetry was used to determine the stability constants of Zn, Pb and Cd hydroxide complexes in 0.7M KNO_3 solution. The concentrations of trace metals in KNO_3 solution are approximate 10(E-7) --- 10(E-8)M. Apparent stability constants of these metals complexes with hydroxy were determined from the magnitude of the shift of peak potential using the equation of Lingane. The results of stability constants were obtained as follows: Zn ($\log\beta_1$ =-5.91, $\log\beta_2$ =-11.10) Pb ($\log\beta_1$ =-6.82, $\log\beta_2$ =-11.23) Cd ($\log\beta_1$ =-3.69, $\log\beta_2$ =-6.49). The constants obtained in this work are in good agreement with the literature values using various voltammetry techniques. The stability constants of zinc hydroxide obtained in 0.7M KNO_3 solution were as well as the results in sea water using the same technique. It can be seen that these stability constants are suitable to characterize trace metal speciations in sea water.

KEY stability constants, hydroxide, anodic stripping voltammetry, seawater, speciation, zinc, lead, cadmium, equilibrium

LANG Chinese, English abstract

NOTE Sun Bingyi was formerly Sun Bin-Yi

250 AUTH Wang, Xianjue; Chen, Yuwei; Lei, Jianquan; Wu, Mingqing; Zhao, Yiyang

AFFI Institute of Geochemistry, Academia Sinica, Guiyang (1, 2, 3, 4); Institute of Oceanology, Academia Sinica, Qingdao (5)

DATE 1982

TITL REE geochemistry in sea-floor sediments in the continental shelf of East China Sea

CITA Geochimica, 56-65 (1982)

ABST REE geochemistry has been studied with respect to sea-floor sediments in the continental shelf of East China Sea. The average content of RE_2O_3 is derived as 175ppm based on 68 samples of the continental shelf sediments. The absolute concentrations of Y and La-Lu in the above mentioned sediments are shown in Table 3. The REE distribution patterns of the sediments demonstrate a distinct depletion in Eu and a negative slope. It is considered that the fragments of Mesozoic intermediate-acid igneous rocks widely distributed in southeastern China are the main source of REE in sea-floor sediments of the continental shelf.

KEY geochemistry, sediments, continental shelf, East China Sea, rare earth elements, lanthanum, yttrium, europium, lutecium, Mesozoic, sources

LANG Chinese, English abstract

251 AUTH Wang, Xianlan; Liang, Jingzhou

AFFI Second Institute of Oceanography, National Bureau of Oceanography, Hangzhou

DATE 1982

TITL Study of the factors controlling heavy mineral distribution on the East China Sea continental shelf by using statistical analysis

CITA Acta Oceanologica Sinica 4, 65-77 (1982)

ABST In this paper, quantitative studies are made of the space distribution and variation of heavy minerals in the sediments of the East China Sea continental shelf using mathematic statistical methods. The paper discusses the effect of geological processes on the distribution and changes of the heavy minerals since the late Pleistocene, and suggests regional and local variation models of heavy minerals in the East China Sea. Regression analyses of 122 samples taken from the continental shelf indicate that the change of content of heavy minerals caused by the change of medium grain-size in sediment ranges only from 0.04% to 13%, which shows that hydraulic fractionation by sediment size has less effect on dispersion and concentration of heavy minerals. Analyses of variance on the above samples show that the variation of heavy minerals in various sedimentary environments mainly relates to hydraulic fractionation of heavy minerals by shape and density and to the action of chemical decomposition of unstable minerals. Q-mode factor analyses of 77 samples show that three types of heavy mineral combination exist in the sediments on the East China Sea contintental shelf: 1) high enrichment of unstable minerals, i.e. schistose minerals-amphibole-epidote-metal minerals; 2) high enrichment of stable minerals, i.e. metal minerals-amphibole-epidote-garnet-zircon and 3) higher content of both stable and unstable minerals, i.e. amphibole-epidote-metal minerals-garnet-sphene (similar to those of the Yellow River) and amphibole-epidote-metal minerals-sphene-garnet (similar to those of the Yangtze River). These three types of minerals can not only be compared with river

samples, but also coincide spatially with the environmental provinces divided on the basis of parameters of sediment structure. The author of this paper holds that deposition of rivers, heavy mineral hydraulic fractionation by size, shape and specific gravity, and selective chemical decomposition of unstable minerals have been affecting, in varying degrees, the sediments on the East China Sea continental shelf since late Pleistocene. These local variations have gradually resulted in regional variations, finally forming three heavy mineral divisions. These three types of heavy minerals indicate that deposition, deposition erosion and erosion occur on the East China Sea floor.

KEY East China Sea, distribution, sediments, continental shelf, grain size, Yellow River, Yangtze River, minerals, Pleistocene

LANG Chinese, English abstract

252 AUTH Wang, Ying; Vilks, G.; Piper, D. J. W.

AFFI Nanjing University, China (1); Atlantic Geoscience Centre, Geological Survey of Canada (2, 3)

DATE 1983

TITL Surface textures of quartz sand grains from continental shelf environments

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise Abstract, 187-188 (1983)

ABST Surface textures analysis of continental shelf sands using S. E. M. shows that the continental shelf sands show the following characteristics when compared with sands from other sedimentary environments. 1. The surface textures of grains from the inner Labrador shelf suggest the sands are relict glacial marine deposits containing coarse-layered sands which may have migrated from the coastal zone during periods of

heavy storms. 2. Sands from outermost shelf off Nova Scotia have typical surface textures of submerged beaches. 3. Sands from the Beaufort Sea and East China Sea continental shelves show the major features produced by river (or current) processes, partly mixed with beach textures. Some sands show residual glacial features. Quartz sands from all the above continental shelf environments have relict surface textures produced by subaerial processes on which are superimposed textures resulting from current reworking and diagenetic features such as solution holes and silica deposits. These are probably the typical surface textures of sand grains in the continental shelf environment.

KEY surface, quartz, continental shelf, East China Sea, rivers, diagenesis, silica, sand

LANG Chinese, English abstract

NOTE abstract only

253 AUTH Wang, Yongji; Cai, Deling; Xie, Fuyuan; Xu, Jiasheng; Liu, Xinxia; Kong, Fanrong

AFFI First Institute of Oceanography, National Bureau of Oceanography, Qingdao

DATE 1982

TITL Spore-pollen analysis and C-14 dating of bottom sediments in western part of the Central Pacific

CITA Acta Oceanologica Sinica 4, 50-62 (1982)

ABST Twenty eight families and eleven genera of spore and pollen have been found in the sediments. Through the analysis of the content and assemblages of these spores and pollen grains, it has been found that they come mainly from the islands in the west, and that the main current transporting them is the Equatorial Counter-Current. In the bottom sediments of this area, the spores and pollen grains are by far the most abundant in the calcareous ooze, next in the siliceous-calcareous ooze and red clay. From the

analysis of the column samples it is revealed that minor fluctuations of the climate have occurred since the late Pleistocene. Radiocarbon dating conducted on the column sediments from Station C2016 in the western part of the Central Pacific Ocean shows that calcareous ooze (34cm in thickness) is the product of the Holocene sediments and that the mean apparent sedimentation rate for the period of 10000 years is 2.8 cm per thousand years, if the sediments were not mixed. But, C-14 measurements on the core show a mixed layer of 17cm thick. The model calculation gives an optimum combination of mixing parameters: mixing coefficient D=40 cm^2/kyr and the Holocene sedimentation rate should be 2.4 cm per thousand years.

KEY dating, sediments, Pacific Ocean, C-14, calcareous ooze, red clay, climate, Pleistocene, Holocene, sedimentation rates, mixing coefficient, mixing, siliceous ooze

LANG Chinese, English abstract

254 AUTH Wang, Zhaoding

AFFI South China Sea Institute of Oceanology, Academia Sinica, Guangzhou

DATE 1982

TITL The estimation of dissolved Zn(II), Cd(II), Pb(II) and Cu(II) in the Zhujiang River estuary

CITA Oceanologia et Limnologia Sinica 13, 117-123 (1982)

ABST This article is to use Garrels-Thompson's ion-association model to estimate the dissolved species, the divalent zinc, cadmium, lead, and copper and their distribution in the Zhujiang River (the Pearl River) estuary. The trace element association with inorganic ligands, OH^-, Cl^-, SO_4^{2-}, HCO_3^-, $CO_3^{2}$and Br^- was studied at $S^o/_{oo}$ 0.0302-26.092, pH 6.93-7.84, 25°C and 1 atm. pressure. The important dissolved species are

as follows: (1) Zn: Zn^{2+}, $Zn(OH)_2$, and $ZnCl^+$; (2) Cd: $CdCl^+$, $CdCl_2$, and Cd^{2+}; (3) Pb: $PbCO_3$, $PbCl^+$, and Pb^{2+}; (4) Cu: $Cu(OH)_2$, Cu(OH)Cl, and Cu^{2+}.

KEY rivers, estuary, zinc, cadmium, lead, copper, ligands, pH, speciation, hydroxide, chloride, sulfate, bicarbonate, carbonates, bromine, salinity, Zhujiang

LANG Chinese, English abstract

255 AUTH Wang, Zhengfang; Yao, Longkui; Fan, Ande; Fang, Zhangfu

AFFI Second Institute of Oceanography, National Bureau of Oceanography, Hangzhou

DATE 1982

TITL A preliminary study of the existence and distribution of zinc in the Changjiang River estuary

CITA Acta Oceanologica Sinica 4, 315-323 (1982)

ABST Investigations of 11 stations in the Changjiang River estuarine area (30°50'-31°30'N and 121°50'-122°22'E) were made in April 1979. On board ship, we collected water and surface sediment samples, measured pH and temperature of the water, and prepared dissolved zinc and suspended particle zinc with millipore filter (0.45um). In the laboratory, we analyzed 4 species of zinc. The ranges of concentration change are: 28-84 ppb for total zinc of liquid phase 8.8-46.3 ppb for free zinc, 11.7-191 ppb for zinc of suspended phase, and 80.0-113.7 ppm for zinc of surface sediment; respectively. In this paper, it is pointed out that zinc exists mainly in the forms of free zinc, organic chelate zinc and particle zinc in the above sea area. The concentrations of zinc in these forms make up 12.5-38.0%, 26.7-51.9% and 24.3-61.8% of the total concentration of liquid zinc, respectively. Seawards, particle zinc becomes flocculated and is quickly deposited due to the mixture of river and ocean waters. The diluted water of the Changjiang River stretch north-eastward and the particle zinc brought

by the run off of the Changjiang River is deposited in the southeast of the Changjiang estuary. Several figures plot the contents of various species of zinc versus different investigation stations and distribution of plane of free zinc, and their changes are discussed in this paper. It is shown that the mixing of river and ocean waters is the major controlling factor. Furthermore, two relationships, total zinc of liquid phase varying with salinity and free zinc with salinity, are established as follows: Total zinc of liquid phase(ppb)= 17.4 $S^{0.5}$-0.5S; free zinc (ppb)=12.6+0.4S.

KEY distribution, zinc, Changjiang, estuary, sediments, pH, temperature, particulates, concentrations, speciation, seawater, river water, atomic absorption, anodic stripping voltammetry, organic matter, chelation, flocculation

LANG Chinese, English abstract

256 AUTH Wang, Zhengfang; Yao, Longkui; Ruan, Xiaozheng

AFFI Second Institute of Oceanography, National Bureau of Oceanography, Hangzhou, China

DATE 1983

TITL Transport of trace metals in the Changjiang Estuary

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise Abstract, 38 (1983)

ABST We have determined the concentrations of trace metals (Cu, Pb, Zn, Cd, Fe, Mn, and Al) in filtered waters, unfiltered waters and surface samples from the cruises of CHINA-US Joint Study during 1981. The distribution and the transport of trace metals have been discussed. It shows that trace metals in the Changjiang Estuary water are predominantly in particulate form (Cu 79.1%, Pb 88.3%, Zn 54.5%, Cd 78.3%, Fe 99.7%, Mn 97.1% and Al 99.3%). In situ, the dilution curves of dissolved

trace metal vs salinity and the shipboard laboratory mixing experiments indicate the nonconservative behavior of these metals. We also discussed several controlling factors on this behavior and estimated the seaward fluxes of the total trace metal. They are: Cu 219 kg/sec, Pb 72 kg/sec, Zn 1.42 * (E+3) kg/sec, Cd 1.9 kg/sec, Fe 56.1 * (E+3) kg/sec, Mn 3.75 * (E+3) kg/sec, Al 37.3 * (E+3) kg/sec.

KEY trace metals, Changjiang, estuary, sediments, salinity, copper, lead, zinc, cadmium, iron, manganese, aluminum, river water, seawater, particulates

LANG Chinese, English abstract

NOTE abstract only

257 AUTH Wang, Zhongzhu; Sui, Yongnian; Hao, Enliang

AFFI Shandong College of Oceanology, Qingdao

DATE 1980

TITL Determination of total inorganic carbon in sea water by gas chromatography.

CITA Acta Oceanologica Sinica 2, 182-185 (1980)

ABST A sea-going gas chromatographic system for determination of total inorganic carbon in sea water is described. A new design of the sample stripping chamber and method of calibration for determination of total inorganic carbon in sea water by gas chromatography are presented and discussed. When the above new design and calibrating method are used, the operation is easy and analytical results are precise and reliable.

KEY determination, total inorganic carbon, seawater, gas chromatography

LANG Chinese, English abstract

258 AUTH Wei, Keqin; Lin, Ruifen; Wang, Zhixiang; Wang, Sanyi; Liu, Bangliang; Zhao, Wenzhong

AFFI Institute of Geochemistry, Academia Sinica, Guiyang (1, 2, 3); South-central Prospecting & Designing Institute, Ministry of Electric Industry (4, 5, 6)

DATE 1982

TITL Tritium concentration in deep karst ground water in the area of Wujiangdu hydroelectric power station and its significance in engineering geology

CITA Annual Reports Institute of Geochemistry, Academia Sinica (1980-1981), 42-44 (1982)

ABST Natural radioactive tritium was trially used to investigate the hydraulic relation between the ground water in deep karst caves and the surface water in the reservoir of the Wujiangdu Hydroelectric Power Station. After infiltration down to the aquifers, the tritium concentration of the ground water will decrease with time, but in the leak karst channels it must be the same as in the local surface water. Based on this principle ground water samples were collected regularly from bore holes at different depths under the base of the dam to estimate the tritium concentration. And the picture of tritium distribution in the ground water has been obtained. It indicates the location of the leak karst zone on the left bank of the Wujiang River under the dam and provides a scientific basis for the operation of protection cement screens.

KEY tritium, concentrations, natural waters

LANG Chinese, English abstract

259 AUTH Wells, John T.; Huh, Oscar K.

AFFI Coastal Studies Institute, Louisiana State University, U.S.A.

DATE 1983

TITL Dispersal of silts and clays by winter monsoon surges in the southeastern Huanghai Sea

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise Abstract, 77-78 (1983)

ABST The shallow southeastern Huanghai Sea serves as a receiving basin for numerous sediment-laden rivers, such as the Yeongsan, Kum, and Han, that drain the southern half of the Korean Peninsula. Despite the high tide range (3-9 m) and severe winter monsoons, which create current and wave conditions of sufficient intensity to place the shelf-depth waters of the eastern Huanghai Sea in a category of high energy, muds and fine sands persist intertidally, subtidally, and on many parts of the inner shelf from Inchon to Mokpo, South Korea. Results of field research conducted between 1980 and 1982, together with available data on winds, tides, currents, and river discharge, show that two processes important to fine sediment dispersal are initiated at the onset of northerly monsoons in October-November. First, increase in wave energy causes suspension and vertical mixing of fine-grained sediments, resulting in a nearly uniform high concentration of sediments from surface to bottom. This band of turbid, destratified water ends abruptly as a turbidity front 20-30 km offshore. Suspended sediment decreases across this front from approximately 100 mg l^{-1} to 10 mg l^{-1}. Second, a wind-driven coastal current begins to flow southward along the west coast of Korea, carrying with it this band of suspended sediment as a coastal mudstream. Volume transport rates of fine sediment associated with this band of turbid water are on the order of 25-250 * (E+6) m^3 yr^{-1}. A model for a seasonal dispersal pattern has emerged that suggests low sediment influx to the coast during winter, when north winds generate large waves in the Huanghai Sea, and extremely high influx in summer, at a time when

winds from the south produce little wave activity. Coastal muds are thus eroded in winter and carried south into estuaries and into the Korea Strait. In summer, muds are replenished during high discharge and reform the band of soft material, which characteristically occurs as a series of mud aprons near the coast.

KEY clays, Huanghai, rivers, sediments, wind, sand, particulates, seasonal variation

LANG Chinese, English abstract

NOTE abstract only

260 AUTH Wen, Qizhong; Sun, Fuqing; Diao, Guiyi; Yu, Suhua

AFFI unknown

DATE 1981

TITL Ratios of oxides and relative values of weathering leaching or accumulation in Luochuan loess section, Shanxi Province and their geological significance

CITA Geochimca, 381-387 (1981)

ABST As have been determined, the ratios of oxides and the contents of $CaCO_3$ show a tendency to increase from bottom to top in Luochuan loess section, whereas an opposite tendency is observed for the relative values of weathering leaching or accumulation of loess. Moreover, the limits of oxide ratios from less to greater than the average value coincide with the boundary between Wucheng and Lishi loess strata, as well as with the boundary of magnetic polarity reversal. The ratios of oxides and the variations of relative weathering-leaching or accumulation extents are synchronous with the fluctuation of $CaCO_3$ contents. From this investigation, it is shown that the ratios of oxides in the superimposed loess and paleosols from the loess profile are found rhythmically varied. These characteristics might be

explained by the hypothesis of repeated climatic fluctuation from dry (loess) to humid (paleosol) during the Quaternary period.

KEY weathering, leaching, calcium carbonate, climate, loess, Quaternary

LANG Chinese, English abstract

261 AUTH Wen, Qizhong; Yu, Suhua; Gu, Xiongfei; Lei, Jianquan

AFFI unknown

DATE 1981

TITL A preliminary investigation of REE in loess

CITA Geochimica, 151-157 (1981)

ABST REE oxides in loess are estimated to amount to about 200 ppm. The REE distribution patterns in loess and its clay fraction are characterized by the enrichment of rare earth elements of Ce family. The REE distribution patterns of loess in the middle Huanghe (Yellow River) Valley are consistent with those of sands from the Tengeli desert, probably indicating the consistency of their material sources. The REE distribution patterns are similar to each other in the clay fractions of Malan loess everywhere in the middle Huanghe Valley, indicating the homogeneity in their composition. Close to average value of the earth's crust, the REE distribution patterns in loess and its clay fraction are similar to that of sedimentary rocks (e.g., North American shales), but different from that of chrondrites. It seems to show that large amounts of loessic material were transported from the provenance by moving water into sedimentary systems after it had been separated from its precursor, and then transported by wind to where it is now distributed.

KEY Huanghe, distribution, rare earth elements, loess, clay, sand

LANG Chinese, English abstract

262 AUTH Wu, Jingyang; He, Lianxiu; Liu, Huamin
AFFI Institute of Oceanology, Academia Sinica, Qingdao (1); Salt Chemistry Manufactory, Qingdao (2); Bureau of Salt, Qingdao (3)
DATE 1980
TITL Determination of chromium(VI), lead and cadmium in marine salt by extraction-flame atomic absorption spectrophotometry
CITA Transactions of Oceanology and Limnology 1, 65-70 (1980)
ABST Conditions for determination of Cr(VI), Pb and Cd by extraction-flame AAS using DDTC as a complexation reagent and MIBK as the extraction solvent in NaCl medium were studied. Optimal acidity in the aqueous phase for extraction is pH 2.8-6. A buffered solution of pH=4 is used to control the acidity. The solubility of MIBK in water decreases with increase of salinity of the aqueous solution. The solubility of MIBK in 10% and 20% NaCl solution is approximately 1.2% and 0.5-0.6% respectively. A rapid and precise method for the determination of Cr(VI), Pb and Cd in marine salt is described. This method was used in the analysis of crude and refined salts. Sensitivity of this method is 4 ppb for Cr(VI), 20 ppb for Pb, 0.8 ppb for Cd in 100g sample. Recovery rate is 90-105%.
KEY chromium, lead, cadmium, extraction, atomic absorption, spectroscopy, salinity, pH, sodium, chloride
LANG Chinese, English abstract

263 AUTH Wu, Jingyang; Li, Yunfei; Zhang, Xiangjun
AFFI Institute of Oceanology, Academia Sinica, Qingdao
DATE 1982
TITL Determination of Fe, Mn, Zn, Cr, Cu, Ni, Co, Pb and Cd in marine sediments by atomic absorption spectrophotometry
CITA Acta Oceanologica Sinica 4, 43-49 (1982)

ABST A rapid method for successive determination of Fe, Mn, Zn, Cr, Cu, Ni, Co,Pb and Cd using the common flame atomic absorption spectrophotometer on weighted and once digested samples of marine sediments is described. After comparison we chose the $HF-HClO_4-HNO_3$ decomposition or the $HNO_3-H_2O_2$ digestion and studied certain interfering issues: deducting background absorptions in determining Co and Ni we measured nonabsorbable lines, using $K_2S_2O_7$ or sodium sulfate-sodium citrate solution to inhibit several elements interfering with the determination of Cr. Experimental evidence proved that the presence of a certain amount of Fe has no influence on extracting determination of Pb, Cd and Ni. On the basis of the usual content of heavy metals in our marine sediments and the sensitivity of the instruments for atomic absorption determination, we formulated our methods of determination. We directly aspirated the digested solution into an air-acetylene flame to determine elements such as Mn, Zn, Cu, Ni and Co and used a more diluted solution for Fe (Mn). We pipetted a few ml of the digested solution, then added an equal amount of 4% $K_2S_2O_7$ solution to determine Cr. The presence of Pb and Cd were determined by the aspiration of the organic phase of an aliquot of the sample solution after extracting concentration with DDTC-MIBK as the extraction system. This technique is applicable to routine analyses of a large number of samples from shallow sea sediments.

KEY determination, atomic absorption, sediments, heavy metals, iron, manganese, zinc, chromium, nickel, cobalt, lead, cadmium, interference

LANG Chinese, English abstract

264 AUTH Wu, Mingqing

AFFI Institute of Geochemistry, Academia Sinica, Guiyang

DATE 1982

TITL REE geochemistry of sea-floor sediments from the Taiwan shallows, China

CITA Annual Reports institute of Geochemistry, Academia Sinica (1980-1981), 217-218 (1982)

ABST REE geochemistry of sea-floor sediments from the Taiwan shallows has been studied. Σ REE of 76 samples from the Taiwan shallows was determined by chemical extraction-spectrophotometry, of which 7 samples were analyzed for 15 rare earth elements by XRF, and 23 samples for 7-8 individual rare earth elements by paper chromatographic separation-spectrophotometry. The analytical results show that Σ REE of the samples increases gradually with a decrease in grain size. The average REE contents are 59.6 ppm for coarse-grained sediments, 82 ppm for medium-coarse-grained ones, 145 ppm for fine-grained ones, and 211 ppm for silt. The REE content of the samples is controlled distinctively by the grain size and mineralogical composition of sediments. All these data indicate a significant enrichment in light REE relative to heavy REE. The REE distribution patterns in sediments from the Taiwan shallows are similar to those in granites in southern China, which show a negative Eu anomaly and a positive Ce anomaly. The pattern lines have a negative slope. It is considered that based on REE geochemical characteristics and related oceanographic information, Taiwan shallows sediments seem to be residual deposits of ancient littoral facies during Pleistocene glacial period.

KEY sediments, geochemistry, rare earth elements, europium, cerium, atomic absorption, Pleistocene, lithium, rubidium, cesium, calcium, copper, cobalt, nickel, praseodymium, aluminum, strontium, barium, zinc, neodymium, samarium, silicon, iron, magnesium, gadolinium, dysprosium, yttrium, scandium, glacier

LANG Chinese, English abstract

265 AUTH Wu, Shiying

AFFI First Institute of Oceanography, National Bureau of Oceanography, Qingdao

DATE 1981

TITL A comprehensive study of the sedimentary characteristics of the Huanghai Sea

CITA Acta Oceanologica Sinica 3, 460-471 (1981)

ABST This paper deals with the sedimentary characteristics of the Yellow Sea with emphasis on the horizontal distribution and vertical distribution of the sediments, so as to obtain an understanding of time-space relationship. The Yellow Sea surface sediment generally has a pattern of distribution which includes three coarse particles and three fine. taking into account such factors as the physical property of grain and modern hydrodynamic conditions, the associated fossil or the character of the organism's shells and their distribution patterns, the geological structure and geomorphic position, the surface sediment areas can be divided into the modern sedimentary area and the relict deposit area. The Haizhou Bay area, Cheng Shantou area and Bohai Strait area are relict deposit areas. Although the relict deposit areas have undergone transformation by modern sedimentation, they still maintain the character of low sea level and high energy area. The vertical distribution of the Yellow Sea sedimentary layers actually acts as a recording device for variations of time and space. Based on the data analysis of the representative sedimentary core samples, especially the study of the samples containing peat layers and shell layers obtained from the deep water areas, the revealed strata are divided into an upper Pleistocene series stratum layer and a Holocene stratum layer, and these can be further divided into eight layers. The fundamental model of the sedimentary process since late Pleistocene is outlined. It also suggests that

the Yellow Sea had undergone large-scale regression and transgression twice with the variation of the climate during the last 70 thousand years. Comparisons based on the division of the climate period were made with other areas of the world, especially with the ocean areas near the Yellow Sea. In addition, the source of material in the Yellow Sea, the sedimentation rate, and some main control factors which influence the sedimentary characteristics of the related sea areas are also discussed in this paper.

KEY Huanghai, Yellow Sea, sediments, carbon-14, Eh, distribution, sources, particulates, shells, Bohai, sea level, Pleistocene, Holocene, climate

LANG Chinese, English abstract

266 AUTH Wu, Shiying; Fang, Zecheng

AFFI First Institute of Oceanography, National Bureau of Oceanography, Qingdao

DATE 1982

TITL The characteristics of caliches in the Haizhou Bay, Huanghai Sea and its geological implications

CITA Scientia Geologica Sinica, 207-216 (1982)

ABST The caliches distributed in the Haizhou Bay are in various forms. In order to search for their characteristics in different aspects, great effort has been devoted to the study of texture, mineral composition, chemical composition and distribution pattern. Based on the analysis of main controlling factors, such as geological structure, hydrodynamical feature, change of mass flux and biochemical action etc., the geological implications of caliches have been discussed.

KEY Huanghai, compositions, distribution, Huanghe, seawater, river water, sediments, trace metals, calsite, calcium, silicon, iron, aluminum, magnesium,

sodium, potassium, titanium, manganese, carbon, phosphorus, sulfur, chloride, vanadium, chromium, strontium, barium, nickel, cobalt, gallium, zirconium

LANG Chinese, English abstract

267 AUTH Wu, Youlu; Cao, Yunhui

AFFI Second Institute of Oceanography, National Bureau of Oceanography, Hangzhou

DATE 1982

TITL Electron microscopical observation on the ultrastructure of some marine luminous bacteria

CITA Acta Oceanologica Sinica 4, 377-381 (1982)

ABST Eight strains of marine luminous bacteria were isolated from the sea water and the sea floor of the East China Sea (E.124°-129°, N.26°30'-30°00'). These strains together with a subculture that lost the luminesecence (7032-) were examined with electron microscopy. The bacteria of strains 7032, 7032- and 1025 all possessed polar flagella, tuft flagella and peritrichous flagella. Strain 7032- was simillar to 7032 in cellular and flagella fine structure. In preparations negatively stained with phosphotungstic acid the flagella could sometimes be seen to be differentiated into a core and a sheath. Sometimes the sheath was disintegrated, while the central core remained intact. A network structure of flagella subunits could be seen in strain 128. The bacteria of all other strains possessed polar or peritrichous flagella. In ultrathin sections of the cells strain 7032 it could be seen that in some cells the cytoplasm was dense, with dense chromatin granules in the nuclear region and fibrous connections between the granules. No dense layer could be observed between the cell wall and plasma membrane of these cells. In other cells of the same ultrathin section the cytoplasm and the nuclear region were less dense, with little or less chromatin granules. There were many

transparent spots in the cell. The cellular structure of strain 7032was simillar to that of the dense cells of 7032. The cells of strain 128 were liable to undergo plasmolysis during specimen preparation. The strain 112 had a dense outer membrane of the cell wall.

KEY bacteria, seawater, East China Sea, bioluminescence, sediments

LANG Chinese, English abstract

268 AUTH Wu, Yuduan

AFFI Department of Oceanography, Xiamen University, Xiamen

DATE 1978

TITL On the mechanisms of the harmful heavy metal transport in Chang Jiang lower estuary I. The transport pattern and the factors affecting it

CITA Oceanologia et Limnologia Sinica 9, 168-182 (1978)

ABST In recent years, the content of heavy metal in Changjiang (Yangtze River) estuarine water was fundamentally unvaried, whereas there was an increase in the amount of sediments. We consider that the estuarine sediments are composed of various phases of water soluble, ion-exchangable, acid-soluble and crystalline solid. From the distribution ratio of heavy metal in each phase, we found that the main transporting process of the Hg, Cr, Cu dissolved in Changjiang estuarine water was caused by the adsorption of inorganic and organic colloidal substances, not by the ion-exchange. Further quantitative study is now in progress.

KEY mechanism, transport, heavy metals, Changjiang, Yangtze River, estuarine water, sediment, adsorption, colloids, ion-exchange, mercury, chromium, copper, river water, pollution, particulates, organic matter, speciation

LANG Chinese, English abstract

NOTE Wu Yuduan was formerly Wu Yu-duan

269 AUTH Wu, Yuduan; Chen Cimei; Chen, Yuwang; Wang, Longfa

AFFI Department of Oceanography, Amoy University, Amoy

DATE 1981

TITL Indicator of the degree of heavy metals pollution in natural aquatic environment-distribution ratio of heavy metals in different phases of sediment

CITA Acta Scientiarum Naturalium Universitatis Amoiensis 20, 254-361 (1981)

ABST Based upon the geochemistry theory and the data from our field observation on the transportation of heavy metals in aquatic environment, we suggested that the distribution ratio of heavy metals in different phases of sediment should be used as an indicator in evaluating the degree of heavy metals pollution in natural aquatic environment. Heavy metals in unpolluted aquatic environment were mainly distributed in the crystalline phases of the sediment, while in the polluted environment they were chiefly distributed in acid soluble and organic phases of the sediment. Sediment index q may be defined as follows: $q = \Delta F/F^\circ = (F - F^\circ)/F^\circ$. We have studied and analysed the distribution ratio of heavy metals in different phases of sediment of the Yangtze River estuary and the Yang River section of the Guan Ting Resource, and made a comparative analysis on the data of investigation on Amazon River, Yukon River as well as How River. As a result, the reliability of the indicator is confirmed.

KEY heavy metals, sediments, geochemistry, Yangtze River, estuary, river water, seawater, pollution, particulates, organic matter, speciation

LANG Chinese, English abstract

NOTE Wu Yuduan was formerly Wu Yu-duan, Wang Longfa was formerly Wang Long-fa

270 AUTH Wu, Yuduan; Chen, Cimei; Chen, Yuwang; Wang, Longfa

AFFI Department of Oceanography, Amoy University, Xiamen, Fujian, China

DATE 1979

TITL On the mechanisms of the harmful heavy metals transport in Yangtze River estuary II. Thermodynamics and kinetics for the process of fixing heavy metals on illitic, montmorillonitic and kaolinitic clays

CITA Second Environmental Science Conference Ministry of Education, 1-28 (1979)

ABST Yangtze River water contains a large quantity of suspended solid matters, among which illitic, montmorillonitic and kaolinitic clays are predominant. These colloidal clays consist of two parts: those coated with inorganic or organic matters and those not. Both have the function of fixing heavy metals on their surfaces in different degrees (see part I). This paper reports the simulation experiments of the adsorption of Cr, Cu and Hg from semi-saline water onto montmorillonite, illite etc., which had been carried out in our laboratory. We measured: (1) the equilibrium time, adsorption capacity and adsorption heat for the adsorption of Cr, Cu and Hg from synthetic sea water of different salinities, 0.5m NaCl and 0.5m NaCl-$MgCl_2$ solution systems onto illite, montmorillonite etc., (2) the effects of pH, S‰, T and humic substance on adsorption: (3) the competition of co-existent ions on adsorption, (4) the kinetic parameters for velocity and activation energy of the adsorption processes. In this work, (1) we considered the possibility and reality of the adsorption of heavy metals onto illitic, montmorillonitic and kaolinitic clays from the standpoint of thermodynamics and kinetics of adsorption, (2) we also considered the characteristics of high organic matter contents of Yangtze River estuarine water, and determined the effects of the adsorptions of water-soluble (low molecular weight) and base-soluble (middle molecular

weight) humic acid on the adsorption of Cr, Cu and Hg onto these clays. Hence we concluded that the adsorption behaviour is strongly influenced in different degrees by organic matters of different molecular weight.

KEY mechanism, heavy metals, transport, Yangtze River, estuary, adsorption, montmorillonite, illite, equilibrium, seawater, pH, humic material, activation energy, organic matter, humic acid, chromium, copper, mercury, particulates, salinity, temperature, thermodynamics, kinetics, clays, speciation

LANG Chinese, English abstract

NOTE Similar paper was published in Oceanic Selections 2, 64-88 (1979) and Acta Oceanologica Sinica 4, 303-314 (1982), and see Note 269

271 AUTH Wu, Yuduan; Chen, Cimei; Chen, Yuwang; Wang, Longfa

AFFI Department of Oceanography, Amoy University, Xiamen, Fujian, China

DATE 1979

TITL On the mechanisms of the harmful heavy metals transport in Yangtze River estuary II. Thermodynamics and kinetics for the process of fixing heavy metals on illitic, montmorillonitic and kaolinitic clays

CITA Oceanic Selections 2, 64-88 (1979)

ABST Yangtze River water contains a large quantity of suspended solid matters, among which illitic, montmorillonitic and kaolinitic clays are predominant. These colloidal clays consist of two parts: those coated with inorganic or organic matters and those not. Both have the function of fixing heavy metals on their surface in different degrees (see part I) (1). This paper reports the simulation experiments of the adsorption of Cr, Cu and Hg from semi-saline water onto montmorillonite, illite etc., which had been carried out in our laboratory. We measured: (I) the equilibrium time, adsorption capacity and adsorption

heat for the adsorption of Cr, Cu and Hg from synthetic sea water of different salinities, 0.5m NaCl and 0.5m NaCl-$MgCl_2$ solution systems onto illite, montorillonite etc., (2) the effects of pH, S‰, T and humic substance on adsorption, (3) the competition of co-existent ions on adsorption. (4) the kinetic parameters for velocity and activation energy of the adsorption processes. In this work, (1) we considered the possibility and reality of the adsorption of heavy metals onto illitic, montmorillonitic and kaolinitic clays from the standpoint of thermodynamics and kinetics of adsorption, (2) we also considered the characteristics of high organic matter contents of Yangtze River estuarine water, and determined the effects of the adsorptions of water-soluble (low molecular weight) and base-soluble (middle molecular weight) humic acid on the adsorption of Cr, Cu and Hg onto these clays. Hence we concluded that the adsorption behaviour is strongly influenced in different degrees by organic matters of different molecular weights.

KEY mechanism, heavy metals, transport, Yangtze River, estuary, thermodynamics, kinetics, clays, adsorption, montmorillonite,illite, equilibrium, seawater, pH, humic material, activation energy, organic matter, humic acid, chromium, copper, mercury, salinity, particulates, temperature, speciation

LANG Chinese, English abstract

NOTE Similar paper was published in Second Environmental Sciences Conference, Ministry of Education, 1-28 (1979) and Acta Oceanologica Sinica 4, 303-314 (1982) and see Note 269

272 AUTH Wu, Yuduan; Chen, Cimei; Chen, Yuwang; Wang, Longfa

AFFI Xiamen University, Xiamen

DATE 1982

TITL On the mechanism of transport of harmful heavy metals in the Changjiang River estuary. II. Thermodynamics and kinetics for the process of fixing heavy metals on illitic, montmorillonitic and kaolinitic clays

CITA Acta Oceanologica Sinica 4, 303-314 (1982)

ABST The water of the Changjiang River contains a large quantity of suspended solid matters, among which illitic, montmorillonitic and kaolinitic clays are predominant. These colloidal clays consist of two parts: one is coated with inorganic or organic matters, and another is not. Both have the function of fixing heavy metals on their surface in various degrees. This paper reports the simulation experiments of the adsorptions of Cr, Cu and Hg (from semi-saline water) on montmorillonite, illite, etc. We have measured: (1) the equilibrium time, adsorption capacity and adsorption heat for the adsorptions of Cr, Cu and Hg from synthetic sea water of different salinity, 0.5N NaCl and 0.5N NaCl-$MgCl_2$ solution systems on illite, montmorillonite, etc., (2) the effects of pH, S ,T and humic substance on adsorption, (3) the competition of co-existent ions on adsorption, and (4) the kinetic parameters for velocity and activation energy of the adsorption processes. From the viewpoints of thermodynamics and kinetics of adsorption, we have considered the possibility and reality of the adsorption of heavy metals on illitic, montmorillonitic and kaolinitic clays, we discussed the characteristics of high organic matter contents of the Changjiang River estuary and determined the effects of the adsorptions of water soluble (lower molecular weight) and basic soluble (medium molecular weight) humic acid on the adsorptions of Cr, Cu, and Hg on these clays. Hence we come to the conclusion that the adsorption behaviour is strongly influencedin various degrees by orgainic matters of different molecular weights.

KEY mechanism, heavy metals, Changjiang, estuary, thermodynamics, kinetics, clays,adsorption, capacity, salinity, pH, chromium, copper, mercury, humic material, particulates, organic matter, speciation

LANG Chinese, English abstract

NOTE See Note 269

273 AUTH Wu, Yuiduan; Chen, Cimei; Chen, Yuwang; Lin, Yumin; Wang, Longfa

AFFI Deparment of Oceanography, Amoy University, Amoy

DATE 1982

TITL Geochemical balance of budget Cr(III), Cu(II) and Hg(II) in Yangtze River estuary

CITA Acta Scientiarum Naturalium Universitatis Amoiensis 21, 344-350 (1982)

ABST Based upon the thermodynamic and kinetic study for the adsorption of Cr(III), Cu(II) and Hg(II) on mineral clays, we employed the mathematical statistics in designing the experiment of 7 parameters with two levels per parameter system for adsorption. As a result the adsorption ability for heavy metals on mineral clays was significantly different in various systems. According to the best probability of fixation for these three metals on mineral clay (multiple system), the mean turbidity and the discharge loads of effluent into Yangtze River water, we suggested a theoretical model for the geochemical balance of budget Cr(III), Cu(II) and Hg(II) under the environment of Yangtze River estuarine. Hence, We obtained a pattern of distribution and transport of these metals in the region. At last it was found that Cr(III), Cu(II) and Hg(II) entered into the estuary and would be transported to sediment and offcoast, leading to 70%, 50% and 85% purification respectively.

KEY Yangtze River, estuary, adsorption, clays, heavy metals, sediments, thermodynamics, kinetics, chromium,, copper, mercury, cycle, particulates, turbidity, speciation

LANG Chinese, English abstract

NOTE See Note 269

274 AUTH Xia, Ming

AFFI Institute of Geology, Academia Sinica, Beijing

DATE 1982

TITL Uranium-series dating of fossil bones from Peking Man cave - mixing model

CITA Acta Anthropologica Sinica 1, 191-196 (1982)

ABST A mixing model of uranium-series method based on Th-230/U-234 and U-234/U-238 ratios for the sediment of Peking Man cave is discussed here. The resulting ages of fossil bones collected at the Loc. 1 are determined as follows: about 230 * E+3 yr B.P. for the 1st-3rd layers, 350 * E+3 yr B.P. for the 6th-7th, over 400 * E+3 yr B.P. for the 8th-9th, and more than 500 * E+3 yr B.P. for the 12th. In an attempt to explain the discordant isotopic ratios of a suite of bone samples from Peking Man cave, the author is of the opinion that the paleohydrological coniditions in the environment changed during the last 200 * E+3 yr, so did the migration processes of uranium concentrations. Hence fossil bones for uranium-series method have indeed commanded much attention.

KEY uranium, dating, mixing model, thorium-230, uranium-234, uranium-238, sediments

LANG Chinese, English abstract

275 AUTH Xia, Ming; Zhang, Chenghui; Zhou, Xiuyun

AFFI Institute of Geology, Academia Sinica, Beijing (1, 2); Institute of Geochemistry, Academia Sinica, Guiyang (3)

DATE 1983

TITL Uranium concentration and U-234/U-238 disequilibrium in water as an aid to hydrologic study of the Xiamen Bay

CITA Journal of Marine Science 1, 1-5 (1983)

ABST The concentration of dissolved uranium and the relative abundance of two uranium isotopes, U-234 and U-238, in water samples from the Jiu Longjiang River and the Xiamen Bay, Fujian province, have been determined and by use of these parameters, the relative volume proportions of mixed water have been calculated in this paper. Ten surface water samples collected from two water sources in the studied area during May, 1981 are analyzed by using alpha spectrometric method. Jiu Jongjiang River water itself contains an average of about 0.24 μg/l U with active ratio of 1.22. Eight samples from surface water mixture varied from 1.20 to 2.60 μg/l with A. R. from 1.09 to 1.14. Analytical data show that the river-sea system provides excellent test on the mixing equations of two components. According to this mixing model, three water association sectors have been divided on the basis of the distribution of uranium and isotopic data. These initial data, although limited, provide an interesting insight into future potential research.

KEY uranium, concentrations, mixing, seawater, estuary, rivers, uranium-234, uranium-238, river water

LANG Chinese, English abstract

276 AUTH Xia, Ming; Zhou, Xiuyun

AFFI Institute of Geology, Academia Sinica, Beijing (1); Institute of Geochemistry, Academia Sinica, Guiyang (2)

DATE 1982

TITL Alpha-spectrometric determination of uranium and thorium in geological samples

CITA Geochimica, 277-284 (1982)

ABST Alpha-spectrometric technique is described as an independent method of determining micro-content of U-238 and Th-232. This method is based on the comparison of U-238 and Th-232 alpha spectral activity in geological samples with U-232 and Th-228 spectral activity contributed by the spike of known concentration. The experiment procedure consists in dissolving fine powdered sample with acid and adding a given amount of U-232-Th-228 spike. The uranium and thorium are then separated by ion exchange. After purification each fraction is mounted on a separate stainless steel disk for measurement by alpha-spectrometer which consists essentially of a surface barrier detector and a low noise amplification system connected to a multi-channel analyser. After correcting for background, tail and other factors, the desired U-232 and Th-232 concentrations can be calculated. The data obtained by the alpha-spectrometric method using U-232-Th-228 spike are compared with colorimetric determination. Excellent agreement is obtained between the two sets of results. The coefficient of correlation is about 0.98 for U-238 and 0.97 for Th-232. The accuracy of uranium and thorium analyses by this method depends primarily upon the counting statistics of U-238, U-232, Th-232 and Th-228 and, to a lesser extent, upon the calibration of U-232-Th-228 spike. Errors of uranium and thorium concentration by this method are generally 2 to 5 per cent.

KEY determination, uranium, thorium, ion-exchange, analytical chemistry, thorium-232, thorium-228, uranium-238, uranium-232, colorimetry

LANG Chinese, English abstract

277 AUTH Xiao, Yusheng; Teng, Wenfa; Xiang, Zhenjun

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL The relationship between cell density of Phaedactylum tricornutum and bio-accumulation and excretion of zinc-65 in the algae

CITA Jorunal of Marine Science 3, 22-25 (1982)

ABST The effects of different cell densities of Phaedactylum tricornutum on bio-accumulation and excretion of Zn-65 in the algae have been studied. The experimental results show that concentration of Zn-65 in low density group of the algae from sea water is greater than that in high density group. Concentration factors of three groups are above 10,000, and the C. F. of the lowest density group is the greatest, 4.4 * E+4. The mechanism of accumulating Zn-65 by unicellular algae is discussed.

KEY zinc-65, algae, bioaccumulation, concentrations, pollution, Bohai, seawater

LANG Chinese, English abstract

278 AUTH Xie, Qinchun; Zhang, Liren; Zhou, Fugen

AFFI Second Institute of Oceanography, National Bureau of Oceanography, Hangzhou, China (1, 2); Tongji University, Shanghai, China (3)

DATE 1983

TITL The features and the transport of suspended matter over the continental shelf off the Changjiang River mouth

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise Abstract, 67-68 (1983)

ABST The distribution of TSM concentrations had a temporal and spatial variation. The highest TSM concentrations were present in the Changjiang Estuary in all year, and decreased significantly seaward. The vertical distribution of the concentrations increased with depth. Both the concentrations and vertical gradients were greater in summer than in winter. On the

continental shelf, the TSM concentrations were lower, and greater in winter than in summer. The composition of suspended matter mainly consisted of terrigenous detritus, organisms and organic matter. The terrigenous detritus of suspended matter were most abundant in the Changjiang Estuary, and decreased rapidly seaward. But organisms and combustible component (%) increased markedly seaward. It can be derived from the data of the concentration and the composition that the suspended matter debouched from the Changjiang River were transported advectively southeastward during the whole year. Because of the Taiwan warm current blocking effect, most of suspended matter was deposited in the Changjiang Estuary extended too long. 123 degree 00' E. The remainder was moved southward alongshore. Only a little part can be moved eddy-diffusively to the middle and outer shelf of the East China Sea. We suggest the suspended and resuspended matter from the Huanghai Sea has a stronger influence over the region of the northeast of continental shelf of the East China Sea.

KEY Changjiang, particulates, estuary, compositions, organic matter, distribution, seasonal variation, detritus, resuspention, Huanghai, continental shelf

LANG Chinese, English abstract

NOTE abstract only

279 AUTH Xin, Xueyi (the Late); Yin, Xiangchun; Duan, Zhe; Wang, Guiyun

AFFI First Institute of Oceanography, National Bureau of Oceanography, Qingdao

DATE 1982

TITL The determination of low levels cadmium in seawater by anodic stripping voltammetry.

CITA Acta Oceanologica Sinica 4, 35-42 (1982)

ABST A simple and rapid method for the determination of Cd at low levels down to 0.01 ug Cd/l in seawater by anodic stripping voltammetry with a precision RSD of 6% and recovery of 92.5% is described. The method was based mainly on the principle of the positive "coordinating effect" of metallic ions during plating. In analysis, a sensitive AD-1 model polarography of Chinese manufacture and its mercury-film electrode was used without any preliminary treatment of the sample. The deoxygenation process was simply performed by adding 3 drops of saturated Na_2SO_4 solution to 50ml of seawater sample without passing N_2-gas. The total time for a plating and stripping cycle was 6 min. The plating process was performed with magnetic stirring, in two continuous steps at two reasonably controlled initial potentials of -1.4V (vs. the Ag/AgCl electrode; the same bellow) for 3 min. and -0.9 V for 1 min. respectively. In the first step Cd was codeposited by zincic effect, and with it to the mercury-film electrode by means of the positive "coordinating effect" between ions of Zn and Cd during plating. In the second step, which was easily performed by rapidly turning the potentials from -1.4 V to -0.9 V, most of the Zn already plated to the electrode in the first step stripped first, while the Cd continued to be deposited. A sharp current-peak for Cd was obtained after a 1 min. rest period and subsequent stripping in the potential range of -1.4 to -0.1 V (Fig. 1(b)). The experiment shows that at low concentrations of Cd the peak-current is in linear relation with the concentration of Cd enriched by adding various known amounts of Cd (Fig. 2), so the standard addition method can be used for Cd determination. Three types of stirring methods were compared by laboratory experiment; (1) stirring by a magnetic stirrer only; (2) stirring by a magnetic stirrer with passing N_2-gas; (3) stirring by passing

N_2-gas only, the results showed that method (1) was better than the others (Table 3). The results of the experiment showed that there was no adsorption loss when the un-acidified seawater sample (pH 8) was stored in a borosilicate glass bottle for a long period of time of 1 month (Fig. 3). The authors emphasized that the analysis using an acidified seawater sample usually tended to show a higher amount of Cd, therefore they used an un-acidified seawater sample for analysis. The authors also noted that the standard solution diluted with deionized water for the standard addition method tended to show a lower amount of Cd and the standard solution diluted with ocean water which had been stored for a long period of time gave the accurate total soluble amount of Cd in seawater.

KEY determination, cadmium, seawater, anodic stripping voltammetry, polarography, electrode

LANG Chinese, English abstract

280 AUTH Xiong, Xiaoxian; Zang, Rubo

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1981

TITL Studies on the application of 5-Cl-PADAB in the analysis of sea water - Spectrophotometric determination of cobalt

CITA Oceanologia et Limnologia sinica 12, 61-66 (1981)

ABST A method of determining the concentration of cobalt in sea water has been worked out. The procedure can be described as follows: Place 1000 ml sample of sea water into a separate funnel of appropriate size and add 0.5ml of 2N HCl and 5ml of 20%(W/w) 8-hydroxy-quinoline in chloroform. After mixing, allow the sample to stand for 5 min. Add 10ml of chloroform and shake the mixture vigorously for 5 min. Drain the organic phase into a 100ml crucible, and repeat the extraction two times, each time with 10ml

of chloroform. Until the aqueous phase becomes colorless or milky white. Collect all extracts in the crucible, evaporate the chloroform extract to dryness, and heat to ash at the temperature of 600°C for 30 min. After dissoluting the residue in 2ml of 2N HCl, add 5ml of 2M CH_3COONa in alchol and after mixing add 5ml of concentration HCl, the solution diluted to 25ml. Measure the optical density of the solution spectrophotometrically at 578 nm with a 3cm cell. This method is suitable for the range 0-10μg-Co/l with the error < = + or -10% when 1 or 2 liters sample of sea water are taken.

KEY seawater, determination, cobalt, colorimetry, concentrations, determination

LANG Chinese, English abstract

281 AUTH Xu, Chengyuan

AFFI Research Institute of Marine Fisheries, Liaoning Province

DATE 1982

TITL Surveys on the causal organisms of red tide in Dalian Wan

CITA Journal of Fisheries of China 6, 173-180 (1982)

ABST 13 surveys on causal plankton of red tides were made from April to October 1979 in Dalian Wan. It revealed that the biomass of Skeletonema costatum (Greville) Cleve reached a concentration more than 1*E+4 cells/ml in 5 surveys, while the biomass of Dactyliosolen mediterraneus Peragallo, Mesodinium rubrum (Lohmann) and Prorocentrum micans Ehernberg reached more than 1*E+3 cells/ml in few surveys and more than ten species of common red tide causal organisms were also observed.

KEY red tide, pollution, plankton

LANG Chinese, English abstract

282 AUTH Xu, Kuncan; Huang, Shiulong; Wu, Liqing

AFFI Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE 1982

TITL Studies of heavy metals in the estuarine sediments of the Changjiang River

CITA Acta Oceanologica Sinica 4, 440-449 (1982)

ABST The distribution of mercury, copper, lead, zinc and chromium contents in the estuarine sediments of the Changjiang River and the influence of environmental factors on them are described in this paper. Except chromium, distribution of heavy metals, Fe_2O_3 and organic matter in the estuarine sediments of the Changjiang River appear to be low-high-low from the estuary to the seaward end of the estuary with increasing salinity of sea water, while the grain size of sediments appear to be coarse-fine-coarse. Their peak values occur in the range of salinity 17-21°/$_{oo}$. And these are mainly due to the complex influence of wave, tide, current, eddy, flocculation and adsorption-desorption on sediments. The conditions for the distribution are: (i) almost no pollution in the estuary, and (ii) a stronger current passing the outer flank of the estuary. It is found that there is a good correlation between heavy metals contents, environmental factors grain size of sediment, salinity of sea water, Fe_2O_3 and organic matter content of sediments. Multivariate analysis technique has been employed to identify the predominant factors controlling the distribution of individual element in sediments. For mercury, the dominant factors are grain size of sediment, salinity of sea water and organic matter content in sediments; for copper, grain size of sediment; for lead, grain size of sediment, salinity and Fe_2O_3 content in sediments; for zinc, grain size of sediment and Fe_2O_3 content; and for chromium, Fe2O3 content in sediments. The regression equations of the concentrations of heavy metals in the Changjiang River

are as follows: Hg(ppb) = 5.3Mdϕ - 0.40 S(°/₀₀) + 20 org.(%) + 5.2/(r=0.83), Cu(ppm) = 2.77Mdϕ + 4.6 (r=0.82); Pb(ppm) = 1.42Mdϕ + 0.169 S(°/₀₀) + 2.35 Fe_2O_3(%) - 2.2(r=0.84); Zn(ppm) = 4.43Mdϕ + 9.28 Fe_2O_3(%) + 38.0(r=0.86); and Cr(ppm) = 12.9 Fe_2O_3(%) 15.0(r=0.67).

KEY sediments, Changjiang, mercury, copper, lead, zinc, chromium, salinity, flocculation, adsorption, pollution, estuary, trace metals, seawater, organic matter, grain size

LANG Chinese, English abstract

283 AUTH Xu, Qinghui; Zheng, Jinshu; Zhang, Gongxun

AFFI Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE in press

TITL Research on chelating resins for extracting uranium from sea water

CITA Collected Oceanic Works, in press

ABST A number of chelating resins have been synthesized for extracting uranium from seawater. The feasibility of extracting uranium directly from sea water by synthesized chelating resins has been studied by considering three factors: The first: the chelating ability of the resins for uranylion; The second: the competitive complex of calcium, magnesium and other cations with uranylion; Finally, the competitive complex of carbonate ion with uranylion. It is suggested that the competitive complex of carbonate ion with uranylion is the most important factor.

KEY resin, chelation, extraction, uranium, seawater, uranyl, complex, carbonates, adsorption, capacity, extraction, marine resources

LANG English

284 AUTH Xu, Shenglong

AFFI Kunming Institute of Physics, Kunming

DATE 1980

TITL The reflection index of a kind of stratified medium with variable density

CITA Acta Oceanologica Sinica 2, 64-69 (1980)

ABST The reflections of the plane wave in a stratified medium with variable density have been investigated by many authors. Owing to the mathematical difficulty, generally the selected medium model may be either troublesome in calculation or quite different from the practical situation. In this paper, a medium model that is not only simple with an extensive representation but also convenient for calculation has been selected by utilizing a specificity of mathematic symmetry between 4 and 6. The theoretical analysis shows: 1. In the limited case of the high or low frequency, the coefficient of reflection tends to Fresnel's formula. 2. The gradient of the density not only influences the reflection index but also causes a change in refraction index.

KEY refractive index

LANG Chinese, English abstract

285 AUTH Yan, Chengdon; Liu, Lingxun; Mao, Jiyu

AFFI Department of Shipbuilding and Ocean Engineering, Huazhong University of Science & Technology, Wuhan, Hubei, China

DATE 1981

TITL Ocean engineering in the eighties

CITA Acta Oceanologica Sinica 3, 655-663 (1981)

ABST Current interests in ocean engineering are discussed. Topics included are: oil and gas exploration; manganese nodules; marine living resources; ocean energy; environmental protection; remote sensing and deep sea diving, etc..

KEY manganese nodules, OTEC, resources, environment, pollution, remote sensing, oil

LANG Chinese

286 AUTH Yang, Zuo-sheng

AFFI Department of marine geology, Shandong College of Oceanography, Qingdao

DATE 1981

TITL Analyses of compositional and structural variations in carbonate and dolomite with an example of their application

CITA Transactions of Oceanology and Limnology 26-36 (1981)

ABST Methods of qualitative and quantitative analysis for measuring compositional and structural variations in carbonate and dolomite are briefly discussed from the standpoint of chemical crystallography. Forty-two core samples from the Tertiary limestone of the Shengli oil field were analysed and found to contain protodolomite with a poor level of crystallization. This suggests evaporative conditions during the Tertiary and development of a supersaline brine which would provide conditions necessary for dolomite formation. Micropaleontologic, tectonic, and petrologic data provide evidence of a continually desalified lagoon here, which supports this hypothesis. The ratio of protodolomite to calcite decreases and the Mg percent in the protodolomite increases with decreasing depth in the area near the lagoon, suggesting a possible evidence for dolomitization through the mechanism "evaporative pumping".

KEY carbonates, dolomite, brine, calcite, magnesium, calcium, limestone

LANG Chinese, English abstract

NOTE Yang Zuo-sheng is now spelled Yang Zuosheng

287 AUTH Yang, Zuosheng; Milliman, J. D.

AFFI Shandong College of Oceanography, China (1); Woods Hole Oceanographic Institution, U. S. A. (2)

DATE 1983

288 AUTH Yi, Liying; Ye, Yunjin

AFFI Institute of Geology, Academia Sinica, Beijing

DATE 1982

TITL Total analysis of minerals of micro amount of eschynite group

CITA IGAS, Research On Geology, 303-309 (1982)

ABST This paper proposes a simple and rapid method of the total analysis of minerals of micro amount of eschynite group, which is capable of determining the 17 elements from a sample of 5mg, such as K_2O, Na_2O,

NnO, CaO, MgO, Al_2O_3, Fe_2O_3, RE_2O_3,$(La-Nd)_2O_3$, $(Sm-Gd)_2O_3$, $(Tb-Lu)_2O_3$, SiO_2, ThO_2, TiO_2, Nb_2O_5, Ta_2O_5 and H_2O.

KEY rare earth elements, determination, minerals, spectroscopy

LANG Chinese, English abstract

289 AUTH Yin, Hanhui; Yu, Cimei; Zhang, Guoxin; Lu, Jialan

AFFI Institute of Geochemistry, Academia Sinica, Guiyang

DATE 1982

TITL Geochemistry of stratabound Pb-Zn deposits in China

CITA Annual Reports Institute of Geochemistry, Academia Sinica (1980-1981), 29-32 (1982)

ABST Work in the past two years has made us get a better understanding of the geochemistry of stratabound Pb-Zn deposits in China. In terms of field observations, ore microscopic examination, lead-sulfur isotope data, fluid inclusion research, and trace element geochemistry, five metallogenetic provinces and six ore-forming stages have been recognized in respect to six genetic types. Based on the temperature, pressure, salinity, and density of fluid inclusions, it is suggested that both hydrothermal deformation and metamorphism may be the main mechanisms of formation of Pb-Zn ore deposits. High temperature and high pressure experiments have shown that the adsorption of Pb^{2+} and Zn^{2+} on colloidal $Fe(OH)_3$, organic matter and clay minerals is explained to be the chief mechanism for the formation of source beds during syngenetic deposition. Later hydrothermal solution may play an important role in the mobilization, migration and concentration of Pb and Zn, which was rich in NaCl, $CaCl_2$, $MgCl_2$, NH_4Cl and minor organic acids (or salts). The following reactions are accompanied by the precipitation of PbS and ZnS. 1. $PbCl_4^{2-} + H_2S = PbS(s) + 4Cl^- + 2H^+$, $ZnCl_4^{2-} + H_2S = ZnS(s) + 4Cl^- + 2H^+$, $2H^+ + 2CaCO_3 = 2Ca^{2+} + 2HCO_3^-$, 2. $2Pb^{2+} + 2FeS_2 =$

$2PbS(s) + 2Fe^{2+}S_2$, $2Zn^{2+} + 2FeS_2 = 2ZnS(s) + 2Fe^{2+} + S_2$ 3. $2FeS_2$ <--pyrolysis--> $2FeS + S_2(gas)$, $3PbCl_4^{2-} + 2S_2(gas) = 3PbS(s) + SO_4^{2-} + 12Cl^-$.

KEY geochemistry, sulfur, isotopes, temperature, pressure, salinity, density, hydrothermal activity, ore deposits, organic matter, clays, lead, zinc, sodium chloride, calcium chloride, magnesium chloride, ammonium chloride, sulfide, calcium carbonate, ferric hydroxide

LANG Chinese, English abstract

290 AUTH You, Kunyuan; Sui, Liangren; Qian, Jiangchu

AFFI Nanjing University, China (1); Second Institute of Oceanography, National Bureau of Oceanograpy, Hangzhou, China (2, 3)

DATE 1983

TITL Recent sedimentation rate in the vicinity of Changjiang estuary and adjacent continental shelf

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise Abstract, 102-103 (1983)

ABST In this paper, sedimentation rate is identified from the distribution of recent mud layers, trace of bio-activities, the total density of benthonic animal population, the appearance of laminae, degree of destruction of laminae by bioturbation, the preservation condition of foraminifera tests, the distribution of subaerial pebbles and nodules on the sea-bottom and the characteristic of submarine geomorphology etc. On the basis of Pb-210 and C-14 data and comparison of bathymetric maps published during the different period, the rate of sedimentation is calculated. From analysis of all these factors, the area can be divided into five zones: 1) Zone of high sedimentation rate; 2) Zone with both high and very low sedimentation rate; 3) Zone with light

erosion; 4) Zone of very low sedimentation rate and 5) Zone of low sedimentation rate. In each zone sedimentary processes are different. The existence of zone of high sedimentation rate outside the Changjiang Estuary, the great difference of sedimentation rates in these zones, the occurrence of sedimentation layers deposited very quickly in a single event and the higher sedimentation rate in zones directly supplied by terrigenous clastic sediments are major characteristics of sedimentation rate in this area.

KEY sedimentation rates, Changjiang, carbon-14, lead-210, continental shelf, benthos, bioturbation, foraminifera

LANG Chinese, English abstract

NOTE abstract only

291 AUTH Yu, Chin-Kuang; Li, Lian-Niang

AFFI Chinese Medical Science Institute, Department of Pharmacy

DATE 1977

TITL Preparation of polyamide thin-layer chromatography

CITA Huaxue Tongbao 6, 359-364 (1977)

ABST The preparation and application of polyamide thin-layer chromatography are discussed.

KEY chromatography

LANG Chinese

292 AUTH Yu, Fuji; Liu, Deping

AFFI Institute of Geochemistry, Academia Sinica, Guiyang

DATE 1982

TITL A newly developed method for continuous analysis of oxygen and hydrogen isotopes in a trace amount of water and its application to mineral inclusions

CITA Annual Reports Institute of Geochemistry, Academia Sinica (1980-1981), 187-189 (1982)

ABST This newly developed technique --- CO_2-H_2O high temperature equilibration method has proved to be highly effective in continuous analysis of oxygen and hydrogen isotopes with uranium or zinc as reducing agent. This technique is noted for continuous analysis of oxygen and hydrogen isotopes in the same sample of water, and it is particularly valid in the study of mineral inclusions. The results are highly comparable with those obtained by other methods. It has an accuracy of ± 0.1‰ for oxygen isotopes and of ± 1.0% for hydrogen isotopes. In addition, the method has the advantages of simple equipment-requirement, easier operation and less time-consumption.

KEY oxygen, hydrogen isotopes, analytical chemistry, oxygen-18, denterium

LANG Chinese, English abstract

293 AUTH Yu, Guohui; Chen, Weiyue, Huang, Depei; Lin, Yian; Zhu, Fengguan; Buckley, Dale

AFFI Second Institute of Oceanography, National Bureau of Oceanography, Hangzhou, China (1, 2, 3, 4, 5); Bedford Institution of Oceanography, Canada (6)

DATE 1983

TITL Initial investigations of the geochemistry of surficial sediments on the submarine Changjiang Delta, East China Sea

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise Abstract, 143-144 (1983)

ABST The first results of cooperative research between China and Canada on the geochemistry of surficial sediments from the submarine delta of the Changjiang River demonstrate that the concentration of the transition metals Fe, Mn, Cu, and Zn are controlled by both geochemical and sedimentological processes.

Total Fe and Mn are most concentrated in the fine grained sediments on the surface of the delta and this concentration appears to result from both surface adsorption and clay mineral composition. Total Cu and Zn are less well correlated with the texture of the sediments but Cu is highly correlated with the organic carbon content of the sediments. There is a strong statistical similarity between the trace element composition of suspended particulate matter over the delta and the average composition of the surficial muds, indicating that resuspension or bioturbation of the bottom sediments has prevented post-depositional alteration of the trace element content in the bottom muds. The reactive portion of metals in the bottom muds has been determined by weak acetic acid leach experiments. These show that an average of 8 percent of the total 4.1 percent of Fe is weakly bound to the sediment, whereas about 50 percent of the total 850 ppm of Mn is potentially reactive. Similarly 20 percent of the total Cu concentration at 25 ppm is weakly bound and only 8 percent of the 100 ppm Zn is leachable.

KEY sediments, East China Sea, Changjiang, resuspension, bioturbation, trace metals, iron, manganese, copper, zinc, organic matter, particulates, adsorption, clay, organic carbon

LANG Chinese, English abstract

NOTE abstract only

294 AUTH Yu, Shengrui; Sun, Bingyi

AFFI Department of Marine Chemistry, Shandong College of Oceanology, Qingdao

DATE 1980

TITL The distribution and seasonal change of dissolved oxygen in the South Yellow Sea.

CITA Journal of Shandong College of Oceanology 10, 81-90 (1980)

ABST The periodic variation of dissolved oxygen in sea water can be expressed by a Fourier series $Y=-A_o + Am \cos(m\omega t-\phi m)$. The distribution of annual average value (A_o), constants of annual and semi annual (Am, ϕ_m) of dissolved oxygen in the surface water and a vertical section of South Yellow Sea have been described. The parameters in the surface water, subsurface water and Yellow Sea cold water mass have also been disscussed.

KEY distribution, seasonal variation, dissolved oxygen, Yellow Sea

LANG Chinese, English abstract

295 AUTH Yu, Shengsong; Tang, Yuan

AFFI Qinghai Institute of Saline Lake, Academia Sinica, Xining

DATE 1981

TITL The hydrochemical characteristics of the saline lakes on the Qinghai-Xizang Plateau

CITA Oceanologia et Limnologia Sinica 12, 498-511 (1981)

ABST The water in the saline lake on the Qinghai-Xizang Plateau is highly mineralized and yet weakly basic. The brine of these lakes is mainly of the sulfate type. The carbonate and chloride type lakes have not been found in the regions of Qaidam Basin and northern Xizang. Their hydrochemical characteristics suffice to explain the evolutionary process of the saline lakes. There are nearly 40 chemical components in the saline lakes on the Qinghai-Xizang Plateau. Among them potassium, magnesium, lithium, boron, rubidium, cesium, uranium, thorium etc. count most. They are linearly correlated and closely coexistent, forming a lot of complex liquid deposits. Boron is mainly concentrated in the carbonate and sodium sulfate brines; lithium is mostly concentrated in the sodium sulfate brine and next in the magnesium sulfate brine; rich potassium can be found in all the three brines; and rubidium and cesium are mainly enriched in

the sulfate brine. The chemical components of the brine vary with the changes of environment and time. High enrichments of fluorine, phosphorous, silicon and arsenic are also found to be present in the saline lake brine in northern Xizang-----another characteristic of the brine in this area. Around the mineralized basins on the Qinghai-Xizang Plateau, the weathering of rocks is also a basic cause for mineral accumulation in the saline lake. In western Qaidam Basin, leaching weathering of the Tertiary salt-bearing rock series furnishes the most important materials to the saline lakes in that region, while the chemical components in the brine of the saline lakes in northern Xizang are the main products of the strong hydrothermal activity in the said area.

KEY lakes, brine, sulfate, carbonates, chloride, potassium, magnesium, lithium, boron, rubidium, cesium, uranium, thorium, enrichment, weathering, hydrothermal activity

LANG Chinese, English abstract

296 AUTH Yu, Shu-chiou; Meng, Shiang-sheng; Chen, Chia-yung

AFFI Institute of Chemical Metallurgy, Academia Sinica, Beijing, China

DATE 1980

TITL Separation and recovery of vanadium and chromium from solutions by solvent extraction with primary amines as solvent

CITA Reprint from PWC. 1SEC, 3, 80-132 (1980)

ABST It has been found by the present research program that vanadate can be extracted quantitatively by the primary amines from nearly neutral chromium(VI) containing solution. Studies were made on the conditions of extracting and separating of vanadate and chromate from the aqueous solution with primary amines as solvent as well as the conditions of scrubbing and stripping the loaded solvent. A

flowsheet is proposed to extract and separate vanadium and chromium from a solution derived from chromium and vanadium containing titaniferous iron ore. Satisfactory results were obtained in bench scale tests using the solution from the leaching of sodium salt roasted titaniferous iron ore.

KEY vanadium, chromium, solvent extraction, aqueous solution, resources, mechanism

LANG English

NOTE Yu Shu-chiou is now spelled Yu Shuqiu, Meng Shiang-sheng is now spelled Meng Xiangsheng, Chen Chia-yung is now spelled Chen Jiayong.

297 AUTH Yu, Shuchiou; Chen, Chiayung

AFFI Institute of Chemical Metallurgy, Academia Sinica, Beijing

DATE 1981

TITL Solvation extraction of transition metals chromium, molybdenum, tungsten and vanadium by amines

CITA Reprint, China-USA Bilateral Metallurgical Conference, 221-233 (1981)

ABST Metals such as chromium (VI), molybdenum (VI), tungsten (VI) and vanadium (V) can be extracted by amines from nearly neutral aqueous solutions. The mechanism of extraction has been found to be by solvation with molecular association through hydrogen bonds. The number of active hydrogen atoms attached to nitrogen atoms of different classes of amine determine their effectiveness in extraction of metals by solvation. Primary amines with two hydrogen atoms attached to each nitrogen atom are the most effective extractants in comparison with secondary & tertiary amines. Results obtained from metals extraction with amines by the present reported solvation mechanism are quite different from those obtained by the widely studied anion exchange mechanism. The oxo and hydroxo complexes of transition metals such as chromium,

molybdenum, tungsten and vanadium in aqueous solutions form different types of isopolyanion at different solution pH. The electric charge density or specific charge of different isopolyanions can be used to predict the relative tendency of these species to be extracted by the amines through solvation mechanism. Experimental results confirm the prediction and indicate that by using amines as solvation extractant new processes can be developed for metal extraction and separation.

KEY extraction, chromium, molybdenum, tungsten, vanadium, mechanism, aqueous solution, solvent extraction, resources

LANG English

NOTE Yu Shuchiou is now spelled Yu Shuqiu, Chen Chiayong is now spelled Chen Jiayong.

298 AUTH Yu, Shuqiu; Meng, Xiangsheng; Chen, Jiayong

AFFI Institute of Chemical Metallurgy, Academia Sinica, Beijing, China

DATE 1982

TITL Solvent extraction of vanadium(V) from aqueous solutions by primary amines

CITA Scientia Sinica (Series B) 25, 113-123 (1982)

ABST Vanadium (V) can be quantitatively extracted by primary amines from nearly neutral chromium (VI) containing solutions. Under similar conditions with equilibrium aqueous phase pH above 7, no vanadium can practically be extracted by tertiary amines while extraction by secondary amines is only about 25-30%. The quantitative extraction of vanadium from aqueous solutions containing no chromium (VI) can be obtained by adding acid to the extent that the ratio of gram equivalents of H^+ added to the gram atoms of vanadium in the aqueous solution is equal to one or slightly higher. The mechanism of extraction is believed to be

solvation with molecular association between primary amines and tetravanadic acids through hydrogen bonding.

KEY solvent extraction, vanadium, aqueous solution, resources, mechanism

LANG English

NOTE Yu Shuqiu was formerly Yu Shu-chiou, Meng Xiangsheng was formerly Meng Shiang-sheng, Chen Jiayong was fromerly Chen Chia-yung.

299 AUTH Yu, Tianchang

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL A numerical model of sewage transport in Bohai Bay

CITA Oceanologia et Limnologia Sinica 13, 1-9 (1982)

ABST In this paper, an upwinding finite elements model was given, sewage distribution was modeled for Bohai Bay, the maximum discharge of Tianjin south sewage river and north sewage river permissible by the water quality standard in the gulf was computed, and a guidance for disposing sewage was given. Conclusion: Considering the remaining tidal current as the only self-purifying process of Bohai Bay, the maximum discharge of Tianjin south sewage river and north sewage river counted by chemical oxygen demand (COD) should be smaller than 200 tons/day in dry season and smaller than 300 tons/day in wet season.

KEY numerical model, Bohai, chemical oxygen demand, pollution, sewage, rivers

LANG Chinese, English abstract

300 AUTH Yuan, Yingru

AFFI Marine Geological Comprehensive Research Brigade, Ministry of Geology, Shanghai

DATE 1982

TITL Sediments and sedimentary facies of the modern Changjiang (Yangtze) Delta

CITA Discussions in Geology 28, 21-28 (1982)

ABST The Changjiang River has a tide-dominated estuary. Sandy sediments with thin mud layers are formed in the distributary channels of the estuary. The outer limit of the modern Changjiang Delta is near the 50-m bathymetric contour. In the deeper part, the sediments include mainly muddy silts and silty muds. According to the hydrodynamic, subaqueous topographic and paleontological characteristics as well as the components and structures of the sediments, the modern Changjiang Delta may be divided into 3 facies, delta plain, delta front and prodelta facies. The delta front facies is situated at the mouths of the distributary channels and the river, where the conditions change apparently and the sedimentary environments vary from place to place, so all kinds of complex subfacies are formed. The study shows that all the sedimentary facies of the modern Changjiang Delta are very thin and are advancing seawards with greater speed.

KEY Changjiang, Yangtze River, estuary, particulates, grain size, sand

LANG Chinese, English abstract

301 AUTH Yuan, Yingru; Chen, Guanqiu

AFFI Marine Geology Research Department, Geology Miinistry

DATE 1981

TITL Mineral assembly characteristics of the sediments and its distribution pattern in the northwestern part of south Huanghai Sea.

CITA Oceanologia et Limnologia Sinica 12, 512-521 (1981)

ABST In the Northwestern part of South Huanghai Sea (Yellow Sea), the mineral composition is complicated by having more than 50 kinds of assemblages in the sediments. The content of the heavy minerals are also different in various sediment types and grades. The Northwestern part of South Huanghai Sea can be divided

into 5 sections according to the spatial distribution of heavy minerals. Each has its own mineral assembly pattern and distribution features and their spatial distribution is influenced and controlled by sediment source, sedimentation environment, sediment type, paleo-coastline, hydrodynamic conditions and others.

KEY minerals, sediments, distribution, Huanghai, Yellow Sea, compositions, sources, palaeontology

LANG Chinese, English abstract.

302 AUTH Zang, Weiling

AFFI Shanghai College of Aquaculture, Shanghai

DATE 1982

TITL Seawater alkalinity

CITA Journal of Marine Science 2, 67 (1982)

ABST Alkalinity is defined and explained

KEY pH, acid, base, seawater, alkalinity

LANG Chinese

303 AUTH Zheng, Jianlu; Wang, Zhaoding; Lin, Zhiqing; Li, Zijiang; Zhu, Zhuohong; Chen, Jinsi

AFFI South China Sea Institute of Oceanology, Academia Sinica, Guangzhou

DATE 1982

TITL A study of estuarine chemistry in the Zhujiang River I. Trace metal species in water phase

CITA Oceanologia et Limnologia Sinica 13, 19-25 (1982)

ABST In this article nine chemical species of Zn, Cd, Pb and Cu in water phase were measured in the main course of the Zhujiang (Pearl) River estuary for the first time. The measurement was carried out in seven stations with salinity from 0 to 26°/$_{oo}$. The method proposed by Florence and Batley of measuring chemical species of heavy metals in seawater by ion-exchange, ultra-violet irradiation, anodic stripping voltammetry was referred to, and the home-made chelating resin CR-1 was also used. The nine species are as follows.

ASV Labile Metal: M---Free metal ions, ML1---Labile organic complexes, MA1---Labile inorganic complexes, ML2---Labile organic complexes + Labile metal adsorbed on organics, MA2---Labile inorganic complexes + Labile metal adsorbed on inorganics, Bound Metal: ML3 ---Non-labile organic complexes, MA3---Non-labile inorganic complexes, ML4---Non-labile organic complexes + Non-labile metal adsorbed on organics, MA4 ---Non-labile inorganic complexes + Non-labile metal adsorbed on inorganics. The following conclusion can be drawn from the distribution of the nine species in percentage: (1) M+ML1 + MA1 in labile metal state of the four metals hardly exist or are only a minor fraction. (2) The main chemical speciations of the four elements in the stations of different salinity are: ML2 and MA4 for Zn; ML2 and ML4 for Cd; ML2 and MA4 for Pb; ML2 and MA3 for Cu. (3) ML2 is the principal chemical species of the four metals in labile metals. (4) In bound metals MA3 or MA4 is the main species of the four metals except Cu. (5) The ratios of total amount of organic to inorganic species of these metals decrease with the increase of salinity. As a result, the estuarine chemical pattern of the metal elements Zn, Cd, Pb and Cu in the Zhujiang River estuary was roughly made: most of these trace heavy metal elements, carried by the river, entered the estuarine area, and were affected by the chemical changes and biological processes during mixing of river water and seawater, such as their exchange, adsorption, co-precipitation and flocculation with the organic colloids like humates. At the same time, toxic metals changed into nontoxic labile organic complexes + labile metal adsorbed on organic species (ML2). This transport is the primary estuarine chemical purifying process. In the estuarine transport process, these labile heavy metal organic species constantly undergo exchange and

complexation with inorganic silicates, $Fe(OH)_3$ and $Al(OH)_3$. Therefore non-labile inorganic colloids or complex compounds are formed and ultimately transported into the sea. This is the second chemical purifying process. From these we can see, the estuarine area of the Zhujiang River has relatively great self purifying ability in respect to heavy metal pollution.

KEY trace metals, salinity, ion-exchange, chelation, estuarine water, seawater, river water, speciation, zinc, cadmium, lead, copper, UV, silicate, colloids, pollution, anodic stripping voltammetry, Zhujiang, resin, precipitation, flocculation, organic matter, adsorption, ferric hydroxide, aluminum hydroxide

LANG Chinese, English abstract

304 AUTH Zhang, Rongkun; Luo, Yinghua; Wan, Zhen; Cai, Weiping

AFFI Xiamen University, Xiamen

DATE 1980

TITL Research on determination of dissolved oxygen in seawater

CITA Acta Oceanologica Sinica 2, 71-85 (1980)

ABST Different methods for instrumental determination of dissolved oxygen in sea water are discussed. Based on the principle of constant potential-chronoamperometry, this article presents a new method to determine the dissolved oxygen in seawater with considerable success. A new model electrochemical sensor has been designed for this purpose. The new sensor retains most of the Clark cell's components, but has the following modifications. 1. gaseous diffusion through membrane is eliminated. 2. two gold cathodes (a disc and a ring) and a ring anion exchange membrane are included. 3. the flow of sample water into the sensor is automatized. The sensor has the advantage of overcoming hysteresis and "outskirts effect", thus increasing its stability and prolonging its use to 1-2

years. In connection with this new method a new model SY-1 integrating microcoulometer with digital display is designed. In order to give better accuracy and a wider range of chronoamperometry, the technique of pulse and delayed recorder electrolytic current are introduced to remove the interference of conductivity with success. Frequent calibration is required owing to the aging of the gold cathode. A new calibration method of iodine pulse-dhronoamperometry is used to determine indirectly the dissolved oxygen in natural water. The result of calibration is reliable. The range obtained by this method (0-8mlO_2/l) is similar to those obtained by employing Winkler's method. It is a fast (a sample/2 min) and accurate (± 1--1.5%) method, suitable to be used in the lab on a ship.

KEY determination, seawater, oxygen, diffusion, electrode, natural waters

LANG Chinese, English abstract

305 AUTH Zhang, Shumei; Zheng, Shunqin

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL Determination of mercury in Venerupis philippinarum (Adamset Reeve) from Jiaozhou Bay.

CITA Journal of Marine Science 1, 19-22 (1982)

ABST The contents of mercury in Venerupis philippinarum collected from 18 sites in the Jiaozhou Bay during the period from August 1979 to May 1980 were determined by cold vapour atomic absorption method. The results obtained showed that range of mercury contents in the soft parts of Venerupis philippinarum was 0.005-0.166 ug/g wet weight. The regional variations of mercury content in Venerupis philippinarum were also observed. Mercury content round the sites near the coast showed higher values than those far from the coast. The seasonal variation of mercury content in Venerupis

philippinarum was not remarkable. There was an unusual mercury value at station D which was possibly due to the effect of land source there.

KEY mercury, Jiaozhou bay, atomic absorption, seasonal variation, seawater, pollution, determination, bioaccumulation

LANG Chinese, English abstract

306 AUTH Zhang, Tianfu; Xu, Xianyi; Gu, Tangxiu

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL Determination of chlorinated pesticides in seawater

CITA Oceanologia et Limnologia Sinica 13, 124-128 (1982)

ABST A simple sensitive gas chromatographic method is presented. When one liter of seawater is passed through the XAD-2 resin bed, the chlorinated pesticides are absorbed and eluted with warm acetone (40°C) and back extracted with petroleum ether (30-50°C fraction). Then the chlorinated pesticides are determined by gas chromatography using a Ni-63 electron-capture detector. The procedure described in this paper is a convenient and reliable method for the determination of nanogram quantities of BHC and DDT from one liter sample of seawater.

KEY determination, pesticides, seawater, gas chromatography, DDT, BHC

LANG Chinese, English abstract

NOTE Zhang Tianfu was formerly Zhang Tianfo

307 AUTH Zhang, Xiulian; He, Lijuan

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL Application of X-ray fluorescence spectroscopy in the analysis of marine sediments

CITA Journal of Marine Science 4, 53-55 (1982)

ABST The application of X-ray fluorescence spectroscopy in the analysis of marine sediments is discussed.

KEY fluorescence, spectroscopy, sediments, analytical chemistry, iron, manganese, titanium, potassium, calcium, zirconium, copper, zinc, lead, rubidium, ytterbium

LANG Chinese

308 AUTH Zhang, Zhengbin; Liu, Liensen; Zhang, Dongsheng; Yang, Jihui

AFFI Department of Marine Chemistry, Shandong College of Oceanology, Qingdao

DATE 1982

TITL A study of the inorganic ion-exchange reaction of cadmium with hydrous titanium oxide in sea water

CITA Journal of Shandong College of Oceanology 12, 53-64 (1982)

ABST The results described in this article which are from a study of the inorganic ion exchange reaction of cadmium with hydrous titanium oxide in seawater are: 1. Both of pH-dependent and salinity-dependent models for the speciation of Cd(II) in sea water were constructed with available and estimated thermodynamic stability constants and activity ceofficients that is based on the Pitzer equation. This model was used to calculate the degree of interaction between Cd(II) and anions Cl^-, SO_4^{2-}, HCO_3^-, CO_3^{2-}, OH^- and humic materials as a function of pH or as a function of salinity. Interactions between Cd(II) and a anion were assumed to result only in the formation of complexes with coordination numbers of 1 to 4, polynuclear and mixed ligand complexes were not included in the model. The calculations showed that cadmium(II) is complexed to a considerable extent in seawater, the distribution of chemical species of Cd(II) vary greatly with change in pH and salinity, Cd(II) interacts primarily with Cl^-. 2. The mechanics of reaction of cadmium(II) with hydrous titanium oxide in seawater have been studied in

detail. It has been determined that one of the steps in the chemical reaction is that of cation ion exchange. From the "ratio of exchange (%) pH graph" in Fig. 3. viz. pH(initial) = 2.5, pH(final) = 6.5, it is possible to deduce further that the reaction can be explained by the mechanics of monovalence cation exchange: $Ti - OH + CdCl^+ \leftrightarrows Ti - O - CdCl + H^+$ 3. The stepwise equilibrium constants of cadmium with hydrous titanium oxide in seawater have been determined by experiments, the results being: $K_1(g/g)$ is 4.5 and 13.1 at pH 4.85 and 6.20 respectively. These results well agree with Keen's enrichment coefficients. 4. The above result will exhibit its theoretical guiding effect in marine geochmistry of cadmium.

KEY ion-exchange, cadmium, hydrous titanium oxide, seawater, stability constants, activity coefficients, humic materials, complexation, speciation, thermodynamics, pH, salinity, marine resources, chloride, sulfate, bicarbonate, carbonates, hydroxide, ligands

LANG Chinese, English abstract

NOTE See Note 15

309 AUTH Zhang, Zheng-bin; Liu, Lian-sheng

AFFI Department of Oceanological Chemistry, Shandong College of Oceanology, Qingdao

DATE 1979

TITL Electrochemical potential of pure metals in seawater

CITA Kexue Tongbao 21, 980-985 (1979)

ABST A new application of the $\Phi(z/l,X)$ rule of chemical processes in seawater to electrochemical potential of metals in the same medium has been studied. According to the $\Phi(z/l,X)$ rule, we suggest a classification of electrochemical potentials of metals in seawater and a quantitative calculation formula. The calculated results and the experimental data are in good

agreement. On the basis of the Born-Haber thermochemical cycle is the equation for quantitative calculation by this rule deduced.

KEY electrochemical potential, metal, seawater, thermodynamics, redox potential, equilibrium, equilibrium constant, corrosion

LANG Chinese, English abstract

NOTE See Note 15

310 AUTH Zhang, Zhengbin; Li, Zijiang

AFFI Department of Oceanological Chemistry, Shandong College of Oceanology, Qingdao

DATE 1979

TITL A kinetical study of the inorganic ion exchange of minor elements in sea water - film progressive model

CITA Acta Oceanologia Sinica 1, 77-89 (1979)

ABST This article suggests a "film progressive model" for inorganic ion exchange in seawater, whose features are simplicity and ease of mathematical treatment. It has a good straight line relationship when experimental data are plotted into graphs and there is a quantitative relationship between it and B.A.M theory and its formulae. Using this model and mathematical equations it has been decided that the rate of ion exchange of uranium(VI) and hydrous titanium oxide and/or Aluminium-Activated Carbon composite exchanger throughout the whole process is controlled by film-diffusion. Experiments prove "film progressive model" is correct under conditions of minor components and in sea water. It is at least as effective as B.A.M theory. This model will exhibit its theoretical guiding effect in the comprehensive utilization of marine resources, in marine pollution and prevention, in marine geochemistry of elements and such like spheres in so far as the study of kinetical problems are concerned.

KEY kinetics, ion-exchange, seawater, reaction rate, uranium, hydrous titanium oxide, activated carbon, marine resources, pollution

LANG Chinese, English abstract

NOTE See Note 15

311 AUTH Zhang, Zhengbin; Liu, Liansheng

AFFI Department of Marine Chemistry, Shandong College of Oceanology

DATE 1981

TITL A $\phi(Z/1,X)$ rule of chemical processes in sea water and its application - Application of $\phi(Z/1, X)$ rule to study of various physical-chemical properties of elements in sea water

CITA Oceanologia et Limnologia Sinica (Supplement), 41-67 (1981)

ABST This article deals with the $\Phi(Z/1,X)$ rule in chemical processes in seawater and its new applications; the results obtained are mainly as follows: (1) With the application of $\Phi(Z/1, X)$ rule to the partial molal volumes of seawater components, ion and salt, the coincidence of theoretical calculations and experimental results surpasses that obtained by a lot of other methods of calculation. (2) Application of $\Phi(Z/1,X)$ rule to electrochemistry potential of metal in seawater is studied, with calculated results and experimental values well coincide. On the basis of the Born-Haber thermochemical cycle are deduced the equation of $\Phi(Z/1,X)$ rule. (3) In this article we suggested a chemical models of the residence time of elements in seawater and the factors of its influences. On the basis of these chemical models, we discussed the definition of residence time τ, mathematical expression of τ and the significance of it in physics. According to the chemical models of this article and to the $\Phi(Z/1,X)$ rule in cognizance of R_{ξ}, we suggest three calculation formulae from three

different angles. The result of calculation obtained by those formulae, besides being self-consistent, also coincide with the results of our predecessors. The $\phi(Z/l,X)$ rule is not only a general rule of marine chemistry in theory, but is also useful in practice in the utilization of marine resources, marine pollution and protection, ... etc.

KEY seawater, partial molal volumes, residence time, marine resources, pollution, thermodynamics, electrochemical potential

LANG Chinese, English abstract

NOTE See Note 15

312 AUTH Zhang, Zhengbin; Liu, Liansheng

AFFI Department of Oceanological Chemistry, Shandong College of Oceanology, Qingdao

DATE 1978

TITL A study of the theory of the liquid-solid distribution of elements in sea water - The theory of distribution equilibrium of minor elements on hydrous oxides in sea water.

CITA Oceanologia et Limnologia Sinica 9, 151-167 (1978)

ABST This article made a study of the theory of distribution equilibrium of minor elements on hydrous metal oxide in sea water, as well as of their calculating equations. As a result we found that: (I) When using Freundlich's formula in expressing the value of b in smaller systems, at present there is still no good calculating equation for expressing the law of their liquid-solid distribution. On the basis of the theory of step-wise equilibrium of inorganic ion exchange, we extended the condition of positive integer n=0,1, 2,..., N etc. in our previous article to $0 \leq n < 1$, thus obtaining calculating equation (15). The result is satisfactory, as testified by calculations using experimental data. Consequently, this article is the continuation and development of

our previous article; (II) Quantitative relationship also exists between the theory of step-wise equilibrium and Sips' adsorption equation. Sips' equation and equation (15) are entirely similar in form; (III) The experimental data of several systems have been calculated by means of equation (15) and curve fitting method. The result is that theory and experiment well coincide within the whole range of concentration. Finally, availing ourselves of the theory established in this article, we discussed the reasons for the deviations occurring in the literature regarding these systems. The theory established in this article is also applicable to the general aqueous solution systems similar to those discussed in this article.

KEY seawater, equilibrium, minor elements, hydrous metal oxide, ion-exchange, adsorption, liquid-solid partition, uranium, extraction, mechanism, pH, reaction rate, partition, hydrous titanium oxide, aqueous solution, adsorption isotherms

LANG Chinese, English abstract

NOTE See Note 15

313 AUTH Zhang, Zhengbin; Liu, Liansheng; Chen, Nianyi

AFFI Department of Oceanological Chemistry, Shandong College of Oceanology, Qingdao

DATE 1979

TITL A $\Phi(Z/1,X)$ rule of chemical processes in oceans and its applications. VII. The transport of elements in oceans and the screening loss parameter

CITA Oceanologia et Limnologia Sinica 10, 214-229 (1979)

ABST This article expounds the $\Phi(Z/1,X)$ rule in cognizance of the parameter of screening loss $R\xi$ and discusses its application in the study of the transport processes of elements in oceans, with the main results as follows: 1. We improved Slater's type of atomic orbitals formula and deduced from it the quantity of

non-dimension Rξ, called parameter of screening loss. Using this parameter in conjunction with Φ(Z/l,X) rule in studying the regularity of transport changes of elements in seawater, the results of calculation by means of formulae obtained thereby are generally better than when Rξ is disregarded. The value of Rξ can be calculated from atomic spectrum data, for results see table 1. 2. Applying the Φ(Z/l,X) rule in cognizance of Rξ to the calculation of ionic hydration, we got the following formula: $L=-(165.5/(r_i+0.8))*[1+0.38R\xi^2+0.05*(X^3/Z)]$. This formula is applicable to 1---(univalence), 2---(bivalence), 3---(trivalence) and 4---(tetravalence) cations. As compared with actual experimental values, the results of calculation show much smaller discrepancies than results obtained by various methods of calculation given in literatures. 3. Applying the Φ(Z/l,X) rule incognizance of Rξ to the calculation of the solubility of hydroxides, we got the following formula: $pK_m = 0.8z(z/\gamma_k) + 0.2zX + 8R\xi - 2.1$. The results of calculation of 61 hydroxides of M(OH)n type (n=1,2,3,4) show that the calculated values and actual experimental values well coincide, while study of this question in the literature generally require the use of four formulae, with results no better than those of this article. 4. Applying the Φ(Z/l,X) rule in cognizance of Rξ to the calculation of C(concentration rate), C'(rate of elimination), and pH(final), also show improved results. 5. The residence time of elements in oceans τ is closely related to the above mentioned hydration, solubility, rates of concentration and elimination. In this article we suggested a chemical models of the residence time of elements in seawater and the factors of its influences. On the basis of these chemical models, we discussed the definition of residence time τ, mathematical expression of τ and the significance

of τ in physics. We discussed our opinion of the mathematical expressions of τ in the literature, and pointed out that they are erroneous and directly combined τ with C(concentration rate), C'(rate of elimination) in physical sense. 6. According to the chemical models of this article and the $\phi(Z/1,X)$ rule in cognizance of $R\xi$, we suggest three calculation formulae from three different angles: (1) $\log\tau$ = 4.5*0.003L-1.8logC'(rate of elimination)-2.6; (2) $\log\tau$ = 4.5*0.003L+2.6 log C(concentration rate)-0.6; (3) $\log\tau = [1.5 + (1/5)*\log(A)] + 1.1[|\Delta(z/r)_A|] + R\xi(X_A-X_{A1})$. The results of calculation obtained by these three formulae, besides being self-consistent, also coincide with the results of our predecessors.

KEY transport, residence time, oceanography, hydration, solubility, seawater, valence

LANG Chinese, English abstract

NOTE See Note 15

314 AUTH Zhang, Zhengbin; Wang, Qiang

AFFI Department of Oceanological Chemistry, Shandong College of Oceanology, Qingdao

DATE 1979

TITL A kinetical study of inorganic ion exchange of minor elements in seawater --- film progressive model. U(VI)-hydrous titanium oxide systems under conditions of concentrated U(VI) and the effect of magnetic field on the reaction of U(VI) with hydrous titanium oxide in seawater

CITA Acta Oceanologia Sinica 1, 227-242 (1979)

ABST This paper makes a kinetic study of the reactions of inorganic ion exchange of minor elements in seawater. The main results obtained follow: 1. Under conditions of concentrated U(VI): (1) A comparatively complete film-progressive model is suggested. The equations deduced from this model include the results of [1] and [2] in bibliography. (2) A set of experiments under

concentrated uranium was made, the degree of concentration being: Natural seawater, 13μg/l, 33μg/l, 103μg/l, 303μg/l, etc. Within this range of concentration we got "$[1+3(1-F)^{2/3} + 2(1-F)]$ --- t graph" and "$-\log(1-F)$ --- t graph", showing straight lines, and "Bt --- t graph" that does not show a straight line. This proves that the rate of the process is still under the control of film diffusion and not of particle diffusion. (3) The equation obtained under conditions of concentrated uranium, (slope of "$[1-3(1-F)+(1-F)]$-t graph")/(slope of "$-\log(1-F)$-t graph")=-1/2, shows that experimental results agree with theoretical relations. It also shows that under the said conditions the film progressive model theory has good quantitative relationship with B.A.M. theory and proves that this theory is still effective. (4) several aspects of the experiment are explained. 2. The effects of magnetic field on the reaction of U(VI) with hydrous titanium oxide: (1) Experimental conditions: (A) Operations took place with ion exchange column in steady state in natural seawater; (B) Intensity of magnetic field was 2500 Gauss; (C) Experiments took place under three different conditions i.e. (a) without magnetic field; (b) seawater flowed through magnetic field; (c) ion exchange column placed in magnetic field (comparisons have been made), other conditions of the experiment were similar to those in [1]. (2) Under the three different experimental conditions as stated above the ratio of uranium exchange in order of quantity was (a) < (b) < (c), where in (c) exceeds (a) by 15%. Both the highest ratio of exchange and the rate of exchange increased. (3) Under the influence of magnetic field, the reaction of uranium with hydrous titanium oxide still follows the theortical formula [1] of film progressive model of inorganic ion exchange as suggested by us. Experimental result $[1-3(1-F)^{2/3} +$

2(1-F)] as compared with t graph, shows quite a good straight line. This proves that reaction under the influence of magnetic field is still under the control of film diffusion. (4) Under the influence of magnetic field, the thickness of film decreases, consequently both the quantity and rate of ion exchange increases.

KEY kinetics, ion-exchange, seawater, uranium, hydrous titanium oxide, magnetic field, reaction rate

LANG Chinese, English abstract

NOTE See Note 15

315 AUTH Zhang, Zhengbin; Yuan, Hanxiang

AFFI Department of Oceanological Chemistry, Shandong College of Oceanology, Qingdao (1); Research Institute of Sea-water Utlization, Qingdao (2)

DATE 1980

TITL An infrared spectrometric study of the reaction mechanism of uranium(VI) with the hydrous titanium oxide in seawater

CITA Oceanologia et Limnologia Sinica 11, 220-228 (1980)

ABST In the present article an infrared spectrometric study of the reaction mechanism of uranium(VI) with hydrous titanium oxide in sea water has been made, with results as follows: 1. Our study of the reaction mechanism of uranium with hydrous titanium oxide in sea water was made under the following three different conditions: (1) Under conditions of natural sea water; the relationship between the amount of uranium exchanged by hydrous titanium oxide and the duration of water flow has been studied, the results obtained being shown in figure 1. (2) Under conditions of a set different concentrations of sea water; the results obtained being shown in figures 2 to 5. (3) The influence of magnetic field on the reaction of uranium with results as shown in figure 6. 2. The changes undergone by infrared spectrograms under the above

three sets of conditions have been studied and a comparison of these spectrograms made, conducing to the exploration of the regularity of infrared spectrographic changes during the process of reaction between uranium(VI) with hyd. us titanium oxide. The regularity of infrared spectrographic changes and the quantity of uranium exchanged by hydrous titanium oxide correspond with each other. On the basis of experiments made in this article explanations have been given for the absorption bands of infrared spectrograms. 3. A direct experimental basis is offered to the study of the reaction mechanism of uranium(VI) with hydrous titanium oxide by the regularity of changes of infrared spectrograms. The results are in agreement with that obtained by using pH method, viz. (1) Under conditions of concentrated sea water, UO_2^{2+} and the H^+ of OH^- base on the surface of hydrous titanium oxide undergo cation ion exchange; (2) Under conditions of natural sea water (including conditions with and without the effect of magnetic field respectively); the study by means of "complexation-dewater" reaction or by cation ion exchange reaction mechanism may be possible.

KEY mechanism, uranium, seawater, hydrous titanium oxide, magnetic field, pH, ion exchange, IR, spectroscopy

LANG Chinese, English abstract

NOTE See Note 15

316 AUTH Zhao, Hongben; Sun, Hanzhan

AFFI Department of Marine Chemistry, Qingdao

DATE 1982

TITL Physical chemical studies of the silver chloride - sea water system

CITA Journal of Shandong College of Oceanology 12, 39-46 (1982)

ABST The absorbing capacity of the silver chloride grains to the dissolved iodide in sea water draws our interest to the behavior of silver ion in sea water. The condition in which AgCl(AgBr) segregates from artificial sea water has been studied. It is found that, when AgCl (AgBr) is saturated in artificial sea water, the total silver ion concentration amounts to 2.4 * (E-5) M (25°C), which is about twice its solubility in pure water and that when the granulated AgCl is used in exchange column with natural sea water as the eluant, the total silver ion concentration in the sea water can reach the solubility of AgCl in pure water. Therefore, when granulated AgCl is used as a concentrating agent, the dissolved silver ion should be recovered. Our experiments have shown that ZnS, or FeS, is the more effective recovering agent for this purpose. The concentration of the total dissolved silver ion can fall down to value lower than 1* (E-8) M. The mechanism of the extraction of iodide-iodine from sea water has also been discussed in this paper, and some suggestions presented. Following the law of solubility product, it seems that the concentration of iodide-iodine in sea water is at the critical transforming condition from AgCl to AgI, and if most of the iodate-iodine can be transformed into iodide-iodine, the process will proceed as predicted.

KEY seawater, capacity, solubility, extraction, solubility product, bromine, iodide, iodine, marine resources, absorption, silver chloride

LANG Chinese, English abstract

317 AUTH Zhao, Huadeng; Tian, Xuelin; Sun, Shoutian

AFFI Department of Biology, Shandong College of Oceanology, Qingdao

DATE 1979

TITL The effect of Mn in small amount on the growth of Laminaria japonica

CITA Acta Oceanologia Sinica 1, 119-126 (1979)

ABST (1) We treated the seedlings of Laminaria japonica with $MnCl_2$ solution in various concentrations of 5, 10, 20, 50, 100, 200 ppm. When treated with low concentrations of $MnCl_2$ solutions of 5, 10, 20, 50 ppm, the growth of the seaweed both in length and in weight is evidently enhanced. The optimum concentrations are 10 and 20 ppm. Higher concentrations, such as 100, 200 ppm, are inhibiting to the growth of the plant. But at the time of harvest, the contents of carbon, nitrogen and phosphorus of all the seaweed treated with various concentrations of Mn are higher than those of the control group. The carbon and nitrogen contents are the highest in the 10 and 20 ppm Mn treated groups, and phosphorus contents are the highest in the 20 and 50 ppm Mn treated groups. (2) When the concentration of Mn is of 20 ppm, the optimum treating duration is 30 minutes. If the treatment lasts longer than 60 minutes, the growth of the seaweed is retarded; and if the treatment is shorter than 30 minutes, then there is no significant effect. (3) When the seedlings are treated with Mn solution of 20 ppm in different number of times, the effects are significant when treated twice to six times, the weight increases more than 10%. (4) When the seedlings are soaked with a mixture of EDTA and Mn of 20ppm, the effect is better than with Mn solution of 20ppm alone but the difference is not very significant.

KEY seaweed, concentrations, carbon, nitrogen, phosphorus, EDTA, manganese, pollution

LANG Chinese, English abstract

318 AUTH Zhao, Taichu; Huang, Weigen; Jiang, Zhongxi

AFFI Second Institute of Oceanography, National Bureau of Oceanography, Hangzhou, China (1, 2); Institute of water Transport Engineering, Tianjin, China (3)

DATE 1983

TITL The satellite image interpretation about upper-layer suspended sediments outside the Changjiang River mouth

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise abstract, 71-72 (1983)

ABST By means of T-100 type image analysis instrument, a picture of 8 density levels can be obtained. If the observational data are acquired at the same time with image-taking, the distribution map of suspended sediment concentrations can also be plotted with the methods of relative analysis. By analysing the concentration map, the conclusions can be drawn as follows: 1. There are two sediment diffusion sources along the coast of Jiangsu Province bordering East China Sea. 2. The outer edge of high turbid tongue located at 122 degree 15' E on the whole coincides with the bar of Changjiang River mouth. The outer boundary of turbid water zone located at 122 degree 30' E on the whole coincides with the boundary line of the muds and sediments. 3. The suspended sediments between the high turbid tongues and turbid water zone are plumes. They are good indicators of the water mass movement. From the ERTS images of different dates, we can see that the suspended sediments outside Changjiang River mouth diffuse sometimes southeastward and sometimes northeastward. The diffusing direction of suspended sediment is dominated by the direction of the wind over the sea, by the runoff of the Changjiang River and by the sea current of East China Sea.

KEY Changjiang, East China Sea, particulates, remote sensing, wind, sediments

LANG Chinese, English abstract

NOTE abstract only

319 AUTH Zhao, Xitao; Peng, Gui; Zhang, Jingwen
AFFI Institute of Geology, Academia Sinica (1), Institute of Geology, State Seismological Bureau (2,3)
DATE 1979
TITL A preliminary study of Holocene stratigraphy and sea level changes along the coast of Hainan Island
CITA Scientia Geologica Sinica 4, 350-358 (1979)
ABST Radiocarbon datings of several profiles of Holocene sediments have enabled us to subdivide and correlate these profiles in relation to sea-level changes. Preliminary conclusions are given as follows. 1. Several index stratigraphic units have been established, i.e. the Luhuitou raised coral-reef, formed in the middle stage of the Middle Holocene (5200-4900yrs. B.P.); the Luhuitou formation composed of coral sand, gravels and secondary reef was formed in the middle and late stages of the Middle Holocene (about 4300yrs.and 3800--3600yrs. B.P.), and the Yandun formation (marine sands and sandstones) and the Haikou formation (lagoon clayey sand and sandy clay) deposited in the early and middle stages of Late Holocene (2200--2000yrs. and about 1600yrs. B.P.) respectively. 2. The middle-late Holocene beach rocks can be further divided into two kinds, the Luhuitou and the Yandun ones (about 3750 and 2000yrs. B.P. respectively). 3. Evidences for four higher sea-levels (dated 5200--4900, 4300,3800--3600 and 2100--1500yrs. B.P. respectively) along the coast of Hainan Island are found in the Holocene.
KEY sea level, dating, carbon-14, palaeontology, Holocene
LANG Chinese, English abstract

320 AUTH Zhao, Yiyang
AFFI Institute of Oceanology, Academia Sinca, Qingdao
DATE 1982

TITL Geochemistry of uranium in sediments of the Bohai Gulf, China

CITA Geochemistry 1, 338-342 (1982)

ABST The following conclusions can be drawn from the work reported in this paper: (1) Sixteen samples were determined for uranium by spectrophotometric method. The uranium content in the sea floor sediments of the Bohai Gulf ranges from 1.6 to 6.3 ppm, with an average of 4.3 ppm. (2) Statistical data show close relationship between U concentration and grain size. Relatively larger amount of uranium was found accumulated in mud than in sand. The bulk of uranium is assumed to be derived from terrestrial detrital minerals. (3) A positive correlation between U and Fe is recognized. Similar relation also can be seen between U and Al. The plot of U concentration vs. Fe is linear, and can be expressed by the linear regression equation: $Y = -0.37 + 1.35X$. The plot of U against Al gives an equation of $Y = -2.48 + 1.01X$. (4) The average $U/C_{org.}$ ratio for these sediments is 7 x (E-4), and the average ratios of U/P, U/Mn, and $U/CaCO_3$ are 100 x (E-4), 50 x (E-4) and 2 x (E-4), respectively. (5) Compared with the abundances of other shelf sediments, the average concentration of U in the area under consideration is close to that of sediments on the shelves of Japan and the Gulf of Mexico, and the Black Sea. Uranium concentration in the Bohai Gulf sediments is comparable to that of the continental crust, but differs from that of deep-sea clay.

KEY geochemistry, uranium, sediments, grain size, iron, aluminum, organic carbon, phosphorus, manganese, calcium carbonate, Bohai, determination, spectroscopy, detritus

LANG Chinese, English abstract

NOTE Chinese version was published in Collected Oceanic Works 3, 86-90 (1980)

321 AUTH Zhao, Yiyang

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1980

TITL Geochemistry of uranium in sediments of Bohai Gulf, China

CITA Collected Oceanic Works 3, 86-90 (1980)

ABST The folowing conclusions can be drawn from the work reported in this paper: (1) Determinations were made for uranium on 16 samples by spectrophotometric method. Uranium content in the seabed sediments of the Bohai Gulf ranges from 1.6 to 6.3 ppm, with an average of 4.3 ppm. (2) Statistical data show close relationship between U concentration and grain size. Relatively larger amount of uranium is accumulated in mud than in sand. The bulk of uranium is assumed to be derived from terrestrial detrital minerals. (3) A positive correlation between U and Fe has been recognized. Similar relation can also be noticed with respect to U and Al. The plot of U concentration against Fe is linear, and can be expressed by the linear regression equation: Y=-0.37 + 1.35X. The plot of U against Al gives an equation of Y=-2.48+1.01X. (4) The average U/C_{org}. ratio for these sediments is 7*10(E-4). The average ratios of U/P, U/Mn, and $U/CaCO_3$ are 100*10(E-4), 50*10(E-4) and 2*10(E-4) respectively. (5) Compared with the abundances of other shelf sediments, the average concentrations of U in the same under consideration are close to these in the shelf of Japan, the Gulf of Mexico and the Black Sea. Uranium abundance in sediments from the floor of the Bohai Gulf is comparable to that of continental crust, but differs from that of deep-sea clay.

KEY uranium, sediments, Bohai, detritus, clays, concentrations, iron, aluminum, organic carbon, phosphorus, manganese, calcium carbonate, spectroscopy, grain size, sand

LANG Chinese, English abstract

NOTE Also published in Geochemistry 1, 338-342, 1982.

322 AUTH Zhao, Yiyang; Che, Chenghui; Yang, Huilan; Jia, Fengmei

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1981

TITL Geochemistry of Fe, Mn, Ti and P in the seabed sediments of the Taiwan Bank, China

CITA Acta Geologica Sinica, 118-126 (1981)

ABST The most important conclusions of this study are: (1) The contents of Fe, Mn, Ti and P in the sediments of the Taiwan Bank are lower than those in the East China Sea and South China Sea. This is because the grain size of sediments in the area of study is coarser. "The law of grain-size control" of elements is conspicuous, i.e. the average contents of elements increase gradually with the decrease in the grain size of sediments. (2) The distribution patterns of these elements are similar in most respects. The regional distributions of elements are belt-shaped and roughly parallel with the coastline. The distribution of elements is related to that of sediments and minerals. (3) We call the ratio of detrital elemental content to total elemental content in sediments "the detrital index". The index of each element during this study is in the same order of magnitude with that in the East China Sea. The detrital index of elements varies inversely as the chemical activity of elements. For example, the chemical activity of Ti is lower, but the detrital index of Ti is higher. (4) Like other continental shelves, in the area studied close

correlations exist among these elements. It must be pointed out that sometimes the authigenic process can interfere with these correlations.

KEY sediments, Taiwan Strait, East China Sea, South China Sea, grain size, distribution, iron, manganese, titanium, phosphorus, detritus

LANG Chinese, English abstract

323 AUTH Zheng, Baoshan

AFFI Institute of Geochemistry, Academia Sinica, Guiyang

DATE 1982

TITL Environmental geochemistry of fluorine in the Bao Tou region

CITA Annual Reports Institute of Geochemistry, Academia Sinica (1980-1981), 219-220 (1982)

ABST Both industrial fluorine pollution and endemic fluorosis have been reported in the Bao Tou region. Analysis on samples of soil and ground water, and evaluation of chemical equilibrium have shown that a large amount of water-soluble fluorine has been accumulated onto the soil, subsequently making ground water enriched in fluorine during the process of soda-salinization. The ground water with the highest fluorine is usually related to water-soluble fluorine-rich sediments of the Miocene series. The majority of fluorine in surface and ground water probably come from local precipitation. Thermodynamic calculations for ground water samples from the Bao Tou region reveal: $\Delta G(CaCO_3) > \Delta(CaF_2) > \Delta(CaSO_4)$. Therefore, the deposition sequence of minerals should be: $CaCO_3$, CaF_2, and $CaSO_4$. But during the process of soda-salinization it should be: $CaSO_4$, NaF, and NaCl.

KEY geochemistry, fluorine, pollution, rain water, natural waters, calcium carbonate, calcium fluoride, calcium sulfate, sodium fluorate, sodium chloride, free energy

LANG Chinese, English abstract

324 AUTH Zheng, Guoxing; Shi, Junxian; Wang, Sulian; Chen, Zhonlgyuan

AFFI Second Institute of Oceanography, National Bureau of Oceanography, Hangzhou, China

DATE 1983

TITL Relationship between the bacteria and the sediments in the Changjiang estuary and adjacent continental shelf area

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise Abstract, 166-167 (1983)

ABST In order to study the interaction between the bacteria and the sediments, the aerobic heterotrophic bacteria in all sediment samples of 40 stations and anaerobic bacteria in the sediment samples of part of stations collected during 3 cruises at the Changjiang Estuary and adjacent continental shelf area were enumerated by viable count. The physiological and biochemical experiments for 1297 strains separated from sediments collected at 28 stations have been carried out. The density of bacterial populations in the sediments is much different with the types and sources of sediments and the rates of the depositions. The highest bacterial number was found in the modern fine sediments, the lowest in the lag deposit of fine and medium-fine sands. The various effects of the modern depositions in the investigative area were considered marked, comparatively marked, median, poor and very poor. The vertical distributions of bacterial numbers in the sediments, both aerobic and anaerobic, are the highest on the surface of the sediments and decrease with the increase of depth of the sediment core. The decreased gradient is sharper in the sandy sediment than in the soft mud sediments. The bacteria have extensive abilities of decomposition of organic

materials. About 50% of them are able to decompose carbohydrate, 73% to decompose protein and release H_2S. Biochemical characteristics of bacteria vary with types, depths and seasons of sediments.

KEY bacteria, Changjiang, estuary, continental shelf, organic matter, protein, sediments, hydrogen sulfide, biochemistry, carbohydrates

LANG Chinese, English abstract

NOTE abstract only

325 AUTH Zheng, Jianlu; Lin, Zhiqing; Wang, Zhaoding; Zhu, Zhuohong; Li, Zijiang; Chen, Jinsi

AFFI South China Sea Institute of Oceanology, Academia Sinica, Guangzhou

DATE 1982

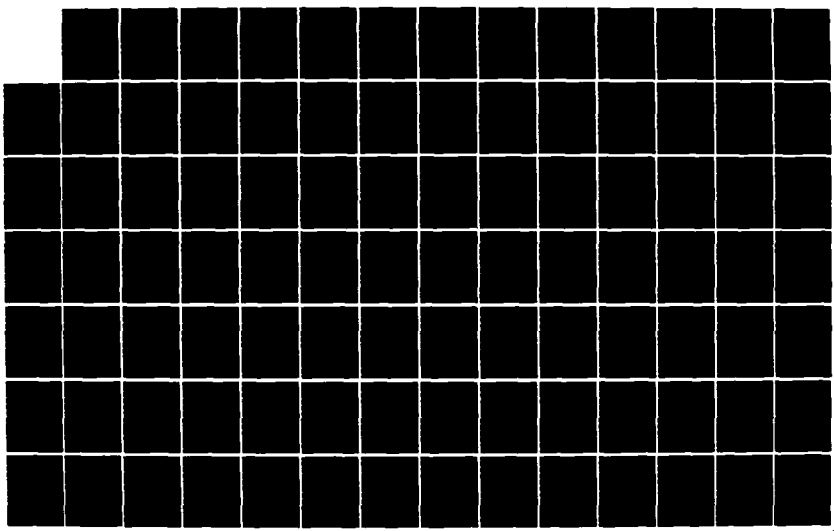
TITL Application of China-made chelating resin in the analysis of seawater I. Measurement of the species of heavy metals in sea water

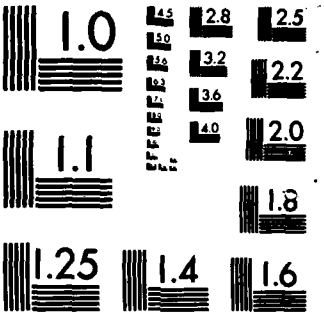
CITA Acta Oceanologica Sinica 4, 431-439 (1982)

ABST This article deals with the procedure for determining the exchange capacity of the China-made chelating resin CR-1. The exchange capacity of CR-1 resin in H^+ and Na^+ forms was measured, and a correlation experiment was made in comparison with the internationally used Chelex-100 resin. The result shows that the exchange capacity of CR-1 is equal to that of Chelex-100. The absorptive characterization of CR-1 to the heavy metals in sea water was tested. The result proves that CR-1 and Chelex-100 have the similar function. Therefore CR-1 can be used to separate the different species of heavy metals. Nine chemical species of heavy metals in seawater were measured by using CR-1 for the first time. The experiment indicates that this method proves accurate and workable.

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MICROCOPY RESOLUTION TEST CHART
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KEY analysis, seawater, heavy metals, capacity, resin, ion-exchange, zinc, cadmium, lead, copper, determination, anodic stripping voltammetry, speciation

LANG Chinese, English abstract

326 AUTH Zheng, Shunqin; Zhang, Shumei

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1981

TITL Mercury content in Arca subcrenata Lischke from Bohai Bay.

CITA Transactions of Oceanology and Limnology 4, 29-33 (1981)

ABST The contents of mercury in Arca subcrenata collected in the Bohai Bay during the period from May 1979 to February 1980 at 10 sites were determined by cold vapour atomic absorption method. The results obtained showed that mercury level in Arca subcrenata was 0.003-0.052μg/g wet weight. The variations of mercury content in Arca subcrenata with sites assigned were observed. The mercury content near the coast and estuary showed higher values than those far from the coast and estuary. The seasonal variation was unremarkable though the samples collected in Spring and Autumn contained a little higher mercury concentration than those collected in Summer and Winter. The mercury content in Arca subcrenata is correlated to sea water where they live, it increases as the mercury concentration of the sea water is getting higher. The factor of accumulation of mercury by Arca subcrenata from sea water is about 2000.

KEY mercury, Bohai, atomic absorption, estuary, seasonal variation, seawater, pollution, marine organism, coastal water, bioaccumulation, enrichment

LANG Chinese, English abstract.

327 AUTH Zheng, Shunqin; Zhang, Shumei

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1981

TITL Mercury content in some marine fishes and invertebrate animals from the outer continental shelf of the East China Sea.

CITA Oceanologia et Limnologia Sinica 12, 188-192 (1981)

ABST Mercury content in 20 samples of marine organisms was determined by cold vapour atomic absorption method. The samples determined include 5 species of fishes, 3 species of Mollusks, 4 species of Crustaceans, 4 species of Echinoderms and 4 species of Coelemterates. The results obtained are summarized as follows; 1. Mercury level in fish is the highest among the samples determined. 2. Mercury content in fish is relevant to the depth where they live; it increases with increasing depth. 3. The muscle, liver, gill, skin and spawn of Cypselurne pociloplerws were analyzed for mercury content. It was found that liver has the highest among these tissues. 4. The concentration factor of mercury by fish from seawater is about 2000.

KEY mercury, fish, invertebrate, continental shelf, East China Sea, atomic absorption, seawater, pollution, bioaccumulation, enrichment

LANG Chinese, English abstract

328 AUTH Zheng, Xiyu

AFFI Qinghai Institute of Saline Lake, Academia Sinica, Xining

DATE 1982

TITL The distribution characteristics of B and Li in the brine of Zhacang Caka (Zhangzang Caka) saline lake Xizang autonomous region, China

CITA Oceanologia et Limnologia Sinica 13, 26-34 (1982)

ABST 1. Composition of the Brine. The specific gravity of its surface brine is from 1.073 to 1.291. Its salinity is 230-350g/l. It consists of more than 30

elements, such as Na^+, K^+, Mg^{2+}, Ca^{2+}, Cl^-, SO_4^{2-}, HCO_3^-, and so forth. In addition to the above elements, it has also B, Li, Rb etc. Hence it is highly mineralized with rich-B and rich-Li. 2. Type of the Lake. This saline lake belongs to the sulfate type. Of which lake I and lake II are of Na_2SO_4 subtype, lake III is of $MgSO_4$ subtype. 3. The Distributive characteristics of B and Li in the Lake. (1) The concentrations of B and Li are higher than that in sea water, B being 78-121 times higher, Li being 2625-4000 times higher. (2) A striking enrichment area of B, Li was formed in this brine lake. (3) The concentrations of B and Li are related to total mineralization of this lake.

KEY distribution, brine, salt lake, compositions, salinity, concentration, seawater, enrichment, lakes, boron, lithium, sodium, potassium, magnesium, calcium, chloride, sulfate, bicarbonate, rubidium, specific gravity, sodium sulfate, magnesium sulfate, resources

LANG Chinese, English abstract

NOTE Zhang Xiyu was formerly Zheng Xiui

329 AUTH Zheng, Xiyu; Yu, Shengsong

AFFI Qinghai Institute of Salt Lake, Academia Sinica, Xining

DATE 1981

TITL Formation of the salt lakes resources and its utilization on the Xizang Plateau

CITA Scientia Geographica Sinica 1, 66-78 (1981)

ABST The Xizang Plateau is an area in which there are many salt lakes and rich in resources. The salt lakes contain nearly forty kinds of chemical elements and twenty-seven kinds of minerals, especially their high content and large reserves of boron, lithium and potassium, etc., which are well known to the world. On the basis of analyzing the distribution, the hydrochemical characteristics, the salt-forming law

of the salt lakes in Xizang Plateau, together with the geological structure, palaeogeographic environments and the strong hydrothermal activities of the plateau, this article has discussed the conditions of the formation of the salt lakes and the mechanism of their genesis. We consider that the block basin was the topographical basis for the formation of the fossil lakes; the arid climate was the palaeogeographic environment affecting the salinization of lake water and controlling the distribution of salt lakes, and the strong natural hydrothermal circulation has supplied abundant boron, lithium and potassium, and other materials to the salt lakes.

KEY salt lakes, resources, boron, lithium, potassium, climate, lake waters, hydrothermal activity

LANG Chinese, English abstract, minerals

NOTE Zheng Xiyu was formerly Zheng Xiui

330 AUTH Zhong, Chongxin; Qin, Pei

AFFI Institute for Spartina Anglica and Beach Exploitation Studies, Nanjing University, Nanjing

DATE 1983

TITL An inquiry into the mercury absorption of Spartina anglica and its environmental purification effect

CITA Journal of Marine Science 2, 6-11 (1983)

ABST This is a report of preliminary water culture experiments of absorption of mercury by big rice grass, Spartina anglica, which is a very vigorous and stress resistant halophyte. The amounts of mercury absorbed by the shoots from water culture of different concentrations are 10-56 times the initial amounts and those absorbed by roots are 250-2500 times. The most efficient absorption by the tillers was found to be almost half of the original amount in the 1 ppm culture after four-week absorption. The curve of S. anglica absorption of mercury is a positive relative

exponent curve. Hence S. anglica is found to be rather effective as an agent to remove pollutants, especially in the case of mercury.

KEY mercury, absorption, pollution, bioaccumulation

LANG Chinese, English abstract

331 AUTH Zhong, Puhe; Zhou, Xiaoxia; Zhao, Zhenhua; Yu, Songhua; Wang, Changsheng; Yang, Shouye; Yi, Weixi; Zhang, Zaiquan

AFFI Institute of Geochemistry, Academia Sinica, Guiyang

DATE 1982

TITL Instrumental neutron activation analysis of trace elements in sedimentary rocks and granites

CITA Annual Reports Institute of Geochemistry, Academia Sinica (1980-1981), 169-170 (1982)

ABST More than twenty trace elements were determined by non-destructive neutron activation analysis in sedimentary rocks and granites. They are La, Ce, Nd, Sm, Eu, Gd, Tb, Yb, Lu, U, Th, Ta, Hf, Zr, Rb, Cs, Sr, Ba, Fe, Co, Cr, Mn, Sc, and Sb. The precision is better than 10% for most of them except for Nd, Gd, Yb, U, Zr, Sr, Se and Ba, whose precision is better than 30%. The analytical procedure is described briefly. Relative RE abundance patterns in these samples are discussed, too.

KEY sedimentary rocks, neutron activation analysis, lanthanum, cerium, neodymium, samarium, europium, gadolinium, trace metals, terbium, ytterbium, lutecium, uranium, thorium, tartalum, hafnium, zirconium, rubidium, cesium, strontium, barium, iron, cobalt, chromium, manganese, scandium, antimony, granites

LANG Chinese, English abstract

332 AUTH Zhou, Fugen

AFFI Institute of Marine Geology, Tongji University, Shanghai, China

DATE 1983

TITL Automorphous calcite crystal in sea water of the northeast East China Sea

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise Abstract, 75-76 (1983)

ABST In the 1981 August Cruise of CHINA-US Joint Study Program of Marine Sedimentation Process, a multitude of calcite crystals were discovered from seawater within an area of 20,000 km^2 of the northeastern East China Sea. They are platelike rhombohedron crystals with grain size about 5-25 μ, no color and transparent, uniaxial and negative crystal, their refringence being N_o =1.658, Ne = 1.486, I/I_o value of X-ray peaks 3.035 A, 2.285 A, 2095A is 100, 18, 18 respectively. Results of electron-beam microprobe are CaO = 49.6-55.4%, MgO < 1%, other dioxides less than 1%. For these reasons, it is no doubt a low-magnesium authigenic calcite in seawater. The content of this calcite crystal is higher (Mix 254,592 units/l) in the upper part of seawater, decreases with depth and does not occur in bottom float-mud. It suggests that the calcite crystal be possibly produced by a process in which a high-temperature meteoric water carried from Kuroshio and splitting into the Huanghai Sea encounters the Huanghai Sea cold water layer, containing more clastic carbonates and saturated $CaCO_3$, so that carbon dioxide escapes and then the calcite is crystallized out from seawater. It also might be carried from Kuroshio or resuspended from the sea bed elsewhere.

KEY calcite, seawater, East China Sea, magnesium, Huanghai, carbon dioxide, calcium carbonate, microprobe, grain size, magnesium carbonate, Kuroshio, resuspension

LANG Chinese, English abstract

NOTE abstract only

333 AUTH Zhou, Guozhi

AFFI Department of Physical Chemistry, Beijing University of Iron and Steel Technology, Beijing

DATE 1979

TITL Influences of van der Waals' force upon diffusion-controlled reaction rate---With a discussion on Smoluchowski's formula applied in nonspherically symmetric reaction systems.

CITA Scientia Sinica 22, 845-858 (1979)

ABST According to the previous theories, only when the whole surface of a molecule is the active site can Smoluchowski's formula be used to estimate the upper limit of the second order rate constant. In this paper it is pointed out that, owing to the existence of van der Waals' attraction among molecules, Smoluchowski's formula, in some conditions, may be extended to cover nonspherically symmetric reaction systems. These conditions can be expressed with an inequality. Since the inequality can be satisfied for quite a number of enzyme-catalyzed reaction systems, we may employ Smoluchowski's formula to estimate the upper limits of the rate constants of these enzymic systems. Further, the effects arising from the van der Waals' force in the diffusion-controlled reaction process are discussed. The question as to when the van der Waals' effects may be neglected and when they must be taken into consideration is also reviewed. The upper limits of reactions are analyzed. Finally, the expression for the distribution of concentrations on the surface of an enzyme molecule under a limiting case and the expression for calculating the corresponding concentration ratio are presented. What is worth pointing out further is that the above results not only apply to the enzyme-substrate

reaction system, but can also be extended to cover all those reaction systems with diffusion as their limiting steps.

KEY active site, rate constant, enzyme, van der Waals' force, diffusion, carbonic anhydrase, carbonic acid, kinetics, surface

LANG English

NOTE Zhou Guozhi was formerly Chou Kou-chih.

334 AUTH Zhou, Jiayi; Qian, Wanying; Fu, Ruiwen; Zhao, Yunying; Tang, Yungming

AFFI Department of Marine Chemistry, Shandong College of Oceanology

DATE 1981

TITL Marine environmental geochemistry II. The chemical forms of mercury in seawater and the seawater-sediment mercury interchange

CITA Collected Oceanic Works 4, 56-63 (1981)

ABST In this paper, the concentrations of total Hg, inorganic Hg, methyl mercury in sea water, and those adsorbed on particulate matter in water samples taken from fifteen coastal sites of Jiao Zhou Bay near Qingdao have been determined and reported. And a laboratory experiment of seawater-sediment interchange of Hg has also been performed. Interesting results are obtained. 1. As we have seen in Table 1-3, the percentage of Hg(Inorg)/Hg(Total) in water samples at sites outside the Bay (sites 101, 102, 103, 104) and site 3A are 11-17%. It shows that the Hg in water samples taken from sites far from Hg sources has mainly existed in organic combined state or organic compounds. The percentage of Hg(Inorg)/Hg(Total) in samples at sites 5, 6, 4A, 4B, 6A, 6B, which is near the sources of inorg. Hg is significantly higher. 2. The concentrations of inorganic Hg in seawater samples taken on July 5th, 1978, are lower than those observed on Nov. 1st, 1978, are much higher than those in the

two other surveys. This rule is in agreement to the concentrations of inorg. Hg in coastal seawaters of England and East China Sea observed by Gardner(1975). 3. The results from table 2 show that the concentrations of methyl mercury in sea water sample at site 6 is 0.0012 ppb. It is equivalent to 1.7% of the total Hg (0.069 ppb) in water sample. Our results indicate that the methyl mercury surely exists in sea water at the coastal site near Hg source, although the concentration of methyl Hg is exceedingly low in this water sample and plays an insignificant role in the transport of mercury to the ocean. 4. The results of laboratory experiment of absorption show that the absorption percentage of Hg from sea water by the suspended marine sediment is 59.3% at a 1 ppb level of Hg in sea water and a water-sedimentation of 1000:1 (Table 4). It is apparent that the suspended particulate matter acts as a "scavenger" of inorganic Hg in sea water. 5. The results of Table 2 and 3 show that with the exception of individual sites, there is a positive correlation between The concentration of total particulate Hg and concentrations of Hg which can be released by concentrated HCl and determined directly. According to the results of the surveys and laboratory experiments (2 and 4), we consider that the unstable combined portion of total particulate Hg mostly is much more likely formed by adsorption of inorganic Hg onto suspended solids. 6. The results of Table 5 indicate that the release of Hg into sea water from Hg polluted sediment is little (0.11 ppb at most, Fig.2) It seems to be possible that the release of Hg from Hg polluted sediment will not cause the "secondary pollution" of sea water under ordinary conditions. However, the mercury contaminated sediment is still an important pollution source to the nektons and benthos.

KEY mercury, seawater, sediments, particulates, pollution, Jiaozhou Bay, speciation, absorption, organic matter, benthos

LANG Chinese, English abstract

NOTE Zhou Jiayi was formerly Chow Chia-yi

335 AUTH Zhou, Zhonghuai; Xu, Lijun; Liu, Xingjun

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL Concentration of uranium from seawater I. The preparation of aluminium hydroxide-manganese dioxide composite and its concentration factor

CITA Journal of Marine Science 5, 17-20 (1982)

ABST Aluminium hydroxide-manganese dioxide composite was prepared in three ways. It was found that the composite concentrating agent prepared with H_2O_2 and $KMnO_4$ is better than those by other methods in absorbability of uranium. The recovery of uranium by this composite agent is about 80%. The concentrating capacity of the composite agent for uranium from seawater is 200μg/g composite agent after 15 days. Composite agent are better than those of aluminium hydroxide-active carbon composite concentrating agent prepared by the Japanese.

KEY concentrations, uranium, seawater, capacity, extraction, marine resources, absorption, determination, aluminum hydroxide, activated carbon

LANG Chinese, English abstract

336 AUTH Zhu, Erqin

AFFI Institute of Oceanology, Shandong College of Oceanology, Qingdao

DATE 1982

TITL Glauconite in the surface sediments of south part of Huanghai

CITA Journal of Shandong College of Oceanology 12, 61-67 (1982)

ABST We have researched the glauconites of the surface sediments in the southern part of Huanghai. The glauconite samples collected from twenty stations of the Huanghai were analysed by polarizing microscope, X-ray diffraction, and chemical method. These studies show that the glauconites of the area is young, and they were created on the sea-bottom by authigenic process (early diagenesis).

KEY sediments, Huanghai, diagenesis, x-ray diffraction

LANG Chinese, English abstract

337 AUTH Zhu, Erqin

AFFI Shandong College of Oceanology, China

DATE 1983

TITL On studying ferric concretions in the northern East China Sea

CITA International Symposium on Sedimentation on the Continental Shelf, with Special Reference to the East China Sea, Hangzhou, China, Treatise Abstract, 122 (1983)

ABST The ferric concretions in various shapes have been discovered in an area from the southern Huanghai Sea to the northern East China Sea. They can be classified into three kinds from its forms: gelatins, (reniform, bukzhot, ferric pisolite and oolite), diffusive secretions (hollow crust and thin plate) and casts of organic shell. The dominant diagenetic component of the concretions is goethite, and the rest are terrigenous detritus, such as quartz, feldspar. They differ from manganese nodules of the ocean in the lack of concentration of trace metal and in low Mn/Fe ratio. On the basis of the characteristics of ferric concretions, it is considered that part of the concretions are authigenic, formed on recent sea bottom and part, known as terriginous authigenic

concretions, are formed through the intensive oxidation of intergranular secretion solutions on the fossil delta plain.

KEY East China Sea, goethite, detritus, quartz, manganese nodules, concentrations, trace metals, authigenic, iron, manganese, shells

LANG Chinese, English abstract

NOTE abstract only

338 AUTH Zhu, Erqin; Yu, Liansheng; Li, Jianhua; Xia, Mingjie

AFFI Shandong College of Oceanology, Qingdao

DATE 1983

TITL Color of surficial sediments in the northern part of the East China Sea

CITA Marine Geology & Quaternary Geology 3, 67-73 (1983)

ABST Using the "Rock-color Chart" (1979) distributed by the Geological Society of America, the color measurements of 144 samples from 39 stations in the northern part of the East China Sea were made. An attempt was made through this article to illustrate the distribution pattern, controlling factors, and the original conditions of the surficial sediment colors in the northern part of the East China Sea. The main colors of the surficial sediments in this area are: yellowish brown (8YR-10YR 3-5/1-2); (light) olive gray (1Y-5Y 4-5/1-2), and dusky yellow green (1GY-5GY 4-5/1-2). The yellowish brown color of the sediments are caused by ferric oxides in form of fine powders. This color is authigenic, originated under the oxidizing environments and distributed within the range of the fossil Yangtze deltaic plain. Authigenic glauconite and ferrous oxide in clay minerals gave rise to the yellow green color of the surficial sediments. Therefore, this color is authigenic too, caused under reducing conditions.

KEY sediments, East China Sea, color, clays, distribution, oxidation, reduction, Yangtze River

LANG Chinese, English abstract

339 AUTH Zhu, Sulin; Liang, Baihe; Wu, Huaxin; Luo, Yongming
AFFI Department of Geology, Zhongshan University, Guangzhou
DATE 1983
TITL A preliminary study on the heavy minerals in the surface sediment in the estuary of the Pearl River and its adjacent coast
CITA Marine Science Bulletin 2, 22-29 (1983)
ABST Surface sediments in the Pearl River and its adjacent coast are finegrained deposits with low contents of heavy minerals, which mainly consist of igneous minerals such as hematite, zircon, ilmenite, tourmaline, amphibole, niobite-tantalite and a small amount of altered minerals such as epidote, diopside and garnet, etc. Based on the variation in the combination and content of heavy minerals as well as their different depositional positions, six areas over which they are distributed may be identified. There is a law governing the components content and shape characteristics of the heavy minerals as well as the plane distribution of these characteristics. This law depends on the energy conditions of the sediment size and the various depositional environments. In the estuary - the nearshore shallow waters at a depth of 5m, there are distinct river tidal and wave actions, which result in an area with high content of heavy minerals. Being sorted under high energy conditions of sea water, the heavy minerals here are characterized by the isometric, well round shape and frosted-glass-like appearance. The source of the heavy minerals may be traced to terrigenous clastic deposits or to the deposits of recent origins off the islands and continental coasts. Owing to the

complexity of the variations in the hydrologic conditions, one cannot determine the source distance simply by the roundness of the minerals.

KEY minerals, sediments, estuary, grain size

LANG Chinese, English abstract

340 AUTH Zhuang, Dongfa; Chen, Zexia; Xu, Muzhe; Wu, Yuduan; Li,Faxi

AFFI The Third Institute of Oceanography, National Bureau of Oceanography, Xiamen(1,2,3); Department of Oceanography, Amoy University, Xiamen(4,5)

DATE 1979

TITL Physico-chemical processes of silicates in the estuarial region. II Laboratory model studies on the mechanism of the silicate removal in the estuarial region-The adsorption of reactive silicate in sea water on colloidal $Fe(OH)_3$ and $Al(OH)_3$ precipitates

CITA Acta Oceanologia Sinica 1, 65-76 (1979)

ABST The adsorption of reactive silicate in sea water on colloidal $Fe(OH)_3$ and $Al(OH)_3$ precipitates has been studied quantitatively in the laboratory in order to find out the extent of the adsorption under conditions similar to those occurring in natural environments, the type of adsorption process, and also the more acceptable mechanism of the silicate removal in the estuarial region. Adsorption isotherms under different $Cl^o/_{oo}$, pH, and composition of electrolytes have been obtained and isosteric heats of adsorption have been calculated. Desorption experiments have been done by washing the adsorption residues with NaCl, Na_2SO_4, $MgCl_2$ or NaOH solution. Some residues were re-dissolved by 0.02 N HCl to determine the form of the adsorbed silicate. It was found that reactive silicate in sea water is markedly adsorbed by collodial $Al(OH)_3$ and $Fe(OH)_3$ precipitates. The adsorption increases with increasing $Cl^o/_{oo}$ and pH. Although the overall isosteric heats of adsorption in

sea water are in the order of 1000-2000 cal./mole, the isosteric heats of adsorption in pure $MgCl_2$ solution are as high as 5000-10000 cal./mole. Practically no silicate can be washed out by all the above mentioned electrolytic solutions, and after re-dissolved by 0.02 N HCl, almost all the adsorbed silicate returns to reactive silicate form rather than polymerized silicate. This shows that the adsorption is more probably a type of chemical adsorption and the absorbed silicate ions may form chemical bonds with $Fe(OH)_3$ or $Al(OH)_3$ lattices, gradually transform into their inner structure, and finally form certain kinds of insoluble ferric and/or aluminum silicates. The results give support to a proposition of the mechanism of the silicate removal in the estuarial region that the reactive silicate is partly removed by irreversible chemical adsorption on $Fe(OH)_3$ and $Al(OH)_3$ newly formed under higher pH and salinity, gradually transforms into stable ferric and/or aluminum silicates, and finally sinks onto sea bottom as sediment. This proposed geochemical pattern of estuarine silicate needs to be checked with sufficient in situ oceanographic observations.

KEY estuarine water, mechanism, silicate, adsorption, seawater, chlorinity, adsorption isotherm, pH, heat of adsorption, aluminum hydroxide, ferric hydroxide, salinity, sediment, particulates, colloids, electrolytes

LANG Chinese, English abstract

NOTE Chen, Zexia was formerly spelled Chen, Ze-hsia; Li, Faxi was formerly spelled Li, Fa-si, Wu, Yuduan was formerly spelled Wu, Yu-duan; Zhuang, Dongfa was formerly spelled Zhuang Donghua

341 AUTH Zou, Xingchang

AFFI Department of Marine Physics, Shandong College of Oceanology, Qingdao

DATE 1982

TITL Analysis of data from passive microwave remote sensing over the Jiaozhou Bay, Qingdao

CITA Journal of Shandong College of Oceanology 12, 21-26 (1982)

ABST The passive microwave radiometric images were taken from the test field over Jiaozhou Bay, Qingdao, with an airborne 3-centimetric imaging microwave radiometer, in September and October, 1979. In this paper, we present some microwave radiometric pictures and analyse the remote-sensing data obtained with a brief discussion of oceanography microwave remote sensing. From these pictures and analysis it is shown that the distribution of the brightness temperature of salt fields differs distinctly from an estuarine environment.

KEY Jiaozhou Bay, remote sensing, temperature

LANG Chinese, English abstract

342 AUTH Zubov, N.N.

DATE 1959

TITL Increase in water density resulting from mixing of seawater of different temperature and salinity

CITA Oceanologia et Limnologia Sinica 2, 93-108 (1959)

ABST The increase in density upon mixing produced by the nonlinearity of the equation of state of seawater is studied.

KEY temperatures, salinity, density, mixing, nonlinearity, equation of state, seawater

LANG Chinese

NOTE Translated from Uplotneniye pri smeshenii morskikh vod raznoy temperatury; solenosti, Moscow, Gidrometeoizdat, 1957, 49 pp

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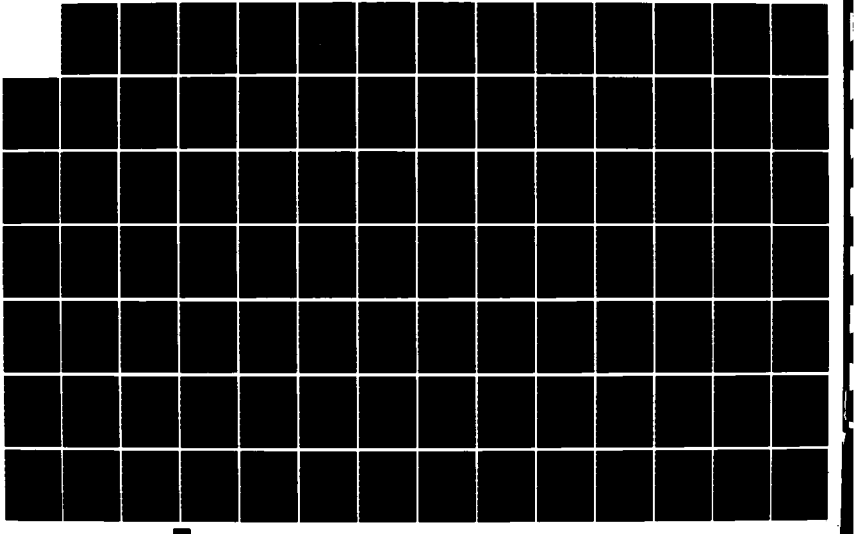
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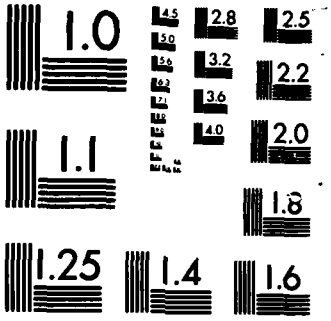
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SUPPLEMENTAL BIBLIOGRAPHY

1 AUTH Bai, Mingzhang

AFFI Institute of Elements-Organic Chemistry, Nankai University, Tianjian

DATE 1983

TITL Bioinorganic chemistry of molybdenum and chemical modeling of nitrogen biofixation

CITA Huaxue Tongbao 2, 1-6 (1983)

ABST Most plants need trace amounts of Molybdenum; Mo is important for the circulation of natural N_2. The nitrogen-fixing enzyme is a Mo-containing enzyme, but the structure of FeMo-co in the enzyme is not clear. So far, many methods have been used to study the coordination number of Mo and the mechanism of FeMo-co, such as EPR, EXAFS etc. In most of the Mo complexes, the valence of Mo is 6 and the coordination number for Mo(VI) complex is also 6. The chemistry of Mo(V) and Mo(IV) complex has been studied for understanding the mechanism of nitrogen-fixing enzyme. Evidence shows that the valence of Mo in the active nitrogen-fixing enzyme should be 4 and might have 3 different valences existing in the enzyme at the same time. The Mo complexes used for studying the structure of nitrogen-fixing enzyme model are: (1) Mo-sulfur alcohol group (including Mo-cys system) (2) Mo-dithiocarbamic acid group (3) Mo-CN^- group; Mo-Fe-S atom group. The electronic effect of S-containing coordination complex of Mo is also discussed in this paper.

KEY molybdenum, enzyme, nitrogen, complexation

LANG Chinese

2 AUTH Bailey, Martin

AFFI unknown

DATE 1983

TITL The secret uranium trade

CITA World Press Review, April, 55 (1983)

ABST No mineral is as strategically important or as shrouded in secrecy as uranium, and Africa plays a special role in its trade. The producers and consumers in uranium trade are reported in this article. China is one of the most secretive uranium producers. Chinese mining is controlled by the Army, and production - about 1,000 tons yearly - is mainly for military purposes.

KEY uranium

LANG English

3 AUTH Beijing University, Teaching and Research Group of Analytical Chemistry, Department of Chemistry

AFFI Department of Chemistry, Beijing University

DATE 1974

TITL Determination of trace amounts of beryllium in natural water - chromium azurin S - bromohexadecyl pyridine spectrophotometry

CITA Analytical Chemistry 2, 192-198 (1974)

ABST The author claims that Be^{2+} forms a dark-blue colored 3-dimensional complex with chromium azurin S and bromo-hexadecyl-pyridine at pH 4.5-5.5; the maximal absorption wavelength is 625 nm, and this is considered a sensitive reaction in the photometric determination of trace amounts of Be^{2+} in natural waters. A systematic study of the conditions for the color reaction in the determination Be^{2+} is reported; acetylacetone-chloroform was used to extract and concentrate the trace Be^{2+} in natural waters and to eliminate the interference of F^- and Al^{3+}. An amount as small as 0.0002 mg Be^{2+}/l can be measured with this method.

KEY determination, beryllium, natural waters, pH, absorption, extraction, concentrations, fluorine, aluminum, analytical chemistry, colorimetry, spectrophotometry

LANG Chinese

4 AUTH Bi, Mutian

AFFI Beijing University, Department of Technical Physics

DATE 1982

TITL Atmospheric Chemistry

CITA Huaxue Tongbao, 321-325 (1982)

ABST Atmosphere is divided into five vertical layers: (1) troposphere (2) stratosphere (3) mesophere (4) thermosphere (5) exosphere. So far, atmospheric chemistry studies consist mainly of examining the chemical reactions in the troposphere and stratosphere. Basic considerations in atmospheric chemistry include the following: (1) Atmospheric chemistry is a "reaction rate chemistry"; (2) In addition to N_2, O_2, Ar, H_2O and CO_2, trace elements concentration of the atmospheric composition are studied; (3) Because the atmosphere is not an uniformly mixed system, modelling of the atmospheric chemistry rates has to include the diffusion effect; (4) The suspended particulates in the air are also important. The major researches in atmospheric chemistry include analysis and survey, reactions of uniform phase, reactions of non-uniform phase, nucleation and formation of particulates, circulation of atmospheric materials, and atmospheric modelling.

KEY freons, pollution, aerosol, ozone, nitrogen, oxygen, argon, carbon dioxide, nitrous oxide, nitric oxide, sulfur dioxide, ammonia, rain water

LANG Chinese

5 AUTH Booda, Larry L.

AFFI Editor, Sea Technology

DATE 1981

TITL China plans to overcome gap in ocean technology - Instrument group sees old equipment, introduces new

CITA Sea Technology, May, 10-16 (1981)

ABST A trade delegation of oceanographic instrumentation manufacturers of U.S. was invited to China. Delegation members introduced their companies and reviewed their products with more than 30 Chinese government officials and users in four cities. Many instruments seen by the group represented the technology of 20 to 30 years ago, with one exception. Many of the instruments installed in two new oceanographic research vessels represented up-to-date technology. In this paper, author reports the research fields of marine sciences in National Bureau of Oceanography, South China Sea Institute, Institute of Acoustics, National Institute of Oceanographic Instrumentation, Shandong College of Oceanography and the equipment on the research vessels.

KEY marine chemistry, acoustics

LANG English

6 AUTH Cai, Shouhui

AFFI Department of Basic Theories, Chengdo Institute of Radio Engineering

DATE 1983

TITL A formula for calculating acidity of hydrogen acid

CITA Huaxue Tongbao 2, 15-16 and 38 (1983)

ABST The dissociation of H^+ from water solution of hydrogen acid depends on the molecular structure; the solvent (H_2O) is only the condition for dissociation. Usually, this kind of dissociation is a 2-step procedure. $HX \rightarrow H^+X^- \rightarrow H^+ + X^-$. By comparing the energy needed for the second step with the observed value of the acidity of hydrogen acid, the author worked out a formula which can also calculate pK_2: $pK_a = 137.5 \{1/Y [(8-N)-(M-1)/2]\}^{1/4}-125.5$. Y = ion radius; N = group number of the element in the periodic table; M = number of hydrogen atoms in the hydrogen acid. The calculated results are quite consistent with the observed values. The advantages

of this formula are: (1) only one datum of ionic radius is needed, (2) the formula is uniform; it can calculate not only the hydrogen acid acidity of the same group of elements in the periodic table, it also can calculate the secondary dissociation constant (pK_2).

KEY thermodynamics, equilibrium, dissociation constant, acid

LANG Chinese

6.1 AUTH Carbon Cycle Research Unit, Tianjin University, Tianjin, People's Republic of China

AFFI Tianjin University, Tianjin

DATE 1982

TITL The amount of carbon transported to the sea by the Yangtze and Huanghe Rivers (People's Republic of China) during the half-year July-December, 1981

CITA Mitteilungen aus dem Geologisch-Palaontologischen Institut der Universität Hamburg Part 1. Transport of Carbon and Minerals in Major World Rivers, 437-448 (1982)

ABST The monitoring of various physical and geochemical parameters of the Yangtze River (at Nanjing/Datong) from July-December, 1981, suggests that maximum discharge takes place during May, June and July, with an average annual rate of 865 km^3/a for the period 1975-1981. pH of the river water is high, but CO_2 pressures are low. During high water in summer, supersaturation of calcite and dolomite occurs, but undersaturation prevails throughout the winter. Similar monitoring of the Huanghe (at Luokou) during the same half year suggest months of maximum discharge at August, September and October, with an average annual rate of 34.2 km^2/a for the period 1975-1981. Like the Yangtze, alkalinity of the river water is high and PCO_2 low. Thus, both calcite and dolomite from loess may be transported in suspension. The main

carbon transport by both the Yangtze and the Huanghe is in the form of suspended particulate carbonates. The computed flux of HCO_3-C and CO_3-C from July to December, 1981, was 12.0 Mio tons for the Yangtze (at Nanjing/Datong) and 1.13 Mio tons for the Huanghe (at Luokou).

KEY Huanghe, Yangtze River, pH, calcite, dolomite, alkalinity, loess, carbonates, PCO_2, particulates, atomic absorption, colorimetry, bicarbonate, carbonate, Eh, oxygen, total carbon dioxide, chloride, phosphate, nitrate, organic carbon, nitrite, silicate, sulfate, potassium, calcium, magnesium, sodium

LANG English

7 AUTH Chang, Chen-ping; Liu, Lien-sen

AFFI Department of Oceanological Chemistry, Shandong College of Oceanology

DATE 1974

TITL A study of the theory of stepwise equilibrium of inorganic ion-exchange in seawater

CITA Scientia Sinica No.3, 270-282 (1974)

ABST This article deals with the three achievements acquired in the study of the theory of stepwise equilibrium of inorganic ion-exchange in seawater, viz.: (1) It suggests that the theory of stepwise equilibrium of inorganic ion-exchange in seawater is also applicable to ordinary aqueous solution system and introduces the average ion-exchange number n, which can be measured experimentally. Three ways are suggested for calculating the formation constants of ion-exchange products, by means of general mathematical treatments, using the basic formula of n (11). (2) A quantitative discussion of the relationship between the theory of stepwise equilibrium of ion-exchange and the theory of adsorption is given. Experimental data obtained by using uranium-hydrous titanium oxide system etc. well

confirm this relationship. (3) The theory of stepwise equilibrium of inorganic ion-exchange has been used to explain the most important experimental fact in the exchange of inorganic ion--the relationship between ion-exchange ratio and pH. Two ways have been suggested for calculating K, the equilibrium constant of ion-exchange equilibrium. Experimental data of several separate systems have been utilized in making calculations, with the result that theory and practice comparatively agree.

KEY equilibrium, seawater, ion-exchange, formation constants, adsorption, uranium-hydrous titanium oxide, pH, equilibrium constant, equilibrium

LANG Chinese

NOTE English version of this paper published in Scientia Sinica 17, 486-503, 1974; Chang Chen-ping is also spelled as Chang Chen-Ping, Chang Chenping, Zhang Zhenbin, Zhang Zheng-bin or Zhang ZhenBin; Liu Lien-shen is also spelled Liu Liansheng, Liu Liensen, Liu Lian-Sheng, Liu Lien-sen, Liu Lien-sheng or Liu Lian-sen

8 AUTH Chang, Chen-ping; Liu, Lien-sheng

AFFI Department of Marine Chemistry, Shandong College of Oceanology

DATE 1978

TITL A $\phi(Z/1, X)$ rule of inorganic ion-exchange reactions in seawater and its applications

CITA Oceanic Selections No.1, 52-71 (1978)

ABST Fundamental chemical properties (change, ionic radii and electronegativity) were applied to studies regarding the ion-exchange reactions in seawater and in KCl solution. The same properties were also used to study the removal of elements in the oceans.

KEY ion-exchange, thermodynamics, pH, marine resources, extraction, equilibrium constant, copper, mercury, cadmium, lead, manganese, zinc, bismuth, uranium,

chromium, arsenic, antimony, ruthenium, tin, vanadium, tungsten, molybdenum, phosphorus, selenium, magnesium, lanthanum, aluminum, indium, gallium, iron, thorium, cerium, zirconium, beryllium, titanium, niobium, tantalum, silicon, lithium, sodium, chlorine, potassium, calcium, cobalt, bromine, rubidium, strontium, cesium, iodine, nickel

LANG Chinese

NOTE See Note 7

9 DELETED

10 AUTH Chen, Dechang; Tang, Siqi

AFFI Department of Marine Chemistry, Shandong College of Oceanology, Qingdao

DATE 1980

TITL Determination of iodine in offshore seawater of Qingdao - application of catalytic method to determine total iodine content

CITA Kexue Tongbao, Special Edition of Mathematics, Physics and Chemistry, 323-326 (1980)

ABST The reaction of ceric sulfate and arsenous acid with the catalysis of iodine ion can be used to determine trace amounts of iodine in seawater. This study combined the catalytic method with (1) spectrophotometry and (2) titration to determine the total iodine content in offshore surficial waters of Qingdao. Results from spectrophotometry and titration are compared. Spectrophotometry is considered a more reliable method to be used with catalysis. The total iodine content is 50 ± 5 microgram per liter seawater.

KEY determination, iodine, seawater, analytical chemistry, spectroscopy

LANG Chinese

11 AUTH Chen, Guohua

AFFI Department of Chemistry, Shandong College of Oceanology, Qingdao

DATE 1982

TITL Practical salinity scale 1978 and the Chinese standard seawater

CITA Ocean Technology 3, 22-23 (1982)

ABST The establishment of PSS 78 provides a reliable and accurate relative "practical salinity scale standard" - KCl solution to the salinity determination by electric conductivity, it also prepares a set of unified formula and related information for CTD salinometer to measure salinity with high accuracy under general conditions. Chinese standard seawater prepared according to the standard provided by international standard seawater is a sub-standard. The average deviation of two salinity values (electric conductivity and chlorinity method) of international standard seawater is 0.002 S, maximal deviation is 0.01 S; the Chinese standard seawater also has a similar average deviation. The chlorinity and K_{15} value of Chinese standard seawater should be measured based on those of international standard seawater in order to implement the PSS 78. In addition to preparing the standard seawater with salinity 35, the low-salinity standard seawater is also needed for measuring seawater with low salinity.

KEY salinity, conductivity, standard seawater, chlorinity, seawater

LANG Chinese

12 AUTH Chen, Guohua

AFFI Department of Chemistry, Shandong College of Oceanology, Qingdao

DATE 1983

TITL The practical salinity scale 1978 and the Chinese standard seawater

CITA Collected Oceanic Works 6, 56-67 (1983)

ABST Practical salinity scale 1978 has been widely adopted by the oceanographers for the conductivity methods to determine salinity. A precisely specified KCl solution was chosen as a reproducible electrical conductivity standard. While using conductivity-temperature-depth instruments, all oceanographers will be able to report their in situ measurements in a unified manner. The Chinese Standard Seawater is adopted as secondary standards for the determination of salinity in China. Each batch of the standard seawater is certified in chlorinity determined by a precise gravimetric/potentiometric method. Its salinity is calculated from chlorinity using the ratio S = Cl X 1.806550. There are some reports on the comparison of conductivity salinity with chlorinity salinity of standard seawater. In order to carry out the practical salinity scale 1978, the Chinese Standard Seawater should be consistent with the international standard seawater. Each batch of them is certified in K_{15} as well as chlorinity on the label, which is used as the standard for determination of salinity and chlorinity respectively in China. Salinity measurement by conductivity will replace the chemical determination of chlorinity in the near future. However, the author suggests that research on the establishment of the KCl second electrical standard of China be done so as to guarantee strict reliability of the salinity data and unification with the international data.

KEY salinity, standard seawater, conductivity, chlorinity, determination, potentiometry

LANG English

NOTE This paper has been published in Ocean Technology (China) 1982, No. 3, 22-23

13 AUTH Chen, Guohua; Chen, Zhonglin; Lin, Wenye

AFFI Department of Chemistry, Shandong College of Oceanology, Qingdao

DATE 1981

TITL Studies on the dilution of contaminants in estuary - The mathematical modelling of dilution process of contaminants (2)

CITA Oceanologia et Limnologia Sinica (Supplement) 10, 68-78 (1981)

ABST This paper investigated the relationship between dilution ratio and concentration of contaminants, and suggested a mathematical model to predict the dilution process of contaminants in a well-mixed estuary. The model is used to predict physical parameters or to present the transition of chemicals when mixing between river water containing sewage and seawater occurs in the estuary. In such a manner our preliminary studies provided some rule for the dilution process of contaminants in seawater in Jiaozhou Bay.

KEY estuary, mixing, river water, seawater, Jiaozhou Bay, pollution

LANG Chinese, English abstract

14 AUTH Chen, Guohua; Wu, Baoren

AFFI Shandong College of Oceanology, Qingdao

DATE 1981

TITL Electrical conductivity of seawater

CITA Ocean Press, Beijing, 295 pp. (1981)

ABST The electric conductivity of seawater has been used extensively on seawater salinity determination. This book discusses systematically the mechanism of seawater conductance, its influential factors, interchange of electric conductivity and salinity as well as the influence of seawater conductivity on transmission of electric wave. The principles and determination of seawater electric conductivity and salinity, and the instruments used are also introduced.

KEY conductivity, seawater, salinity, determination, temperature, pressure, density, chlorinity, major ions, pH, carbon dioxide, calcium carbonate, photosynthesis, standard seawater

LANG Chinese

15 AUTH Chen, Guozhen

AFFI National Bureau of Oceanography

DATE 1965

TITL Seawater analytical chemistry

CITA Seawater Analytical Chemistry

ABST Various analytical methods for seawater application are described.

KEY analytical chemistry, seawater

LANG Chinese

NOTE This book is not available to the author of this report.

16 AUTH Chen, Hao-wen

AFFI Institute of Oceanology, Academia Sinica

DATE 1981

TITL Cr-tolerant bacteria in the intertidal and coastal zone of Jiao Zhou Bay

CITA Acta Scientiae Circumstantiae 1, 313-323 (1981)

ABST The work was conducted during the period of 1979.5-1980.8. The primary results obtained are as follows: 1. There are a great number of Cr-tolerant microorganisms, particularly Cr-tolerant Bacteria (abb. CTB) and a higher ratio of CT/AA in every station of the surveyed zone. The amount of Colony-Forming Units (abb. CUF) of CTB (abb. CT) is 4.69×10^6--1.08×10^8CFU/g with an average of 3.52×10^7 CFU/g in sediment, and 5.69×10^4--3.51×10^6 CFU/ml, with an average of 1.44×10^6 CFU/ml in water, respectively. The amount of (ratio of) CT/AA is 0.0021--0.1094, with an average of 0.0304 in sediment and 0.007--0.3106, with an average of 0.0977 in water, respectively. 2.

Most CTB are often accompanied by a higher concentration of chromium, varying with stations and samples. Some results have demonstrated a close relationship between CTB and Cr-concentration of the sample. The correlation between the CFU number of total heterotrophic bacteria (abb. AA) and Cr-concentration is negative, while, positive correlation is found only between CT/AA and Cr-concentration. Therefore, increase of CT/AA may be regarded as an important index of severity of Cr-contamination in the environment. CT shows certain kind of seasonal fluctuations. 3. 16.67% of the strains selected can tolerate a Cr^{3+} concentration of 1176 ppm; 16.7% can tolerate 500 ppm Cr^{6+}. It is found that many of CTB have a steady Cr-tolerant ability. So CTB may be thought of as an important remover of Cr-pollutant in the environment. 4. 57.69% of the strains selected can tolerate 30 ppm Hg^{2+} (in the presence of 168 ppm Cr^{3+}). All of the strains can be utilized to degrade petroleum. Based on these data, it may be concluded that CTB has a powerful ability to adapt, to remove and/or degrade environmental complex pollutants. They may play an important role in the so-called self-purification action in the environment. CTB therefore in a contaminated environment has important ecological significance.

KEY bacteria, Jiaozhou Bay, chromium, petroleum, speciation, mercury, colorimetry, seawater, sediments, pollution

LANG Chinese, English abstract

17 AUTH Chen, Haowen

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1980

TITL The supply and demand of oceanic vitamin B-12 and its chemical and ecological significance

CITA Hai Yang Ke Xue 3, 51-54, 1980

ABST This paper discusses the distribution, changes, supply and demand of oceanic vitamin B-12 in relation to microbes. Some environmental effects and measuring methods are also mentioned.

KEY primary productivity, seawater, microbes, vitamin, distribution

LANG Chinese

18 AUTH Chen, Haowen

AFFI Institute of Oceanology, Academia Sinica

DATE 1983

TITL Mercury-tolerant bacteria in the intertidal and coastal zones of the Jiao Zhou Bay I. Distribution of mercury-tolerant bacteria

CITA Huanjing Kexue 4, 15-20 (1983)

ABST The change in distribution of mercury-tolerant bacteria (MTB) is closely related to the route of mercury pollution. This research showed that MTB of intertidal zones is mainly from waters of land souce; geological differences have an effect on the ratio of clump formation unit (CFU) of MTB/CFU of anaerobic heterotrophic bacteria and the ratio of MT in water/MT in sediments. The frequency of appearance in water was higher than that in sediments, but the absolute amount in sediments was greater than in water.

KEY bacteria, distribution, mercury, pollution, seawater, sediments

LANG Chinese

19 AUTH Chen, Jian-bin; Han, Shu-qin; Huang, Wu-hua; Lin, li; Wang Xian-bin; Xian, Hai-jun

AFFI Institute of Microbiology, Academia Sinica

DATE 1981

TITL Phenol-degrading yeasts in activated sludge and biological film

CITA Acta Scientiae Circumstantiae 1, 331-336 (1981)

ABST 39 strains of phenol-degrading yeasts were isolated from activated sludge and biological film in 7 wastewater treatment plants which contained phenol. All these strains can utilize phenol as the sole carbon source for growth, and remove phenol at 500 ppm more than 90% within 24 hours. They were identified as Candida tropicalis, Trichosporon cutaneum and Trichosporon capitatum. Without being induced, the strain can have concentrations of phenol causing both maximum growth and phenol-resistant growth at about 1000 ppm and 1150 ppm respectively for C. tropicalis; within 24-48 hours about 800 ppm and 1000 ppm for T. cutaneum; and about 750 ppm and 1500 ppm for T. capitatum. The optimum temperature for growth on phenol is 30°C for C. tropicalis; 25--30°C for T. cutaneum; and 25--36°C for T. capitatum. The optimum pH for three of them lies in the range of 4.8--7.0. The phenol-degrading yeasts show obviously inhibitive action on cyanide. The problem of dominant species of yeasts in the biological treatment of wastewater containing phenol was discussed.

KEY phenol, yeast, pH, cyanide, waste water, pollution, environment

LANG Chinese, English abstract

20 AUTH Chen, Jiarong

AFFI Xiamen Fisheries College

DATE 1982

TITL Organic matter in seawater and its relation to the growth of phytoplankton

CITA Journal of Marine Science 6, 56-58 (1982)

ABST The chemical composition of organic matter in seawater is complicated and its concentration is fairly low (2-3 mg/l). In this paper, the composition and category of organic matter in seawater are reported. Certain types of organic matter can affect the growth

of phytoplankton. For example, they may act as organic growth promoters for algae or contribute to heterotrophic growth of other marine phytoplankton.

KEY seawater, phytoplankton, compositions, organic matter, algae

LANG Chinese

21 AUTH Chen, Renlin

AFFI Research Institute of Ma'anshan Iron and Steel Company

DATE 1982

TITL A study on corrosion resistance of marine engineering steel

CITA Journal of Marine Science 5, 12-16 (1982)

ABST Experiments on the corrosion resistance of marine engineering steel by means of imitating-long-ruler connected by electric current showed that the corrosion resistance of low-alloy steel in both atmospheric and splash zones increased on a larger scale as compared with carbon steel, while its effect in the immersed zone was very slight; PV steel series and CrMoCuSi steel are excellent in resisting corrosion in splash zone. And P, V, Mo, Cu alloyed steel also showed good corrosion resisting property in the splash zone.

KEY corrosion, steel

LANG Chinese, English abstract

22 AUTH Chen, Rongsan; Chen, Yuehua; Lu, Yuqin; Xu, Ruran

AFFI Nanjing University (1,2); Jiling University, Changchun (3,4)

DATE 1983

TITL Application of small angle laser light scattering on the study of polymerization of silicic acid

CITA Huaxue Tongbao, 22-24 (1983)

ABST Small-angle laser-scattering technique is used to study the change of molecular weight during the polymerization process of silicic acid and the effect of salt in acidic solution on the polymerization speed of silicic acid. Results show that the addition of salt has no effect on the polymerization speed at the level of pH at which polymerization speed is the slowest. The authors claim that this method can be applied to the study of polymerization of inorganic polyacids.

KEY molecular weight, silicic acid, physical chemistry, speciation, pH

LANG Chinese

NOTE Chen Rongsan is also spelled Chen Rong-san; Chen Yuehua is also spelled Chen Yue-hua.

23 AUTH Chen, Rongsan; Wang, Jinxi; Liu, Haicheng; Dai, Anbang

AFFI Coordination Chemistry Institute, Nanjing University

DATE 1983

TITL Studies on silicic acid and its salts XIV. Reaction of Ca^{2+}, Na^{+} and K^{+} with surface silanol groups of silica gel

CITA Journal of Nanjing University 1, 73-83 (1983)

ABST The reaction of Ca^{2+}, Na^{+} and K^{+} with surface silanol groups of silica gel was studied with ion selective electrodes. It has been found that in $Ca(NO_3)_2$, NaCl and KCl solutions within pH range of 7--10, surface complexes of $(Si_s{\cdot}O)_2Ca$, $Si_s{\cdot}ONa$ and $Si_s{\cdot}OK$ were formed respectively. The formation constants, K, of these complexes were found to be dependent on the concentration of the surface complex, {C}, which could be expressed by the equation: $pK = pK^{\circ} + a \log(1 + b\{C\})$, wherein a and b being characteristic parameters of each metal ion and K°, the formation constant when the concentration effect was eliminated, that is, with

{C} equal to naught, then pK = pK°. The value of pK° for $(Si_s{\cdot}O)_2Ca$ was found to be 12; for $Si_s{\cdot}ONa$, 5.7 and for $Si_sO{\cdot}K$, 5.4.

KEY silicate, calcium, sodium, potassium, dissociation constant, equilibrium, thermodynamics, formation constants

LANG Chinese, English abstract

NOTE Chen Rongsan is also spelled Chen Rong-san; Liu Haicheng is also spelled Liu Hai-Cheng; Dai Anbang is also spelled Dai An-bang

24 AUTH Chen, Rongsan; Zhang, Xueqin; Wang, Baikang; Dai, Anbang (Tai-pong)

AFFI Coordination Chemistry Institute, Nanjing University

DATE 1980

TITL Studies on sillicic acid and its salts - XI - Temperature effect on and activation energy of the gelation process of monosilicic acid

CITA Chemical Journal of Chinese Universities 1, 31-38 (1980)

ABST Using H_3PO_4, HAc and HCl as gelating agents, in a wide range of pH, temperature effect on the rate of gelation of silicic acid was studied at 0°, 20°, 30°, 40°, 50°, and 70°. Activation energy of gelation was obtained therefrom. The results indicated that the activation energy varied with the kind of gelating agents used and pH of the solution. It was found also that concentration of silicic acid had an effect on the activation energy of gelation, however, when the total salt concentration of the solution maintained constant, the activation energy would not change with the concentration of the acid. All these findings had been well explained by the theory of polymerization of silicic acid proposed previously.

KEY sillicic acid, pH, temperature, rate, activation energy, concentration, thermodynamics, silicate, kinetics

LANG Chinese, English abstract

25 AUTH Chen, Shaomou et al.

AFFI unknown

DATE 1982

TITL Geochemical characteristics of the minerals in the surface sediments of the central and northern areas of South China Sea

CITA Symposium on research reports on the sea area South China Sea, 69-98 (1982)

ABST The present paper concludes the preliminary results of mineral-geochemical investigations on the basis of analyses and identification of the surface sediment samples collected from twenty-three surface stations (water depth: 449--4380m) by R/V "Experiment" during its three cruises in 1977--1978 in the central area of South China Sea. The purpose is to investigate mineral-geochemical characteristics of this area from continental slope to the abyssal basin. According to the sea floor relief, water depth, composition and grain size of the sediments, chemical and mineral composition and their distributions, as well as micropaleontological species and their percentages in the sediment, etc., the explored area can be divided into two deposition types: i.e. continental slope-bathyal and abyssal deposition. The major clay minerals in this area are illite, smectite, kaolonite and chlorite. Concentration of kaolinite and smectite in the abyssal sediments is higher than in the continental slope-bathyal sediments, but the percentage of illite and chlorite in the continental-bathyal sediments is higher than in the abyssal ones. Chemical composition of the minerals consists mainly of SiO_2 (35.56--53.19%), CaO (1.39--17.6%), and Al_2O_3 (8.99--17.12%). There is somewhat higher concentration of SiO_2, Al_2O_3, Fe_2O_3, Na_2O, MnO, K_2O, MgO, P_2O_5, as well as the minor elements of Cu, Ni, Ba, B in the abyssal sediments,

while in the continental slope-bathyal sediments there is high concentration of CaO, TiO_2, organic carbon and N. However, exceptions occur on some stations, requiring further investigations. It is obvious that horizontal zonation of mineral composition and variation of sediments with depth exist in this area, causes of which are discussed in this paper. In this paper there is also a discussion about the origin of sedimentary material and pattern of its transportation. It is suggested that major supply of material comes from the mainland and volcanic islands to the northwest, with the former being the main source. Some authigenic minerals may result from chemical or biochemical processes.

KEY minerals, sediments, South China Sea, analytical chemistry, continental slope, abyssal basin, compositions, grain size, sediments, distribution, clays, illite, smectite, kaolinite, chlorite, geochemistry, silicon, calcium, aluminum, organic carbon, transportation, organic nitrogen, copper, nickel, barium, boron

LANG Chinese, English abstract

NOTE The co-authors were not listed

25.1 AUTH Chen, Shunnian

AFFI Institute of Oceanographic Instrumentation, Tianjin

DATE 1982

TITL Implement practical salinity scale 1978

CITA Ocean Technology 3, 4-11 (1982)

ABST The practical salinity scale 1978 has been recommended by the UNESCO/ICES/SCOR/IAPSO Joint Panel on Oceanographic Tables and Standards since January 1982. Salinity is one of the basic parameters to depict the characteristics of seawater. This paper tries to ascertain the problems needed to be solved in the near future by reviewing the development of studies on salinity. The evolution of salinity definition, the

development of salinity scale and techniques for salinity determination are reviewed in detail. Method of using PSS 78 and the highly accurate measuring instruments are introduced. The author suggests to label K_{15} value for domesticly prepared standard seawater, to unify the technique for salinity determination and to convert salinity information collected earlier using PSS 78.

KEY salinity, seawater, chlorinity, conductivity, standard seawater

LANG Chinese

26 AUTH Chen, Suitian

AFFI The First Institute of Oceanography, National Bureau of Oceanography, Qingdao

DATE 1981

TITL Sediments

CITA R/V (Xiangyanghong 09) Observational Report of the Western Central Pacific, 137-170 (1981)

ABST The sediments in the region of observation is pelagic; it is divided into calcareous ooze, siliceous-calcareous ooze, siliceous ooze and brown clay according to the characteristics of sediments. The sources of sediments in the area are as follows: (1) biological sediments (2) volcanic ejecta (3) wind-borne material (4) authigenic sediments at the bottom and (5) cosmic dust. The vertical variation curves of foraminifera, calcium carbonate and clay minerals from columnar sample at L2001 station are similar. The corresponding climate from 5 layers of 4.14 m columnar sample (boundary surface is at 30 cm, 110 cm, 190 cm and 340 cm) includes 3 warm periods and 2 cold periods -warm-cold-warm-cold-warm. The content variation of spore-pollen in the column also reflects the similar climatic temperature. The geological age estimated from the 4.14 m columnar sample at L2001 station is about 2.4x10(E+5) years.

KEY sediments, clays, cosmic dust, foraminifera, calcium carbonate, minerals, geochemistry, paleoclimate, air-sea exchange, climate

LANG Chinese

NOTE Chen Suitian is also known as Chen Sui-tian.

27 AUTH Chen, Yuwang; Li, Pingling; Du, Zhiping; Wu, Yuduan

AFFI Department of Oceanography, Xiamen University

DATE 1982

TITL Studies on the chemical phases of copper and lead in the Jiulong River estuary

CITA Taiwan Strait 1, 41-48 (1982)

ABST The chemical phases of copper and lead in estuarine waters are classified into four types, namely particulate, labile, nonlabile organic complexes and nonlabile inorganic complexes. The reliability of classification technique has been examined. The experiments designed to verify the theoretical distribution of various species's content indicate that the nonlabile organic complexes is about one half of the total dissolved copper. After acidification with HNO_3(2N), 95% of the total copper content in seawater can be recovered in the dissolved phase. The relative errors of ASV for copper and lead are 7.9% and 14% respectively. From our survey of the distribution of these phases of copper and lead in Jiulong River estuarine waters, we have determined that the particulate phases of copper and lead are 64.7% and 56.2% respectively of the total content in estuarine waters. The relationship between nonlabile organic complexed copper and COD as well as total dissolved lead and Cl% are found.

KEY copper, lead, estuary, distribution, chemical oxygen demand, speciation, complexation, anodic stripping voltammetry, particulates, chlorinity, pollution

LANG Chinese, English abstract

28 AUTH Cheng, Bo; Qiao, Juhai

AFFI The First Institute of Oceanography, National Bureau of Oceanography, Qingdao

DATE 1983

TITL Distribution of phosphorus in surface sediment from offshore northern Jiangshu

CITA Journal of Marine Science 1, 33-35 (1983)

ABST The contents of phosphorus in the surface samples from offshore, Northern Jiangshu have been analysed. Determinations of phosphorus were made by spectrophotometric method. The phosphorus content ranges from 0.15 to 0.33%. The concentration of phosphorus in the surface sediment is generally correlated with that in the seawater. The geological environment can be reflected by the concentration of phosphorus in the sediment. Furthermore, based on the distribution characteristics of phosphorus, the sources of sediments can be elucidated.

KEY distribution, phosphorus, sediments, concentrations, determination, spectroscopy, seawater

LANG Chinese, English abstract

28.1 AUTH Cheng, Guangfen; Tu, Renliang

AFFI unknown

DATE 1981

TITL Manganese nodules on the ocean bottom

CITA Geology Publishing Co, 129 pp. (1981)

ABST This book presents the history of manganese nodule studies. It gives the physical property, distribution, structure, mineral and chemical composition, growth rate, formation mechanism, etc. Finally, ocean survey and mining technology are discussed.

KEY manganese nodules, marine resources, distribution, compositions

LANG Chinese

29 AUTH Cheng, Zuliang; Zhuang, Qunmeng; Li, Yujiang; He, Zhanyuan; Wang, Yurong; Xue, Zuolin; Zhang, Jiechen

AFFI Institute of Environmental Chemistry, Academia Sinica (1,2,3,4,5); Institute of Applied Chemistry, Academia Sinica (6,7)

DATE 1983

TITL Determination of NO_x by using potentiostatic electrolysis I. Pt-catalysed diffusio electrode

CITA Huanjing Kexue 4, 21-23 (1983)

ABST The authors conclude that potentiostatic electrolysis is a simple, fast and sensitive method for determining NO_x. The determination of NO_x by using Pt diffusion electrodes is affected by CO, and could be eliminated by using Au diffusion electrodes. The results from this method are consistent with the results from chemiluminescence and colorimetry.

KEY analytical chemistry, pollution, nitric oxide, nitrogen dioxide, electrode

LANG Chinese

30 AUTH Chi, M. H.

AFFI Institute of Oceanology, Academia Sinica

DATE 1965

TITL Advances in marine algal chemistry

CITA Oceanologia et Limnologia Sinica 7, 306-328 (1965)

ABST This is a review on the advances in marine algal chemistry. The chemical composition including: carbohydrates, organic carbon, pigments, vitamins, inorganic elements such as sodium, potassium, magnesium, calcium, indium, bromine, phosphorus, iron, silicon, sulfur, aluminum, copper, manganese, cobalt, chromium, zinc, lead, cadmium, nickel, titanium, vanadium, arsenic, barium, gold, silver, molybdenum, tungsten, rhenium, strontium, and radionucleis such as Fe-59, Co-60, Sr-89, Sr-90, Y-91, Zr-95, Nb-95,

Ru-106, Rh-106, Cd-115, Cs-134, Cs-137, Ce-144, Pr-144 was presented. The biochemistry of algae was also discussed. A total of 323 references were given.

KEY compositions, carbohydrates, organic carbon, pigment, vitamin, sodium, potassium, magnesium, calcium, indium, bromine, phosphorus, iron, silicon, sulfur, aluminum, copper, manganese, cobalt, chromium, zinc, lead, cadmium, nickel, titanium, vanadium, arsenic, barium, gold, silver, molybdenum, tungsten, rhenium, strontium, algae, marine resources, sugar, protein, sulfur-35, carbon-14, pollution, iron-59, cobalt-60, strontium-89, strontium-90, yttrium-91, zirconium-95, niobium-95, rhodium-106, cadmium-1, cesium-134, cesium-132, cerium-144

LANG Chinese

NOTE Chi M.H. is also known as Chi Ming-hou or Ji Minghou

31 AUTH Chi, Ming-hou; Chang, Yen-hsia

AFFI Institute of Oceanology, Academia Sinica

DATE 1962

TITL Quantitative determination of alginate by 9-N fluorene colorimetry

CITA Oceanologia et Limnologia Sinica 4, 100 (1962)

ABST The 9-N fluorene colorimetry is improved in this study. The standard alginate solution is prepared by dissolving alginate in alkaline solution, then the standard acid is used to back titrate the excess base; the actual alginate concentration is calculated which shows higher accuracy than the standard solution prepared from sodium alginate. The concentration of sulfuric acid for hydrolysis is 4:1; the acid is added all at once. The time for hydrolysis is about 20-30 minutes. The two hours needed earlier for adding acid drop by drop is saved and therefore, it is suitable for measurement of large sample size. Results from

the improved method is consistent with that from CO_2 determination; the repeatability of this method is good.

KEY determination, colorimetry, marine resources, analytical chemistry

LANG Chinese

NOTE See Note 30

32 AUTH Chi, Ming-hou; Pu, Shu-zhu

AFFI Institute of Oceanology, Academia Sinica

DATE 1962

TITL Study of amino acids in seaweed I. Determination of amino acids in seaweed by paper chromatography

CITA Oceanologia et Limnologia Sinica 4, 99 (1962)

ABST Formic acid-pyridine solvent system was used for the quantitative and qualitative analysis on amino acid content in seaweed. Experimental procedures are as follows: Seaweed is hydrolyzed in 6N HCl at 145 degree C for 48 hrs., the hydrolysate is dropped on Whatman No. 1 filter paper (25 x 20 cm); two-dimensional chromatography is done at 30 degree C. Then the paper is dried and sprayed with ninhydrin solution and heated to locate amino acids. Amino acid is washed by $CuSO_4$ solution and quantitatively determined by spectrophotometry at wavelength 510 nm. Results show that leucine, isolucine, phenylalanine, valine, glutamine, asparagine, proline, lysine, histidine, arginine, cysteine are in brown, red and green algae, tyrosine and tryptophane are in some algae. The first seven amino acids are also analyzed quantitatively.

KEY amino acids, seaweeds, determination, chromatography, leucine, isoleucine, phenylalanine, valine, glutamine, asparagine, proline, lysine, histidine, arginine, cysteine, algae, tyrosine, tryptophane, analytical chemistry, marine resources, spectroscopy

LANG Chinese

NOTE See Note 30

33 AUTH Chin, Yuan-shan

AFFI Institute of Oceanology, Academia Sinica

DATE 1963

TITL A preliminary study on the morphology and bottom sediment types of the Chinese continental shelf

CITA Oceanologia et Limnologia Sinica 5, 71-86 (1963)

ABST Results show that the maximal width of the Chinese continental shelf is 735 nautical miles, the maximal depth at the outer edge of the continental shelf is 140 m, with average depth 45m and average slope 0°02'. The major morphologic characteristics of the Chinese continental shelf are as follows: (1) the slope is smooth, it is less than 0°02' in Bohai, Yellow Sea and the East China Sea; the slope is larger in the South China Sea; (2) the slope of the inner edge of continental shelf is greater than that of the outer edge; (3) the slope is greater outside the base rock, sandy coast and uplifted area; the slope is smooth outside the muddy coast and submerging coast; (4) inheritance of the morphology appears in the continental shelf. The sedimentary distribution in Chinese continental shelf is that fine-grained sediments distribute in the inner of continental shelf, with ooze the major component; coarser fine-sands mixed with gravels distribute in the outer area of the continental shelf. The formation of sediments can be divided into 2 types at different stages: one is the river-borne modern fine-grained clastic materials; another one is the early-stage seashore sediments immersed by the seawater; the age is around Pleistocene.

KEY continental shelf, depth, Bohai, Yellow Sea, East China Sea, South China Sea, sediments, calcium carbonate, Kuroshio, particulates, manganese nodules, seawater, age

LANG Chinese, Russian abstract

NOTE Chin Yuan-shan is also known as Qin Yunshan

34 AUTH China National Committee for the International Union of Geodesy and Geophysics, Beijing, China

DATE 1983

TITL National report on physical sciences of the oceans

CITA The XVIIIth General Assembly of IUGG, Hamburg, 1983

ABST This report contains the work accomplished in China during the years following the 1979 XVII General Assembly of IUGG held in Canberrra, Australia, dealing with the different fields of earth's sciences which concern the seven Associations of IUGG. As China became a member country of IUGG only in 1977, previous national reports have been lacking and this is the first of its kind. So it includes, to a certain extent, work done before the entry of China in IUGG. Different portions of the report are written by different authors, they are thus not quite balanced in size and arrangement of the texts. It is intended to give the readers a general picture of the results of studies on the earth sciences in China.

KEY marine chemistry, acoustics, optics, thermodynamics, pollution

LANG English only

35 AUTH Chou, Dezhong

AFFI South China Sea Institute of Oceanology

DATE 1982

TITL Density circulation of the central water of South China Sea

CITA Symposium on Research Reports on the Sea Area of South China Sea, 129-139 (1982)

ABST Based on the investigation data obtained in the central water of South China Sea during October, 1977, and June-July 1978, the distribution of the dynamic height relative to the depth of 1,000 m decibar

surface is constructed. During the period of prevailing NE monsoon the open sea off Vietnam is an upwelling region with high salinity and low temperature. The maximum velocity of the surface water exceeds 1.0 knots and at 500 m layer 0.5 knots. The flows are toward north in the east of this region near the Philippines and toward south in the central. This south flow seems as a part of anticyclonic circulation in the northwest of Nansha Islands. Near Nansha Islands the flow velocity is the strongest, and amounts to 2 knots in the surface, and over 1 knot in the 100 m layer. During the period of prevailing SW monsoon, an anticyclonic circulation exists in the west of this area. Under the action of the SW monsoon, in the vast waters between south of a line joining Zhongsha Bank-Huangyan Island and north of the Nansha Islands the currents are not all in the east or northeast direction, but some rotate apparently. GEK data and the results obtained from the drift bottles mainly coincided with the above circulation model.

KEY density, circulation, South China Sea, distribution, salinity, temperature, monsoon

LANG Chinese, English abstract

36 AUTH Chou, Kuo-chen

AFFI Shanghai Institute of Biochemistry, Academia Sinica

DATE 1976

TITL The kinetics of the combination reaction between enzyme and substrate

CITA Scientia Sinica 19, 505-528 (1976)

ABST A stochastic analysis has been made for enzyme-substrate combination reaction systems. The relationship between diffusion-encounter and effective collision has been discussed. A new equation, derived for calculating the combination rates of multiple-active-site reaction systems, will serve to provide a theoretical basis for experimentally

investigating the combination activation energies of liquid phase fast reaction systems. The calculated results show that the usual method employed to estimate the combination rates of multiple-active-site reaction systems is applicable only to the large activation energy concerned, but not to the small. In the latter case, the coupling effect among active sites should not be overlooked. In this paper, the kinetic characteristics of liquid phase fast reaction systems involving conformational changes are further discussed. A new method of separation of kinetic constants has been suggested and the relationship between measuring signal and multi-barrier reaction analyzed. On such a basis, we have derived a general equation which takes into account both the effect of the diffusion-limit and the effects of conformational changes and of solvents, in an attempt to provide a kinetic basis for further investigating the whole process of enzyme-substrate combination reactions.

KEY kinetics, enzyme, diffusion, carbonic acid, carbonic anhydrase

LANG English

37 AUTH Chu, Erqin

AFFI Department of Marine Geology, Shandong College of Oceanology, Qingdao

DATE 1979

TITL Mineral characteristics of manganese nodules in the ocean

CITA Journal of Shandong College of Oceanology, 82-88 (1979)

ABST Eight Fe-Mn oxides and hydroxides have been found in manganese nodules; 7A and 10A manganites are commonly present. In addition to the Fe and Mn, the 10A manganite also contains Ni and Cu; δ-MnO_2 contains Co. The crystal structures of two major minerals are discussed in detail. The manganese minerals in the nodules are affected by the environment, the redox

potential in the environment being the major influence. The mechanisms of the formation of Mn nodules are discussed; (1) Mn^{+2} is oxidized and precipitates directly from seawater; (2) the active surface of $Fe(OH)_3$ colloid catalyzes the oxidation of Mn; (3) the interface formed by adsorbed materials on the nodules raises the oxidation rate and favors the precipitation of Mn^{+2}; (4) biological catalysis by marine bacteria takes place; (5) radioactive elements in sediments activate the Mn^{+2} in seawater. Further study of the mechanism of nodule formation is needed.

KEY manganese nodules, redox potential, seawater, precipitation, bacteria, iron, manganese, nickel, copper, cobalt, ferric hydroxide, adsorption, marine resources, pH, thermodynamics, temperature, oxygen, Eh, free energy

LANG Chinese

38 AUTH Chu, S. P.; Shin, H. Y.

AFFI Institute of Zoology, Academia Sinica (1); Fisheries Research Institute, Department of Fisheries, National University of Shantung (2).

DATE 1949

TITL The variation of certain chemical constituents of biological importance and some other properties of sea water in Chiaochow Bay, August, 1948, to May, 1949

CITA Science and Technology in China 2, 55-56 (1949)

ABST The data collected from station C1 (Long. 120°14'3", Lat. 36°4'43") in this investigation are as a whole considered as more representative than those from other stations situated in the shallow part of the bay. The concentrations of both phosphate and silicate, which are important nutrients for phytoplankton growth, vary considerably at different times of the year. Besides the effects due to the variation in the occurrence of phytoplankton, the concentrations of these nutrients are remarkably

affected by floods, which often wash large amount of nutrient substances into the sea from the land. There is generally no great variation with depth in the concentrations of PO_4-P and SiO_2, as well as chlorinity in the area surveyed. There is only little variation in the water temperature at different depths, and the difference from the mean value is generally not more than 1°C. No thermocline was observed during the summer. Results show that the PO_4-P and SiO_2 contents at station C1 should be able to support a good growth of phytoplankton for the greater part of the year. In the shallow part of the Bay these nutrients are generally higher than those at station C1. To accumulate an unbroken series of data on nutrients over a period of many years is suggested in order to study the fertility of the sea.

KEY Chiaochow Bay, Jiaoshou Bay, phosphate, silicate, phytoplankton, temperature, nutrients, seawater, chlorinity

LANG English

39 AUTH Chu, Tsu You

AFFI National Taiwan University (retired), Taipei, Taiwan, Republic of China

DATE 1982

TITL Laying the foundation for marine science research

CITA World Journal, June 11 and 12, 1982

ABST This is a memoir-type newspaper article by Prof. Tsu You Chu who recollects the development of marine science research in China.

KEY marine chemistry

LANG Chinese

NOTE Prof. Chu was one of the researchers when the Division of Oceanology, Qingdao Meteorological Observatory was established in 1928. He retired from National Taiwan University in 1978.

40 AUTH Churgin, James

AFFI National Oceanographic Data Center

DATE 1980

TITL Marine science programs in The People's Republic of China

CITA Sea Technology, June, 31, 36, 40 (1980)

ABST The history of marine programs in China during the past 30 years is introduced. The first period (1949-mid 1950's) was characterized by a number of diverse programs in fishery research, biological oceanography, and some physical/chemistry measurements. The second period (mid 1950's-early 1960's) included a 12-year plan for Ocean Science Research. With experience, the techniques and quality of observations improved. The third period (mid 1960's-present) includes the period of the Cultural Revolution in China, when virtually all investigations were suspended and almost all progress in science ceased. The Institute of Marine Scientific and Technological Information was established by the National Bureau of Oceanography during this period. The marine activity during this period has been characterized by single-ship area surveys, an increase in the number of coastal stations, the beginning of time-series observations at specific locations, and studies on marine meteorology, particularly on the cause, effect and prediction of storm surges. Organization of marine science programs in China is also introduced in this paper. The author expresses his opinion on the bilateral exchange of marine data between U.S. and China.

KEY marine chemistry

LANG English

41 AUTH Churgin, James

AFFI National Oceanographic Data Center

DATE 1983-1984

TITL The structure of oceanography in China

CITA Oceanus 26, 13-18 (1983-1984)

ABST A delegation of American marine scientists visited China in 1979 in order to gain an understanding of the nature of marine programs in China, to make a preliminary assessment of exchange and assistance that might be implemented and plan for a reciprocal visit by Chinese marine-data specialists. The primary marine agencies in China are introduced, they are National Bureau of Oceanography (NBO)--The First Institute of Oceanography, Second Institute of Oceanography, Third Institute of Oceanography, Xiamen General Ocean Station, Institute of Marine Scientific and Technological Information, Bureau of Aquatic Products, Ministry of Petroleum, Ministry of Transportation, Ministry of Chemistry, Environmental Protection Bureau, People's Republic of China Navy, Ministry of Education, Academia Sinica - South China Sea Institute of Oceanology, Qingdao Institute of Oceanology; the major responsibilities of each agency and their research fields are described in detail. There are a number of colleges and universities in China that have both course curricula and research projects dealing with marine disciplines. The principal oceanographic educational institution is Shandong University, School of Oceanography in Qingdao. The coastal provinces of China run various institutes and laboratories dealing with science and technology, including the marine sciences. The author also evaluates two of China's oceanographic research vessels relative to American-vessel standards.

KEY marine chemistry

LANG English

42 AUTH Dai, An-bang (Tai, An-pang); Chen, Rong-san; Liu, Hai-cheng; Chen, Yue-hua

AFFI Coordination Chemistry Institute, Nanjing University

DATE 1982

TITL Studies on silicic acid and its salts XIII. Dissociation constants of monosilicic acid in the gelation process

CITA Acta Chimica Sinica 40, 767-769 (1982)

ABST Monosilicic acid of sufficient concentration readily sets into a gel. When the logarithm of gelation time (log t) is plotted against the initial pH of the acid solution in a wide enough range, a N-shaped curve would result. According to the theory of polymerization of silicic acid proposed by us previously, the pH values at the maximum and minimum points of the curve bear inherent relations with the dissociation constants of the various species of the monosilicic acid which are involved in the polymerization process. With different acidifying agents and salt concentrations, the maximum and minimum points of the log t-pH curve vary somewhat and the dissociation constants derived therefrom are not constant. In the present study, with a definite acidifying agent, when the total salt concentration is maintained constant, the maximum and minimum points of the log t-pH curve of gelation have been found constant and the dissociation constants calculated therefrom show consistent values.

KEY dissociation constants, pH, silicate, equilibrium, thermodynamics

LANG Chinese, English abstract

NOTE Dai An-bang is also spelled Dai Anbang; Chen Rong-san is also spelled Chen Rongsan; Liu Hai-cheng is spelled Liu Haicheng; Chen Yue-hua is spelled Chen Yuehua

43 AUTH Dai, Dong

AFFI unknown

DATE 1983

TITL Sea and land remote sensing satellites in the 80's

CITA Journal of Marine Science 1, 62-63 (1983)

ABST Four types of remote sensing satellites are introduced (Landsat-D, SPOT, MOS-1, and ERS-1), and the information they will provide on "land resources" and "ocean monitoring" is also mentioned.

KEY remote sensing, resources

LANG Chinese

NOTE Translated by Dai Dong from NERC New Journal 2, 4-5, 1982.

44 AUTH Dai, Zhongdao; Ji, Mingtang; Gu, Jinchen

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1966

TITL The protective action of Ca-Mg coating film on steel with cathodic protection in seawater

CITA Oceanologia et Limnologia Sinica 8, 51-59 (1966)

ABST The Ca-Mg coating film formed on the surface of steel during the cathodic protection in seawater has a significant effect on protection. It can save 9/10 of the protective current used or cut down the time needed for protection by about 1/2. The structure of Ca-Mg mixed film is more compact than the Ca- or Mg-film, also the mixed film has the highest polarization; the Mg-film has higher polarization than Ca-film. During electrification, the protective action of this film is only due to the mechanical covering. After the electric current is cut off, the OH^{-1} protection also contributes to the protection. When the pH of the film is kept at >10, the electric potential is correspondingly kept at more negative values, and the steel will not rust; when the pH of the film is down to 9, the electric potential becomes more positive, and the steel will rust. The OH^- protection of film is provided mainly by the dissociation of $Mg(OH)_2$; the Ca-film shows no OH^- protection. The surficial state of the metal, the flow rate of seawater and the density of the electric

current etc. are factors that show significant influence on the deposition and protective action of the film.

KEY steel, seawater, pH, magnesium hydroxide, corrosion

LANG Chinese, Russian abstract

45 AUTH Dauphinee, T. M.; Klein, H. P.

AFFI National Research Council of Canada, Division of Physics, Ottawa, Ontario, Canada

DATE 1980

TITL The effect of temperature on the electrical conductivity of seawater

CITA Hai Yang Ke Xue 3, 57-61 (1980)

ABST A new method of measuring the variation with temperature of the electrical conductivity of seawater is described. The sample water driven by low air pressure through a fine-tube heat exchanger is brought to thermal equilibrium with a thermostatted bath containing the cell. By operating two exchanger-cell pairs in different baths but supplied from the same sample the ratio of conductances (Ct_1/Ct_2) at any two temperatures t_1 and t_2 is obtained directly. Measurements were carried out on standard seawater, synthetic seawater (35°/$_{oo}$ S), and a lot of Atlantic water (33.2°/$_{oo}$) from below the freezing point to 35°C. In each case the results can be fitted by a 4th order equation with a maximum deviation of any measured point of less than 1 ppm S. The new equation for standard seawater can be introduced into a number of C, T, P→S conversion formulae.

KEY conductivity, temperature, seawater, salinity, standard seawater

LANG Chinese

NOTE Translated by Lin Dehui from Deep-Sea Research 24, 891-902, 1977.

46 AUTH Davies, I. M.; Graham, W. C.; Pirie, J. M.

AFFI DAFS, Marine Laboratory, Torry, Aberdeen (Scotland)

DATE 1979

TITL A tentative determination of methylmercury in seawater

CITA Hai Yang Ke Xue 4, 61-62 and 47 (1980)

ABST A bioassay experiment using caged mussels has suggested a total concentration of methylmercury in the seawater of a polluted estuary of 0.06 ng dm^{-3}. The technique may provide a useful tool for the assessment of relative concentrations of methylmercury in seawater at different locations.

KEY determination, bioassay, mussels, concentrations, estuary, seawater, mercury, analytical chemistry, pollution, marine organisms, fish, sediments

LANG Chinese, English abstract

NOTE Translated by Chen Ziqiang from Marine Chemistry 7, 111-116 (1979)

47 AUTH Diao, Huanxiang

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1981

TITL Reverse osmosis desalination with accompanying high degree of deboronation

CITA Hai Yang Ke Xue 3, 43 (1981)

ABST By using reverse osmosis desaliniation, the author finds that seawater samples can also be deboronated up to 60-73 per cent and concludes that this method is better than electrochemical desalination.

KEY desalination, seawater, boron

LANG Chinese

48 AUTH Diao, Huanxiang

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1983

TITL A study of the determiniation of ammonia in sea water with automatic analyzer oxidation process of sodium hypobromite

CITA Journal of Marine Science 1, 25-28 (1983)

ABST It has been difficult to determine the ammonia in seawater. The author has made improvement to the method of determining the ammonia with the oxidixing reaction of sodium hypobromite proposed by Gao Fengming et al. The method is suitable for Automatic Analyzer due to the finding of the optimal concentration of the oxidizer after adding the complexing agent for calcium and magnesium. This method is proved to be of high precision. The standard deviation is 0.2mg/m^3 at a level of NH_4-N 9.0mg/m^3. The rate of recovery is over 97%. The preparation of reagent is simple and the stability of the reagent can be well maintained.

KEY determination, ammonia, seawater, colorimetry

LANG Chinese, English abstract

49 AUTH Ding, Yongyao; Zhang, Xinmei; Lu, Peiding; Wang, Genyun

AFFI The First Institute of Oceanography, National Bureau of Oceanography, Qingdao

DATE 1983

TITL Determination of chlorophyll a in marine organisms using fluorescence method

CITA Acta Oceanologica Sinica 5, 340-348 (1983)

ABST Fluorescence method is used to determine the chlorophyll a content of phytoplankton in seawater samples. Results are consistent with that from spectrophotometry. Since there is no need to pre-treat seawater samples and only a small amount of sample is required, the authors claim that this method is simple, fast and can be used to measure chlorophyll content of phytoplankton directly on board.

KEY determination, chlorophyll a, marine organisms, fluorescence, phytoplankton, seawater, analytical chemistry

LANG Chinese

50 AUTH Dong, Huiying

AFFI Shanghai First Reagent Plant

DATE 1974

TITL Colorimetric determination of trace lead in the air

CITA Analytical Chemistry 2, 182-186 (1974)

ABST Dimethyl phenol orange is used to determine trace Pb in the air. Pb forms red complex with dimethyl phenol orange (1:1) in the slightly acidic solution. The appropriate conditions for coloration were tested: the maximal absorbance is shown at 530 nm wavelength, optimal pH range is 5.0-6.0, the amount of dimethyl phenol orange [4 x (E-4)M] is 3.0-5.0 ml, the coloration of complex compound completes in 10 minutes and the light density shows no significant change in 24 hours. Ca, Mg, Hg, Ag etc. ions do not interfere with the determination; Fe, Cu, Zn, Ni, Sn, Co, Al, Bi etc. ions can affect the result, but the interference can be eliminated by adding either one or combinations of four different masking agents (potassium ferrocyanide, ascorbic, acid, ammonium fluoride, and potassium chloride).

KEY determination, lead, air, colorimetry, analytical chemistry, pollution

LANG Chinese

51 AUTH Dong, Yunyu

AFFI Lanzhou Institute of Chemical Physics, Academia Sinica

DATE 1982

TITL Glass capillary gas chromatography part I. General Introduction

CITA Huaxue Tongbao, 404-410 (1982)

ABST The basic theory for the gas-liquid chromatography is introduced. Gas chromatography has the following characteristics: high efficiency for separation, high speed for analysis, easy preparation of capillary

column and extensively used. The experimental conditions for gas chromatography are selected based on the separation and analytic time. Capabilities and qualities of the column, qualities and quantities of the fixative liquid, temperature of column and carrier gas are the major factors affecting the analytical result. Optimal practical gas velocity (OPGC) is chosen in practice, which can shorten the time needed for anlaysis, and the vertical diffusion can be overlooked. Low temperature has a beneficial effect on separation. Low density gases such as H_2, He etc. are good carrier gases. The types of capillary column are introduced. Major evaluations for the qualities and capabilities of column are discussed in detail.

KEY chromatography, analytical chemistry

LANG Chinese

52 AUTH Fan, Jiahua

AFFI Research Institute of Water Conservancy and Hydroelectric Power, Academia Sinica; Ministry of Water Conservancy and Electric Power

DATE 1982

TITL Experimental studies on the diffusion of sediment particle in turbulent fluid

CITA Scientia Sinica 25, 99-112 (1982)

ABST Based on the equation of motion of sediment particle settling in turbulent fluid, an expression of vertical diffusion coefficient has been derived under simplified conditions. The vertical diffusion coefficient of a fine particle has the same form as derived from the analysis of Lagrange characteristics of turbulent flow by G.I. Taylor, while the vertical diffusion coefficient of coarser particle is a function of the turbulent velocity of the particle, its settling velocity and density, and the flow

characteristics. Experimental values agree fairly well with the calculated ones based on the theoretical analysis with an empirical coefficient.

KEY diffusion, sediments, settling, particulates

LANG English

53 DELETED

54 AUTH Fan, Shi-ching; Chin, Yuan-shan

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1959

TITL A preliminary study of the bottom sediments of the East China Sea and the Southern Yellow Sea

CITA Oceanologia et Limnologia Sinica 2, 82-84 (1959)

ABST The major source of bottom sediments in East China Sea and southern Huanghai is river water suspensions, so the bottom sediments of this area are of terrigenous origin. Hydrodynamics of seawater is the primary factor on the distribution of sediments in East China Sea and southern Huanghai; the bottom configuration also influences the distribution. The sandy bottom in the area far away from the seashore of southeast of East China Sea may be influenced by the warm current of Kuroshio, and the sandy bottom in the nearshore area is also affected by the high speed of tidal current. The size distribution pattern of the sediments in the investigated area is: the size of sediments becomes finer with distance from seashore (sand→sandy mud→ooze); the configuration of bottom becomes deeper with distance from seashore. This effect of configuration on the size distribution is significant only for the open sea.

KEY sources, sediments, East China Sea, Huanghai, river water, seawater, distribution, Kuroshio, grain size, particulates, size distribution

LANG Chinese, Russian abstract

NOTE Chin Yun-Shan is now spelled Qin Yunshan; Fan Shi-ching is now spelled Fan Shi-qing.

55 AUTH Fan, Shi-qing
AFFI Institute of Oceanology, Academi Sinica, Qingdao
DATE 1982
TITL Earth and the Ocean
CITA Science Press, Beijing, 348 pp. (1982)
ABST This book discusses the origin and development of continents and oceans, the dynamic state of the lithosphere, the distribution of land and ocean, the shape and structure of the earth, its crust and core, its atmosphere, climatic evolution (including the origin of glacial ages), and the evolution of life on earth. The geology of the ocean basins and continental margins is also discussed. Oceanic sediments and their transport in the modern ocean are described, including such features as turbidity currents. Other oceanic phenomena such as tsunamis and earthquakes are also described. The earth's natural resources are discussed, its energy potential for the future and the role of the oceans in providing future resources are also included.
KEY carbon dioxide, green house effect, glacier seawater, marine resources, petroleum, climate, manganese nodules, trace metals, major ions, trace elements, air
LANG Chinese
NOTE Fan Shi-qing is also known as Fan Shi-ching

56 AUTH Fan, Zhengang
AFFI Institute of Oceanology, Academia Sinica, Qingdao
DATE 1982
TITL Studies on the pollution ecology of intertidal zone of the Jiaozhou Bay
CITA Journal of Marine Science 6, 39-41 (1982)

ABST Jiaozhou Bay is a semi-sheltered bay south of the Shandong peninsula where more than ten rivers enter and many marine invertebrates and algae flourish in its littoral zone. From the zoogeographic point of view, this region is transitional from the Northern Temperate North Pacific zone to the Tropical Indo-Pacific zone. The specific composition of the biocoenoses is very rich and complex and of important ecological significance. In this paper the decrease of the specific number and the change of community structure in Jiaozhou Bay and its environmental quality are discussed.

KEY pollution, ecology, Jiaozhou Bay

LANG Chinese, English abstract

57 AUTH Fang, Zhengsheng; Xu, Shibo; Wang, Renguang; Wang, Yifeng

AFFI South China Sea Institute of Oceanology, Academia Sinica (1); Biology Department of Zhongshan University (2,3,4)

DATE 1983

TITL A study on the hypotensive effect and mechanism of soft corals

CITA Tropic Oceanology 2, (1983)

ABST Soft corals belong to Coenlenterata. We have conducted a research on the hypotensive effect of 4 species of soft corals (Lemnalia exilis, Sarcophyton molle, Sinularia elongata, Sinularia capitalis) collected from the South China Sea from April to May 1980 and also on the mechanism of Lemnalia exilis. The results reveal that they have significant hypotensive effect on the experimental animals. As compared with the control groups, their hypotensive effect and the percentage of net hypotensive area are significantly different from those of the control groups ($P<0.001$). And the result of the examination on soft coral hypotensive mechanism demonstrates that

the hypotensive efficiency is peripheral. Soft corals have no poisonous and unhealthy effects on the animals.

KEY corals, marine resources

LANG Chinese, English abstract

58 AUTH Fang, Zhongxi

AFFI Shandong College of Oceanology, Qingdao

DATE 1980

TITL Develop the oceans in order to serve the "Four Modernization"

CITA Hai Yang Ke Xue 1, 6-7 (1980)

ABST The author recommends increased study of oceanography and the development and utilization of marine resources.

KEY marine resources

LANG Chinese

59 AUTH Fei, Chang-pei; Chan, T. H.

AFFI Institute of Chemistry, Academia Sinica, Beijing (1); Department of Chemistry, McGill University, Montreal, Quebec, Canada (2)

DATE 1983

TITL Preparation and application of acetylacetonyl resins for metal ion chelation

CITA Acta Chimica Sinica 41, 364-370 (1983)

ABST A macroreticular resin (YCH_2CHAc_2; Y = PS-DVB resin) containing acetylacetone group can be prepared from macroporous polystyrene (crosslinked with 6% divinylbenzene) by first chloromethylation followed by reaction with acetylacetonate salt of nickel, or sodium or tetrabutylammonium ion. The use of nickel acetylacetonate was found to be the method of choice, according to analyses of the resin with chelation tests, elemental analyses and infrared spectra. The resin YCH_2CHAc_2 can chelate with Fe^{3+} in the 58% to 87% range (from 4 mmol Fe^{3+}/mL aqueous or acetone

solution respecti-ely) or with Ni^{2+} up to 0.072 mmol Ni/g resin (from 0.1 mmol Ni^{2+}/mL aqueous solution). Factors such as pH, concentrat.on, stirring etc. on chelation were investigated. Specific surfaces, thermal stability and swell capacity of resins have been measured.

KEY resins, chelation, extraction, iron, nickel

LANG Chinese, English abstract

60 AUTH Fudan University, Department of Chemistry Analytical Group

DATE 1974

TITL Analysis of trace amounts of mercury by cold vapor atomic absorption spectroscopy

CITA Analytical Chemistry 2, 222-226 (1974)

ABST This paper reported the determination of trace amounts of mercury in rocks, soils, fishes, meat, hair, coal, gasoline, rice, facial powder, water and wine by cold vapor atomic absorption spectroscopy. This method is simple and fast; only 1-2 minutes are needed for each measurement; analytical sensitivity is 0.2 microgram mercury per liter of solution.

KEY mercury, atomic absorption, spectroscopy, soil, fish, coal, gasoline, water, analytical chemistry

LANG Chinese

61 AUTH Gan, Jinghao

AFFI Institute of Polymer Science, Fujian Normal University

DATE 1982

TITL The proposal on moult hormone in Barnacle and new ocean anti-pollution

CITA Hai Yang Tong Bao 1(5), 90-93 (1982)

ABST Moult hormone from Barnacle is used for the prevention of fouling by marine organisms. Synthesizing the proper hormone and adding it into anti-fouling paint is suggested as an effective way to prevent fouling of the marine environment.

KEY hormone, pollution, marine organisms, fouling, marine resources

LANG Chinese

62 AUTH Gan, Jinghao; Gan, Chunji

AFFI The Laboratory of Marine Natural Products, Institute of Polymer Science, Fujian Normal University, Fuzhou

DATE 1982

TITL The application of X-ray diffraction technique in the study of marine products

CITA Ocean Technology 4, 67-72 (1982)

ABST The present authors give a short review on the subject of X-ray diffraction and the application of this technique in studying chemical structures of marine natural products. They give some examples to illustrate the application of this new technique in studying structures of dinosterol, dictyxpin, dolabelldiene and illimaquinone.

KEY X-ray diffraction, marine natural products, marine resources

LANG Chinese, English abstract

63 AUTH Gan, Jinghao

AFFI Institute of Polymer Science, Fujian Normal University

DATE 1982

TITL The development of marine organic chemistry

CITA Hai Yang Tong Bao 1(1), 105-108 (1982)

ABST Preliminary studies in marine organic chemistry involve the investigation of the organic chemical composition in seawater and marine organisms. The categories that have been investigated are: hydrocarbons, humic substances, terpenoids, amino acids and N-containing organic substances, carbohydrates, toxicants and toxins, as well as pigments.

KEY seawater, marine organisms, compositions, hydrocarbons, amino acids, carbohydrates, toxins, pigment, humic acid, organic nitrogen

LANG Chinese only

63.1 AUTH Gan, Jinghao

AFFI Institute of Polymer Science, Fujian Normal University

DATE 1982

TITL A kind of useful marine organics in agronomy and horticulture - Cytomin

CITA Hai Yang Tong Bao 1(3), 95-97 (1982)

ABST A seaweed extract had been demonstrated to have cytomin-like activity, which showed its potential as fertilizer in agriculture and horticulture.

KEY seaweeds, cytomin, marine resources, fertilizer

LANG Chinese

64 AUTH Gan, Zijun

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1980

TITL A new seawater salinity standard - practical salinity scale (1978)

CITA Hai Yang Ke Xue 4, 60-61 (1980)

ABST The new practical salinity scale (1978) was established owing to the extensive use of the CTD recorder in oceanic investigations. According to this standard, seawater with the same relative conductivity have the same salinity. And seawater with salinity 35°/$_{oo}$ does not necessarily have the specific ion composition. The conductivity ratio of the seawter with 35°/$_{oo}$ to the standard KCl solution with gravimetric concentration 32.4357 g/kg is defined to be 1 at 15°C, 1 atm.

KEY seawater, salinity, conductivity, compositions, potassium chloride, standard seawater

LANG Chinese

NOTE Gan Zijun was formerly spelled Kan Tze-Chun or Gan Zi-jun.

65 AUTH Gan, Zijun

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1981

TITL A new equation of state for seawater

CITA Hai Yang Ko Xue 2, 58-59 (1981)

ABST The 1978 UNESCO high pressure equation of state for seawater developed by Millero, Chen, Bradshaw and Schleicher is presented.

KEY pressure, equation of state, seawater, temperature, density

LANG Chinese

NOTE See Note 64

66 AUTH Gao, Jianxi; Lu, Chenggong; Liu, Binchang; Li, Wenqin; Bai, Yelong

AFFI The First Institute of Oceanography, National Bureau of Oceanography, Qingdao

DATE 1982

TITL Preliminary study on foraminifera and calcium carbonate in sediments of western mid-Pacific Ocean

CITA Acta Oceanologica Sinica 4, 586-594 (1982)

ABST Results show that (1) in surficial sediments the number of foraminifera per gram sample decreases gradually with increase in depth of water and in the ratio of benthonic to planktonic foraminifera. $CaCO_3$ in surficial sediments decreases with the increase of depth; in waters deeper than 5000 m, the $CaCO_3$ content is less than 5 percent; (2) the lysocline in this area is at around 3500 m; the $CaCO_3$ compensation depth is at around 5000 m; (3) correlating the change of planktonic foraminifera and dissolving index with time, the author investigated the changing patterns of palaeoclimate; he identified 5 climatic periods: Z, Y, X, W, V; (4) the lower limit age for a rock core of

4.2 m is around 300,000 years; (5) the "Z" period of sedimentation is missing in this experimental station.

KEY foraminifera, calcium carbonate, sediments, Pacific Ocean, lysocline, compensation depth, sedimentation, climate, oxygen-18

LANG Chinese

67 AUTH Gao, Shi-yang; Zhao, Jin-fu; Xue, Fang-shan; Hu, Ting-jin

AFFI Qinghai Institute of Salt Lake, Academia Sinica, Xining

DATE 1983

TITL The chemistry of borate in salt lake brine II. Hydrated Mg-borate crystallizing out from concentrated magnesium chloride brine

CITA Acta Chimica Sinica 41, 217-221 (1983)

ABST The concentrated boron-containing brine was cooled in steps with stirring to 0°C, -10°C and -20°C, with intervals of 8 hours to one week between each. The salts crystallized out at each temperature were removed accordingly. The final clear solution was then kept for a long time at room temperature and -20°C respectively. Hydrated Mg-borates crystallized out from these solutions. They have been analysed by chemical analysis, thermal analysis, X-ray and infrared analysis, and these analytical results show that the hydrated Mg-borates crystallized out from the said brine at room temperature and at -20°C are identical, being $MgO \cdot 3B_2O_3 \cdot 7\text{-}1/2\ H_2O$.

KEY borate, salt lakes, brine, magnesium chloride, X-ray diffraction, temperature, precipitation

LANG Chinese, English abstract

NOTE Gao Shi-yang is now spelled Gao Shiyang

68 AUTH Gao, Shiyang; Li, Gouying

AFFI Qinghai Institute of Saline Lake, Academia Sinica (1); Department of Chemistry, Peking University, Beijing (2)

DATE 1982

TITL The chemistry of borate in salt lake brine (I) -- Behaviour of borate during solar evaporation of brine

CITA Chemical Journal of Chinese Universities 3, 141-148 (1982)

ABST In this paper, we have studied behavior of borate during solar evaporation of brine. The solar evaporation of the borate-containing brine indicates that the crystallization of salts does not accord with Van'thoff's stable equilibrium diagram, but agrees with Kurnakov's solar evaporation diagram. The concentration factor of brine ($W^{\circ}_{brine}/W_{brine}$) equals to that of boron enrichment ($C_{boron}/C^{\circ}_{boron}$) in concentrated brine during solar evaporation. It may be considered that the borate does not generally crystallize out till the stage of bischofite, and accumulates fully in the concentrated brine.

KEY borate, salt lakes, brine, evaporation, thermodynamics, compositions, density, sodium, potassium, magnesium, sulfate, chloride, precipitation

LANG Chinese, English abstract

NOTE Gao Shiyang was formerly spelled Gao Shi-yang

69 DELETED

70 AUTH Gong, Changseng; Kuang, Seng-lu

AFFI Wuhan Institute of Chemical Technology

DATE 1982

TITL The chemistry of solvated electron

CITA Huaxue Tongbao, 501-506 (1982)

ABST The four ways to produce solvated electron are: (1) reaction of alkaline metals with solvent; (2) radiolysis of pure water; (3) photochemical reaction; (4) electrolysis. The theoretical models for solvated

electron are also introduced: (1) molecular orbital model; (2) continuum model; (3) semicontinuum model. The FFK model and CKJ model (both are semicontinuum models) are discussed in detail. Solvated electron has very high diffusivity and transfer rate and is a very powerful reducing agent. In inorganic chemistry, the metal-cation complex can be reduced to a metal complex or metal by solvated electron; In organic chemistry, the reaction of solvated electron is important for studying the redox reaction and can act as a nucleophile in synthetic processes in order to facilitate certain unfavorable reactions.

KEY thermodynamics, solvation, complexation, photochemistry

LANG Chinese

71 AUTH Grant, B. C.; Edmond, J. M.; Spivack, A.; Hu, Ming-Hui; Chen, Zexia

AFFI Department of Earth, Atmospheric and Planetary Sciences, Massachusetts Institute of Technology, Cambridge, Massachusetts (1,2,3); Department of Oceanography, Amoy University, Xiamen, Fujian Province, People's Republic of China (4); Third Institute of Oceanography, Xiamen, People's Republic of China (5)

DATE 1983

TITL Chemical dynamics of the estuary of the Changjiang

CITA EOS 64, 715 (1983)

ABST A reconnaissance of the chemical dynamics of the estuary and plume of the Chiangjiang was carried out on cruises in the summer of 1980 and the winter of 1981. In summer, vigorous turbulence in the main channel of the inner estuary maintains high concentrations of suspended material in the surface layers which suppresses biological activity. Plankton blooms occur only on the inner shelf at salinities greater than about 20 ppt. In winter, there is not

significant photosynthetic activity over the entire mixing zone. Therefore, a wide variety of inorganic processes can be studied in detail. Of the nutrients, nitrate is present in the river in very high concentrations and suffers only minor depletion in the biologically active areas. The distribution of silica is rather similar. Phosphate shows major release from the suspended particulates and complete depletion in the plankton blooms. Among the trace elements, copper and beryllium behave conservatively while nickel and barium are desorbed rapidly at low salinity. Cadmium is undetectable in the river waters (less than 10 pM) but displays a broad desorptive maximum at intermediate salinities in the mixing zone. These data allow fluxes to be calculated for the net transport of dissolved material from the basin of the Chiangjiang to the surface waters of the East China Sea and their comparison with those of other large rivers of the world.

KEY estuary, Changjiang, suspended material, plankton, nitrate, distribution, silica, phosphate, copper, beryllium, nickel, barium, salinity, cadmium, river, transport, photosynthesis

LANG English

NOTE Chen Zexia was formerly Chen Ze-Hsia

72 AUTH Gu, Hongkan

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1980

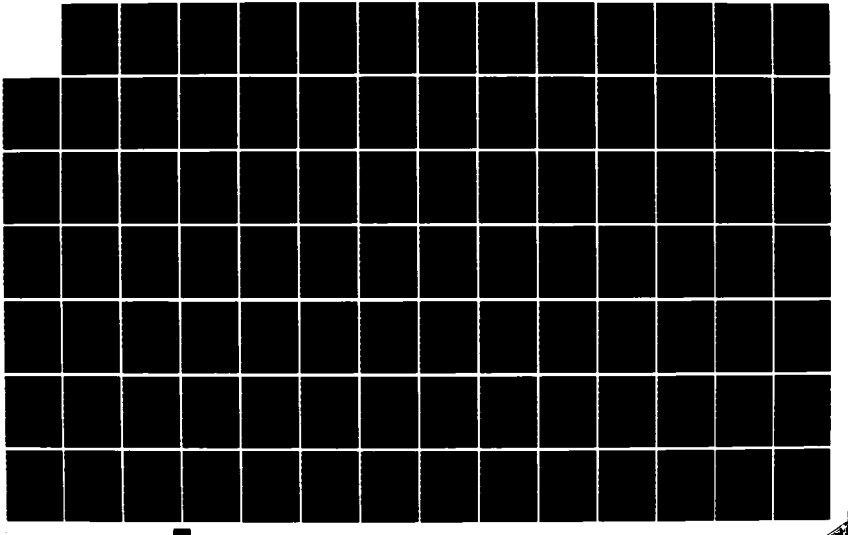
TITL The maximum value of dissolved oxygen in its vertical distribution in Yellow Sea

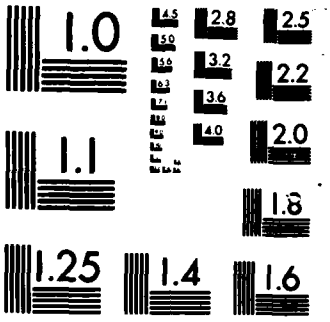
CITA Acta Oceanologica Sinica 2, 70-80 (1980)

ABST The maximum value of dissolved oxygen in its vertical distribution in the Yellow Sea was studied. It is concluded that the oxygen maximum in the summer thermocline is mainly reserved from winter. Similar reservation occurs also in density and temperature in

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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

the cold water mass of the Yellow Sea. Above and below the depth of the oxygen maximum, the oxygen content is decreased by an increase of temperature and the decomposition of organic matter respectively. The oxygen maximum in the cold water mass of the Yellow Sea is a typical one of oxygen maximum in the world sea. The oxygen maximum in the summer thermocline is mainly reserved from winter. This is a general mechanism in the sea. This mechanism can describe all of the oxygen maximum in the world sea. The oxygen maximum may be affected by photosynthesis, which, however is not a decisive factor and occurs only by chance. Photosynthesis can not decide the presence of oxygen maximum except some in special cases over a short period (one or two months). The other physical process is not a decisive factor, but only an affective factor.

KEY oxygen, distribution, Yellow Sea, thermocline, temperature, organic matter, photosynthesis, pH, silicate, phosphate, density, seawater

LANG Chinese, English abstract

NOTE Gu Hongkan was formerly Koo H.K. or Ku Hong-Kan

73 AUTH Gu, Hongkan

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL A physically coated Ag/Ag·Hg/Hg film electrode for inverse polarography

CITA Journal of Marine Science 3, 34-36 (1982)

ABST A new electrode for inverse polarography, physically coated Ag/Ag·Hg/Hg film electrode which is developed from physically coated mercury film electrode, is described. The electrode which keeps a thick Ag·Hg amalgam layer does not need to renew with nitric acid, but needs recoating with mercury biweekly. A clear polarogram of a sea water with ion concentrations of

1.7 ppb Zn^{++}, 0.0088 ppb Cd^{++} and 0.20 ppb Pb^{++} is obtained by electrolysis of 6 ml sea water at -1.3V for 3 min. The errors are < ± 5--13°/$_{oo}$.

KEY electrode, polarography, seawater, concentration, lead, zinc, cadmium, analytical chemistry

LANG Chinese, English abstract

NOTE See Note 72

74 AUTH Gu, Hongkan; Liu, Mingxing

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1973

TITL Physically coated mercury film electrode for single-cell differential inverse polarography

CITA Analytical Chemistry 1, 15-21 (1973)

ABST Single-cell differential inverse polarography results from placing a pair of Hg film electrodes in a electrolytic cell, one of which has been pre-electrolyzed. Differential inverse sweep is carried out, in which i_c of two electrodes compensates each other, so i_p of the pre-electrolyzed electrode can be measured. The electrode is made of silver wire (long 2 cm, ϕ 1.6 mm); the mercury is coated directly. A 25 ml electrolytic solution is needed. The pre-electrolysis time is 3 min. The concentration of lead in seawater is 2 x 10^{-10} M; the analytical error is < 10-15%.

KEY polarography, concentrations, lead, seawater, analytical chemistry

LANG Chinese

NOTE See Note 72

75 AUTH Gu, Hongkan; Liu, Mingxing

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1974

TITL The application of physically coated mercury film electrode for single-cell differential inverse polarography in the analysis of natural seawater I. Determination of Zn^{2+}, Pb^{2+} and Cu^{2+} in natural seawater

CITA Analytical Chemistry 2, 175-182 (1974)

ABST The authors applied physically coated mercury film electrode for single-cell differential inverse polarography to measure Zn^{+2}, Pb^{+2} and Cu^{+2} in natural seawater. Fresh seawater was boiled for 2 minutes in order to eliminate the effects of the catalyst and the oxidizer. Zn^{+2} and Pb^{+2} are measured by standard addition method. Cu^{+2} is measured by a short standard curve. The quantitative and recovery error for 2×10^{-7} M Zn^{+2} are $< \pm 9\%$ and $< \pm 10\%$ respectively; for 2×10^{-10} M Pb^{+2} are $< \pm 11\%$ and $< \pm 15\%$ respectively; for 2×10^{-8} M Cu^{+2} are $< \pm 10\%$ and $< \pm 5\%$ respectively. This method is recommended for use on board for in situ determinations.

KEY polarography, *seawater*, *zinc*, *lead*, *copper*, determination, analytical chemistry

LANG Chinese

NOTE See Note 72

76 AUTH Gu, Hongkan; Liu, Mingxing; Li, Guoji; Bao, Wanyou; Zhang, Shoulin

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1983

TITL The reliability of trace metal analysis in seawater

CITA unpublished, 1-8 (1983)

ABST The reliability of trace metal analysis in seawater is discussed; the trace metals in samples can be contaminated or adsorbed by the sampler or the sample container during collection, storage, or treatment of the samples.

KEY trace metals, seawater, adsorption, determination

LANG Chinese

NOTE Gu Hongkan was formerly spelled Koo H.K. or Gu Hong-Kan

77 AUTH Guan, Dinhua
AFFI unknown
DATE 1982
TITL Sound and the oceans
CITA Ocean Press, Beijing, 210 pp. (1982)
ABST Sound transmission and detection in the oceans are discussed in this book. Topics include absorption, reflection, refraction, sound speed, sound channel, noise and sonar.
KEY absorption, refraction, sound speed, sound channel, temperature, salinity, pressure, magnesium sulfate, borate, acoustics
LANG Chinese

78 AUTH Guo, Fang
AFFI Committee of Environmental Sciences, Academia Sinica
DATE 1981
TITL Developing the science of marine environment
CITA Hai Yang Ke Xue 3, 1-3 (1981)
ABST This paper encourages the development of certain aspects of marine ecological studies for the purpose of protecting the marine environment and utilizing the marine resources.
KEY environment, resources, pollution, remote sensing, petroleum, ecology, pesticides, heavy metals, nutrients
LANG Chinese

79 AUTH Guo, Gongyu; Zhang, Jinglei
AFFI Institute of Oceanology, Academia Sinica, Qingdao
DATE 1979
TITL Electrochemical behavior of aluminum base anode in seawater
CITA Metal corrosion and its prevention 4, 15-21 (1979)

ABST Based on the Al-Zn-In aluminum anode, Mg, B, Be, Zr, Cd etc. elements were added to form different anodes in order to improve the electrochemical capability of the anode. Comparison with Al-Zn-Sn anode shows that: (1) In addition to Al-Zn-Sn 8 other anodes have negative electric potential, high current efficiency, good polarizability, and even surficial corrosion; (2) Mg added to Al-Zn-In alloy can increase the negativity of the aluminum anode without affecting its current efficiency; (3) Cd added to Al-Zn-In alloy can enhance the dissolution of the corrosive product on the anode; (4) trace amounts of B, Be or Zr added to Al-Zn-In alloy result in a greater negativity of the electric potential and also improve the polarizability of the alloy.

KEY seawater, corrosion, alloy, magnesium, boron, beryllium, zirconium, cadmium, tin, aluminum, zinc, indium

LANG Chinese

79.1 AUTH Hai, Biao

AFFI unknown

DATE 1982

TITL Recommendation on the implementation of practical salinity scale 1978

CITA Ocean Technology 3, 24-29 (1982)

ABST The author recommends setting up the base of Chinese practical salinity, to establish the standard equipment and standard solution of different grades in order to implement the practical salinity scale 1978 in China. The use of oceanographic tables, laboratory salinometer, STD and CTD installations; change of rules for marine investigation, teaching materials, references as well as information is also suggested.

KEY salinity, equation of state, seawater, conductivity

LANG Chinese

NOTE The author probably used a pen-name. Hai Biao means oceanic standards.

80 AUTH Han, Wuying

AFFI South China Sea Institute of Oceanology, Academia Sinica

DATE 1983

TITL The consumption rate of dissolved oxygen in abyssal basin water

CITA Nanhai Studia Marina Sinica 4, 115-120 (1983)

ABST According to the equilibrium of dissolved oxygen content we calculated the consumption rate of dissolved oxygen in abyssal basin water which is regarded as a specific circulation model. The value is determined by our derived equation; $R = [n-n_o- (n_z - n_o)e^{WZ/A}]W/[Z + (Z_o - A/W)(e^{WZ/A} - 1)]$. Where R is the consumption rate of dissolved oxygen; n_z and n_o are the dossolved oxygen concentration at the upper and lower bound in the basin respectively; Z_o is the depth, where the dissolved oxygen concentration is n_o; A is the vertical eddy coefficient; W is the uniform upwelling velocity (it may be obtained by the vertical distribution of temperature in sea water); Z is depth and n is the dissolved oxygen concentration corresponding to Z. Applying this equation, according to investigative data gained from the South China Sea Basin in 1978, we calculated the consumption rate of dissolved oxygen; its value is 0.7×10^{-10} ml/l sec. Then, by virtue of this value we made a series of calculations about the properties of the basin water; the uniform upwelling velocity is 8.0×10^{-5} cm/sec; the horizontal current velocity is 1.7×10^{-2} cm/sec; the transport quantity is 6.7×10^{5} m^3/sec; the renewal period of the basin water is about 100 years; the consumed quantity of the dissolved oxygen is ten

percent of the total dissolved oxygen content and the regenerated phosphate is three percent of the total dissolved phosphate.

KEY oxygen, distribution, temperature, seawater, South China Sea, residence time, phosphate, depth, upwelling

LANG Chinese, English abstract

81 AUTH Han, Wuying; Wu, Linxing; Huang, Xineng; Rong, Ronggui; Wang, Hankui; Li, Pengcheng

AFFI South China Sea Institute of Oceanology, Academia Sinica

DATE 1982

TITL Study on the chemical elements of seawater of the central water of South China Sea

CITA Symposium on the research reports on the sea area of South China Sea, 157-175 (1982)

ABST The vertical distribution of dissolved oxygen concentration in the central area of the South China Sea has been discussed in this paper that shows some characteristics as follows: A minimum value commonly exists in the depth of 10 meters, and a maximum value in the lower part of the homogeneous layer (the average value of that being 4.73 ml/l in October, 1977, and 4.77 ml/l in June, 1978). Under the layer of oxygen maximum there occurs the spring layer of oxygen. At many observation stations an inverse phenomenon of dissolved oxygen content is found in the depth of 150-200 meters. At the depth about 800 meters there appears the minimum value of the dissolved oxygen (of which the content averaged 1.73 ml/l in October, 1977, and 1.62 ml/l in June, 1978). Dissolved oxygen is abundant in the abyssal basin where the water exchange is good, and the rate of the oxygen consumption is low (about 0.7×10^{-10} ml/l sec). In the photic layer, in correspondence with the oxygen maximum value, there exists a pH maximum value

(averaged 8.39 in Oct. 1977, and 8.43 in June, 1978). The maximum value of pH appeared in this layer is much deeper than that of oxygen, and the variation range of pH is much greater than that of oxygen too. The maximum vertical gradient of pH exists between 100-200 meters, and the minimum in the depth of 800-1000 meters. But in some observation stations pH minimum values are not so evident. In the same deeper layers, pH value in South China Sea is higher than that in the Northern Pacific Ocean. The contents of the dissolved phosphate and silicate in seawater are low at the upper layer. The former increases rapidly with depth at 50-200 meters while the latter at 100-1000 meters: these changes are not evident below 1000 meters. The characteristics of the vertical distribution of dissolved oxygen, pH, phosphate and silicate in seawater show evidently that they are relatively close to one another; probably the organisms play an important part in them.

KEY seawater, South China Sea, distribution, oxygen, concentration, rate, phosphate, pH, silicate, seasonal variation, depth, marine organisms

LANG Chinese, English abstract

82 AUTH He, Changsheng

AFFI Second Institute of Oceanography, National Bureau of Oceanography, Hangzhou

DATE 1983

TITL Development of high performance membranes for single pass desalination of seawater

CITA Collected Oceanic Works 6, 45-55 (1983)

ABST This paper is primarily concerned with the formulation and material screening of reverse osmosis blend membranes suitable for seawater single-pass desaliniation. The principal parameters bearing on the membrane performance, such as the temperature and time of evaporation in different seasons, heat

treatment and casting solution preservation, are also discussed with a view to optimizing film-making condition.

KEY desalination, seawater, marine resources

LANG English

NOTE This paper has been published on Marine Science Bulletin (China) 1983, No. 2.

83 AUTH He, Liangbiao

AFFI The First Institute of Oceanography, National Bureau of Oceanography, Qingdao

DATE 1982

TITL The change of clay minerals in marine sediment cores and its relationship to the change of palaeoclimate

CITA Kexue Tongbao, 809-812 (1982)

ABST Qualitative and semi-quantitative analyses of clay minerals in core samples are undertaken, and an overall study of the analyzed data confirm the close relationship between clay-mineral composition and palaeoclimate. The author concludes that the relative abundance of illite and montmorillonite increases as climate becomes colder, while the kaolinite content increases as climate becomes warmer.

KEY climate, clay minerals, illite, montmorillonite, kaolinite

LANG Chinese

84 AUTH He, Liangbiao

AFFI The First Institute of Oceanography, National Bureau of Oceanography, Qingdao

DATE 1983

TITL Distribution of clay minerals in the near-shore areas of Huaughe Delta

CITA Kexue Tongbao, 554-556 (1983)

ABST The purpose of this study is to provide information on the distribution of clay minerals in this area. More than 10 samples of surficial sediments are analyzed.

Illite is the most abundant clay mineral in the sediments of this area; kaolinite is the next. Their average contents are 55% and 25% respectively. Chlorite and montmorillonite are around 10%. The distribution of those minerals in this area is controlled and influenced by the materials transported in Huanghe, geochemical environment and hydrodynamic action. The general rule is: From Huanghe estuary to Bohai, the content of kaolinite decreases gradually (from > 30% to < 15%), and the content of illite increases gradually (from < 50% to 70%). However, their distribution diagrams of illite and kaolinte are alike. Those diagrams also show the transportation and spreading characteristics of muddy sands carried by Huanghe: Most of the muddy sands go into Bohai Bay and then into the sediment; small portions go into Caizhou Bay, and then into the sediment or are carried into Huanghai by coastal currents.

KEY clay minerals, Huanghe, distribution, sediments, illite, kaolinite, chlorite, montmorillonite, Bohai, Huanghai, distribution, sand

LANG Chinese

85 AUTH He, Qingxi; Fan, Pin

AFFI South China Sea Institute of Oceanology, Academia Sinica, Guangzhou

DATE 1982

TITL Analysis of cadmium speciation in estuarine waters

CITA Environmental Chemistry 1, 71-75 (1982)

ABST Anodic stripping voltammetry is found to be a reliable analytical method for the determination of cadmium speciation. Suspended granular Cd in water, dissolved unstable Cd, dissolved organic matter combined Cd (by complexation or adsorption), dissolved inorganic matter combined Cd, and dissolved total metal Cd are determined. Since estuarine waters show great variation in salinity, supporting electrolytes should be added to the low salinity water for the normal

function of A.S.V. The pH of seawater influenced by the natural chelators can affect the sensitivity of anodic stripping curve. The relative standard deviation for each speciation is ± 10-20%. Results show that the unstable Cd in filtered water samples can be stored for 3 months at room temperature (20-35°C). In addition to adjusting the pH of water, digestion is also needed for the accurate determination of total Cd.

KEY anodic stripping voltammetry, determination, cadmium, speciation, complexation, adsorption, salinity, pH, seawater, particulates, organic matter, pollution

LANG Chinese

86 AUTH He, Yueqiang

AFFI South China Sea Institute of Oceanology, Academia Sinica, Guangzhou

DATE 1982

TITL Why do we study the "Marine Environmental Pollution"?

CITA Journal of Marine Science 3, 63 (1982)

ABST The meaning of Marine Environmental Pollution is discussed and various fields of this science are introduced.

KEY pollution

LANG Chinese

87 AUTH He, Yueqiang; Wen, Weiying

AFFI South China Sea Institute of Oceanology, Academia Sinica, Guangzhou

DATE 1982

TITL A preliminary study on the pollution of surface sediments of the central area of South China Sea

CITA Symposium on Research Reports on the Sea Area of South China Sea, 187-198 (1982)

ABST A preliminary study has been made over the vicinity of the Zhongsha-Xisha Islands, South China Sea, on 10 kinds of substances including heavy metals and

insecticides, with special regard to the source, content, distribution, and pollution. The following conclusions may be drawn: (1) Of the poisonous substance in the surface of bottom sediments, the content averages lower than the corresponding substance over the north part of the South China Sea, except Cr, Cu, and Cd. (2) The content of Cu, Cd, Hg, As etc. is respectively higher over the deep sea than on the continental slope. (3) These poisonous substances have their main source from the north and northwest parts of the South China Sea. The parent materials include natural matters from terrigenous rocky efflorescence and soil solutes, as well as from human wastes, in addition to biodeposition and volcanic explosion. (4) The content and partition of the poisonous substances are closely related to the ionic electric potential, ionic radius, physical and chemical conditions of the sea water, sea current movement, and the bottom geomorphology. (5) Of the surface sediments in the abyssal basin, a relation exists between the heavy metals (Cu, Cd, etc.) and the Fe-Mn concretions. (6) The distribution of the heavy metals (Cu, Cd, etc.) shows that their quantities in the surface sediments decrease from the shore to the continental slope, and hence increase toward the abyssal areas.

KEY pollution, sediments, South China Sea, heavy metals, pesticide, distribution, partition, mercury, cadmium, arsenic, copper, lead, zinc, chromium, DDT, BHC, radioactivity, pH, bioaccumulation, sources, continental slope

LANG Chinese, English abstract

88 AUTH He, Yueqiang; Wen, Weiying

AFFI South China Sea Institute of Oceanology, Academia Sinica

DATE 1982

TITL Distribution and concentrations of some heavy metals in the offshore bottom sediments, Guangdong province

CITA Tropic Oceanology 1, 58-71 (1982)

ABST This paper presents the result of the study on the concentrations of heavy metals Cu, Pb, Zn, Cr, Cd, Hg and As in the sedimentary samples collected from 78 stations off the south coast of Guangdong Province in 1976-1980. This area stretches from the Qiongzhou Strait in the west to the Taiwan Strait in the east. Areas where high content of heavy metals is found appear in estuaries and bays, especially in the Zhujiang (Pearl River) estuary. Contents decrease seaward and low-content areas lie offshore. The difference between high and low contents is about 5 to 10 times. The decrement of Cu, Cd and Cr seaward is larger than that of other heavy metals. The source of the heavy metals in the bottom sediments and the relation of their content distribution with oceanographic and geologic conditions have been studied. In addition, the coefficient of correlation between the particle size of organic matter and the heavy metal concentration of the bottom sediments has been calculated.

KEY distribution, heavy metals, sediments, particle size, organic matter, concentration, copper, lead, zinc, chromium, cadmium, mercury, arsenic, estuary, pollution, polarography, atomic absorption, colorimetry, spectroscopy, particulates, Taiwan Strait, Zhujiang, sources

LANG Chinese, English abstract

89 DELETED

90 AUTH Horibe, Yoshio and ten others

AFFI Ocean Research Institute, University of Tokyo

DATE 1983

TITL Seawater chemistry

CITA Science Press, Beijing, 398 pp. (1983)

ABST This book was written by well-known marine chemists in Japan. Information on physical chemistry of seawater and circulation of materials in seawater is reviewed systematically. It also gives a thorough description of researches done by Japanese marine chemists.

KEY physical chemistry, seawater, marine chemistry, density, equation of state, temperature, pressure, salinity, thermodynamics, physical chemistry, conductivity, major ions, minor elements, speciation, cycle, oxygen, carbon dioxide, geochemistry, isotopes, age, dating, carbon-14, nutrients

LANG Chinese

NOTE This book was translated into Chinese by Cui Qingchen and Yu Weijun

91 AUTH Hou, Ranjie

AFFI Beijing Normal University

DATE 1982

TITL Forecasting method for the river quality

CITA Journal of Environmental Science, 32-35 and 79 (1982)

ABST Forecasting of river quality consists of ascertaining the present and future state of water quality according to the physical, chemical and biochemical change of pollutants in the water. The purpose of this study is to find a method which is simple, fast and based on sound theory. The estimating and forecasting mathematical models of river quality under steady state was derived; steady state implies that the discharge of pollutants, flow of the river, the flow rate and temperature are constant; the dynamic and time-changing characteristics of the system are then considered. This method is applied to field data collected on Tumen river in north-eastern China. Results show that the estimated value and the observed value of the water quality state have a good

correlation. The author claims that the above-mentioned modeling is effective, can meet the requirements for water quality control.

KEY temperature, rivers, oxygen, biological oxygen demand, pollution, environment

LANG Chinese

92 AUTH Hou, Ranjie

AFFI Beijing Normal University

DATE 1983

TITL Application of system identification and paramenter estimation on the modeling of river water quality

CITA Journal of Environmental Science 3, 58-63 (1983)

ABST Systematic identification and parameter estimation have been applied successfully to the modeling of water quality. In this paper, mathematical theory and the calculation for the parameter estimation are introduced in detail. Estimation method is applied to the Tumen river quality model; the results correspond very well with the practical situation. The author suggests that the initial values of the parameters should be carefully chosen, and both BOD, DO data should be included in the parameter estimation. The inaccuracy of parameter estimation is mainly from (1) choosing the wrong initial data; (2) influences of random interferences (such as rainfall, surface run-off etc.); (3) the unreliability of water quality monitoring data.

KEY river water, oxygen, biological oxygen demand, pollution, environment

LANG Chinese

93 AUTH Hou, Ranjie; Li, Huimin

AFFI Beijing Normal University (1); North-Eastern Normal University (2)

DATE 1982

TITL Mathematical model describing BOD-DO dynamics for rivers in northern China during freeze season

CITA Acta Scientiae Circumstantiae 2, 113-119 (1982)

ABST BOD-DO dynamics for rivers in Northern China during freeze season were investigated. One type of mathematical model which can be used to describe the dynamics was proposed and parameters: deoxygenation rate K_1, reaeration rate K_2, BOD-DO sedimentation and resuspension rate K_3, were determined by a parameter estimation method using the field data based on the Tumen River. Validation of the model shows that the model can describe BOD-DO dynamics better during that season and therefore can be used with the purpose of prediction and control of the Tumen River quality.

KEY rivers, biological oxygen demand, oxygen, kinetics, resuspension

LANG Chinese, English abstract

NOTE Li Huimin is also spelled Li Hui-min

94 AUTH Hsu, Sheng-chieh; Lo, Lan-chun

AFFI Institute of Applied Chemistry, Academia Sinica

DATE 1966

TITL Application of ethyl violet in colorimetric analysis II. Extraction - photometric determination of thallium

CITA Kexue Tongbao 17, 208-209 (1966)

ABST Thallium is extracted by organic solvent then determined photometrically

KEY thallium, extraction, determination, analytical chemistry, colorimetry

LANG English

NOTE Chinese version published in Kexue Tongbao 2, 82-83 (1966); Hsu Sheng-chieh is now spelled Xu Shengjie

95 AUTH Hsu, Sheng-chieh; Lo, Lan-chun

AFFI Institute of Applied Chemistry, Academia Sinica

DATE 1966

TITL Application of ethyl violet in colorimetric analysis II. Extraction - photometric determination of thallium

CITA Kexue Tongbao 2, 82-83 (1966)

ABST Thallim is extracted by organic solvent then determined photometrically.

KEY thallium, extraction, determination, analytical chemistry, colorimetry

LANG Chinese

NOTE English version published in Kexue Tongbao 17.5, 208-209 (1966); Hsu Sheng-chieh is now spelled Xu Shengjie

96 AUTH Hsu, Sheng-chieh; Yuan, Xiushun; Ren, Shichang

AFFI Institute of Applied Chemistry, Academia Sinica

DATE 1965

TITL Application of ethyl violet in colorimetric analysis I. Extraction - photometric determination of antimony

CITA Collected works of the Institute of Applied Chemistry, Academia Sinica 13, 57-61 (1965)

ABST Antimony is extracted by organic solvent then determined photometrically

KEY extraction, determination, analytical chemistry, colorimetry, antimony

LANG Chinese

NOTE Hsu Sheng-chieh is now spelled Xu Shengjie

97 AUTH Hsueh, T. Y.

AFFI Shangtung College of Oceanology; Institute of Oceanology, Academia Sinica, Qingdao

DATE 1964

TITL Advances in comparative biochemistry of marine bioluminescence

CITA Oceanologia et Limnologia Sinica 6, 423-432 (1964)

ABST The biochemical mechanisms of luminescence in representative marine microorganisms as well as marine plants and animals are discussed based on the

preliminary studies on luminous bacteria by the author and the previous studies on bioluminescence by others.

KEY biochemistry, bioluminescence, bacteria, phytoplankton, zooplankton, fish, marine organisms

LANG Chinese

97.1 AUTH Hu, Zhaobin; Zhu, Xiaobin; Li, Yan

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1981

TITL The contamination-proof hydraulic piston water sampler for interstitial use

CITA Hai Yang Ke Xue 3, 28-29 (1981)

ABST A press filter is devised to extract interstitial water from sea bottom muddy samples. Polytetrafluoroethylene is used as the inner part of this filter to eliminate contamination from metals. And No. 45 steel is used for the outer part of the filter to maintain the shape of the filter while it is under pressure.

KEY interstitial water, pore water, sediments, seawater, standard seawater, chlorinity, trace metals, nutrients, sampler

LANG Chinese

98 AUTH Huang, Baoting; Li, Chengzhi

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL KL transformation of multiband spectral remote sensing information on Jiaozhou Bay and its interpretation

CITA Acta Oceanologica Sinica 4, 724-730 (1982)

ABST Karhunen-Loeve transformation (KL transformation) is significant to the transmission of compressed information and the study on the compression of multiband spectral information. The information of Jiaozhou Bay area in the CCT magnetic tape is processed by KL transformation. By examining the

images of main component (λ 1,2) and the morphologic interpretation after the transformation, the authors ascertain that KL transformation is an ideal way for the compression of multiband spectral information.

KEY remote sensing, Jiaozhou Bay

LANG Chinese

99 AUTH Huang, Jinsen

AFFI South China Sea Institute of Oceanology, Academia Sinica, Guangzhou

DATE 1983

TITL The karst features of kays (coral reef) in China

CITA Collected Oceanic Works 6, 98-107 (1983)

ABST The karst types of kays in China are: a) Uptidal type; b) Intertidal (beach) type; 3) Subtidal type; d) Buried type. From inside to outside the karst micromorphology zone of reef-flat may be divided into the following: a) Exposed karst and covered karst zone; b) Seashore dissolution cliff zones; c) Basin zone of dissolution; d) Dissolution platform zone with ravines and stacks; and e) Sea washed cliff zone on the seaward slope of a reef-flat. Study on the karst of kays gives valuable estimations for oil-gas exploration.

KEY calcium carbonate, calcite, aragonite, dolomite, magnesium, calcium, temperature, carbon dioxide, silicon, phosphorus, iron, strontium, carbon-14, dating, petroleum, karst, dissolution

LANG English

NOTE Also published in Tropic Oceanology 1, 12-20 (1982)

100 AUTH Huang, Jinsen; Zhu, Yuanzhi; Zhong, Jinliang; Nie, Baofu

AFFI South China Sea Institute of Oceanology, Academia Sinica, Guangzhou

DATE 1982

TITL The reef-islands relief and characteristics of sedimentation in the central and northern areas of South China Sea

CITA Symposium on Research Reports on the Sea Area of South China Sea, 39-67 (1982)

ABST This paper is based on explorations in the Xisha Islands, Zhongsha Islands, and Huangyan Island (Democracy Atoll) etc. as well as the results of analysis in laboratory. The reef-building corals (Scleractinia) are dominant absolutely over all other reef-building organism in this area where over 100 species belonging to 32 genera of Schleractinia have been found. The coral reef islands can be divided into two types: the oceanic atolls standing on the central abyssal basin (e.g. Huangyan Island); and the reef-islands (various atolls or table reefs) on the terraces of the continental slope (e.g. Zhongsha, Xisha, Dongsha Islands etc.). The only exception is a volcanic island-Gaojianshi Island, it consists of tuffaceous lava (being formed 2.05 million years ago according to K-Ar age dating). The sedimentary facies of coral reef islands can be divided into 4 types: i.e. facies of the reef-fore; the reef-flat; the lagoon; and the supratidal zone. The reefs growth rate in this area is 1-3 mm/yr. The diagenesis of reef-islands such as the cementation, transformation, metasomatosis, solution and infiltration of the carbonate sediment, are carried on 2 stages: the syngenetic diagenesis and hypergene diagenesis. In the subtidal zone, besides the algal cohesive, there are acicular crystals of aragonite in some of the coral pore spaces; in the tidal zone, the carbonate cementation minerals are primarily acicular aragonite and micrite of aragonite, as well as micrite of magnesium calcite; and above the tidal zone, the cementation minerals are grained calcite and collophane. The crystal habit of cementation minerals

of carbonate is influenced by matrix material. Enclosing crust of algae, algal cohesive and boring holes are the biological action of the carbonate sedimentation of marine facies which can be often seen.

KEY sedimentation, South China Sea, corals, continental slope, growth rate, diagenesis, cementation, transformation, aragonite, magnesium calcite, carbonates, algae, marine organisms, dissolution

LANG Chinese, English abstract

101 AUTH Institute of Environmental Chemistry, Academia Sinica

AFFI Institute of Environmental Chemistry, Academia Sinica

DATE 1983

TITL An investigation of the distribution of chlorinated pesticides in Jiyun River

CITA Journal of Environmental Sciences 4, 12-14 (1983)

ABST The distribution of chlorinated pesticides in river water and bottom mud of Jiyun river is reported. Results show that the concentration in deep river water samples is lower than that of the surface water; the concentration in the bottom mud is also lower. The major source of contamination is effluent from pesticide factories, the pesticide residue itself and contaminated soil.

KEY distribution, pesticides, river water, concentrations, soil, sediments, sources, pollution

LANG Chinese

102 AUTH Institute of Hydrogeology and Engineering Geology, Chinese Academy of Geological Sciences

AFFI Institute of Hydrogeology and Engineering Geology, Chinese Academy of Geological Sciences

DATE 1976

TITL Karst in China

CITA Karst in China, Shanghai People's Publishing House, 1976, 148 pp.

ABST Main karst types of carbonate and non-carbonate rocks in China are listed. The formation of karst, utilization and transformation of karst are also discussed.

KEY calcium, magnesium, carbon dioxide, bicarbonate, karst, carbonates, calcium carbonate, limestone, dolomite, calcite, solubility, oolite, natural waters

LANG Chinese only

103 AUTH Institute of Hygiene, Chinese Academy of Medical Sciences

AFFI Institute of Hygiene, Chinese Academy of Medical Sciences

DATE 1979

TITL Analytical methods of water-quality

CITA People's Hygiene Press, 375 pp. (1979)

ABST This book describes the analytic methods for assessing the quality of water, analyzing human-waste sewage and industrial sewage, and the determination of water quality by the presence or absence of certain aquatic organisms. Some new instruments are also described.

KEY determination, analytical chemistry, pollution, colorimetry, carbon dioxide, pH, particulates, alkalinity, calcium carbonate, calcium, magnesium, sulfate, chloride, silicate, phosphate, iron, manganese, aluminum, zinc, copper, sodium, potassium, ammonia, oxygen, lead, cadmium, chromium, arsenic, selenium, fluoride, iodide, DDT, mercury, phenols, nitrate, colorimetry, spectroscopy

LANG Chinese

104 AUTH Institute of Hygiene, Chinese Academy of Medical Sciences

AFFI Institute of Hygiene, Chinese Academy of Medical Sciences

DATE 1974

TITL Determination of DDT and phenyl-hexachloride in surface water by gas chromatography

CITA Analytical Chemistry 2, 199-202 (1974)

ABST The concentration of organic chlorine-containing pesticides is at the level of μg-ng/l in the surface water. Gas chromatography is known as the best method for detecting the trace quantity of these pesticides. This paper studies the selection of stationary phase and solvent, and the effects of the sample volumes injected. DDT and phenyl-hexachloride ($C_6H_6Cl_6$) both show a DC-200 and 5% silicon oil AF-1 act as stationary phase. Since the area underneath the peak is not linear to the volume injected, the volume of sample injected should be the same as that of the standard. The area underneath the peak is linear to the concentration only in a very narrow range, so the concentration of standard injected should be similar to that of sample. When chloroform or benzene is used as extractant, the recovery for DDT is above 75% and that for $C_6H_6Cl_6$ is above 80%. Chloroform is a better extractant becuase of the lower emulsion and simpler practice. The specific conditions for chromatography and the experimental procedures are introduced in detail.

KEY DDT, gas chromatography, concentrations, pesticides, BHC, natural waters, pollution

LANG Chinese

105 AUTH Ji, M. H.; Shi, S. Y.; Pu, S. Z.; Zhang, Y. X.

AFFI Institute of Oceanology, Academia Sinica

DATE 1963

TITL Further studies on the comprehensive utilization of Laminaria japonica aresch

CITA Studia Marina Sinica 3, 77-101 (1963)

ABST A method of comprehensive utilization of Laminaria japonica had been suggested previously[3], on the basis of which further studies were carried out in

greater details, the following results being obtained: 1) Extraction of water soluble components from the raw material with warm water was confirmed to be better than with dil. acid, which will cause certain degree of degradation of alginic acid, the main product of comprehensive utilization (Tab. 5). Although at 70-80°C the amounts of iodine and potassium dissolved appeared to be higher than those at low temperatures, yet from the points of view of economization of fuel and maintenance of high viscosity of the alginic acid, extraction at about 55°C twice, first with 10-12 times and second with 8 times of water by weight of the raw material used for 1 hr per extraction, seemed to be more reasonable (Tab. 1,2,3 and 4); 2) Extraction for mannitol from the water extract with 90% alcohol twice, first with 5 times and second with 3 times of alcohol by weight of the extract for 15-30 min. per extraction, were found to give the best results (Tab. 6,7,8 and 9); 3) Among the purification methods of mannitol the highest purity (95%) and complete recovery were obtained in ion-exchange method, 93% in purity and 72% in recovery in the alcohol recrystallization method after crystallization twice, while in water recrystallization method the recovery was very low, being only 50-65%, though the purity might attain 94% (Tab. 10,11 and 12); 4) Evaporation method for mannitol without using alcohol has been studied (Fig. 1). The water extractive liquor was first eliminated from organic impurities with alkali and acid, and then concentrated to a preferable concentration, crude mannitol thus isolated having a purity of 53-58%, amounting to 50-54% of the total mannitol contents in the raw material (Tab. 13, as T_3, U_2 and V_2). Pure mannitol may be prepared from the crude mannitol by any of the purification methods mentioned above; 5) The remaining residue after the extraction of mannitol

with alcohol was carbonized, and extracted with hot water. The aqueous extract was then concentrated on direct heat evaporation to a definite concentration (Sp. gr. 1.24-1.26, Boiling temp. 108°C) and cooled to room temp. The crude crystals thus settled out were rich in potassium, amounting to 42% of the total potassium contents in the raw material (Tab. 14); 6) The waste liquor after the alcohol was distilled out was confirmed to be rich in iodine and a good source for its preparation (Fig. 1). By direct oxidation and distillation iodine liberated amounted to 85% of the total iodine contents in the raw material (Fig. 2, (C)); 7) In the study of fractional precipitation for obtaining laminarin from the aqueous extract of the remaining residue after the extraction of mannitol, it was found that in alcohol fractional precipitation method in the precipitate at 20% alcohol (W/V) the laminarin was relatively abundant (Tab. 17), while in lead acetate precipitation method, it was richer in the filtrate obtained after treating the liquor with lead acetate and then barium hydroxide solution (Tab. 18); 8) A practical flow sheet of laboratory procedure for complex utilization of Laminaria japonica is presented in Fig. 1. With this procedure and under conditions mentioned above, products such as alginic acid, mannitol, iodine, crude potassium chloride or crude laminarin mixture can be successfully obtained from Laminaria japonica.

KEY extraction, iodine, potassium, marine resources, kelp, potassium chloride

LANG Chinese, English abstract

NOTE Ji M.H. is also known as Ji Ming-hou, Ji Minghou or Chi Ming-hou; Shi S.Y. is also Shi Sheng-yao or Shi Shengyao; Pu S.Z. is also Pu Shu-zhu

106 AUTH Ji, Ming-hou; Shi, Sheng-yao; Liu, Wan-ging

AFFI Institute of Oceanology, Academia Sinica

DATE 1965

TITL Studies on the agar from Gracilaria verrucosa I. Extraction and treatment of agar

CITA Shui-Chan Zue-Bao 2, 1-12 (1965)

ABST 1) It is recommended to extract the Gracilaria agar by steam in an autoclave or an open kettle to shorten the extracting time and to facilitate the filtration. Extraction of Gracilaria agar under 3 lb/in^2 of steam pressure with 30- or 40-fold of water for 1 to 1 1/2 hour and then with 15-fold of water for a half hour, seemed to be more preferable (Table 1,2,3). 2) When NaOH or KOH was used as an extracting reagent, the gel strength of agar obtained was highly increased, and NaOH appeared to be more effective than KOH (Table 4). The mixed reagents of NaOH and KH_2PO_4 showed more marked effect on the yield of agar than did NaOH alone. But the effect of the combination of NaOH and neutral salts solution was about the same as the NaOH alone (Table 5), and various salts without NaOH exhibited no distinct effects (Table 6). 3) On the addition of K, Ca, Mg salts to the agar sol, their gel strength was enhanced in spite of whether or not being heated (Table 7), while the agar sol, treated with NaOH+KH_2PO_4 under 5 lb/in^2 of steam pressure for 1-2 hours, and then cooled, thawed and dried, also gave a higher gel strength with about 60% of recovery (Table 8). 4) The extracted liquor from Gracilaria after adding alkali and heating gave a higher gel strength than untreated, while no distinct change was observed if inorganic salts were added (Table 9). Our experiment on the effect of different heating time upon the extracted liquor treated with alkali indicated that their gel strength increased with the increase of heating time under 3 lb/in^2 of steam pressure, but the yield was relatively low. Judging from the gel strength, the treatment with 1% NaOH under 3 lb/in^2 of steam pressure for 2 hours seemed to

be an optimum condition in obtaining a good quality of agar (Table 10). 5) The treatment of Gracilaria with $NaOH+CaCl_2$ or NaOH along[2] showed no marked difference in the gel strength of agar. In the alkali-treated liquor remained about 10% of agar, which might be recovered by freezing-drying. The thalli of Gracilaria after treatment with alkali ought to be washed as thoroughly as possible with running water before the extraction to remove the alkali, or neutralized with acid, and were then subjected to extraction (Table 11).

KEY agar, extraction, marine resources, seaweeds

LANG Chinese, English abstract

NOTE See Note 105

107 AUTH Ji, Ming-hou; Shi, Sheng-yao; Tseng, C. K.

AFFI Institute of Oceanology, Academia Sinica

DATE 1960

TITL On the iodine contents of some Chinese economic brown algae

CITA Oceanologia et Limnologia Sinica 3, 205-213 (1960)

ABST The iodine contents of 25 samples of Chinese economic brown algae and 2 samples of imported haidai (Laminaria japonica) were determined with the nitrous acid-urea method suggested by Suzuki[10]. The results obtained show that the iodine content of Laminaria japonica cultivated in Tsingtao reaches as high as 0.488%, a value about twice as much as that of the imported Laminaria japonica, while that of Ecklonia kurome from Fukien is 0.198%. Both of these native species are considered to be worthy of commercial exploitation as raw materials for iodine production. The iodine contents of the species of Sargassum which grow in large quantities along the China coast are remarkably low in value. For instance, in Sargassum pallidum, one of the most common seaweeds in the Yellow Sea region and the raw material for our algin

industry in the north, the iodine content is only 0.024-0.049%. It is therefore concluded that this species could not serve as raw material for commercial iodine production unless some new complex utilization method could be devised to make iodine extraction sufficiently profitable. It is on some interest to note that in some samples of Sargassum collected from the South China Sea coast, their iodine contents reach a relatively high value of 0.153%. Since the sargassa grow in the South in enormous quantities, exploitation of these seaweeds as raw materials for our iodine industry may not be entirely impossible.

KEY iodine, algae, marine resources, South China Sea

LANG Chinese, English abstract

NOTE See Note 105

108 AUTH Ji, Minghou; Tsao, Wenda

AFFI Institute of Oceanology, Academia Sinica

DATE 1982

TITL Humus in seawater

CITA Journal of Marine Science 2, 48-54 (1982)

ABST This is a review paper on humus in seawater. The definition of seawater humus is given, and the general methods for separating seawater humus are introduced. Its chemical characteristics are discussed with respect to: (1) element composition; (2) ultraviolet-visible spectra in seawater; (3) fluorescent spectrum in seawater; (4) infrared spectrum; (5) $\delta^{13}C$; (6) acid titration; (7) distribution of molecular weight; (8) ^{1}H-NMR spectrum; and (9) ^{13}C-NMR spectra. The chemical structure of humus and its complexation with metal ions are also discussed. The ecological effects of seawater humus on marine life are presented.

KEY compositions, NMR, complexation, seawater, dissolved organic matter, particulates, organic matter, humic acid, fulvic acid, fluorescence, fatty acids, amino

acids, pH, calcium, magnesium, manganese, cobalt, nickel, copper, cadmium, zinc, mercury, speciation, hydroxide, sulfide, carbonates, sediments, primary productivity, phosphate, nitrate, silicate, carbon-13

LANG Chinese

NOTE See Note 105

109 AUTH Ji, Minghou

AFFI Institute of Oceanology, Academia Sinica

DATE 1979

TITL Progress of researches in marine chemistry in China

CITA Huaxue Tongbao 4, 299-301 (1979)

ABST The researches in marine chemistry in China can be divided into chemical oceanology and applied marine chemistry. 1) Studies on chemical oceanology: In the 50's, overall oceanic investigations had been done and a series of on-board analytical methods of seawater were established. In the 60's, the distribution patterns of N-speciation and the geochemistry of Fe in Jiaozhou Bay and Yangtze River mouth were studied. Recently the trace elements in seawater and interstitial water of sediments in continental-shelf of East China Sea, the major elements in the deep sea of West Pacific, the distribution of active Si in Jiulong rivermouth and the adsorption process are all studied. Isotopic elements in seawater and the pollution effect are two popular topics. The researches in physical chemistry of seawater include systematic study on the theory of inorganic ion-exchange and adsorption, the effect of major electrolytes in seawater on salinity and specific gravity, and measurements of En, Es, pH and electro-conductivity etc. physical-chemical parameters in surficial sediments of East China Sea. 2) Studies on applied marine chemistry: seawater resource chemistry, desalination of seawater and metal corrosion are three major fields. The analytical methods and instruments used in these studies have

been improved for better results. In the future, more researches on physical chemistry, inorganic chemistry, organic chemistry and radioactive chemistry should be developed, as these are fundamental to chemical oceanology; and theoretical studies should be made in applied marine chemistry.

KEY marine chemistry, seawater, distribution, speciation, geochemistry, Yangtze River, trace elements, interstitial water, East China Sea, major ions, adsorption, pollution, ion-exchange, salinity, specific gravity, pH, conductivity, sediments, desalination, corrosion, physical chemistry, iron, nitrogen, silicate, continental shelf, marine resources, Eh

LANG Chinese

NOTE See Note 105

110 AUTH Ji, Minghou

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL Polyphenolic compounds and humus from sea algae

CITA Journal of Marine Science 5, 44-48 (1982)

ABST Sea algae partially account for the dissolved organic matters, especially the water-soluble secretion from phaeophycean, in near-shore waters. Four groups of polyphenolic compounds from sea algae are discussed in this paper: fucols, fucophloroethols, phlorethols and fuhalols. The chemical characteristics of sea algae humus are also mentioned. These polyphenolic compounds can form complexes with most of the metal ions.

KEY algae, resources, humic material, complexation

LANG Chinese

NOTE Ji Minghou was formerly spelled Ji Ming-Hou or Ji M.H. or Chi Ming-hou

111 AUTH Ji, Minghou; Tsao, Wenda

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL Humus in marine sediments

CITA Journal of Marine Science 3, 43-47 (1982)

ABST The formation of marine humus starts from the water column and proceeds into the sediments. The separation of humus from sediments is mentioned, and the chemical composition and properties of marine humus in sediments are discussed in detail. The study of the origin, distribution, transport, chemical composition, structure and chemical reactions of marine humus may yield new concepts in geochemistry.

KEY sediments, compositions, geochemistry, sources, distribution, humic material, transport

LANC Chinese

NOTE Ji Minghou was formerly spelled Ji Ming-Hou or Ji M.H. or Chi Ming-hou

112 AUTH Jiang, Jialun; Xu, Zhimin

AFFI The Second Institute of Oceanography, National Bureau of Oceanography, Hangzhou

DATE 1982

TITL A survey of the preliminary appraisal of some marine organism specimen from Newcam Bay of Antarctica

CITA Haiyang Tongbao 1(1), 114-115 (1982)

ABST Several specimens of marine organisms from Newcam Bay of Antarctica were studied; they are Thematomus bernecchii Boulenger, Beroe cucumis Fabrius, Desmarestia compressa (Reinsch) Skottsb, Iridaea cordata (Turn.) Bory and adhesive diatom.

KEY marine organisms, diatom, Southern Ocean

LANG Chinese

113 AUTH Jiang, Lijin (Chiang, Li-Chin); Ma, Jinshi; He, Huizhu; Zeng, Fanjie; Yang, Zixuan; Liu, Yongyong

AFFI Institute of Photographic Chemistry, Academia Sinica

DATE 1983

TITL Some properties of R-phycoerythrin

CITA Oceanologia et Limnologia Sinica 14, 315-323 (1983)

ABST The adsorption and fluorescence spectra of R-phycoerythrin from Polysiphonia urceolata in neutral, acidic, alkaline aqueous solutions and in presence of zinc acetate were measured. The excitation energy transfers, in aqueous solutions, through R-phycoerythrin, C-phycocyanin, Allo-phycocyanin (isolated from Porphyra yezoensis), Beta-carotene and chlorophyll a (isolated from Impatiens sultanii Hook, f.) were observed. The molecular weights of the two subunits and the ratio of the two subunit contents were determined by SDS-Discontinuous Polyacrylamide Gel Electrophoreses. The n's of the aggregate composition $(\alpha_2\beta)_n$, in neutral buffer, were determined to be both 6 and 9 through Sephadex G-200 Gel Filtration. The concentration effects of the fluorescence spectra of R-phycoerythrin in solutions of various concentration were observed. The quenching effect on the fluorescence of R-phycoerythrin by iodide ion was measured. When $F_0/\Delta F$ was plotted against $I/[I^{-1}]$, a straight line was obtained. Through the quenching test, the presence of different aggregate forms was further proved.

KEY chlorophyll, fluorescence, protein, biochemistry, marine organisms

LANG Chinese, English abstract

114 AUTH Jiang, Shanchun; Fu, Jiamo; Lin, Maofu; Yan, Zuopeng; Tang Yuanqian

AFFI Institute of Geochemistry, Academia Sinica (1,2,3,4); The 2nd Institute of Oceanography, National Bureau of Oceanography (5)

DATE 1983

TITL Fatty acid distribution in East China Sea sediments

CITA Geochimica, (1983)

ABST Monocarboxylic acids and dicarboxylic acids in sea-floor sediments of the Jizhou Island and estuarine sediments at the Yangtze River mouth have been examined by using thin layer chromatography and gas chromatography as well as computerized gas-chromatography-mass-spectrometry. Free and bound fatty acids distributed in the sea-floor sediments show remarkable even/odd predominances except for sample 8138. Monocarboxylic acids show a unimodal distribution, ranging from n-C_{14} to n-C_{32} with the maximum at n-C_{16} while dicarboxylic acids also show a unimodal distribution, ranging from di-C_{16} to di-C_{32} with the maximum at di-C_{24} or di-C_{28}. Evidence from the distribution of fatty acids in the East China Sea sediments indicates that these monocarboxylic acids are probably derived from algal debris and these dicarboxylic acids are derived from terrigenous higher plant detritus.

KEY distribution, sediments, Yangtze River, gas chromatography, fatty acids, East China Sea, detritus, mass spectroscopy

LANG Chinese, English abstract

115 AUTH Jing, Jianmin; Zhou, Fuxian; Li, Jingchang; Chen, Changdu

AFFI unknown

DATE 1983

TITL Environmental protection

CITA Science Press, Beijing, 195 pp. (1983)

ABST This book explains what causes pollution and how to monitor and ameliorate the problem.

KEY pollution, pH, DDT, BHC, cyanide, thermal pollution, zinc, phenol, ammonia, sulfur, radium, uranium, strontium-90, particulates, acid rain, lead, fluorine, trace metals, carbon dioxide, mercury, bioaccumula-

tion, oil, marine resources, arsenic, ozone, ion-exchange, adsorption, enviroment

LANG Chinese

116 AUTH Jing, Zhenhua

AFFI Department of Oceanography, Shandong College of Oceanology, Qingdao

DATE 1982

TITL Sea water density calculator

CITA Haiyang Tongbao 1, 1-12 (1982)

ABST A seawater density calculator is introduced which can calculate $\sigma(t)$, ρ, in a simpler way. The principle for calculating seawater density is discussed; the in situ seawater density (ρ) is the function of salinity, temperature and pressure. The design and use of the calculator are illustrated and explained in detail.

KEY seawater, density, pressure, salinity, temperature

LANG Chinese

117 AUTH Kinzelbach, W.; Hou, Ran-jie; Li, Hui-min

AFFI Institute of Environmental Chemistry, Academia Sinica (1); Department of Geography, Peking Normal University (2); Department of Geography, North-Eastern China Normal University (3)

DATE 1981

TITL Modeling of BOD-DO dynamics in Tu Men River

CITA Acta Scientiae Circumstantiae 1, 166-179 (1981)

ABST A method for mathematical modeling of the BOD-DO dynamics of a river is described. The method is applied to field data collected on Tu Men River in North-Eastern China. In this model of Tu Men River quality the functional structures of the deoxygenation coefficient k_1, reaeration coefficient k_2 and BOD sedimentation-resuspension coefficient k_3 are established and the parameters determined by a regression technique to suit the characteristics of a river in the mountain area of North-Eastern China. In

the model the sedimentation-resuspension coefficient k_3 is given in the form of a single analytical function of the flow rate in the river. The model can also be used as basis for a river quality management scheme to be carried through on Tu Men River.

KEY rivers, kinetics, oxygen, biological oxygen demand, resuspension, sedimentation

LANG Chinese, English abstract

NOTE The present address of Kinzelback is the Max-Planck Institute, West Germany; Hou Ran-jie is also spelled Hou Ranjie; Li Hui-min is also Li Huimin.

118 AUTH Koo, H. K.

AFFI Institute of Oceanology, Academia Sinica

DATE 1965

TITL Marine geochemistry of elements

CITA Oceanologia et Limnologia Sinica 7, 73-83 (1965)

ABST Marine geochemistry of elements deals with not only the content, distribution, speciation and transfer processes of the chemical elements in seawater, but also the mechanism of the processes. Major elements, bio-limiting-elements, trace elements as well as radioactive and stable isotopes are all studied. This paper reviews researches on the geochemistry of major elements including Cl^-, SO_4^{-2}, HCO_3^-, Br^-, F^-, H_3BO_3, Na^+, Mg^{+2}, Ca^{+2}, K^+, Sr^{+2} etc., bio-limiting-elements including N, P, Si etc., trace elements such as Fe, Mo, Mn, Cu etc.; and isotopes such as U^{238} series, U^{235} series, Th^{232} series, Cs^{137}, Sr^{90}, Ce^{144}, C^{14} etc.

KEY geochemistry, distribution, speciation, major ions, trace elements, isotopes, sulfate, carbonates, bicarbonate, sodium, magnesium, calcium, potassium, strontium, boron, nitrogen, phosphorus, silicon, iron, molybdenum, manganese, copper, uranium-238, uranium-235, thorium-232, cesium-137, strontium-90, cerium-144, carbon-14, ammonia, chlorinity, salinity,

calcium-45, redox reaction, bacteria, nitrogen, nitrate, nitrite, carbon dioxide, ammonia, equilibrium constant, activity, organic nitrogen, protein, amino acids, phosphate, silicate, organic phosphorus, adsorption, seawater, clays, organic silicon, pH, oxygen, pCO_2, climate, greenhouse effect, air-sea exchange, organic carbon, carbohydrates, vitamins, fatty acids, particulates, primary productivity, hydrogen, helium, lithium, beryllium, carbon, fluorine, neon, aluminum, sulfur, chlorine, argon, scandium, titanium, vanadium, chromium, cobalt, nickel, zinc, gallium, germanium, arsenic, selenium, bromine, krypton, rubidium, yttrium, zirconium, neodymium, technetium, palladium, silver, cadmium, indium, tin, antimony, tellurium, iodine, xenon, cesium, barium, lanthanum, cerium, praseodymium, tungsten, rhenium, tanlalum, gold, mercury, thallium, lead, bismuth, radon, francium, radium, actinium, thorium, protactinium, uranium, polonium, astatine, thorium-234, protactinium-254, uranium-234, thorium-230, radium-226, radon-222, thorium-231, protactinium-231, actinium-227, radium-228, actinium-223, thorium-228, radium-224, prometium-147, cesium-137, antimony-125, yttrium-91, cerium-141, ruthenium-106, ruthenium-103, rhodium-106, zirconium-95, strontium-89, deuterium, sulfur-34, nitrogen-14, nitrogen-15, oxygen-16, oxygen-18, boron-10, boron-11, carbon-12, carbon-13, sulfur-32, sulfur-33, mechamism, transport, cycle, density

LANG Chinese

NOTE See Note 72

119 AUTH Lan, Xinghua; Chen, Wanyan

AFFI South Chines Sea Institute of Oceanology, Academia Sinica, Guangzhou

DATE 1982

TITL Semiquantitative spectrographic analyses of the bottom sediments from the South China Sea

CITA Tropic Oceanology 1, 184-192 (1982)

ABST A method has been developed for simultaneous semiquantitative spectrographic determination of 6 rock-forming elements (Al, Ca, Mg, Fe, Mn, Ti) and 30 odd trace elemtns in the bottom sediments from the South China Sea. Samples of the sediments were classified into 3 types, namely, silicate, aluminium-silicon clay and carbonate types, according to their chemical compositions. In order to analyze the samples, 3 sets of standard sample series, closely corresponding to the 3 sample types were prepared separately. Samples were placed into the cavity of the lower cup-electrode. Excitation source was direct current arc (D.C.). Each loaded electrode was exposed twice and 2 spectra were obtained. The first spectrum was exposed for 45 seconds and current intensity was 6A, and the second one 30 seconds at 12A at first, and then went on to be exposed, while the current intensity was increased to 16A, until the samples were burnt up and this spectrum was taken. The measurement range of the rock-forming elements was 0.1-10%, that of the trace elements was 0.001-0.1%. A comparison between the result of this method to measure the rock-forming elements and the result obtained by means of chemical analyses has been made. Precision of the measurements is within the tolerance limit of semiquantitative spectrographic analyses and can meet the requirements of marine geological investigations.

KEY sediments, South China Sea, trace elements, silicate, clays, carbonates, compositions, analytical chemistry, antimony, silver, aluminum, boron, barium, beryllium, bismuth, cadmium, cerium, cobalt, chromium, copper, iron, gallium, germanium, hafnium, indium, potassium, lanthanum, magnesium, manganese, molybdenum, sodium, niobium, nickel, lead, scandium, tin, silicon,

strontium, tantalum, thorium, titanium, vanadium, tungsten, ytterbium, zinc, zirconium, spectroscopy, emission spectroscopy

LANG Chinese, English abstract

120 AUTH Li, Chuanyan; Huang, Zongguo; Zhang, Liangxing; Li, Furong; Zheng, Chengxing

AFFI Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE 1983

TITL A preliminary study on the fouling and boring organisms in Lianyun harbour

CITA Collected Oceanic Works 6, 59-67 (1983)

ABST In order to comprehend the biology of fouling organisms in the major harbors in China, a panel experiment was carried out in the Lianyun Harbor from September, 1976 to March, 1978. Panels were hung on both sides of the floating wharves in the harbor. Results show that the major fouling organisms in the Lianyun Harbor are Molgula manhattensis, Cryptosula pallasiana, Bugula californica, Electra devinensis, Ostrea denselamellosa and Enteromorpha intestinalis. There is attachment from March to November and the flushing period is from June to October (18.9°C - 26.5°C). The fouling organisms arrive at their peaks from July to September. The monthly attaching amount varies from 0 to 1757.8 g/m^2. The coverage area varies from 0 to 83.9%. The seasonal attaching amount varies from 0.1 to 1769.5 g/m^2, with a coverage area of less than 78%. Teredo navalis is the only boring organism found in the area, but the animal greatly sabotaged the panels. The main characteristics of fouling organisms in the Lianyun Harbor are fewer species and low wet weight; ascidians are the dominant species. The number of species and quantity of barnacles are very low.

KEY fouling, marine organisms, seasonal variation

LANG English

NOTE This paper has been published in Marine Science Bulletin (China) 1982, No. 5, 43-48

121 DELETED

122 AUTH Li, Fa-xi

AFFI Department of Oceanography, Xiamen University, Xiamen, Fujian, China

DATE 1983

TITL Some recent studies on estuarine and coastal chemistry in China

CITA International Union of Geodesy and Geophysics 18th Meeting, Hanburg, 1983, FS-11, 235

ABST During the past four years, many chemical oceanographers in China have carried our studies on various topics in estuarine and coastal chemistry. Some results are outlined in this report, as follows: (1) The chemical oceanographic investigation of the estuarine and coastal zones near Changjiang River Mouth under China-U.S. Joint Study Program of Marine Sedimentation Process, including the field work and the geochemical study on nutrients, alkalinity, pH, Eh, Fe, Al, Mn, Cu, Pb, Zn, Cd, Hg, Cr, and also the sedimentation rate by Pb-210 method. (2) The effects of flow rate, eddy diffusion, axial length of the estuarial region, and the residence times of the dissolved species of the element on the shape of the concentration vs. salinity curve of a non-conservative constituent in the estuarial region--a mathematical model study. (3) The use of vertical distribution of some insecticides, such as $C_6H_6Cl_6$, in the continental-shelf sediment as indicator for the estimation of sedimentation rate. (4) The formation of authigenic silicate minerals by mixing of river water with seawater and the effect of silicate on the scavenging action on heavy metals by hydrous-oxide colloidal precipitates in the ocean system.

KEY Changjiang, nutrients, alkalinity, pH, sedimentation rates, diffusion, residence time, salinity, silicate, mixing, river water, seawater, scavenging, heavy metals, iron, aluminum, copper, zinc, cadmium, mercury, chromium, estuary, continental shelf, BHC, geochemistry, redox potential, lead-210, colloids

LANG English

NOTE Li Fa-xi is also spelled Li Fa-si or Li Faxi

123 AUTH Li, Faxi

AFFI Department of Oceanography, Amoy University

DATE 1979

TITL An analysis of the mechanism of removal of reactive silicate in the estuarial region

CITA Oceanic Selections 2, 1-16 (1979)

ABST The author and his colleagues have been working on the physico-chemical processes of silicate in the estuarial regions and made surveys of the Jiu-long River, Fujian, since 1962. This paper reports and discusses the works they have accomplished on: 1) the distribution and variation of reactive silicate content and the factors affecting them; 2) laboratory model studies on the adsorption of reactive silicate in seawater on colloidal $Fe(OH)_3$ and $Al(OH)_3$ precipitates; 3) the distributions of suspended "authigenic" Si, Fe, Al and suspended organic Si in the estuary, and their relations to the mechanism of silicate removal; and (4) a mathematical model for the distribution of a conservative or non-conservative constituent related to the chlorinity among the estuarial region during the mixing.

KEY mechanism, silicate, distribution, seawater, chlorinity, ferric hydroxide, aluminum hydroxide, particulates, estuary, adsorption, organic silicon, mixing

LANG English

NOTE See Note 122

124 AUTH Li, Guixiang

AFFI Institute of Marine Scientific and Technological Information, National Bureau of Oceanography, Tianjin

DATE 1982

TITL Estimate of marine energy resource reserves

CITA Hai Yang Tong Bao 1(6), 93-102 (1982)

ABST Marine energy resource is the natural energy of seawater which can be regenerated, including kinetic energy of seawater movement, thermal energy of seawater, and chemical energy of seawater, etc. This paper discusses the oceanic thermal energy, wave energy, tidal energy, ocean current and tidal flow energy, as well as energy caused by differences in salinity. The marine energy resource of China was estimated: 1.9×10^8 KW in tidal energy, 1×10^8 KW in wave energy, 5×10^8 KW in thermal energy, 0.5 to 1×10^8 KW in kinetic energy (from ocean currents) and 1×10^8 KW in potential energy due to salinity gradient.

KEY seawater, salinity, marine resources, OTEC

LANG Chinese

125 AUTH Li, Heping

AFFI unknown

DATE 1982

TITL Determination of trace elements in Mytilus edulis by X-ray fluorescence spectrometry

CITA Journal of Marine Science 6, 62-63 (1982)

ABST Since Mytilus edulis can accumulate high concentrations of heavy metals, it is used to measure the heavy metal contamination of the near-shore waters. The purpose of this research is to find a standard method of X-ray fluorescence spectrometry to determine quantitatively the trace elements in Mytilus edulis and its application.

KEY determination, trace elements, pollution, marine organisms, bioaccumulation, iron, zinc, lead, copper, manganese, arsenic, selenium, molybdenum, bromine, rubidium, strontium, potassium, chloride, spectroscopy

LANG Chinese

NOTE Translated by Li Heping from Marine Pollution Bulletin 10(9) (1979)

126 AUTH Li, Jianzhi; Yao, Nanyu

AFFI Department of Biology, Liaoning Normal University

DATE 1980

TITL Determination of the absorption spectra of live algae by using the improved opal glass method

CITA Hai Yang Ke Xue 1, 35-37 (1980)

ABST In this paper, a thin-layer algae suspension is used with opal glass method to study the absorption spectra of the non-transparent, non-thin membranous algae. The results show that the absorption spectra of the thin-layer suspension is consistent with the absorption spectra of the live algae.

KEY algae, pigment, chlorophyll

LANG Chinese

127 AUTH Li, Jing; Zhang, Minxiu; Xu, Chao; He, Chongli; Zhou, Jiayi; Qian, Wanying

AFFI Department of Marine Chemistry, Shandong College of Oceanology, Qingdao

DATE 1981

TITL Marine environmental geochemistry III. Speciation of arsenic in surface sea water of Jiaozhou Bay

CITA Journal of Shandong College of Oceanology 11, 32-38 (1981)

ABST 1) The content of the total arsenic, particulate arsenic, dissolved arsenic, dissolved organic arsenic and inorganic arsenic (As (III) and As (V)) in the surface sea waters taken from coastal sites of

Jiaozhou Bay have been determined by using anodic stripping voltammetry (ASV) and $Fe(OH)_3$ coprecipitation-DDCAg methods. The concentration ranges of total arsenic, particulate arsenic, dissolved total arsenic, dissolved organic arsenic, dissolved inorganic arsenic, inorganic arsenic (III) and inorganic arsenic (V) in the surface sea water of Jiaozhou Bay are: 17.42-47.49μgl^{-1}, 14.73-44.22μgl^{-1}, 1.46-4.01μgl^{-1}, 0.2-2.43μgl^{-1}, 1.23-1.60μgl^{-1}, 0.35-1.20μgl^{-1}, 0.34-1.06μgl^{-1}, with the mean values of 24.49μgl^{-1}, 21.55 μgl^{-1}, 2.94μgl^{-1}, 1.58μgl^{-1}, 1.36μgl^{-1}, 0.67μgl^{-1}, 0.69μgl^{-1} respectively. The mean values of As_p/As_T, As_D/As_I, $As_{D\cdot o}/As_{D\cdot T}$, $As_{D\cdot I}/ As_{D\cdot T}$, $As_{DT}(III)/As_{D\cdot I}$, $As_{D\cdot I}/(V)/As_{D\cdot I}$ are 0.88, 0.12, 0.512, 0.488, 0.496, 0.504 respectively. 2) The results of experiment show that: (1) The species of arsenic in the coastal surface sea water of Jiaozhou Bay exist essentially as particulate arsenic; (2) The concentration range of dissolved arsenic is equivalent to content of arsenic in unpolluted seawater, it means that the sea water of Jiaozhou Bay has not been polluted yet by arsenic; (3) The sites from which water samples contain organic arsenic more than 50% of total dissolved arsenic are situated in estuaries, down-stream of the pesticide factory and those near the agricultural areas; (4) The fluctuation of concentration of the inorganic arsenic in sea water of Jiaozhou Bay is very small, but the ratio of As(III)/As(V) is quite different (from 0.56 to 3.16). The sites of high As(III)/As(V) ratio are situated in areas along the coast. Whether there is any relationship between As(III)/As(V) ratio and high primary productivity or bioreduction, it should be identified by field investigation later on.

KEY geochemistry, speciaton, arsenic, Jiaozhou Bay, concentrations, seawater, primary productivity, pollution, organic matter, polarography, particulates, pesticides

LANG Chinese, English abstract

128 AUTH Li, Jinhong; Zheng, Yifang

AFFI unknown

DATE 1981

TITL Research vessels, methods and instruments

CITA R/V (Shijian) Observational Report of the Western Central Pacific, Ocean Press, Beijing, 4-7 (1981)

ABST The characteristics of the research vessel are introduced in detail, and the instruments and analytical methods used in this survey are reported. The survey items include water temperature, salinity, current, sound velocity in water, color and transparency of seawater, luminescence of seawater, meteorological elements over the surface, deep-sea sediments, and sampling of plankton in water layers of 0-200 m.

KEY temperature, salinity, color, transparency, seawater, luminescence, sediments, plankton, sound speed, research vessels

LANG Chinese

129 AUTH Li, Linghua

AFFI Institute of Marine Scientific and Technological Information, National Bureau of Oceanography, Tianjin

DATE 1981

TITL Oceanic environment of Antarctic waters

CITA Hai Yang Ke Xue 4, 52-53 (1981)

ABST This is an introductory paper on the Antarctic Ocean. It discusses the Antarctic Circumpolar Water mass and current, chemistry of the seawater, terrain of the sea bottom and oceanic deposits.

KEY Southern Ocean, nutrients, phytoplankton, ice, phosphate, nitrate, silicate, concentrations, seawater, seasonal variation, distribution, sediments

LANG Chinese

130 AUTH Li, Mingfeng
AFFI National Bureau of Oceanography
DATE 1982
TITL An inquiry into some problems of the Chinese oceanographic research vessels
CITA Hai Yang Tong Bao 1(5), 77-79 (1982)
ABST Research vessels should meet the requirements for oceanographic research. This paper investigates some major problems involved in vessel building and concludes that: (1) a vessel with length-width ratio at 5.0-6.0, width-draft ratio at 2.5-2.8 has better capabilities; (2) the reasonable sailing speed should be 14-15 knots; (3) low speed propelling is necessary and the engine should be reliable; and (4) automatic and electronic instruments are recommended in research vessels.
KEY research vessels
LANG Chinese

131 AUTH *Li, Mingfeng*
AFFI National Bureau of Oceanography
DATE 1982
TITL A survey of the development in the Chinese oceanographic research vessels
CITA Hai Yang Tong Bao 1(4), 95-99 (1982)
ABST An overall survey of the development of Chinese oceanographic research vessels is given. The author claims that there are over 100 research vessels in PRC with total displacement of over 100,000 tonnes, ranked fourth in the world.
KEY research vessels
LANG Chinese

132 AUTH Li, Peiquan
AFFI Institute of Oceanology, Academia Sinica
DATE 1981

TITL The content and form of uranium in the ocean and $^{234}U/^{238}U$ rates

CITA Transactions of Oceanology and Limnology, 51-56 (1981)

ABST This paper discusses the concentration and speciation of uranium in seawater and the U-234/U-238 ratio. The average content of uranium in seawater is 3.3μg/ℓ which is about 2.2×10^{-12} curie radioactivity. The content in oceanic water is close to the average value, but the low salinity in near-shore waters results in the low U content in the area. Usually, the highest U content is at 1000 m depth, but special vertical distribution patterns may also exist at certain areas. The average U content in continental shelf sediments is 3.0 μg/g, in suboceanic sediments is 2.5 μg/g and in oceanic sediments is 1.0-1.8μg/g. The concentration variation of U in sediments may be due to the different ratios of clay/carbonate, or the different sources of Ca-containing materials. Since the U content in oceanic sediments is higher than that in seabottom sediments, an exchange process is expected between seabottom sediments and seawater. U in seawater exists in 2 major complex-ion forms: (1) $UO_2(CO_3)_3^{-4}$ and (2) $UO_2(CO_3)_3^{-2}$; the relative content of U speciation is related to the pH value of seawter. The U-234/U-238 ratio should be 1 in nature but this balance is not found anymore. At present, the ratio is around 1.15 (1.09-1.20); the high amount of U-234 in seawater suggests that U-234 finds its way into the water from diffusion of sediment interstitial waters and through the weathering process on land.

KEY concentrations, speciation, uranium, seawater, salinity, vertical distribution, continental shelf, sediments, clays, diffusion, interstitial water, weathering, uranium-234, uranium-238, carbonates, interface

LANG Chinese

133 AUTH Li, Peiquan

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL Analytical methods for the determination of Ce-144 in seawater

CITA Journal of Marine Science 1, 44-47 (1982)

ABST In this paper the author discusses the analytical methods for the determination of cerium in seawater. (1) Direct measurement by measuring γ-ray emission; or (2) combination of preconcentration by precipitation and extraction followed by detection of β or γ emission. The measurement of Ce-144 in marine organisms and sediments is also mentioned.

KEY seawater, marine organisms, sediments, cerium-144, analytical chemistry, pollution

LANG Chinese

134 AUTH Li, Peiquan; Liu, Zhihe; Lu, Guangshan; Sun, Xieming; Yuan, Yi

AFFI Institute of Oceanology, Academia Sinica (1,3,5); Shandong Institute of Medical Science (2,4)

DATE 1983

TITL Determinations of U, Ra, Th, ^{40}K and ^{137}Cs in the surface sediments in the offshore area of Western Bohai Sea with Ge(Li) γ spectrometer

CITA Oceanologia et Limnologia Sinica 14, 333-341 (1983)

ABST The determinations were made of U, Ra, Th, ^{40}K and ^{137}Cs in the surface sediments of offshore area of western Bohai Sea with Ge(Li) γ spectrometer in 1981. The sediments and the material carried by the river were made mainly of shale. The contents of four natural radioactive isotopes in sediment were $2x10^{-6}$, $11x10^{-6}$, $7x10^{-13}$ and $3x10^{-6}$g/g (or 20pCi/g) respectively. Distribution of the four isotopes were uniform. The low values of the contents of four isotopes which was closely related to the composition of sandy mud, were found in the area of the anchorage,

indicating that the deposition and resolution of isotopes were easy in the region where the water and sediments moved swiftly. The content of artificial radioactive isotope ^{137}Cs was much higher than that in sea water. The high value was found in the place where the suspended matter deposited easily. This indicated that ^{137}Cs could be concentrated by sediments. Its distribution was, however, not uniform, decreasing generally seawards, with a low value also in the area of anchorage.

KEY sediments, Bohai, isotopes, distribution, compositions, potassium-40, cesium-137, uranium, radium, thorium, determination, seawater, particulates

LANG Chinese, English abstract

135 AUTH Li, Peiquan; Kang, Xinglun

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1981

TITL Geochemical balance of uranium in the ocean

CITA Transactions of Oceanology and Limnology, 71-77 (1981)

ABST Uranium and the uranium series elements are important to the study of chemical oceanology and marine geology. The major source for uranium in seawater is from riverwater; wind-borne materials from land also contribute some effect. Dissolved uranium in seawater can be eliminated by: (1) sedimentation in an anaerobic environment; (2) sedimentation of carbonate; (3) other processes include incorporation in siliceous ooze, by evaporation, incorporation in iron-manganese nodules, and other authigenic minerals etc. The balance of ocean uranium can be estimated from the information on the input and outgoing of the uranium. Further study is needed to specify the factors controlling the balance.

KEY uranium, sources, seawater, river water, sedimentation, carbonates, evaporation, minerals, manganese nodules, geochemistry, aerosol, marine organisms, uranium-234, uranium-238, residence time, speciation, bioaccumulation

LANG Chinese

135.1 AUTH Li, Peiquan

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL Evaluation of the analytical methods used to determine cerium in the marine environment

CITA Journal of Marine Chemistry 3, 48-49 (1982)

ABST This paper introduces several analytical methods for determining cerium: volumetric method, colorimetric method, UV-spectrophotometry, neutron activation. UV-spectrophotometry is a popular and simple method that has a high degree of sensitivity.

KEY cerium, spectroscopy, analytical chemistry, seawater, colorimetry, neutron activation, cerium-144, cerium-141

LANG Chinese

136 AUTH Li, Qin; Zhang, Shuzheng

AFFI Institute of Microbiology, Academia Sinica, Beijing

DATE 1982

TITL Oxygen probe and its application to biochemical analysis

CITA Huaxue Tongbao, 343-348 (1982)

ABST The basic structure of oxygen probe is illustrated. The cathode is made from Pt or Au; the anode is reference electrode, made from Ag-AgCl electrode or Hg electrode. The principle of oxygen electrode is explained in detail. The oxygen probe can be categorized by way of: (1) electrode structure; (2) movement; and (3) purpose. The film-coating type electrode (Clark type electrode) has better stability

than the naked one. The experimental installation for oxygen probe should include a reactor, equipment for solution flow, constant voltage (~ 0.6V) to keep the electrode reaction and a recorder. Clark type microelectrode is now widely used for respiration measurement. Several problems that occurred during measurements with the oxygen probe are discussed: (1) The capability of oxygen probe and detection with electric current-voltage curve; (2) Problems with calibration of the oxygen probe; (3) Sources of measurement error. Application of the oxygen probe to measurement of biological respiration and monitoring of fermentation, oxygen consumption by cell extract or enzyme from microbes, determination of content of materials related to the oxygen consumption, and assembly of enzyme electrode from oxygen probe and solid enzyme are introduced. It also can be used with other equipment to measure several parameters, such as temperature, pH, photorespiration, fluorescence, etc; or used to measure dissolved oxygen content in water.

KEY oxygen, electrode, enzyme, temperature, pH, fluorescence, analytical chemistry, biological oxygen demand, photosynthesis

LANG Chinese

137 AUTH Li, Shanwei

AFFI The First Institute of Oceanography, National Bureau of Oceanography, Hangzhou

DATE 1983

TITL On the formation and evolution of Jiaozhou Bay from the viewpoint of sedimentary characteristics in the bay area

CITA Acta Oceanologica Sinica 5, 328-339 (1983)

ABST The formation and evolution of Jiaozhou Bay are discussed based on the C-14 dating, palaeomagnetic determination, spore-pollen analysis, micropaleontological study, amino acids content and granular size

of sediments in the cores. The formation and development of Jiaozhou Bay are decided by the geological structure around it. Jiaozhou Bay is the center of several different structural breaks. During the ice age, it was a basin for the deposition of continental facies and during the postglacial age it became a bay again. The bottom shape of Jiaozhou Bay is affected by the hydrodynamics of the tidal current and river.

KEY dating, amino acids, sediments, carbon-14, Jiaozhou Bay, grain size

LANG Chinese

138 AUTH Li, Xuelun

AFFI Department of Marine Geology, Shandong College of Oceanology, Qingdao

DATE 1982

TITL Thermal model of oceanic lithosphere and geothermal water convection in the submarine crust

CITA Hai Yang Tong Bao 1(6), 85-92 (1982)

ABST Submarine heat flow, thickness of the lithosphere and the water depth are largely dependent on the age of the oceanic lithospheric crust. In a given age range, these values are in proportion to the square root of the crustal age. The belted submarine crustal heat flow value is consistent with the thermal model of the oceanic lithosphere. Its pattern shows the relationship between the submarine heat flow and the geologic structure. However, the observed value is different from the theoretical value. This difference can be explained by the theory of geothermal water convection in the submarine crust. The formation of hydrothermal ores is discussed.

KEY geothermal water, marine resources, iron, zinc, copper, calcium, magnesium, sulfate, manganese, nickel, lead, mercury, age

LANG Chinese

139 AUTH Li, Yan; Hu, Zhaobin; Zhu, Xiaobin

AFFI Institute of Oceanology, Academia Sinica

DATE 1983

TITL Geochemistry of the sediment interstitial water in the adjacent sea area to the Changjiang River estuary

CITA Oceanologia et Limnologia Sinica 14, 460-472 (1983)

ABST The geochemical characteristics of the sediments and interstitial waters in the adjacent sea area to the Changjiang River Estuary are related to the hydrological and geological conditions of this area. The redox parameters such as Eh, pH, and Es of the surface layer sediments in the area have been measured, and the contents of major, nutrient, and minor elements such as calcium, magnesium, sulphate, chloride ($Cl^{o}/_{oo}$), phosphate, silicate, copper, lead, and cadmium in the interstitial waters of the surface layer sediments have been also analyzed and listed in Table 1 of this paper. Included in this Table are also the analytical results for the five station bottom layer waters. The eighteen stations observed are shown in Fig. 1. The distribution tendencies of pH, Eh, and chlorinity as shown in Fig. 2 a-c indicate that the different mutual confluence of the Changjiang diluted water, the Huanghai Sea Coastal Current, the Taiwan Warm Current, and the Kuroshio system gives rise to the variations of the transport way and distribution of the sedimentary matter in this area. The ratios represented in Table 2 demonstrate that the constituents in the interstitial waters of surface layer sediments are approximately in the sequence of major elements > nutrients > minor elements. The concentration ratios of magnesium to calcium in the interstitial waters lie for the most part between 5.2 and 5.9; however, those in the bottom layer waters of this area are mainly 5.2, which is compatible with the value of 5.3 as in sea water[4]. Therefore, it would be of greater advantage to convert calcite into

dolomite by the replacement of magnesium in the interstitial waters than in the bottom layer waters. Fig. 3 explains that silicic acid is the predominating species of dissolved silica at pH < 9 in interstitial or sea water, that the interstitial waters are supersaturated and undersaturated with respect to quartz and amorphous silica as shown in the left upper diagram of Fig. 3, and that it seems to be possible to convert kaolinite into gibbsite in the bottom layer waters of station 33 and 35 far off this estuary as noted in the diagram and Fig. 1. According to the predominance diagram for the calcium silicate minerals as presented in Fig. 4, the resulting points fall into the stability field of kaolinite, which is likely to be the weathering product of feldspar and the indicating mineral present in the sediments of this area. Therefore, we may infer that the continental shelf sediments of the East China Sea should be of terrigenous material. The tendency to convert kaolinite into gibbsite appears to be present in the bottom layer waters of station 33 and 35 as shown in Fig. 3. If this process progressed successively, silicic acid would have been kept below $10^{-4.7}$ M[27]. Similarly, it can be seen from Fig. 5 that, except station 6 and 40, the interstitial waters are supersaturated with respect to sepiolite(c), and that the magnesium silicate minerals such as sepiolite-palygorskite group are precipitated from the interstitial waters, and the occurrence of these minerals has already been proved by the X-ray analysis of the East China Sea sediments[5]. As seen from Table 4 which is calculated from the corresponding data in Table 1 and 3, and by comparison of the values of 2 pH plus Ca^{2+} activity logarithm with equations (2) and (3) of this paper, it is reasonable to infer that $CaHPO_4$ (s) and $Ca_3(PO_4)_2$ (s) in these two reactions should be eventually transformed into Ca_5OH

$(PO_4)_3$ (s). So hydroxylapatite is the sole stable phase of apatite in the sediments of this area. It follows from the last three columns of HPO_4^{2-} activity logarithms in Table 4 in which the fourth is calculated from HPO_4^{2-} concentrations in the third column, and the fifth and sixth from the formula 2 and 3 in Table 3 in sequence that the contents of soluble inorganic phosphate in the interstitial and bottom layer waters are contributed not only by hydroxylapatite dissolutions as shown in Table 3, but also very likely by the complex formations of Mg^{2+} and Fe^{3+} with phosphate anions and the organic matter decompositions to release soluble phosphate species in oxidative or reductive condition as seen from the comparison of the fourth with the fifth columns. "Surface complex" formed as reaction 3 in Table 3 is metastable equilibrium with the aqueous solution[27], so in fact, as in the natural waters it would be unlikely to attain the values in the final column which are calculated from this reaction equation. The concentrations of soluble trace metals such as cadmium, lead, and copper in the interstitial waters are higher than the equilibrium concentration of their sulfide solids and lower than that of their carbonate solid. The relationship of soluble cadmium concentrations in the interstitial waters to the equilibrium concentrations of the two solids in redox conditions is shown in Fig. 6. The results are similar to those obtained by Lu and Chen[11] on the migration of trace metals in interfaces of seawater and polluted surficial sediments.

KEY geochemistry, Changjiang, estuary, interstitial water, Eh, pH, sediments, nutrients, minor elements, calcium, magnesium, sulphate, chloride, phosphate, silicate, copper, lead, cadmium, chlorinity, Huanghai, Kuroshio, major ions, concentrations, minerals, kaolinite, seawater, equilibrium, sulfide, speciation,

marine pollution, calcite, dolomite, quartz, weathering, continental shelf, iron, feldspar, East China Sea, activity

LANG Chinese, English abstract

140 AUTH Li, Yan; Zhu, Xiaobin; Hu, Zhaobin

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL Geochemical features and contaminative state of the sediment interstitial water in Bohai Bay

CITA Oceanologia et Limnologia Sinica 13, 414-423 (1982)

ABST This article elucidates the geochemical significance of the interstitial water in surface layer sediments of Bohai Bay, and illustrates the circumstance of contamination of the harmful heavy metals in this Bay. The addition to chloride, the contents of other major elements as calcium, magnesium and sulphate in the interstitial waters of the surface layer sediment approach that level in sea water, and the distributive tendency of chlorinity in the interstitial waters increases gradually from the estuarine region of both the Beitang and the Haihe Rivers to the central and the external regions of this Bay. Furthermore, sediments collected near the Beitang estuary appear to be in reductive state and those in other regions of this Bay in oxidative state. In the reductive sediments the contents of zinc(II), copper(II), lead(II) and cadmium(II) ions in the interstitial waters are higher than in the oxidative, and vary in negative correlation with chlorinity and pH, and in positive correlation with silicate; while in oxidative sediments the contents of the four metal ions vary in positive correlation with chlorinity and pH, and in non-correlation with silicate content. The fact mentioned above shows that the physicochemical process of silicate precipitation in the area of the estuary was probably one of the important ways to scavenge the

harmful heavy metal ions from the water column. A linear equation for the relationship between silicate and chlorinity in the interstitial waters was obtained with regression analysis as follows: SiO_3-Si μg-at ℓ^{-1} = 1871-97Cl°/$_{oo}$ and plotted in Fig. 5. In which this "theoretical dilution line" indicates that silicate addition in most of the reductive sediment interstitial water, which occurs above this line, is due to dissolution of dead diatoms and siliceous minerals precipitated in the sediment of estuarine region; and that silicate removal from all of the oxidative sediment interstitial waters, under this line, is due to diagenesis of SiO_2 according to the following reaction: $H_4SiO_4 \rightarrow SiO_2(S) + 2H_2O$. And from Table 1, the calculated SiO_2 contents of oxidative sediment interstitial waters lie between solubilities of amorphous silica (100-140 mg SiO_2 ℓ^{-1}) and of quartz (4 mg SiO_2 ℓ^{-1})[11]. In addition, the result obtained from these correlations indicates that the formation of chloro, hydroxo and thio complexes of the four metal ions in the interstitial waters could cause the increase of solubilities of various insoluble metal compounds in sediments. Therefore, it is a potential factor for secondary pollution of the water column.

KEY sediments, interstitial water, Bohai, chloride, calcium, magnesium, sulphate, chlorinity, seawater, trace metals, pollution, estuary, zinc, copper, lead, cadmium, pH, silicate, diagenesis, amorphous silica, quartz, redox reaction, scavenging, dissolution, complexation, speciation

LANG Chinese, English abstract

141 AUTH Li, Yongqi

AFFI Shandong College of Oceanology, Qingdao

DATE 1980

TITL Can all the pollutants transport and spread in the food chain

CITA Hai Yang Ke Xue 2, 39-43 (1980)

ABST In marine environmental ecology the study of pollutants which are transferred, transformed or spread in the food chain is quite important. Since the structure of marine life food chain is complicated, the author concludes that most of the pollutants can be transformed, or transferred, in the food chain, and some can spread. Further research is needed.

KEY ecology, pollution, DDT, PCB, bioaccumulation, marine organisms, mercury, zinc-65, radioactivity, chromium-51, niobium-95, cesium-137, plutonium, manganese-54, cobalt-60, cerium-141, heavy metals, phytoplankton, temperature, pH, silver, aluminum, arsenic, cadmium, cobalt, chromium, copper, iron, manganese, molybdenum, nickel, lead, tin, selenium, vanadium, zinc, antimony, zirconium, primary production

LANG Chinese

142 AUTH Li, Yongqi

AFFI Shandong College of Oceanology, Qingdao

DATE 1980

TITL Utilization of nuclear energy and the marine radioactive pollution

CITA Hai Yang Ke Xue 3, 38-42 (1980)

ABST So far, part of the radioactive wastes from nuclear reactor has been discharged into the ocean by different paths. The pollution control and the effects of the radioactive radiation from the polluted waters are discussed.

KEY pollution, radionucleis, tritium, strontium-90, iron-55, cobalt-60, zirconium-95, niobium-95, zinc-65, ruthenium-106, cesium-137, cerium-144, plutonium-239, plutonium-240

LANG Chinese

143 AUTH Li, Youngqi

AFFI Department of Biology, Shandong College of Oceanology, Qingdao

DATE 1982

TITL Determination of oceanic primary productivity by C-14 method

CITA Journal of Marine Science 6, 51-55 (1982)

ABST Using C-14 to measure the oceanic primary productivity gives high sensitivity and accuracy. The rationale for this method, instruments and chemicals used in this method, measuring procedures, as well as the correction factors, are all discussed in detail.

KEY primary productivity, carbon-14

LANG Chinese

144 AUTH Li, Zhaolong

AFFI unknown

DATE 1981

TITL Geothermal seawater and super heavy elements

CITA Hai Yang Ke Xue 4, 61 (1981)

ABST This article discusses the relationship between geothermal seawater and postulated super heavy chemical elements (Z = 112-115). However, no conclusion is drawn.

KEY geothermal, seawater, hydrothermal, sediments

LANG Chinese

145 AUTH Li, Zhaolong

AFFI unknown

DATE 1983

TITL On the ashing of marine biological samples

CITA Journal of Marine Sciences 2, 63 (1983)

ABST Volatile elements are lost easily during the process of ashing, especially high-temperature ashing. The loss of 34 elements in 5 marine biological samples by ashing is calculated. Results show that most of Cl, As, Se, Br, I, Au, Hg etc. elements are evaporated

when samples are ashed at 500 degree C for 6 hrs, the loss is less when samples are ashed at 100 degree C for 50-60 hrs. The loss of elements is also related to the speciation of element, the type of organic group and the coexistent materials. U, Th, Lu, Eu, Sm, Ce, La, Ba, Cs, Ag, Sb, Sr, Rb, Zn, Mn, Se, Ca and Fe are the elements with no loss or loss < 10% during high and low temperature ashing processes. Mo, Se, and Co showed loss rate < 10% during low temperature ashing and > 20% during high temperature ashing. The loss rate for Cl, As, Se, Br, I, Au, Hg etc. is > 50% during high temperature ashing, the loss of Hg is high up to 97%. Na, Mg, Al, V, Cd etc. showed different loss rate from different samples, but the effect of temperature on the loss of these elements is not significant.

KEY speciation, temperature, analytical chemistry, trace metals, chlorine, arsenic, selenium, bromine, iodine, gold, mercury, uranium, thorium, lutecium, europium, samarium, cerium, lanthanum, barium, cesium, silver, antimony, strontium, rubidium, zinc, manganese, calcium, iron, molybdenum, cobalt, sodium, magnesium, aluminum, vanadium, cadmium

LANG Chinese

146 AUTH Li, Zhaolong

AFFI unknown

DATE 1983

TITL Rare earth elements and marine chmeistry

CITA Journal of Marine Science 2, 21 (1983)

ABST The general chemical properties of rare earth elements are summarized in this paper. These chemical characteristics are important to studies in marine geochemistry.

KEY rare earth elements, geochemistry, samarium-147, neodymium-144, neodymium-143, strontium, half-life, manganese nodules, cerium, pH, europium, ytterbium, speciation, lanthanum, erbium, dysprosium, gadolinium, seawater

LANG Chinese

147 AUTH Lian, Guangshan; Hou, Shumin; Chen, Xiaolin; Yang, Qingliang; Lin, Jinmei; Cai, Bingji; Chen, Ruixiang; Dai, Yanyu; Chen, Xingqun; Zhang, Jinbiao

AFFI The Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE 1981

TITL Plankton

CITA R/V (Shijian) Observational Report of the Western Central Pacific, Ocean Press, Beijing, 74-88 (1981)

ABST The planktonic community in the region of observation is typical tropical oceanic community; 534 species of plankton are identified, which includes 178 species of phytoplankton and 356 species of zooplankton. The total quantity of phytoplankton is highest in Cyanophyceae; the average total quantity is 19.9 x 10(E + 3) cells/m^3 in January-February; 34.4 x 10(E + 3) cells/m^3 in May-June. The distribution trend for Cyanophyceae is higher in the equatorial area and decreases southward. The seasonal variation of the quantity distribution for diatoms is significant; the average total quantity is 5726 cells/m^3 in January-February and 780 cells/m^3 in May-June. This is related to the nutrient salt content in the area and the average depth at the upper boundary of the thermocline, density layer and salinity layer. The quantity is higher in the high-salinity area. The concentrated area is at the equatorial upwelling area. The quantity distribution of zooplankton basically is similar to that of diatoms; the average bioquantity of zooplankton is 28 mg/m^3 in January-February, 18 mg/m^3

in May-June. Copepoda counts for 62% of the total quantity. The structure of planktonic community is stable, the seasonal variations of the specific composition and quantity distribution are not significant.

KEY phytoplankton, zooplankton, distribution, diatom, thermocline, seasonal variation, salinity, upwelling

LANG Chinese

148 AUTH Liang, Dongquan; Liang, Zijiang; Li, Yubo; Zhang, Fusheng

AFFI South China Sea Institute of Oceanology, Academia Sinica, Guangzhou

DATE 1982

TITL Determination of strontium in coral by atomic absorption spectroscopy

CITA Acta Oceanologica Sinica 4, 778-783 (1982)

ABST Air-acetylene flame atomic absorption spectroscopy is used to determine the strontium in coral. Analytical conditions are listed in the paper. 0-0.24 N HCl and 0-200 ppm Ca are tested and show no effect on the absorbance. Since Al and Si can interfere with the Sr-determination, Ca is added in the study to eliminate the interference. Results also show that Mg, Fe, K, Na etc. in coral will not interfere with the determination when 200 ppm Ca is added. The relative standard deviation of this method is 1.4%. The authors claim that this method is fast, simple, cheap and highly accurate.

KEY determination, strontium, coral, atomic absorption spectroscopy, calcium, aluminum, silicon, magnesium, iron, potassium, sodium, analytical chemistry

LANG Chinese

149 AUTH Liang, Xiangji

AFFI Institute of Geology, Chinese Academy of Geological Sciences

DATE 1982

TITL An experimental study on physico-chemical conditions for the formation of scapolite in the hydrothermal system

CITA Acta Geologica Sinica, 136-148 (1982)

ABST Scapolite, widely developed in many rocks in nature, was mainly formed hydrothermally. It is directly related in space and time with the metallic (iron, copper, etc.) deposits of metasomatic, volcanic and metamorphic types. All experiments were carried out in cold seal pressure vessels with gold liners. The experimental samples were taken from diabase and marble of the Makeng Mine in Fujian. Experimental reagents were acidic, neutral and basic aqueous solutions at temperature ranging from 450° to 650°C and under pressures of 300-650 bars lasting for 168 hours. The experimental products were studied chiefly under microscope and with X-ray analysis. According to our experiment on the mutual physico-chemical relations between the material components and the temperature, the temperature and the pressure, the temperature-pressure and the CO_2 fugacities, as well as the pH values of the reagent and the temperature, meionite-sodaite were formed from diabase (50%), marble (50%)--diabase (10%) marble (90%), under 300-650 bars, 500-650°C, and within the limits of f_{co2} 2.4-6.4 bars, in the hydrothermal system of pH values 2.5-6.8.

KEY hydrothermal system, iron, copper, pH, temperature, pressure, carbon dioxide, geochemistry, X-ray diffraction

LANG Chinese, English abstract

150 AUTH Liang, Zhi; Pang, Jingliang; Sun, Huili

AFFI South China Sea Institute of Oceanology, Academia Sinica, Guangzhou

DATE 1983

TITL Effects of copper and pH on the attachment of larva of Balanus reticulatus

CITA Acta Oceanologica Sinica 5, 526-529 (1983)

ABST Effects of Cu ion and pH on the attachment of larva (Balanus reticulatus) are studied. Results show that when pH is constant the toxicity of Cu increases with increasing the free Cu concentration. The attachment of larva (B. reticulatus) increases with increase of pH when the concentration of Cu ion is constant. The effective concentration (EC_{50}) is defined as the minimal concentration of Cu ion needed to keep 50% of larva (B. reticulatus) from attaching in 72 hours. The EC_{50} decreases with the decrease of pH. The relationship of larva attachment (B. reticulatus), Cu ion and pH is expressed as: $P^* = 134 - 13.8\ pH + 263\ Cu$, P^* is the percentage of larva unattached.

KEY copper, pH, toxicity, concentrations, fouling

LANG Chinese

151 AUTH Liang, Zhi; Wang, Zhaoding

AFFI South China Sea Institute of Oceanology, Academia Sinica, Guangzhou

DATE 1983

TITL Chlorinity, salinity, electric conductivity and alkalinity of Zhujiang estuarine water and their relationships

CITA Acta Oceanologica Sinica 5, 728-734 (1983)

ABST The chlorinity and salinity of Zhujiang increases gradually from north toward south. The relationship of chlorinity and salinity in this area can be expressed as: $S^o/_{oo} = 0.030 + 1.8109\ Cl^o/_{oo}$, with average standard deviation $0.009^o/_{oo}$. The calculated values are consistent with the observed values. The relative electric conductivity (R_{15}) of water samples in Zhujiang estuary is measured, the salinity definition of estuarine water can then be formulated: $S^o/_{oo} = 0.03314 + 26.7625\ R_{15} + 10.6465\ R_{15}^2$, with

average standard deviation 0.129°/$_{oo}$, the maximal deviation from calculated value is 0.340°/$_{oo}$. The alkalinity of estuarine water increases with the increase of salinity, but the alkalinity/chlorinity ratio decreases. This relationship is expressed as: Ac = 0.5099 + 11.971/Cl°/$_{oo}$. Knudson's formulae are based on the assumption that the ion ratio is the same when the salinity of seawater is the same, but this is not the case for near-shore water. The authors suggest to set up individual salinity-chlorinity-electric conductivity relationship for each near-shore area and estuarine water.

KEY chlorinity, salinity, conductivity, alkalinity, Zhujiang, seawater, carbonates, estuarine water

LANG Chinese

152 AUTH Liao, Wenzhuo; Pan, Jiezhai; Chen, Song

AFFI Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE 1983

TITL The distribution and behaviour of Cd, Cu, Pb, in the surface sediments of the Jiulong River mouth and Xiamen Harbour

CITA Taiwan Strait 2, 45-53 (1983)

ABST The average contents of Cd, Cu, Pb in the surface sediments of the Jiulong River Mouth and Xiamen Harbour are 0.18, 26.84, 43.37 (μg/g) respectively. Most of Cd, Pb and a small part of Cu exist in the diluted acid-soluble fraction, including most of Cu exist in the crystalline phase and most of Cd or Pb in the sediments are in the hydrogenous fraction. The higher content of Pb in the sediments is worth further investigation. There is a seaward decrease for the content of each of the three elements in the surface sediments, the diluted acid-soluble fraction and the interstitial water from river mouth, which is related to the hydrologic and geographic conditions in the

area. The organic matter in the sediments plays a significant role in controlling Cd, Cu, Pb. The chemical behaviour of Cd, Pb in the sediments are rather similar. There may exist a quasi-equilibrium between the various speciations of each element in the sediments. The contents of some stations between the Haimen Island and the Jiyu Islet are rather high, which is due to the convergence zone there.

KEY distribution, sediments, interstitial water, organic matter, cadmium, copper, lead, speciation, pollution

LANG Chinese, English abstract

153 AUTH Liao, Xiangui

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1980

TITL Researches on the quality of our marine environment

CITA Hai Yang Ke Xue 3, 34-37 (1980)

ABST Systematic studies of environmental quality were started recently. Research can be categorized into four areas: (1) the flux of pollutants into seawater; (2) the physical, chemical and biological processes of pollutants in seawater; (3) biological effects of oceanic pollution; and (4) indices for environmental quality evaluation.

KEY seawater, pollution

LANG Chinese

154 AUTH Lin, Huiyong

AFFI Institute of Oceanographic Instrumentation, Tianjin

DATE 1982

TITL Sediment dynamics data acquisition system

CITA Ocean Technology, 24-30 (1982)

ABST A brief review of development, working regime, principle of operation and performance of sensors and electronics of the sediment dynamics data acquisition

system developed by University of Washington, U.S.A., is described in this paper. Design features are also discussed.

KEY dynamics, sediments, seawater, turbidity, sampler

LANG Chinese, English abstract

155 AUTH Lin, Jianping

AFFI The Second Institute of Oceanography, National Bureau of Oceanography, Hangzhou

DATE 1983

TITL The distribution characteristic of dissolved oxygen in the coastal upwelling of Chekiang

CITA Journal of Marine Science 1, 6-8 (1983)

ABST This paper outlines the distribution of dissolved oxygen in the coastal water of Chekiang in the summer of 1980, and indicates that there is an area containing small concentration of dissolved oxygen. The saturation of dissolved oxygen in the surface water is about 90%, and is about 20% lower than the nearby areas. The area is of high salinity and low temperature. It is concluded that there is a strong upwelling in the area of 28°-29°15'N and west of 122°45'E.

KEY distribution, oxygen, upwelling, salinity, temperature

LANG Chinese, English abstract

156 AUTH Lin, Minji; Lin, Zhifeng; Zheng, Wenqing; Zhao, Rongping; Chen, Shumei

AFFI The Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE 1983

TITL Study of modern sedimentation rate and sedimentation in continental shelf of East China Sea using BHC

CITA Acta Oceanologica Sinica 5, 719-727 (1983)

ABST Spatial distribution of BHC (benzene hexachloride) in sediments on the continental shelf of East China Sea off Changjiang estuary is reported, and the modern sedimentation rate of sediments is studied by BHC determination. The sedimentation in this area, especially at the G 8126 station is discussed. Results show that the content of BHC increases with depth, except at station G 8126. G 8126 station is mainly in the zone of fast sedimentation rate, the complicated hydrodynamics of this station is responsible for the specific sedimentation type. The authors claim that this is a practical method for determining modern sedimentation rate and the results from this method have good correlation with that from pb-210 dating.

KEY sedimentation rate, continental shelf, East China Sea, BHC, distribution, depth, lead-210

LANG Chinese

157 AUTH Lin, Minji; Lin, Zhifeng; Zhao, Rongping; Chen, Shumei; Zhen, Wenqing

AFFI Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE 1983

TITL The blank analysis of super-trace organic chlorinated pesticides in the marine environment

CITA Taiwan Strait 2, 54-60 (1983)

ABST The reduction of the systematic blank of the analytical method is the key in the determination of super-trace organic chlorinated pesticides, which directly affects the lowest detection limit and the detection accuracy of the method used. In our exploration of this problem, we have developed a set of processing methods in the determination of super-trace organic chlorinated pesticides, including simple processing, reagent purification and instrument

cleaning. The method has been successfully applied in the determination of chlorinated pesticides in water and sediment from the Xiamen Harbour.

KEY pesticides, determination, sediments, seawater, BHC, DDT

LANG Chinese, English abstract

158 AUTH Lin, Reimu; Li, Dekai; Houng, Xuebao; Zheng, Jiancheng; Hung, Shanggao

AFFI The Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE 1983

TITL Effect of attaching marine organisms on the corrosion of carbon steel and low alloyed steel

CITA Acta Oceanologica Sinica 5, 507-512 (1983)

ABST The amount of attaching organisms varies with the month that the samples are hung for both carbon steel and low alloyed steel, which is important for short-term study. The samples hung in April and May show that 60-80% of area is covered in 2-3 months; the samples hung in November show no attaching organism in 5 months. The yearly corrosion rate for samples hung in November is about twice that for samples hung in April and May. The best time for hanging samples is July-September in Xiamen Bay. The salinity, pH and current velocity of seawater do not affect significantly the corrosion of steel specimen in Xiamen Bay. The overall effect of dissolved oxygen and temperature of seawater on corrosion of steel is discussed. The large-size attaching organisms can lower the corrosion rate of carbon steel and low alloyed steel, especially rock barnacle and oyster because: 1) these organisms separate the diffusion of oxygen from seawater to metal surface; 2) the respiration of organisms decreases the oxygen content

of seawater around the specimen; 3) the organism layer attenuates the pounding of water current against steel.

KEY marine organisms, corrosion, steel, salinity, pH, seawater, oxygen, temperature

LANG Chinese

159 AUTH Lin, Shouren; Zhao, Taichu; Zhang, Meirong; Wu, Yunlong

AFFI The Second Institute of Oceanography, National Bureau of Oceanography, Hangzhou

DATE 1982

TITL The application of vector analysis to estimation of the surficial suspended silt content in sea water

CITA Hai Yang Tong Bao 1(3), 83-88 (1982)

ABST Vector analysis was applied to the spectrum distribution of oceanic radiation in the Yangtze estuary. The authors set up a mathematical formula for the relationship between the scalar multiples of the vectors and the corresponding sensing of the suspended silt content in seawater. The calculated value from this formula was compared with the data from synchronous research vessels, and the vector analysis was evaluated.

KEY Yangtze River, estuary, seawater, particulates, remote sensing

LANG Chinese

160 AUTH Lin, Shourong; Hong, Zhunzhan

AFFI The Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE 1981

TITL Sound speed characteristics in the study area

CITA R/V (Xiangyanghong 09) Observational Report of the Western Central Pacific, 109-117 (1981)

ABST The characteristics of sound velocity distribution in the region of observation are as follows: 1) The vertical structure of sound velocity is a 4-layer model. In the upper positive gradient layer, the distribution of sound velocity is mainly decided by the distribution of temperature and salinity. The horizontal distribution is quite smooth, the gradient and time-to-time variation are both small; the vertical gradient value is 0.016-0.02 sec^{-1}; the thickness is 64-136 m. The average thickness in January and May are 106 and 88 m, respectively. 2) The vertical structure of sound velocity discontinuity layer is complex. A double-discontinuity layer exists in the equatorial area, a single-discontinuity layer is in the north. The average intensity and thickness of the discontinuity layer show a belt-shape distribution; the range of intensity is -0.2 to -0.57 sec^{-1}; the range of thickness is 59 to 203 m. 3) Distribution of the sound channel axis is symmetric along the equator; the sound velocity at the sound channel axis is stable and even.

KEY sound speed, distribution, temperature, salinity, sound channel

LANG Chinese

161 AUTH Lin, Zhenhong; Fan, Shouzhi; LÜ, Yanan

AFFI Shandong College of Oceanology (1,3); Institute of Oceanology, Academia Sinica, Qingdao (2)

DATE 1983

TITL Statistical analysis of the heavy minerals from the nearshore sediments, southern Shandong

CITA Oceanologia et Limnologia Sinica 14, 447-453 (1983)

ABST The heavy minerals of 81 nearshore sediment samples collected from the southern Shandong province were statistically analyzed by means of the cluster and multiple end-member methods. The sources and dispersion of the heavy minerals were also discussed

on the basis of the dendrograms and the matrix of the cosine-theta coefficient. 1) The nearshore sediments of southern Shandong can be divided into two heavy mineral assemblage provinces: northern hornblende province and southern epidote province. 2) The provenances of the heavy minerals are various, mainly from the Liangcheng-Baima, Futuan, Jufeng and Xiuzhen rivers. Those from the Longwang River and the Shijiusuo cliff can hardly have any effect on the components of the bottom sediment owing to their insignificant quantity. 3) Longshore sediments are generally transported toward southwest. Sediments from the Liangcheng-Baima River may reach the Futuan River mouth. Sands from the Futuan River are noticeably transported southward. Whereas the Xiuzhen River sediments may be dispersed to the Lanshantou region. 4) The concentration of the magnetite in the southern nearshore zone is controlled by the coastal processes and the material sources. Abundant materials from the intrusive rocks, the Futuan River sediments and strongly sorting process occurring on the beach are foundational factors affecting the concentration of the magnetite.

KEY minerals, sediments, concentrations, geochemistry, sources, rivers

LANG Chinese, English abstract

162 AUTH Liu, Chengsong; Chen, Qingchao; Wu, Yunhua

AFFI South China Sea Institute of Oceanology, Academia Sinica, Guangzhou

DATE 1982

TITL Biochemical analyses of some marine zooplankton

CITA Tropic Oceanology 1, 170-175 (1982)

ABST Biochemical composition of some common species (such as Leptochela; Gastrosaccus, etc.) sampled from the waters south of Yongxing Island of Xisha Islands and southeast of Hainan Island during December 1978 to

January 1979 on board the R/V Shiyan 1 is presented in this paper. These species were collected by means of horizontal and vertical hauling using a zooplankton net, and the individuals of various species were sorted out and were frozen immediately at -20°C in a deep freeze. Biochemical analyses were carried out later in laboratory. In order to compare the present results with the published data, values were converted into constituents on a dry-weight basis, and are expressed as percent dry weight. The results are given in Tables 1, 2 and 3. Crude protein formed the major constituent in all species investigated. Protein content was extremely high ranging from 42.99 to 66.47%, followed by lipid content, which varied from 8.24 to 27%. Carbohydrate content was the lowest, and ranged from 2.0 to 3.8%. Ash varied between 14.91 and 32.25%. They were made up of 16 amino acids. Although species differ in amino acid composition with one another, glutamic acid, aspartic acid, lysine, arginine and alanine were important in all species. Contents of tyrosine in Gastrosaccus and Leptochela, of glycocoll in Platynereis and Siriella, and of cystine in Alima larvae were higher than those in other species. The analysis of inorganic elements (Table 3) showed tha calcium and sodium accounted for the largest proportion in these species, followed by potassium, magnesium, silicon and iron. Their amounts ranged from 3% to 10%. Strontium content in these animals was higher than that in others. Copper content in Siriella was also rather high.

KEY zooplankton, protein, lipids, carbohydrates, amino acids, glutamic acid, aspartic acid, lysine, arginine, alanine, tyrosine, cystine, calcium, sodium, potassium, magnesium, silicon, iron, strontium, copper, compositions, organic matter, aluminum, manganese, lead, tin, uranium, cadmium, zinc, silver,

nickel, chromium, glycine, histidine, phenylalanine, threonine, serine proline, valine, methionine, isoleucine, leucine

LANG Chinese, English abstract

163 AUTH Liu, Fayi

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL Metabolism of mercury in marine organisms

CITA Journal of Marine Science 5, 58-60 (1982)

ABST The uptake, accumulation and excretion of mercury by marine organisms (especially fish and shells) are discussed. Mercury distribution in cells and its combination with high molecular weight proteins and metallothionein are reviewed by the author. The transformation of mercury in living organisms needs further study.

KEY metabolism, mercury, marine organisms, bioaccumulation, pollution, protein, fish, shells, molecular weight

LANG Chinese

164 AUTH Liu, Liensen; Sun, Chengxiuan; Sun, Guanmin; Zhang, Zhenbin

AFFI Department of Marine Chemistry, Shandong College of Oceanology, Qingdao

DATE 1981

TITL A study of the inorganic ion-exchange reaction of copper with hydrous titanium oxide in seawater

CITA Journal of Shandong College of Oceanology 11, 22-31 (1981)

ABST The results obtained in this article by studying the inorganic ion-exchange reaction of copper with hydrous titanium oxide in seawater are: 1) Both of pH-dependent and salinity-dependent models for the speciation of Cu(II) in seawater were constructed with available and estimated thermodynamic stability

constants and activity coefficients that is based on the Pitzer equation. This model was used to calculate the degree of interaction between Cu(II) and anions Cl^-, SO_4^{2-}, HCO_3^-, CO_3^{2-}, OH^- and humic materials as a function of pH or as a function of salinity. The calculations showed that Cu interacts primarily with OH^-, CO_3^{2-} and humic materials. 2) The mechanics of the reaction of copper(II) with hydrous titanium oxide in seawater have been studied in detail. It has been determined that one of the steps in the chemical reaction is that of cation ion-exchange. From the "ratio of exchange (%) - pH graph" it is possible to deduce further that the reaction can be explained by a "complexation-dewater" reaction. The reaction can also be explained by a monovalent cation exchange. 3) The stepwise equilibrium constants of copper (II) with hydrous titanium oxide in seawater have been determined by experiments, the results being: K_1 = 19 (pH = 6.5). This result well agrees with Keen's coefficients. 4) The above result will exhibit its theoretical guiding effect in marine geochemistry of copper.

KEY ion-exchange, copper, hydrous titanium oxide, seawater, pH, salinity, speciation, stability constants, activity coefficients, complexation, equilibrium constants, geochemistry, chloride, sulfate, bicarbonate, carbonates, hydroxide, humic acid, mechanism

LANG Chinese, English abstract

NOTE See Note 7

165 AUTH Liu, Mingxing

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1981

TITL The separating techniques of the laminated interstitial water and the sampling of its overlying water

CITA Hai Yang Ke Xue 2, 60-61 (1981)

ABST R.C. Aller's sampling techniques for the interstitial water and the overlying water are discussed.

KEY seawater, sediments, interstitial water, sampler

LANG Chinese

166 AUTH Liu, Mingxing; Bao, Wanyou; Li, Guoji; Gu, Hongkan

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1983

TITL Speciation distribution of Zn, Cd, Pb and Cu in waters of northwestern Bohai Bay

CITA Acta Oceanologica Sinica 5, 292-305 (1983)

ABST The speciation of Zn, Cu, Cd and Pb in major estuarine water of Bohai Bay is studied. Results show that the highest values of these four metals are in the water of Beitang river mouth. The major speciations of each metal in the area are granular Cu, inorganic bound Pb, granular Cd, and inorganic bound and granular Zn. The relationship between metal and salinity is non-linear, except for the total Cu; there is also no linear relation between metal and suspended particles, except the total Pb. All forms of metals have higher value in river mouth than in the open sea, except unstable Zn, Pb and Cu. The suspended matters show maximal adsorption for Cu and minimal adsorption for Pb in the investigated area. The concentration of metal ions in estuarine water is low when the tide is high, and that in estuarine water is high when the tide is low; which explains that the tide shows influence on the concentration of metals in the estuarine water. The total concentrations of metals in the investigated water are in the order of Zn > Cu > Pb > Cd.

KEY speciation, distribution, Bohai, rivers, salinity, adsorption, concentrations, zinc, copper, lead, cadmium, particulates, marine pollution, estuarine water

LANG Chinese

NOTE See Note 72

167 AUTH Liu, Quxia; Lu, Fenying; Hui, Jiayu

AFFI Institute of Hydrobiology, Academia Sinica

DATE 1983

TITL Variation in the contents of nitrogenous compounds in precipitation over Lake Donghu, Wuhan

CITA Oceanologia et Limnologia Sinica 14, 454-459 (1983)

ABST The present paper reports the contents and variation of nitrogenous compounds in precipitation water over Lake Donghu, Wuhan, from April 1962 to March 1963, and June to August, 1980. The average value of the total inorganic nitrogenous compounds in precipitation water from 1962 to 1963 was 0.447 mg N/1; NH_4-N comprised 73.03% of the total of inorganic nitrogenous compounds, NO_2-N and NO_3-N were 2.55% and 24.42% respectively. NH_4-N was the main form in precipitation water with pronounced seasonal variation: high at the end of winter and the beginning of spring, low in autumn and the lowest in summer. During continuous precipitation, the content of nitrogenous compounds was high in the initial phase and then reduced gradually. The content of NH_4-N in precipitation water increased 2.5 to 8 times during the summer of 1980 as compared with that in summer of 1962. However, NO_3-N was reduced 7.5 to 9 times. During the summers of 1962 and 1980, the total amount of inorganic nitrogenous compounds transmitted through lake surface into the lake by precipitation were 9.8 tons and 20 tons respectively. That transmitted into the drainage basin of the lake by precipitation water in 1980 was 134.0 tons, doubling the amount in 1962, 65.4 tons.

KEY precipitation, lakes, seasonal variation, ammonia, nitrate, nitrite, rain water

LANG Chinese, English abstract

168 AUTH Liu, Shuren

AFFI Department of Chemistry, Northwest University

DATE 1983

TITL Determination of trace mercury in water using demarking reaction of potassium ferrocyanide by the ring-oven

CITA Huanjing Kexue 4, 44-45 (1983)

ABST The author determined trace mercury in water by using the demarking reaction of potassium ferrocyanide with the ring-oven. The chemicals and procedures are presented in detail. Results from this measurement are consistent with theoretical values.

KEY mercury, water, analytical chemistry

LANG Chinese

169 AUTH Liu, Shutian

AFFI Institute of Atomic Energy, Academia Sinica

DATE 1982

TITL Ultra-uranium elements in marine environment

CITA Hai Yang Tong Bao 1(4), 27-33 (1982)

ABST The study of trans-uranic elements in the marine environment is useful for understanding the oceanic radioactive pollution, the sedimentary process, the diffusion and mixture of water masses, and the air-sea interfacial exchange. It is an important area in marine geochemistry. This paper introduces the methods for the analysis of trans-uranic elements in the marine environment. The concentrations of these elements in different water are also presented.

KEY pollution, geochemistry, air-sea exchange, diffusion, seawater, plutonium-238, plutonium-239, plutonium-240, plutonium-241, strontium-90, cesium-137, americium-241, curium-244, californium-252, tritium, neptunium-237, concentrations

LANG Chinese

170 AUTH Liu, Tao

AFFI Environmental Protection Office, National Bureau of Oceanography, Beijing

DATE 1982

TITL International regulations on marine environmental protection

CITA Ocean Press, Beijing, 464 pp. (1982)

ABST Rules, regulations, laws and standards regarding marine environmental protection are listed in this book.

KEY pollution, environment

LANG Chinese

171 AUTH Liu, Tung-sheng; Chen, Ming-yang; Li, Xiu-fang

AFFI Institute of Geology, Academia Sinica (1,2); State Bureau of Meteorology (3)

DATE 1982

TITL A satellite images study on the dust storm at Beijing on April 17-21, 1980

CITA Quaternary Geology and Environment of China, 49-62 (1982)

ABST Using the meteorological satellite images, the authors describe the dust storm that occurred during April 17-21, 1980 in Beijing, China and discuss the eolian process of loess and the continuity of loess deposition in the geological past.

KEY remote sensing, dust, sediments, Huanghe, Changjiang, loess

LANG English only

172 AUTH Liu, Xijin; Fang, Zhensheng; Yan, Zhongyu; Chen, Chuanqiong; Li, Chunyan; Sun, Guangsheng

AFFI South China Sea Institute of Oceanology, Academia Sinica (1,2,3,4); Guangdong Institute of Medicinal Materials (5,6)

DATE 1983

TITL A preliminary study on the antitumor effect of 18 species of sponges and soft corals from the South China Sea

CITA Tropic Oceanology 2, 74-77 (1983)

ABST Antitumor effects of alcoholic extracts from 18 species of sponges and soft corals collected from the South China Sea have been tested. The result reveals that Nephthea capnelliformis, Lemnalia exilis, Paralemnalia thyrsoides, Cladiella subtilis of soft corals and Tetilla sp., Axinella sp., Prosuberites sp. of sponges have antitumor effects; of these, Nephthea capnelliformis and Tetilla sp. have strong antitumor effects.

KEY sponge, corals, South China Sea, marine resources

LANG Chinese, English abstract

172.1 AUTH Liu, Xuetang

AFFI unknown

DATE 1982

TITL Impact of the new salinity scale on salinity-measuring instruments

CITA Ocean Technology 3, 18-21 (1982)

ABST Impact of the new salinity scale on salinity-measuring instruments is discussed. Since the PSS 78 is based on the relationship between salinity and electric conductivity ratio, the chlorinity titration method should not be used anymore. The laboratory salinometer, STD and CTD still meet the definition of new salinity scale. The new standard seawater or sub-standard seawater of different salinities is needed for adjusting or standardizing the instruments; however, the instrument itself does not need to change.

KEY salinity, conductivity, chlorinity

LANG Chinese

173 AUTH Liu, Yansheng

AFFI Office of Guanting Reservoir Headwater Protection

DATE 1983

TITL On environmental management of the Guanting reservoir

CITA Huanghe Kexue 4, 56-58 (1983)

ABST Major scientific investigations on the environmental protection of the Guanting Reservoir are introduced. The areas of concern are the evaluation of water quality and water pollution; assessment of the quality of river environment; evaluation of the influence of mine waste; monitoring the pollutant sources; and treatment of the pollutant at the sources. Research and management are interdependent of each other.

KEY pollution, environment

LANG Chinese

174 AUTH Liu, Zhenxia

AFFI The First Institute of Oceanography, National Bureau of Oceanography, Qingdao

DATE 1982

TITL Distribution patterns of surface sediments in the Yellow Sea

CITA Hai Yang Tong Bao 1(1), 43-51 (1982)

ABST Mainly based on the size, biological, chemical and mineral characteristics of the sediments, the author deduced the chronology of sedimentation in the Yellow Sea. The geomorphology and the conditions of hydrodynamics were also studied. Two categories of the surface sediments are apparent: Recent and paleo-sediment.

KEY grain size, sediments, Yellow Sea, sedimentation

LANG Chinese

175 AUTH Liu, Zhihe; Zhao, Shuqian

AFFI Medical Academy of Shandong Province

DATE 1983

TITL Measurement of ^{137}Cs, ^{40}K, U, Ra, Th in sediment with Ge(Li) γ-spectrometer

CITA Journal of Marine Science 1, 21-24 (1983)

ABST The determination of ^{137}Cs, ^{40}K, U, Ra and Th in the sediment of sea-floor with Ge(Li) γ-spectrometer was carried out. The analytical results of γ-spectra of ^{137}Cs, U, Ra and Th essentially coincide with those by radiochemical analysis. This method was shown to be simple, time-saving and reliable.

KEY cesium-137, sediments, determination, potassium-40, uranium, radium, thorium, analytical chemistry

LANG Chinese, English abstract

176 AUTH Lu, Yupei

AFFI Institute of Oceanographic Instrumentation, National Bureau of Oceanography, Tianjin

DATE 1982

TITL Shift in marine research emphasis

CITA Ocean Technology 1, 2-9 (1982)

ABST A general review on the historical development and the future trends of marine research are presented. The main purpose is to elucidate the shift in emphasis of marine research today. Modern marine research has progressed vigorously, and it has become "big science". With the development of marine science, three disciplines have emerged: Oceanography, Marine Technology and Ocean Engineering. With rapid industrial development and an exploding world population growth, land resources are no longer regarded as infinite. In order to survive, men have to turn to the oceans. And consequently the shift in marine research emphasis becomes inevitable. As a result, marine resources research rises to a leading position in marine science.

KEY marine resources

LANG Chinese, English abstract

176.1 AUTH Lu, Yupei

AFFI unknown

DATE 1982

TITL What does the practical salinity scale mean?

CITA Ocean Technology 3, 14-17 (1982)

ABST Since PSS 78 is established by using electric conductivity method instead of titration method, the adoption of PSS 78 means that all the investigations on oceanic hydrology are undertaken by physical methods. The practical salinity scale can only be accurate within a certain range, so it differs from "absolute" salinity, and chlorinity is still one of the parameters to represent chemical characteristics of seawater. The electric conductivity ratio method of the international standard seawater is different from other secondary standards and the international standard is a reliable substitute for the KCl solution.

KEY conductivity, salinity, chlorinity, seawater, standard seawater

LANG Chinese

177 AUTH Luo, Weiquan; He, Qinxi; Fan, Pin; Chen, Guoqin

AFFI South China Sea Institute of Oceanology, Academia Sinica, Guangzhou

DATE 1982

TITL Preliminary study of mercury and cadmium speciation in Zhu Jiang estuary

CITA Environmental Chemistry 1, 245-251 (1982)

ABST In this study of mercury and cadmium speciation in Zhu Jiang estuary, results show that: 1) The highest amount of dissolved inorganic mercury in the waters is 0.007 microgram per liter, of organic mercury is 0.002 microgram per liter; the highest amount of suspended mercury in some stations can reach up to 0.04 microgram per liter; the suspended mercury in each station is more than 52.7 percent of the total mercury; suspended mercury is the major speciation in Zhu Jiang estuarine waters; 2) Among the five

speciations of cadmium in this area, the dissolved inorganic combined cadmium has the highest amount, about 41 percent of the total cadmium; 3) The total mercury content in each station is 0.019-0.045 microgram per liter, the average is 0.032 microgram per liter; the average cadmium content is 0.22 microgram per liter, which is several times higher than normal and indicates the existence of cadmium contamination in Zhu Jiang estuarine waters.

KEY mercury, cadmium, speciation, estuary, organic mercury, contamination, seawater, particulates, marine pollution, Zhujiang

LANG Chinese

178 AUTH Ma, Huichang; Yen, Huiyu

AFFI Institute of Environmental Chemistry, Academia Sinica

DATE 1983

TITL Application of flow injection analyisis to environment monitoring

CITA Huanghe Kexue 4, 59-64 (1983)

ABST Flow injection analysis (FIA) is a new chemical analysis technique that can measure discontinuous samples. It can also be hooked up with many other instruments for measuring pollutants. This paper introduces the applications of FIA in environmental monitoring.

KEY pollutant, analytical chemistry

LANG Chinese

179 AUTH Ma, Shide

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1979

TITL The relationship of two processes on metal/sea water

CITA Transactions of Oceanology and Limnology 2, (1979)

ABST The electrochemical corrosion due to electrochemical action between metal and seawater accounts for the corrosion of metal in the seawater. This paper

discusses the relationship of electrochemical corrosion and biological attachment on metal/seawater interface. The microbial attachment on surface of the metal changes the electrochemical corrosion environment of metals and influences the electrochemical corrosion in many ways, such as: 1) it increases acidity of environment and enhances corrosion on partial area of the metal; 2) it is involved in the electrochemical corrosion process; 3) it results in electrochemical unevenness and enhances the electrochemical corrosion; 4) it changes the marine environment between metal and microbial film. The effects of large-sized organism attachment are complicated and still under investigation. The influences of electrochemical corrosion process on biological attachment are discussed based on two facts: 1) coming-off of the erosive product during corrosion process makes the metal surface unstable, and keeps the organisms from attaching; 2) poisonous ions or toxicated film is found during the corrosion process which kills the attached organisms.

KEY corrosion, seawater, copper, beryllium, zinc, silver, lead, mercury, tin, marine organisms, fouling

LANG Chinese

NOTE Five pages long, page numbers unknown

180 AUTH Ma, Xinian

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1962

TITL Azoarsenic III-spectrophotometric determination of uranium in seawater brine

CITA Oceanologia et Limnologia Sinica 4, 98-99 (1962)

ABST Azoarsenic III has high sensitivity for uranium determination. Since uranium in seawater is low and most of the anions show no effect on the determination the anion exchange resin is used to separate and concentrate uranium from other cations; the uranium in

saline and seawater is determined by azoarsenic III-spectrophotometer. Results show that: 1) Zerolit FF type ion-exchange resin can quantitatively exchange uranium in seawater and saline solution at pH 5; 0.8 N HCl used as washing liquid; 2) after evaporation, adjust pH to 2.4 and add azoarsenic III (concentration 4 x 10(E-5) M). The concentration of U is determined at wavelength 655 nm; the curve meets Beer's law in the range of 0-1 γ/ml. Sensitivity is 0.004 γ/ml; accuracy is ± 4.5%; 3) PO_4^{-3}, SO_4^{-2}, CO_3^{-2}, CH_3COO^- and Cl^- etc. anions do not interfere with the determination. The recovery for U in saline after ion-exchange is 86%.

KEY determination, uranium, seawater, brine, ion-exchange, analytical chemistry, marine resources, spectroscopy

LANG Chinese

181 AUTH Ma, Xinian; Li, Quansheng; Shen, Wanren; Diao, Huanxiang

AFFI Institute of Oceanology, Academia Sinica

DATE 1983

TITL Particulate iron in the cold water region on the southwest of Cheju-Do

CITA Oceanologia et Limnologia Sinica 14, 279-285 (1983)

ABST Twenty one stations southwest of Cheju-do were observed for particulate iron in July, 1980. There were nine stations where the curves of vertical distribution of particulate iron concentration exhibit hyperbolas. They can be described as: log [Fe] = log a + b logD, where [Fe] is the concentration of particulate iron in μgl^{-1} at the layer D meters from the sea floor, and is a constant denoting the concentration of particulate iron at the layer one meter from the sea floor. The log a ranges from 2.91 to 4.38, b is a constant too, ranging from -1.08 to 2.04. It is interesting that above relation for station 3 can be shown as the following equation: [Fe] = 73.9-1.59D. Particulate iron in this region

originates from two sources: at the surface, the particulate iron is from the Changjiang (Yangtze) River because the water temperature is higher but the salinity of water is less than that of underlayer, and at the underlayer particulate iron is from sediment resuspended by upwelling. At about 10m layer at stations 20 and 21 there is minimum value of particulate iron at the same layer of maximum dissolved oxygen.

KEY iron, distribution, Changjiang, temperature, upwelling, oxygen, particulates, Huanghai, concentrations, seawater, depth, resuspension

LANG Chinese, English abstract

182 AUTH Mao, Hanlee; Zhuang, Guowen; Wang, Qingzhi; Lin, Qihua

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1981

TITL Modeling of marine pollution in the Sea of Japan

CITA Hai Yang Ke Xue 4, 54-56 (1981)

ABST The authors report on the research techniques and facilities for the seawater pollution modeling at several Japanese laboratories.

KEY seawater, pollution

LANG Chinese

NOTE Mao Hanlee was formerly spelled Ma Han-Lee.

183 AUTH Milliman, John D.; Chen, Ji-yu; Yang, Zuo-sheng; Ren, Mei-o

AFFI Woods Hole Oceanographic Institute, Woods Hole, Massachusetts, USA (1); East Chines Normal University, Shanghai (2); Shandong College of Oceanology, Qingdao (3); Department of Geomorphology and Sedimentology, Nanjing University (4)

DATE 1983-1984

TITL The Yangtze River--Past, present, and future

CITA Oceanus 26, 20-25 (1983-1984)

ABST Yangtze River is the fifth largest river in the world in terms of water discharge and the fourth largest in terms of sediment load. To understand how the Yangtze's sediment reaches the ocean and is subsequently dispersed requires an understanding of the river, its estuary and the offshore area. The Yangtze has its origins in Tibetan plateaus where it flows eastward to the East China Sea. Most of its water comes from north- or south-flowing tributaries. Yangtze river discharge gains steadily as it flows downstream. Sediment load also increases, but falls abruptly downstream of Yinchang, then the load again increases further downstream as more rivers join it. The river mouth and estuary are continually evolving, which is proved by examining the ancient map of Yangtze river. The Chinese have been mapping the Yangtze river mouth accurately for many thousands of years. The see-saw pattern of current flow accounts for sediments moving in a start-and-stop pattern in the Yangtze. In most instances, there is a net offshore transport of sediment in all channels of the south branch of the Yangtze, but during low river flow, little sediment may actually be transported. About half of the sediment carried by the river is accumulated in the Yangtze estuary; about 25% of the Yangtze load is deposited in the nearshore area off the river mouth and another 25% is transported to the south, where it remains in the coastal environment. The course of the ancient Yangtze offhsore region has been studied and future changes in the Yangtze are expected.

KEY Yangtze River, estuary, East China Sea, transport, sediments

LANG English

184 AUTH Mo, Jinyuan; Cai, Peixiang; Zhang, Zhe; Ou, Bingshen

AFFI Zhongshan University

DATE 1982

TITL Application of semidifferential electroanalysis in marine chemistry I. Determination of trace amounts of heavy metals in seawater by semidifferential electrochemical stripping analysis

CITA Acta Oceanologica Sinica 4, 688-696 (1982)

ABST The purpose of this study is to derive a method from semidifferential electrochemical stripping analysis for determining trace Cu, Pb, Cd and Zn in seawater. The authors studied all the possible effects of different conditions in the seawater system and compared the results to theoretical values. The curve recorded by this method shows both positive and negative peaks for each measured ion and the heights between two peaks are proportional to the trace concentrations of the measured ion.

KEY determination, marine chemistry, heavy metals, seawater, concentrations, copper, lead, cadmium, zinc, analytical chemistry, polarography

LANG Chinese

185 AUTH Mo, Jinyuan; Cai, Peixiang; Wu, Peigiang; He, Ru; Wang, Baishi; Huang, Weiguang; Yun, Fengeun

AFFI Department of Chemistry, Zhongshan University, Guangzhou

DATE 1981

TITL Theory and application of multiple semidifferential electrochemical stripping analysis with thin mercury film formed in situ

CITA Treatise Abstract of Chinese Chemistry Association, 373-375 (1981)

ABST A theory describing the curves of 1.5th order derivative, e', and 2.5th order derivative, e", of the current vs. the electrode potential, E, in anode stripping processes at thin mercury film electrode formed in situ on the rotating glassy carbon disk electrode is presented. The equations for 1.5th or

derivative and 2.5th order derivative were derived from the semidifferential equation proposed by Goto et al. ALGOL language was used for programming the equations, and the results were processed by a digital computer.

KEY electrode, copper, lead, cadmium, zinc, anodic stripping voltammetry

LANG Chinese, English abstract

186 AUTH Mo, Jinyuan; Zhu, Xihai; Lin, Zhiqing; Li, Jiayong

AFFI Department of Chemistry, Zhongshan University (1,2); South China Sea Institute of Oceanology, Academia Sinica, Guangzhou (3); Huanan College of Agriculture (4)

DATE 1963

TITL Concentration and determination of uranium in seawater

CITA Acta Scientiarum Naturalium Universitatis Sunyatsen 4, 79-87 (1963)

ABST Uranium in seawater forms chelating compound with α-nitroso-β-naphthol in the presence of disodium EDTA, then the chelating compound is co-precipitated with β-naphthol; the concentration of uranium in seawter is determined by using uranium-reagent III colorimetry. The appropriate conditions for coprecipitation were studied: pH 5.5-6.5; the amount of precipitant (0.04g/ml) used is 5 ml/l seawater; the amount of co-precipitant (0.2 g/ml) used is 10 ml/l seawater. Change in room temperature and the standing time show no effect on the co-precipitation. Due to the high selectivity of this method, other elements in seawater do not interfere with the determination. To determine one sample only takes about 1-1/2 hr. the authors claim that it is a simple, fast method with high accuracy; the standard error is 1.2%.

KEY uranium, seawater, concentrations, colorimetry, antimony, tin, cobalt, lanthanum, manganese, cadmium, chromium, lead, cerium, thorium, zirconium, titanium, tungsten, molybdenum, phosphorus, iodine, fluorine, carbonate, precipitation, analytical chemistry, temperature, vanadium

LANG Chinese

187 AUTH Mo, Jinyuan; Zhang, Runjian

AFFI Zhongshan University

DATE 1980

TITL Preliminary study of the self-cleaning process of the heavy metal contamination by suspensions in Zhu Jiang estuarine water

CITA Symposium of Chinese Marine Chemistry, 1-4 (1980)

ABST The adsorption of heavy metals by suspensions in water is closely related to the size of particulate. The size distribution was studied by measuring directly the precipitation speed and precipitation curve. Pb, Cu and Fe in water samples from surficial and bottom layers were measured. Results show that: 1) the riverwater into estuary carries large amounts of muddy sand (0.2091 g/l), 75% of the particulates has $\gamma >$ 0.0018 mm; Pb content was high, the sample from bottom layer (16.4 µg/l) contains less than the surficial layer (24.0 µg/l), the adsorption rate for Pb by suspensions is 75-85%; 2) at the estuarine waters near seawater, most of the muddy sands already deposited, 73% of the particulates (0.0349 g/l) is very fine granules with $\gamma <$ 0.0018 mm, the adsorption rate for Pb by suspensions is 95-97%. Pb contents in samples from both layers are the same (0.9 µg/l). The different adsorption rate for Pb can be explained by the change in pH and salinity; Fe etc. metal ions in river water are hydrolyzed and adsorbed on the surface of suspension which increases the adsorptive capacity of the fine suspended particles. The process of

self-cleaning was studied using Pb-212, most of the Pb discharged into river is adsorbed by suspensions and precipitated to the river bottom. Pb content in sediments and suspensions from the same station are compared; suspensions from the surficial layer contain 68.5 μg/g from the bottom layer, 207.3 μg/g; sediments contain 67.8 μg/g. There are many large-size particulates in sediments, which show a weak adsorptive capacity. The adsorption of Cu by suspensions is basically similar to that of Pb.

KEY adsorption, heavy metals, distribution, precipitation, estuary, salinity, pH, river, sediments, lead, copper, iron, particulates, pollution, grain size, sedimentation rate, sand

LANG Chinese

188 AUTH Mo, Jinyuan; Zhang, Runjian; Li, Huanran

AFFI Department of Chemistry, Zhongshan University

DATE 1962

TITL Determination of nitrate in seawater

CITA Oceanologia et Limnologia Sinica 4, 98 (1962)

ABST The nitrate in seawater is determined using improved Zn-reduction method. The authors notice that the buffering and catalyzing effect of seawater can raise the reduction rate. The appropriate conditions for determination are as follows: 1) the reducing pH for seawater is 4.21-4.41; 2) amount of granulated zinc used is 2.5-3.5g; 3) reducing time is 7-8 minutes; 4) slight change in room temperature (~ 25°C) and chlorinity change (13-17‰) show no obvious effect on reduction; 5) the reduction of nitrate to nitrite increases slightly when the temperature is rising (10-35°C). The color shown is stable and can last for one day. This improved method is sensitive (61-65% of nitrate is reduced to nitrite), simple, accurate and with high repeatability, can be used on board ship.

KEY determination, nitrate, seawater, chlorinity, pH, nitrite, temperature, analytical chemistry, colorimetry

LANG Chinese

NOTE Abstract only; also published elsewhere, see 189

189 AUTH Mo, Jinyuan; Zhang, Runjian; Li, Huanran

AFFI Department of Chemistry, Zhongshan University

DATE 1962

TITL Determination of nitrate in seawater

CITA Acta Scientiarum Naturalium Universitatis Sunyatseni, 36-44 (1982)

ABST The nitrate in seawater is determined using an improved Zn-reduction method. The authors notice that the buffering and catalyzing effect of seawater may contribute to the high reduction rate of nitrate. The appropriate conditions for determination are as follows: 1) the suitable pH for the reduction is 4.21-4.41; 2) the amount of granulated Zn (dia. < 1.4 mm and > 40 mesh) used is 2.5-3.5 g; 3) the reduction time is 7-8 min; 4) a slight change in room temperature has no effect on the reduction rate, but the reduction rate of nitrate to nitrite increases slightly when the temperature is raised from 10°C to 35°C; 5) a change in temperature and chlorinity has no effect on the color, but the time needed is shortened when temperature or chlorinity increases; 6) no interference is shown from other elements in seawater. The color shown is stable and can last for one day. The average deviation for this method is < 3%, with good repeatability. The sensitivity is high (about 61-65% of nitrate is reduced to nitrite); this method can be used on board ship.

KEY determination, nitrate, seawater, pH, nitrite, temperature, chlorinity, colorimetry, analytical chemistry

LANG Chinese, also published elsewhere, see 188

190 AUTH Mo, Jinyuan; Zhu, Xihai; Zhong, Qingrui

AFFI Department of Chemistry, Zhongshan University

DATE 1964

TITL Extraction - concentration - colorimetic determination of uranium in seawater

CITA Communications on Marine Research 2, 8-16 (1964)

ABST The 8-hydroxyquinoline (oxine)-uranium complex is extracted into chloroform in the presence of disodium EDTA, then it is back-extracted with ammonium carbonate solution; U(VI) is reduced to U(IV) by granular zinc (1 g) and ascorbic acid (1 mg); uranium reagent III is used for colorimetric determination. Appropriate conditions for extraction and back-extraction were studied: at pH 6.5-7; the recovery of uranium is maximal (94.5%); concentration of oxine is 50 mg/ml; the amount of EDTA disodium solution added is 3-10 ml; the concentration of ammonium carbonate is 10 mg/ml. The authors claim that this is a simple, fast method; one sample only takes about 1-1/2 hrs. It is also a highly selective and accurate method, most of the elements in seawater do not interfere with the determination, the standard error is ± 1.6%.

KEY extraction, concentrations, determination, uranium, seawater, tin, titanium, zirconium, thorium, lanthanum, cerium, chromium, antimony, cadmium, strontium, manganese, cobalt, lead, phosphorus, molybdenum, tungsten, carbonates, vanadium, fluorine, bromine, iodine, colorimetry, analytical chemistry

LANG Chinese

191 AUTH Mo, Jinyuan; Chen, Luo; Qu, Zhaowen

AFFI Department of Chemistry, Zhongshan University

DATE 1962

TITL Determination of uranium in seawater using ion-exchange technique and colorimetry

CITA Oceanologia et Limnologia Sinica 4, 99 (1962)

ABST Ion-exchange resin is used to separate and concentrate trace amounts of uranium in seawater; then the color complex formed by the reaction of uranium and uranium-sensitive reagent III is determined by colorimetry. The appropriate conditions for determining U(+6) and U(+4) by uranium reagent III are studied: 1) pH 2-3 is suitable for U(+6) determination, but masking reagent is needed for eliminating interferences from other elements; 2) concentration of HCl > 4N is good for U(+4) determination, most of the elements in seawater do not interfere with the coloration. The Zr interference can be masked by oxalate. Since the U(+4) determination is more sensitive than U(+6) determination, the authors suggest U(+6) should be reduced to U(+4) for accurate results.

KEY determination, uranium, seawater, ion-exchange, colorimetry, speciation

LANG Chinese

NOTE Abstract only

192 AUTH Mo, Jinyuan; Qu, Zhaowen

AFFI Department of Chemistry, Zhongshan University

DATE 1962

TITL Preliminary test on the automatic titration for chlorinity determination

CITA Oceanologia et Limnologia Sinica 4, 100 (1962)

ABST The instrument for chlorinity determination consists of two major components: 1) electric potential magnifying system; and 2) automatic controlling system. The reference electrode is made from silver wire and inserts in $AgNO_3$ solution, the indicating electrode is made from silver slice and inserts in seawater. The relative error for this method is ± 0.05-0.03 $Cl^{o}/_{oo}$; lowering the titration speed will raise the accuracy. Since the instrumental installation is simple, it can be used on board ship.

KEY chlorinity, determination, seawater, potentiometry, analytical chemistry

LANG Chinese

NOTE Abstract only

193 AUTH Mo, Shenjun; Yuan, Bin; Wei, Peiheng

AFFI Jilin Institute of Applied Chemistry, Academia Sinica

DATE 1974

TITL Increase the sensitivity of atomic absorption spectrophotometry for certain elements by heated fog chamber

CITA Analyitcal Chemistry 2, 213-216 (1974)

ABST The purpose of this study is to set up a simple and practical heated fog chamber which can be used in the laboratory for absorption spectrophotometry. Installation of heated fog chamber and condenser are introduced. The optimal power for heating 80% alcohol solution of Cu and Zn is 140 watts. The characteristics of 80% alcohol solution are that: 1) only half of the heating power for water is needed to reach the same sensitivity; 2) the intake rate of 80% alcohol solution is half of that of water solution. The effect of condenser connected to the fog chamber is observed, it can raise the concentration of elements into the flame and stabilize the flame. The effective misting rate of the sample increases significantly after adding the heated fog chamber. The concentrations of Zn, Cu are linear to the light density in the range of detectable concentration. After addition of fog chamber the sensitivity of determination increased 7-9 times. The repeatability of this method is acceptable. The concentration of Cu, Zn in blood is tested, the recovery is between 97-107%.

KEY atomic absorption, analytical chemistry, copper, zinc

LANG Chinese

194 AUTH National Academy of Sciences

AFFI National Academy of Sciences, Washington, D.C.

DATE 1980

TITL Oceanography in China

CITA CSCPRC Report No. 9, 106pp. (1980)

ABST This is a trip report of the American Oceanography Delegation in 1978 under the sponsorship of the Committee on Scholarly Communication with the People's Republic of China, the American Council of Learned Societies, the National Academy of Sciences, and the Social Science Research Council. Impressions of the members of the development of biology, chemistry, geophysics, physics, shore processes and marine archaeology, and training and research programs in PRC are presented.

KEY marine chemistry, pollution, geochemistry, analytical chemistry

LANG English

NOTE Perhaps because the Delegation did not have access to openly published PRC journals and because PRC was not as open to foreigners in 1978 as in 1983, my impressions of the marine chemistry research performed at several of the PRC institutions differ significantly from what is described in this report. Some differences may be due to differences in personal perceptions but some factual differences do exist; e.g. Professor Li Faxi and his coworkers at Xiamen University have spent over two decades on the study of physical-chemical processes of silicates and the transport of trace metals in the estuaries but the report simply says they have been "developing and standardizing various analytical techniques."

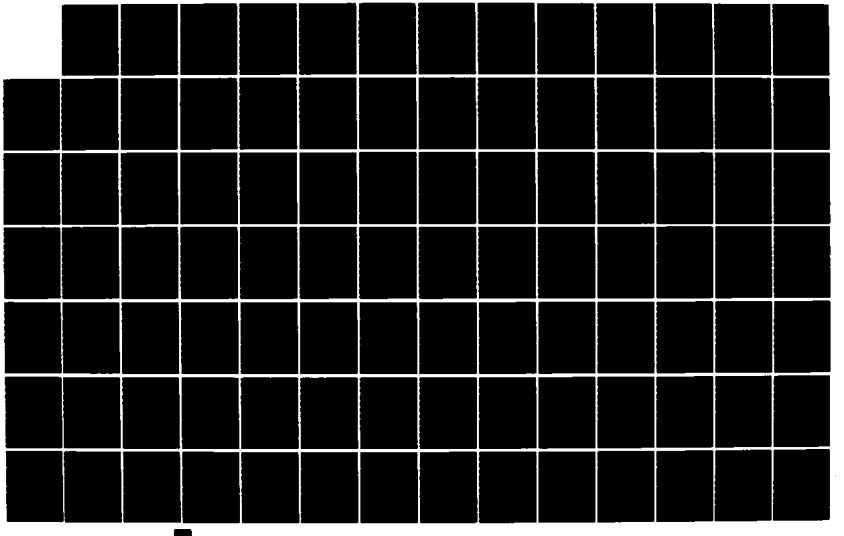
195 AUTH Ni, Chunzhi; Zhou, Zongcheng; Zeng, Huoshui; Li, Zhitang; Xie, Jingxiang

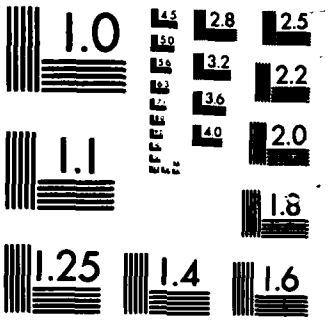
AFFI The Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE 1982

AD-A163 254 MARINE CHEMISTRY IN THE PEOPLE'S REPUBLIC OF CHINA(U) 8/11
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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

TITL Isolation and screening of petroleum-degrading microorganisms

CITA Hai Yang Tong Bao 1(3), 89-94 (1982)

ABST This paper introduces the methods for isolation and screening of petroleum-degrading microorganisms for use in anti-petroleum pollution. The degree of degradation by the microorganisms is reflected by the degree of emulsification and the change in pH, which can also be used as index for preliminary screening from the liquid medium. The strains with high degrading rate had been identified as Pseudomonas, Flavobacterium, Acinetobacter and Alcaligenes.

KEY marine pollution, pH, petroleum, microbes

LANG Chinese

196 AUTH Ostenso, Ned A.

AFFI NOAA, USA

DATE 1983-1984

TITL U.S. - China collaboration in oceanography

CITA Oceanus 26, 9-12 (1983-1984)

ABST A bilateral agreement on cooperation in the Field of Marine and Fishery Science and Technology was signed in Beijing by the administrator of NOAA for the U.S. side and by the Director of China's NBO in May, 1979. Initial exploratory meetings disclosed a range of interests in marine sciences: 1) those that were ready for implementation; 2) those where details needed further development and negotiation; and 3) those for possible future consideration. Reciprocal exploratory visits by small groups of experts in specific fields are made to establish personal relationships and to develop the scientific strategy for cooperative projects. A National Oceanographic Data Center was established in China for the exchange of marine data. Collaboration in aquaculture has been discussed, exchanges of scientists have been completed, and project proposals are pending.

ABST Exchange visits of scientists involved in marine-pollution research and monitoring have been completed and project proposals are being formulated. A three-year study of the sedimentation processes in the East China Sea with special emphasis on discharge from the Yangtze river started in 1980 is the major collaborative research project. Collaboration provides the Chinese access to contemporary technology not available previously, and China has since become a market for U.S.-produced oceanographic equipment. In addition to the benefits, a series of problems has been noticed throughout the collaboration in marine sciences. However, solutions have been found for most of the problems.

KEY East China Sea, sedimentation, marine pollution, Yangtze River

LANG English

197 AUTH Pan, Gendi

AFFI Beijing Meteorology Center

DATE 1983

TITL Solar radiation and air pollution in Beijing

CITA Huanjing Kexue 4, 36-38 (1983)

ABST This paper reports on the monitoring of the concentrations of SO_2, CO_2 and dust in the air of Beijing. It concludes that the concentrations of these substances are higher than the given standards and that the amount of pollutants in the air in Beijing has been increasing year by year.

KEY pollution, air, sulfur dioxide, carbon dioxide, aerosol, dust

LANG Chinese

198 AUTH Pan, Jiezai; Liao, Wenzhuo; Chen, Song

AFFI The Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE 1982

TITL The determination of Cd, Pb, Cu in sediment by differential pulse stripping

CITA Hai Yang Tong Bao 1(5), 22-26 (1982)

ABST The differential pulse stripping method for determining Cd, Pb and Cu in sediments is discussed. Trace amounts of ascorbic acid was added in the measurement to eliminate the interference of ferric ion. The authors claim to be satisfied with their results regarding the peak shape, differential rate, accuracy and sensitivity.

KEY sediments, determination, cadmium, lead, copper, analytical chemistry, anodic stripping voltammetry

LANG Chinese

199 AUTH Pang, Shuwei; Zhao, Kexi

AFFI Institute of Environmental Chemistry, Academia Sinica

DATE 1982

TITL Study of the formation of mercury hydroxide precipitation in aqueous solutions by determination of turbidity

CITA Environmental Chemistry 1, 235-239 (1982)

ABST We studied the interaction of Hg^{2+} and OH^{-} and the formation of precipitation in aqueous solutions similar to the ionic strength and composition in an estuary. We determined the solubility product over a wide pH and mercury concentration ranges, and determined the effect of chloride on the formation of precipitation. The experimental results are represented by the Kragten's formula.

KEY mercury hydroxide, precipitation, aqueous solution, turbidity, ionic strength, composition, estuary, mercury, equilibrium, solubility product, thermodynamics, pollution, speciation

LANG Chinese

200 AUTH Pang, Shuwei; Zhao, Kexi

AFFI Institute of Environmental Chemistry, Academia Sinica

DATE 1982

TITL Study on complexing hydrolytic species of mercury by means of high-voltage paper electrophoresis I. $HgCl_2$-NaCl system

CITA Acta Scientiae Circumstantiae 2, 20-27 (1982)

ABST The river mouth of a water body was investigated for complexing hydrolytic electrophoretic behavior of mercury by high-voltage paper electrophoresis. By using a home-made instrument and filter paper, the best conditions were selected in which electrophoretic separation was achieved. Three series of experiments of $HgCl_2$-NaCl system at pH 7.80 and $\log[Cl^-]$ = 1.0223 were carried out. For those series four stable electrophoretic migrating zones were obtained with good separation and corresponding respectively to four complexing hydrolytic fraction charged differently. And, investigations were also made quantitatively, using tracer atom ^{203}Hg and radioautography techniques.

KEY mercury, electrophoresis, river, tracer, estuary, estuarine water, speciation, pH, thermodynamics, adsorption, complexation, hydrolysis, mercury-203

LANG Chinese, English abstract

201 AUTH Pang, Shuwei; Zhao, Kexi

AFFI Institute of Environmental Chemistry, Academia Sinica

DATE 1983

TITL Study on complexing hydrolytic species of mercury by means of high-voltage paper electrophoresis - Hg^{2+} - FA - NO_3^- system

CITA Environmental Chemistry 2, 49-53 (1983)

ABST The speciation of mercury in the Hg^{2+} - fulvic acid - OH^- system was studied at the ionic strength of 0.1, pH range of 5.25-8.20 using fulvic acid collected from a river.

KEY mercury, electrophoresis, pH, river, fulvic acid, hydrolysis, speciation, ionic strength

LANG Chinese

202 AUTH Peng, An; Wang, Wen-hua

AFFI Institute of Environmental Chemistry, Academia Sinica

DATE 1981

TITL Humic substances and their complex compounds in natural waters I. Extraction and characterization of humic acid from Ji-Yun River

CITA Acta Scientiae Circumstantiae 1, 126-139 (1981)

ABST Humic substances in Ji Yun River in North China have been extracted and investigated. Some of the conclusions have been made based on experimental results. Macroreticular polystyrene resin GDX-102 is found quite satisfactory for separating fulvic acid from river water. No significant difference was observed for IR spectra of fulvic acid before and after adsorption on the resin. Ammonia-ethanol mixture was used to elute fulvic acid from the resin with good results and no metal ions found in eluate. Molecular weights of the aquatic fulvic acid (FA) and humic acid (HA) were determined and found to be lower than those in peat and soil, in the increasing order of FA in river water <FA in sediment <HA in sediment. Aromaticity of aquatic HA and FA are smaller than those in peat and soil, in the same increasing order of FA in river water <FA in sediment <HA in sediment. Characteristic fluorescent properties were observed for FA and HA. The content of acidic functional groups in aquatic humic acids is, on the contrary, higher than those in peat and soil, but the carboxylic part is considerably lower than the other groups, while hydroxyl group is the main-stay of all the groups. The carbon content in the aquatic HA and FA is lower than those in peat and soil. However, oxygen, sulfur and nitrogen content are higher. There might be some groups substituted which should be taken into consideration as a factor in complex formation.

KEY natural waters, extraction, humic acid, river water, fulvic acid, soil, oxygen, sulfur, nitrogen, sediments, complexation, heavy metals

LANG Chinese, English abstract

NOTE Wang Wen-hua is also spelled Wang Wenhua

203 AUTH Peng, An; Wang, Wenhua; Sun, Jingtang

AFFI Institute of Environmental Chemistry, Academia Sinica, Beijing

DATE 1983

TITL The influence of humic acid on the transportation and transformation of mercury in Jiyun River

CITA Environmental Chemistry 2, 33-38 (1983)

ABST The distribution of the mercury-humus complex in the bottom mud of Jiyun River is studied. Results show that the relative content of the humus-mercury complex is increasing as a result of pollution in the estuary. The effect of humic acid on mercury leaching in bottom muds and the precipitation of dissolved mercury, as well as the adsorption of mercury by humic acid are discussed.

KEY humic acid, transportation, transformation, mercury, distribution, estuary, precipitation, adsorption, complexation, sediments, ion-exchange, clays, illite, kaolinite, particulates

LANG Chinese

NOTE Wang Wenhua is also spelled Wang Wen-hua

204 AUTH Peng, Han-chang; Zhao, Kui-huan; Chen, Sui-tian

AFFI First Institute of Oceanography, National Bureau of Oceanography, Qingdao

DATE 1982

TITL The evidence of 'CH01' in sediment core samples of Pacific Ocean collected among FGGE

CITA Journal of Geophysical Research 87, 5563-5565 (1982)

ABST Three new microtektite sites have been identified in addition to the known world distributions. This is of significance for confirming and extending the known range of tektite distributions and for a thorough study of their origin.

KEY sediments, Pacific Ocean, distribution, cosmic dust, composition, microtektite

LANG English

NOTE Peng Han-chang is also spelled Peng Hanchang; Zhao Kui-huan is also spelled Zhao Kuihuan; Chen Sui-tian is also spelled Chen Suitian

205 AUTH Peng, Hanchang

AFFI First Institute of Oceanography, National Bureau of Oceanography, Qingdao

DATE 1979

TITL Investigation of sedimentation environment in western waters of northern Yellow Sea from studying the related factors and distribtuion patterns of authigenic pyrite

CITA Discussion in Geology 2, 1-6 (1979)

ABST Authigenic pyrite is an important indicator that reflects the sedimentation environment. This paper discusses the characteristics of sedimentation environment in the western waters of the northern Huanghai from studying the related factors and distribution patterns of authigenic pyrite. The authigenic pyrite in surficial sediments of northern Huanghai is mainly distributed around western waters; the different layers in the sediment core samples from this area also contain large amounts of authigenic pyrite. [Generally speaking, the content of authigenic pyrite in sediments is high and the content of sheet clastic minerals is also high.] The major factors affecting the formation of authigenic pyrite in sediments of northern Huanghai are as follows: 1) organic matter has a decisive effect on the formation

of sulfuric compounds with Fe; 2) In this area, the Eh value is negative; Eh is also important for diagenesis; 3) pyrite can be formed in neutral to strong alkaline sedimentation environment; the alkalinity is high and the H_2S content is high; 4) a low value in the Fe^{+3}/Fe^{+2} ratio is favorable for the formation of authigenic pyrite - the higher the content of organic matter, the lower the Fe^{+3}/Fe^{+2} ratio. In addition, the color of sediments depends on the Fe^{+3}/Fe^{+2} ratio.

KEY Yellow Sea, distribution, Huanghai, pyrite, iron, redox potential, pH, hydrogen sulfide, authigenic, organic matter, Eh, alkalinity, color

LANG Chinese

NOTE See Note 204

206 AUTH Peng, Hanchang; Yu, Zhong; Miao, Xin; Zhuang, Shijie

AFFI First Institute of Oceanography, National Bureau of Oceanography, Qingdao (1); Institute of Petroleum Survey and Exploiting (2,3); Institute of Geology, Ministry of Metallurgical Industry (4)

DATE 1983

TITL Preliminary study of the microtektite first discovered in mid-Pacific Ocean by Chinese scientists

CITA Acta Oceanologica Sinica 5, 194-201 (1983)

ABST The microscopic characteristics of microtektites are reported in this paper. In general, the content of SiO_2 in microtektite is very high, from 98% to 42%. In some microtektites, the content of MgO is also high. The surficial microstructure is also observed. From the viewpoint of chemical composition and microstructure, the microtektite should be in the Asia-Australia strewn field, but it is not found in the defined field and authors suggest to enlarge the area of above-mentioned strewn field.

KEY microtektite, compositions, magnesium, silicon, titanium, aluminum, iron, calcium, sodium, potassium, manganese

LANG Chinese

NOTE See Note 204

207 AUTH Peng, Hanchang; Zhao, Kuihuan; Chen, Suitian

AFFI The First Institute of Oceanography, National Bureau of Oceanography, Qingdao

DATE 1981

TITL A preliminary study of deep-sea cosmic dust

CITA Kexue Tongbao, 682-685 (1981)

ABST Many iron, silicate, and glass silicate spherulites have been found in the surface sediment layer and in sediment core samples collected from the deep sea floor; these have been considered to be cosmic dust. The microscopic characteristics of these three kinds of cosmic dust are presented. The grain size ranges from 20 to 200 μm, the largest one being 420 μm. The iron cosmic dust is made up of an inner nucleus and an outer shell; the major chemical elements are Fe and Ni. Silicate cosmic dust is made up of oxides; MgO, SiO_2 and FeO occur most abundantly. The SiO_2 concentration is the highest in glassy silicate cosmic dust; Al_2O_3 content is the next highest. The major mineral composition of the iron cosmic dust is magnetite. The microstructure of above-mentioned 3 kinds of cosmic dust is also reported.

KEY iron, silicate, cosmic dust, nickel, magnesium, grain size

LANG Chinese

NOTE See Note 204

208 DELETED

209 AUTH Peng, Hanchang; Zhao, Kuihuan; Chen, Suitian

AFFI The First Institute of Oceanography, National Bureau of Oceanography, Qingdao

DATE 1982

TITL The study of the cosmic dust from western mid-Pacific sea-floor sediments

CITA Acta Geologica Sinica, 62-68 (1982)

ABST In 1978-1979, China's oceanographic vessel collected a lot of sediment samples from the western mid-Pacific (10°S-5°N, 160°E-173°E) when taking part in the First GARP Global Experiment (FGGE). Mineralogical examination of these samples under the stereoscopic microscope has revealed many spherules of different colours and with a diameter less than 1 mm, some of which exhibit strong magnetism. In addition to the study of the microscopic characteristics of the spherules, electron microprobe, X-ray energy spectrum, X-ray powder and scanning electron microscopic analyses have been made respectively. From a vast amount of data on their microscopic characters, chemical composition, mineral composition and microstructures, it may be ascertained that they are cosmic dust of extraterrestrial origin.

KEY sediments, compositions, cosmic dust, Pacific Ocean, grain size, color, X-ray diffraction

LANG Chinese, English abstract

NOTE See Note 204

210 AUTH Ping, Guangming

AFFI Office of Scientific Research, Shandong College of Oceanology, Qingdao

DATE 1982

TITL Success in developing the DF-1 model electrochemical analyzer

CITA Journal of Shandong College of Oceanology 12, 72 (1982)

ABST The DF-1 model electrochemical analyzer is a general electrochemical instrument, which has five two-way independent function-selectors to meet the requirements for different experimental functions such as polarization and chromatograph. This instrument is highly sensitive and accurate and can be used in teaching and research as well as for monitoring purposes.

KEY analytical chemistry, electrode

LANG Chinese

211 AUTH Qi, Dayong; Qu, Changling; Zhou, Tianze

AFFI Institute of Environmental Chemistry, Academia Sinica, Beijing

DATE 1981

TITL An improved spectrophotometric determination of Br in sea water

CITA Hai Yang Ke Xue, 27-30 (1981)

ABST While using phenol red to determine Br content in seawater, the authors added a surface active agent to increase the sensitivity, and the results were improved. This method is also good for use with the low-Br content samples from shallow sea areas or estuaries.

KEY seawater, bromine, determination, colorimetry, indicator, estuary

LANG Chinese

212 AUTH Qian, Wanying; Cui, Junzhi; Fu, Ruiwen; Zhao, Yunying; Tang, Yongming

AFFI Department of Marine Chemistry, Shandong College of Oceanology, Qingdao

DATE 1979

TITL Determination of total mercury in seawater - digestion and storage of water sample

CITA Journal of Shandong College of Oceanology, 1-12 (1979)

ABST Since the total mercury in seawater is low, the complete digestion of water sample is necessary for the determination. Six reagents are tested in order to find the one with low blank value for mercury content. Low concentration of acidic potassium permanganate solution, acidic potassium persulfate solution and mixed solution of oxidizers are tested under chosen conditions. The temperature effects on the digestion of different mercury compounds and water samples by different digestants are also compared. Results show that the low concentration of acidic potassium permanganate solution and acidic potassium persulfate solution are better digestants. Several fixatives are added to unfiltrated offshore-in-situ seawater, to filtered seawater and filtered seawater to which inorganic mercury has been added to study their effects on water stability. Results show that all the fixatives have no effect on unfiltrated in situ seawater and have a protective effect on both samples of seawater. Since the mercury content in filtered seawater is very low, further study on the stability of mercury in seawater is suggested.

KEY determination, mercury, seawater, analytical chemistry

LANG Chinese

213 AUTH Qian, Zuoguo; Sun, Mingkun

AFFI Shandong College of Oceanology, Qingdao

DATE 1980

TITL Marine environmental chemistry of polychlorinated biphenyl

CITA Hai Yang Ke Xue 2, 23-29 (1980)

ABST Because of carelessness during the production and disposal of PCB (polychlorinated biphenyl), this pollutant has become a direct threat to the oceanic ecosystem and to the health of humans. This paper discusses ways that PCB enters the ocean and suggests

that the atmosphere plays an important role. The evaporation of polluted water, the burning of discarded products and gas discharges from factories all contribute to the concentration of PCB in the atmosphere. The distribution of PCB in the oceanic environment is discussed. The stability of PCB suggests that it could be used as a tracer in geochemical studies.

KEY PCB, tracer, seawater, rain, bioaccumulation, sediments, distribution, pollution, transport, marine organisms, DDT

LANG Chinese

214 AUTH Qian, Zuoguo; Sun, Mingkun

AFFI Department of Chemistry, Shandong College of Oceanology, Qingdao

DATE 1982

TITL On the measurement of dissolved saccharides in seawater

CITA Hai Yang Tong Bao 1(4), 100-105 (1982)

ABST The basic problems and the major methods for determining dissolved saccharides in seawater are discussed. Colorimetry or chromatography is used for measuring total dissolved saccharides. The MBTH method is recommended as a sensitive method for measuring total dissolved monosaccharides. Polysaccharides can only be determined indirectly, by measuring their hydrolyzed products. Liquid chromatography is a better method for measuring individual monosaccharide.

KEY seawater, colorimetry, pH, chromatography

LANG Chinese

215 AUTH Qin, Yunshan (Y. S. Chin); Xu, Shanmin; Li, Fan; Zhao, Shijin

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1983

TITL Study on geotechnical properties of sediment cores in western Bohai Sea

CITA Oceanologia et Limnologia Sinica 14, 305-314 (1983)

ABST Fifteen long sediment cores lifted from water depth of 15 to 29 m in western Bohai Sea were geotechnically analyzed. All samples were undisturbed. Sediment cores were not kept under refrigeration because there was only a short time from their collection and analysis. The cores ranged in length from 11-20 m. The geotechnical investigation was part of a general geological study performed by the Institute of Oceanology, Academia Sinica, Qingdao. Some geotechnical properties of cores were measured and analyzed in laboratory; they are water content, bulk density, natural void radio, plastic index, plastic limit, shearing strength, sensitivity, compressibility and so forth. Sediment types of the cores can be classified into three different groups from top downward the cores, depending on the different geotechnical properties of the sediments. (1) Group of soft mud: This group ranged in thickness from 2-4 m. The group may be geotechnically characterized by its high water content, void radio and high compressibility. Its shearing strength, permeability and bearing capability were lower than the other two groups. Therefore, this group is not suitable for engineering construction. The sediment of the group might have been accumulated by discharges derived from the Huanghe River. (2) Group of interbedding of subclayey, subsandy and sandy soils: This group appeared below the first group, ranging in thickness from 2-13 m. It was characterized geotechnically by its intermediate form between the first and third groups. (3) Sand group: Submerged depth of this group was about 5-17 m under the sea floor. Its thickness was not known in detail. The group mainly consists of fine or very fine sand. The geotechnical

properties of the group show low compressibility and high bearing capability. Therefore, the group provides a good foundation for engineering construction.

KEY Bohai, sand, clays, sediments, Huanghe

LANG Chinese, English abstract

NOTE See Note 33

216 AUTH Qiu, Shihua; Cai, Lianzhen; Chen, Tiemei; Yuan, Sixun

AFFI Archaeological Institute, CASS, Beijing (1,2); Peking University (3,4)

DATE 1983

TITL Report on the Chinese sucrose charcoal standard for ^{14}C dating

CITA Kexue Tongbao 3, 170-174 (1983)

ABST For ^{14}C dating, in order to put all the ^{14}C dates of different laboratories on a common basis and make the ^{14}C dates more accurate and reliable, it is necessary to set up a common modern reference[1]. In 1975, we were charged at the National Conference of Isotopic Geology, Guiyang, to establish a common reference in China. The result is reported here.

KEY standard, dating, carbon-14

LANG Chinese

NOTE English version is published in Kexue Tongbao 28, 707-713 (1983)

217 AUTH Qiu, Shihua; Cai, Lianzhen; Chen, Tiemei; Yuan, Sixun

AFFI Archaeological Institute, CASS, Beijing (1,2); Peking University (3,4)

DATE 1983

TITL Report on the Chinese sucrose charcoal standard for ^{14}C dating

CITA Kexue Tongbao 28, 707-713 (1983)

ABST See 216

KEY standard, dating, carbon-14

LANG English only

NOTE The Chinese version is published in Kexue Tongbao 3, 170-174 (1983)

218 AUTH Qiu, Yongde

AFFI P.O. Box 99, Wuxi

DATE 1981

TITL Some acoustic problems in the study of marine bio-acoustics

CITA Hai Yang Ke Xue 3, 39-43 (1981)

ABST The characteristics of sound fields and non-sound fields are discussed. The biological significance of sound fields is in the far-field area, while the non-sound fields affect mainly the near-field area. The near and far fields of marine bio-acoustics are distinguished. In addition, the author mentions the sound propagation and data processing of the marine bio-acoustics.

KEY bioacoustics, sound speed, sound channel, particulates, phytoplankton

LANG Chinese

NOTE Qiu Yongde is also Qiu Yong-de

219 AUTH Research Laboratory of Organic Geochemistry and Sedimentology, Institute of Geochemistry, Academia Sinica

AFFI Institute of Geochemistry, Academia Sinica

DATE 1982

TITL Organic geochemistry

CITA Science Press, Beijing, 354 pp. (1982)

ABST The definition, characteristics, separation and analytical method of various organic compounds, humic acid and kerogen etc. in geologic structures are discussed based on the principles of sedimentology, basic knowledge of organic chemistry, type of organic matters in geology and research methods. The organic stable isotope geochemistry of C, H, N, S etc. and simulated experiments in organic geochemistry are also

discussed. Organic geochemistry of energy sources (petroleum, coal) and other sedimentary minerals (Fe, P, metals and trace elements etc.), environmental pollution, organic clay and origin of life are discussed in detail.

KEY humic acid, geochemistry, minerals, pollution, clays, organic matter, amino acids, fatty acids, chlorophyll, petroleum, dolomite, calcite, aragonite, sediments, carbohydrates, organic chemistry, analytical chemistry, sulfur-32, sulfur-33, sulfur-34, sulfur-36, hydrogen, deuterium, carbon-12, carbon-13, nitrogen-14, nitrogen-15, glycine, alanine, valine, isoleucine, leucine, hydroxyproline, proline, serine, threonine, aspartic acid, glutamic acid, cystine, cysteine, methionine, tyrosine, phenylalanine, hydroxylysine, lysine, histidine, tryptophan, arginine, protein, pigments, methane

LANG Chinese

220 AUTH Rezanov, I. A.

AFFI unknown

DATE 1982

TITL Origin of the oceans

CITA Science Press, Beijing, 174 pp. (1982)

ABST This is a translation of the book "Origin of the Oceans" by I.A. Rezanov, 1979. Ocean bottom geology, topography, geophysics, sedimentology and rock compositions are discussed.

KEY seawater, salinity, major ions, minor elements, sediments, compositions, basalt, rocks

LANG Chinese

NOTE Chinese version of this book was translated by Sun Depei

221 AUTH Shan, Xiao-quan; Ni, Zhe-ming

AFFI Institute of Environmental Chemistry, Academia Sinica, Beijing

DATE 1981

TITL Matrix modification for the differential determination of tellurium (IV) and tellurium (VI) in water samples by graphite furnace atomic absorption spectrometry

CITA Acta Scientiae Circumstantiae 1, 74-80 (1981)

ABST This report described the use of platinum, palladium or iridium in micrograms as matrix modifiers for the determination of Te (IV) and Te (VI). The charring temperature of tellurium can be raised up to 1300°C. The extraction behavior of Te (IV) and Te(VI) with KI-MIBK was investigated in detail. Based on the results obtained an analytical method for differential determination of tellurium (IV) and tellurium (VI) was recommended. Tellurium (IV) was extracted with KI-MIBK and back extracted with (1:1) ammonium hydroxide, and tellurium (VI) was separately determined after reduction to Te (IV) by boiling Te (VI) with (1:1) hydrochloric acid. The ammonium hydroxide solution was introduced into the graphite furnace with matrix modification technique using micrograms of platinum, palladium or iridium. Concentrations of Te (IV) and Te (VI) in several real water samples were found to be less than 0.02 ppb and 0.03-0.06 ppb, respectively. Sensitivity of the recommended method is 2-3 orders of magnitude greater than that reported in the literature.

KEY determination, tellurium, platinum, palladium, iridium, pollution, analytical chemistry, atomic absorption

LANG Chinese, English abstract

222 AUTH Shandong College of Oceanography, Department of Chemistry

AFFI Shandong College of Oceanography, Department of Chemistry

DATE 1962

TITL Determination of chlorinity in seawater

CITA Oceanologia et Limnologia Sinica 4, 100-101 (1962)

ABST Mohr-Knudsen chlorinity determination is widely used, but the concentration of indicator and the amount of indicator used are different in different countries. The purpose of this study is to find an ideal method for our lab. The concentration and amount of indicator (K_2CrO_4) were tested. The significant color change is shown at the end point when 10 drops of 10% K_2CrO_4 (0.05 g) is added earlier. Other methods for chlorinity determination were also tested and compared. Results show that Fajams method is better than Mohr-Knudsen method, the concentration and amount of indicator (fluorescein) in Fajams method are also reported.

KEY determination, chlorinity, seawater, analytical chemistry, indicator

LANG Chinese

223 AUTH Shanghai First Medical College, Department of Sanitation, Environmental Sanitary Group, Sanitary Chemistry Group

AFFI Shanghai First Medical College, Department of Sanitation

DATE 1974

TITL Determination of trace arsenic in water and urine

CITA Analytical Chemistry 2, 186-189 (1974)

ABST DDC silver (silver diethyldithio-carbamate) pyridine method for determining trace As has been studied extensively. In this paper, the effects of several DDC silver absorption liquids were compared. Results show that the use of DDC silver-ephedrin chloroform solution can avoid the smell of pyridine and still has good absorption; the absorption of DDC silver-strychnine chloroform + pyridine (7:1) is as good as pyridine. The suggested reaction time is 35 minutes; As in the water is all evaporated into absorption liquid and forms a complex in 30 minutes.

The color of the complex (red) is stable in 8 hrs. The optimal size of granular Zn is 20-30 meshes. The recoveries of As in river water, seawater and urine of human subjects are 88.6-113%, 85-95% and > 90%, respectively. The experimental procedures for As determination in both water and urine are introduced in detail.

KEY determination, arsenic, water, river water, seawater, spectrophotometry, analytical chemistry, pollution, colorimetry

LANG Chinese

224 AUTH Shanghai Institute of Labor Sanitation and Prevention-treatment of Occupational Disease

AFFI Shanghai Institute of Labor Sanitation and Prevention-treatment of Occupational Disease

DATE 1974

TITL The determination of dibutyl-tin bichloride in the air

CITA Analyitcal Chemistry 2, 208-211 (1974)

ABST Benzfluorenone is used to determine the organic tin in the air. Appropriate experimental conditions were tested: 1) the optimal ratio for alcohol to H_2O is 3:4.5; 2) the amount of benzfluorenone solution added influences the light density significantly, the quantity of benzfluorenone (0.05%) used is 0.1 ml 3) the light density is highest in the pH range of 7.2-8.2; 4) distilled water is a better basal medium than other solutions with pH value 2.2, 4.5 and 8.05 respectively; 5) the optimal wavelength for colorimetric determination is 520 nm; 6) the color of the solution is stable in 40 minutes; 7) the best reaction condition is at 50 degree C for 10 minutes. The reaction time decreases with the increase of reaction temperature; 8) tin tributyl chloride and tin tetrabutyl do not interfere with the determination, but the existence of tin tetrachloride affects the

results significantly. Instead of using distilled water, 1% $CaNa_2$·EDTA solution can be used to decrease the effect of tin tetrachloride. Sampling method is also introduced in the paper.

KEY determination, air, tin, photometry, analytical chemistry, pollution, colorimetry

LANG Chinese

225 AUTH Shen, Quanxing; Chen, Qingze

AFFI East China Normal University

DATE 1983

TITL Determination of uranium in seawater

CITA Acta Oceanologica Sinica 5, 57-61 (1983)

ABST Uranium in seawter is extracted on hydroxo-zinc carbonate (2 $ZnCO_3$ · 3 $Zn(OH)_2$) and determined spectrophotometrically. The extraction efficiency as a function of temperature, pH and foreign ions is evaluated.

KEY determination, uranium, seawater, marine resources, pollution, analytical chemistry, extraction, pH, temperature, absorbent, spectroscopy

LANG Chinese

226 AUTH Shenyang Institute of Forestry Soil, Inorganic Group of Technical Division, Biological Treatment Group of Sewage Division

AFFI Shenyang Institute of Forestry Soil

DATE 1974

TITL Preparation of cyanide selective electrode and its application on the analysis of industrial sewage

CITA Analytical Chemistry 2, 217-221 (1974)

ABST The preparation of cyanide selective electrode (pCN electrode) is reported in detail. The determination of cyanide is affected by pH value; the optimal pH for determining the total cyanide content is > 12. The ion or compound which reacts with Ag^+ or CN^- is usually considered an interfering ion. Fe^{+3}, Co^{+2},

Zn^{+2}, Cu^{+2}, I^{-} and S^{-2} etc. were tested; results show that high concentrations (50 mg/l) of Fe^{+3} and Zn^{+2} do not interfere with the determination. Co^{+2} and Cu^{+2} can affect the result. An optimal amount of EDTA solution should be added as a masking agent. Usually lead carbonate is added to precipitate sulfide; otherwise the sulfide in the sample erodes the electrode. To measure the concentration of cyanide in solution directly by pCN electrode is simple, fast and has good repeatability. The range of detection by this method is 10^{-2} M-10^{-5} M.

KEY electrode, soil, determination, cyanide

LANG Chinese

227 AUTH Shi, Chengxi

AFFI Department of Hydrology, East China College of Water Conservancy; Nanjing Institute of Geography

DATE 1964

TITL The development and trend of hydrography in lakes

CITA Oceanologia et Limnologia Sinica 6, 219-223 (1964)

ABST The historical background on the utilization and study of lakes in China is introduced. The major researches on hydrology in lakes in the 60's and 70's in China include hydrologic survey, water balance, siltation of reservoir, aquatic biology and lake water chemistry. In addition to the overall investigation, several experimental stations were established near lakes in order to proceed periodic study on hydrology, physical-chemical characteristics and aquatic plants in the lake. The research trend of hydrology in lakes is suggested in the field of water balance and change of water level, thermal balance of water, thermodynamics of lake water, movement of lake water, movement of muddy sand as well as hydrologic chemistry.

KEY lake water, thermodynamics, sand, salt lakes, limnology

LANG Chinese

228 AUTH Shi, E Hou

AFFI Institute of Marine Environmental Protection, National Bureau of Oceanography

DATE 1984, unpublished

TITL Marine pollution of near-shore of China

CITA Institute of Marine Environmental Protection, National Bureau of Oceanography

ABST Since 1972 pollution monitoring of the whole area of the Bohai Sea and the offshore of the Yellow Sea, the East China Sea and the South China Sea have been undertaken. The total researched area is about 400,000 km^2. During the same period, pollutant sources have also been investigated. According to the statistics, the annual dumping of municipal and industrial wastewater amounts to about 50-60 hundred million tons. The main pollutants are oils, heavy metals and organic matters. The main ways of pollutants entering into the sea are by river transportation, by direct discharge from factories, from ships, sea ports and marine platforms.

KEY oil, Bohai, petroleum, South China Sea, East China Sea, Changjiang, Huanghe, Zhujiang, pollution, Yellow Sea, marine pollution, trace metals, seawater, sediments, zinc, cadmium, lead, organic matter, river, chemical oxygen demand, sources

LANG English

229 AUTH Shi, S. Y.; Chi, M. H.

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1965

TITL Determination of the ascorbic acid contents in some edible seaweeds

CITA Oceanologia et Limnologia Sinica 7, 67-72 (1965)

ABST The ascorbic acid contents in some Chinese edible seaweeds were studied by using the 2,6-dichlorophenol indophenol titration method. Results obtained were as follows: 1) the ascorbic acid contents showed the highest in Porphyra spp. among the seaweeds investigated, ranging 318-475 mg% by dry weight, and decreased in the following order: 310, 214, 174, 111 and 69 mg% for Ulva, Monostroma, Undaria, Laminaria and Enteromorpha respectively (see Table 1); 2) the ascorbic acid contents in seven samples of the artificially cultured Porphyra yezoensis collected from March to May in 1960 did not show conspicuous seasonal variation (see Table 1, No. 5-11); 3) the ascorbic acid contents in Porphyra rapidly decreased during storage in glass containers, especially in the earlier stage of storage and in the samples cut with kitchen knife and treated with fresh water before drying (see Table 2).

KEY seaweeds, marine resources

LANG Chinese, English abstract

NOTE Shi S.Y. is also known as Shi Shengyao

230 AUTH Shi, Shengyao

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1981

TITL A widely used marine algal polysaccharide--Carrageenan

CITA Hai Yang Ke Xue 2, 47-53 (1981)

ABST The source material, molecular structure, chemical properties, production method and applications of Carrageenan are discussed.

KEY marine resources agar, seaweeds

LANG Chinese

NOTE See Note 229

231 AUTH Shi, Shengyao; Ji, Minghou

AFFI Institute of Oceanology, Academia Sinica

DATE 1980

TITL Studies on the agar from Gracilaria verrucosa III. Seasonal variations in agar yield and gel strength of G. verrucosa

CITA Transactions of Oceanology and Limnology, 35-38 (1980)

ABST The seasonal variations in the yield and the gel strength of the agar from G. verrucosa, collected monthly at Taipingjiao and Tuandao, Qingdao in 1959, 1960 and 1965 were studied. The results showed that the seasonal variations are remarkable. Both the yield and the gel strength of agar from the seaweeds collected in summer showed higher values than those collected in winter and spring.

KEY agar, seaweeds, marine resources, seasonal variation

LANG Chinese, English abstract

NOTE See Note 229 and Note 30

232 AUTH Shi, Shengyao; Tang, Zhanxiang

AFFI Institute of Oceanology, Academia Sinica (1); Guangdong Fisheries Products Plant (2)

DATE 1982

TITL Studies on the agar from Gracilaria II. The effect of alkali treatment on the yield and gel strength of Gracilaria agar

CITA Journal of Fisheries of China 6, 51-58 (1982)

ABST For the purpose to improve the quality of Gracilaria agar two methods of alkali treatment were studied: 1) cold alkali treatment method: Dried Gracilaria was treated with Baumé 10-45° NaOH at room temperature for 5-40 days; 2) hot alkali treatment method: Dried Gracilaria was treated with Baumé 5-35° NaOH at 75° or 90°C for 2-6 hours. After alkali treatment the seaweeds were washed thoroughly to remove the remaining alkali, and then the agar was extracted with water in the ordinary way. The results were summarized in the following: The gel strength of Gracilaria agar is increased markedly by both cold and

hot method. The Gracilaria harvested in Wanning, Hainan Island, Guangdong Province, was pretreated either by cold or by hot method, their gel strength was increased about four times from below 60 g/cm^2 to about 300 g/cm^2. While the Gracilaria harvested in Beihai, Guangxi Province was subjected to pretreat by the cold method, their gel strength was increased about ten times, from below 60 g/cm^2 to about 700 g/cm^2. The effect of treatment was related closely to the temperature, time of treatment and the concentration of sodium hydroxide. In the cold alkali treatment method, Gracilaria was treated with Baume 30-35° alkali for only five days, its gel strength reached to maximum. In case of the concentration of alkali is above Baumé 35° or below Baumé 30°, the time of treatment should be longer. The yield of agar by the cold method was much higher than that by the hot method. Therefore, the cold alkali treatment method in comparison with the old hot method should be recognized as a better one.

KEY agar, seaweeds, marine resources

LANG Chinese, English abstract

NOTE See Note 229

233 AUTH Shi, Shengyao; Xu, Zuhong; Cheng, Zengshen; Tang, Zhanxing; Liang, Zhaoming

AFFI Institute of Oceanology, Academia Sinica (1,2); National Institute for Control of Pharmaceutical and Biological Products, Ministry of Health (3); Guangdong Fishery Products Plant (4)

DATE 1981

TITL A preliminary study on hypnean

CITA Journal of Fisheries of China 5, 179-185 (1981)

ABST 1) For the preparation of hypnean from Hypnea sp. prior to extraction the algae should be treated with Baume' 20° NaOH at room temperature for 2 days, and rinsed with water. The treated seaweed was then

extracted with 15-20 times its quantity of 0.04% dilute H_2SO_4 solution at 100°C for 1-1.5 hr. After filtration, to the filtrate KCl was added to bring its concentration to 0.2-0.3%, and the solution was allowed to gelatinate. The gelatine was frozen, thawed and dried. 2) The gelatinous strength of hynean was affected by electrolytes markedly. The order of effect by cations is: $Ca^{++} > K^+$, Cs^+, $Rb^+ > Na^+$, Li^+, NH_4^+, and by anions is: $Cl^- > NO_3^-$, $SO_4^= > I^- > CO_3^=$. 3) The setting point of hypnean was affected by KCl, it was increased with increase of concentration of KCl. 4) The culturing effects of bacteria (Salmonella typhasa, Pasteurella pestis, Shigella dysenteriae and Brusella abortus) in hypnean media and in agar media were compared. Hypnean gave better results.

KEY marine resources, agar, algae, seaweeds

LANG Chinese, English abstract

NOTE See Note 229

234 AUTH Shi, Shengyao; Zhang, Yanxia; Liu, Wanqing; Li, Zhien

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1983

TITL The seasonal variation in yield, physical properties and chemical composition of agar from Gracilaria verrucosa

CITA Oceanologia et Limnologia Sinica 14, 272-278 (1983)

ABST The seasonal variations in the yield, gel strength, viscosity, gelation and melting temperature, and the 3,6-anhydro-galactose, galactose and sulfate contents of agar from Gracilaria verrucosa collected monthly between June 1978 and October 1979 in Qingdao were studied. 1) The yield of agar extracted from G. verrucosa collected ranges from 24.2 to 33.6% (Fig. 1). It appears to be rather irregular and the trend of seasonal variation is not discernible. 2) Seasonal variation of gel strength is obvious, i.e.

the gel strength of agar from G. verrucosa in summer and autumn are higher than that in spring and winter (Fig. 2). The variation is quite regular with maximum value up to 210 g/em^2 and minimum value down to 3 g/em^2. 3) The viscosity of agar solution varied with the changing of seasons too, but its variation was not so regular as that of the gel strength (Fig. 2), being higher around August at 186.3 e.p. and lower around February at 10.5 e.p. 4) The seasonal variation of gelation temperature and melting temperature of the agar from G. verrucosa coincide fundamentally with each other, being higher in summer and autumn, and lower in winter and spring. The highest gelation and melting temperature were at 37.2°C and 84.2°C and the lowest were at 22.5°C and 26.5°C respectively (Fig. 3). 5) The seasonal variation in 3,6-anhydro-galactose content of agar from G. verrucosa was obvious (Fig. 4), higher in summer and autumn, and lower in winter and spring, the highest being in August for agar with 31.6% of 3,6-anhydro-galactose content, and the lowest in March for that with 17.6%. 6) The agar from G. verrucosa collected in winter and spring had higher contents of sulfate and galactose, being 8.36% and 56.9% respectively, than that collected in summer and autumn, being 3.21% and 44.6% respectively. Their trends in the seasonal variation were just opposite to that of 3,6-anhydro-galactose content. From the seasonal variations in the physical properties and chemical composition, it showed that there existed a correlation. The agar with higher value in gel strength, viscosity, gelation and melting temperature has also higher 3,6-anhydro-galactose content but less sulfate and galactose content.

KEY seasonal variation, compositions, agar, viscosity, temperature, marine resources, sulfate, seaweeds

LANG Chinese, English abstract

235 AUTH Shi, Wenbin; Wang, Ruixian; Li, Murong; Yi, Ruizao; Yu, Lihui; Yu, Qun

AFFI The Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE 1982

TITL Direct determination of manganese in seawater by flameless atomic absorption spectrometry

CITA Hai Yang Tong Bao 1(6), 22-25 (1982)

ABST Direct determination of manganese in seawater by flameless absorption spectrometry is fast, simple and free from reagent contamination. 200 water samples from Yangtze River estuarine were measured; the results show that flameless absorption spectrometry is a reliable method for measuring manganese in seawater.

KEY determination, manganese, seawater, spectrometry, rivers, estuarine, Changjiang, atomic absorption, Yangtze River

LANG Chinese

236 AUTH Shiao, Yinkai

AFFI Qinghai Salt Lake Research Institute, Academia Sinica, Xining

DATE 1982

TITL The effect of $^{10}B(n,\alpha)\ ^{7}Li$ and $^{6}Li\ (n,\alpha)\ ^{3}H$ reactions on the composition of B and Li isotopes in certain salt lakes

CITA Kexue Tongbao, 942-945 (1982)

ABST Qingzang plateau provides the characteristic geographic conditions for the study of the compositional change in B and Li isotopes affected by cosmic radiation. Results show that the $^{11}B/^{10}B$ ratio of the salt lakes at Qaidam basin is higher than that at Xizang plateau; the $^{7}Li/^{6}Li$ ratio is mainly decided by the B/Li ratio and increases with the increase of the B/Li ratio when geological ages are the same. The $^{10}B\ (n,\alpha)\ ^{7}Li$ and $^{6}Li\ (n,\alpha)^{3}H$ reactions resulting from

the action of thermal neutron in cosmic radiation may be responsible for the compositional change in B and Li isotopes in salt lakes of Qingzang plateau. Author concludes that: 1) the higher $^{11}B/^{10}B$ ratio of salt lakes at Qaidam basin is related to the sedimentation age; 2) the penetration power of neutron in cosmic radiation is limited, so the $^{11}B/^{10}B$ and $^{7}Li/^{6}Li$ ratios in the deep layer of earth are not affected by the above-mentioned reactions; 3) the change of $^{7}Li/^{6}Li$ ratio is more complicated than that of $^{11}B/^{10}B$ ratio due to the influences from both reactions.

KEY isotopes, salt lakes, sedimentation, age, boron, lithium, boron-10, boron-11, lithium-6, lithium-7, geochemistry, mass-spectroscopy

LANG Chinese

NOTE The English version is published in Kexue Tongbao 29, 224-228 (1984); Shiao Yinkai is also spelled Xiao Yingkai

237 AUTH Song, Dezheng

AFFI The Second Institute of *Oceanography*, National Bureau of Oceanography, Hangzhou

DATE 1982

TITL The method of boron removal from saline water

CITA Hai Yang Tong Bao 1(2), 81-86 (1982)

ABST This paper introduces several U.S. patent methods for removing boron from saline water to extract $MgCl_2$; they are: 1) resin ion-exchange; 2) liquid-liquid extraction; 3) CaO precipitation; 4) activated aluminum extraction; 5) activated MgO extraction.

KEY boron, saline water, resin, ion-exchange, precipitation, seawater, extraction, magnesium chloride, marine resources

LANG Chinese

238 AUTH Song, Pengsheng; Du, Xianhui; Xu, Hengcun

AFFI Qinghai Institute of Salt Lakes, Academia Sinica, Xining

DATE 1983

TITL The phase relation of ternary liquid system ($Li_2B_4O_7$ - Li_2SO_4 - H_2O) at 25°C and the physical-chemical characteristics of the solution

CITA Kexue Tongbao, 106-110 (1983)

ABST The isothermal line for solubility of the system at 25°C has 2 branches which correspond to the crystalline region of $Li_2B_4O_7 \cdot 3H_2O$ and $Li_2SO_4 \cdot H_2O$ respectively. The crystalline region of $Li_2B_4O_7 \cdot 3H_2O$ is much greater than that of $Li_2SO_4 \cdot H_2O$. This is due to the different solubility of 2 original constituents in water and the great salting-out effect of Li_2SO_4 on $Li_2B_4O_7$. The composition of the system at the common saturation point is 0.41% $Li_2B_4O_7$ and 25.53% Li_2SO_4. There is no formation of complex salt or solid solution between the 2 original constituents; there is also no dehydration, the system is of simple common saturation type. The characteristics of solution shows regular change with the change in composition of the solution. The formula for calculating the density and the refractive indexes of saturated solutions are given in the article.

KEY density, refractive index, salt lakes, resources, thermodynamics, pH, lithium, magnesium, chloride, sulfate, borate, boron, solubility

LANG Chinese

239 AUTH Sui, Yongnian; Hao, Enliang; Liu, Xueqian; Wan, Zhongzhu

AFFI Department of Chemistry, Shandong College of Oceanology, Qingdao

DATE 1982

TITL Determination of dissolved oxygen, nitrogen in sea water by gas chromatography

CITA Hai Yang Tong Bao 1(3), 23-28 (1982)

ABST The author claims that the determination of dissolved O_2 and N_2 in seawater by gas chromatography is feasible. The characteristics of this method are: simple, fast, no reagent needed and highly accurate.

KEY determination, oxygen, nitrogen, seawater, gas chromatography

LANG Chinese

240 AUTH Sun, Bin-yi; Yu, Shengrui

AFFI unknown

DATE 1978

TITL Chlorinity slide rule

CITA Marine Instrumentation, 13-19 (1978)

ABST A slide rule was invented for direct reading of seawater chlorinity and salinity from the readings of the buret. The calculation procedure is simplified, and the inconvenience of using tables or figures plus human error in calculating are eliminated. It can be used for standard seawater of any chosen chlorinity.

KEY chlorinity, salinity, seawater, standard seawater, density

LANG Chinese

NOTE Sun Bin-yi is also spelled Sun Binyi or Sun Bingyi

241 AUTH Sun, Binyi; Tau, Yuehua

AFFI Shandong College of Oceanology, Standard Seawater Plant

DATE 1960

TITL The production of Chinese standard seawater

CITA Oceanologia et Limnologia Sinica 3, 29-35 (1960)

ABST Since highly concentrated seawater is not easy to get, the standard seawater prepared by standard seawater plants has a chlorinity less than 19.31. Water samples are collected from certain areas of Huanghai and South China Sea where the salinity is high and the influence of water from land is minimal. Water sampling, filtration and bottling are presented in

detail. The chlorinity determination for Chinese standard seawater is by the improved Herman method. For the preparation of A_{22} standard seawater, the low chlorinity seawater is evaporated at a low temperature to yield seawater with $Cl^{o}/_{oo}$ 19.4.

KEY seawater, chlorinity, Huanghai, South China Sea, standard seawater

LANG Chinese

NOTE See Note 240

242 AUTH Sun, Jing-qun etc.

AFFI Institute of Atmospheric Physics, Academia Sinica

DATE 1973

TITL Application of laser on atmospheric probing

CITA Collected Works of the Institute of Atmospheric Physics, Academia Sinica 1, 21-31 (1973)

ABST A ruby-pulsed laser instrument with emission wavelength 6943 A is developed by the research team. The particle concentration of synthesized smoke plume can be detected accurately by the instrument in the range of 10^1-10^7 particles/cm^3. In this paper, the authors deduced the basic equations for remote detection of smoke by laser. The measurement on the parameters of the equations and the calculation of smoke concentration from backward-wave voltage curve detected by laser are both discussed. Results show that the absolute concentration value of smoke detected by laser is more reliable than the relative concentration value of smoke deduced by three-dimensional photography.

KEY smoke, concentrations, remote sensing, laser, dust

LANG Chinese

NOTE The co-authors were not listed; Sun Jing-qun is also spelled Sun Jingqun

243 AUTH Sun, Jing-qun; Jin, Hui-shu; Hu, Yu-liang

AFFI Institute of Atmospheric Physics, Academia Sinica

DATE 1977

TITL Remote probing of the atmospheric diffusion parameters by lidar

CITA Scientia Atmospherica Sinica, 36-43 (1977)

ABST Ruby-pulsed laser radar is used for remote detection of the relative concentration of smoke plume discharged from industrial plant under the conditions of random particle shape, stable particle composition, stable spectral component. Based on the vertical distribution of the relative concentration of smoke plume, the authors deduced the atmospheric diffusion parameters (σ_x and σ_z) in the range of fixed distance leeward from smoke source under different climatic conditions.

KEY laser, concentrations, compositions, vertical distribution, remote sensing, smoke, dust

LANG Chinese

NOTE See Note 242

244 AUTH Sun, Jing-qun; Tao, Li-jun; Wu, Shao-ming

AFFI Institute of Atmospheric Physics, Academia Sinica

DATE 1977

TITL Remote measurement of smoke plume concentration using lidar

CITA Academia Sinica 5, 59-76 (1977)

ABST The backward scattering cross-section of a smoke plume under the conditions of random particle shape, stable refractive rate and spectral component is detected by ruby-pulsed laser radar. Then the vertical distribution of the relative concentration of smoke plume can be illustrated under conditions of coherent and incoherent scattering. The average time spent for detecting the vertical section of smoke plume concentration in the range of different distances from smoke source is used to deduce the atmospheric

diffusion parameters. The authors conclude that this is a simple, reliable method for the study of diffusion pattern of air pollutants.

KEY smoke, laser, vertical distribution, concentrations, pollutant, remote sensing, dust

LANG Chinese

NOTE See Note 242

245 AUTH Sun, Jing-qun; Zhang, Hai-fu

AFFI Institute of Atmospheric Physics, Academia Sinica

DATE 1982

TITL Remote measurement of atmospheric aerosol size distribution using lidar

CITA Acta Meteorologica Sinica 40, 483-489 (1982)

ABST Assuming Deirmendjian model for aerosol particles, the aerosol size distribution can be obtained from which aerosol extinction coefficients probed by multiple wavelength lidar fit aerosol extinction coefficients calculated according to Mie scattering theory.

KEY aerosol, size distribution, remote sensing, laser, dust

LANG Chinese, English abstract

NOTE See Note 242; Zhang Hai-fu is also Zhang Haifu

246 AUTH Sun, Jingqun

AFFI Institute of Atmospheric Physics, Academia Sinica

DATE 1983

TITL Measurement of smoke plume rise by using lidar

CITA Acta Scientiae Circumstantiae 3, 203-206 (1983)

ABST Rise of smoke plume from a power plant is probed by using ruby lidar and compared with some typical formulae for plume rise.

KEY laser, smoke, remote sensing, dust

LANG Chinese, English abstract

NOTE See Note 242

247 AUTH Sun, Jingqun; Zhang, Haifu

AFFI Institute of Atmospheric Physics, Academia Sinica

DATE 1982

TITL A theoretical analysis of remote measurement of mass concentration of atmospheric dust using lidar

CITA Acta Scientiae Circumstantiae 2, 36-43 (1982)

ABST In this paper the extinction coefficient of atmospheric dust by remote measurement using lidar is analyzed by means of calculations based on the Mie scattering theory under certain conditions and it thus becomes possible to obtain mass concentration of atmospheric dust. The effect of atmospheric humidity on probing mass concentration of atmospheric dust by lidar is also discussed.

KEY concentrations, aerosol, remote sensing, refractive index, size distribution, laser, dust

LANG Chinese, English abstract

NOTE See Note 242; Zhang Haifu is also Zhang Hai-fu

248 AUTH Zhongshan University, Water Analysis Group, Department of Chemistry, Oceanography Sub-division, Resources Research Division, Guangtung Institute of Aquatic Products

AFFI Zhongshan University, Water Analysis Group. Department of Chemistry, Oceanography Sub-division, Resources Research Division, Guangtung Institute of Aquatic Products

DATE 1978

TITL Turbidimetric determination of zinc in natural waters

CITA Oceanic Selections, 72-74 (1978)

ABST Determination of Zn in water using potassium ferrocyanide turbidimetry shows poor repeatability; the differences of turbidity among standard solutions are also not distinguishable. The experimental conditions for the above-mentioned method are tested in this study; results show that: 1) the manner with which precipitant is added does not affect the repeatability; 2) the use of saturated NH_4Cl 2ml and

0.3 ml 10% $K_4[Fe(CN)_6]$ showed the greatest turbidity differences among standard solutions; 3) the recovery rates are satisfactory (100-112%).

KEY determination, zinc, natural waters, analytical chemistry, turbidity

LANG Chinese

249 AUTH Sun, Yuling

AFFI Institute of Environmental Protection, Jinan

DATE 1983

TITL Calculation of backgraound level of soil in Jinan area

CITA Huangjing Kexue 4, 5-11 (1983)

ABST The distribution of sampling location for the background level of metals in soil and the analytical methods are mentioned. Results show that the background level of soil elements in Jinan is in the range of background level reported elsewhere and reflected the composition of the material in this area. Two soils that developed from different parent rocks have corresponding differences in their composition. Mercury contamination in Jinan is very common; however, no cadmium contamination has been reported from the calculated background level.

KEY soil, mercury, cadmium, lead, copper, zinc, cobalt, nickel, manganese, phosphorus, chromium, lithium, arsenic, vanadium, calcium, magnesium, potassium, sodium, iron, titanium, aluminum, pollution

LANG Chinese

250 AUTH Sun, Yuxin

AFFI Institute of Environmental Protection, Liaoning Province

DATE 1983

TITL Assessment of biochemical action on wastewater with "oxygen parameters"

CITA Huanjing Kexue 4, 30-32 (1983)

ABST "Oxygen parameters" is a simple and reliable method for assessing the wastewater biochemical action. The authors conclude that: 1) the biochemical oxygen demand (BOD) of organic matter is always less than the theoretical total oxygen demand (TOD); 2) when organic matter is totally oxidized, BOD(total)/TOD is about 0.8; 3) when BOD/COD (chemical oxygen demand) = 0.538, the organic matter can be completely degraded by living organism, which means that COD can be eliminated completely. When the ratio is 0.43, the elimination rate for COD is 80%; when the ratio is 0.215, the elimination rate for COD is only 40%.

KEY oxygen, chemical oxygen demand, biochemical oxygen demand, waste water, organic matter

LANG Chinese

251 AUTH Syun, Syao-Syn

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1965

TITL Determination of nitrate in seawater by using diphenylamine-diphenylbenzidine mixed reagent

CITA Oceanologia et Limnologia Sinica 7, 113-121 (1965)

ABST Diphenylbenzidine is an intermediate derivative of diphenylamine; the procedure for determining nitrate are basically the same for both reagents. By mixing diphenylbenzidine and diphenylamine, the author expects to eliminate certain drawbacks of each individual reagent and get a better method for nitrate determination. Five ml mixed reagent which contains 84% H_2SO_4 is used to make 50 mg-N/m^3 mixture; the maximal absorption wavelength for this coloring reagent is 600 mμ. Several factors affect the reaction: 1) the ratio of diphenylbenzidine to diphenylamine; 2) the concentration of mixed reagent; 3) the concentrtion of H_2SO_4 in the reagent; 4)

temperature. Results show that this mixed reagent has high sensitivity and accuracy for measuring nitrate in seawater.

KEY determination, nitrate, seawater, analytical chemistry, colorimetry

LANG Chinese, Russian abstract

NOTE Syun Syao-Syn is now Xiong Xiaoxian

252 AUTH Tang, Siqi; Chen, Dechang

AFFI Department of Chemistry, Shandong College of Oceanology, Qingdao

DATE 1980

TITL Recent advances in the studies of iodine production techniques

CITA Transactions of Oceanology and Limnology, 64-69 (1980)

ABST The characteristics of iodine in seawater are introducedd. The production of iodine in foreign countries is reported; adsorption, precipitation, solvent extraction, blowing method and electrolysis are the methods generally used in extracting iodine from brine; selective ion-exchange resin, specific adsorbent, organic solvent extraction, electrolysis and molecular sieve adsorption are used in extracting iodine from seawater. Kelp is the major source for iodine production in China and iodine produced from brine only accounts for a very small quantity of the total production.

KEY iodine, seawater, adsorption, precipitation, extraction, ion-exchange, resin, adsorbent, marine resources, speciation, kelp

LANG Chinese

253 AUTH Tang, Yanlin; Fang, Zongxi

AFFI Department of Biology, Shandong College of Oceanology, Qingdao

DATE 1982

TITL Success in the separation of Porphyra's vegetative cells and protoplast with enzyme method

CITA Hai Yang Tong Bao 1(5), 94-96 (1982)

ABST A digestive enzyme from Turbo coronatus granlatus was extracted. The enzyme preparation was used to separate the vegetative cells and protoplast from Porphyra suboribiculata. Results show that the protoplast prepared from enzymic method had higher vitality and was suitable for genetic engineering study.

KEY enzyme, marine resources, extraction

LANG Chinese

254 AUTH The China Handbook Editorial Committee

AFFI The China Handbook Editorial Committee

DATE 1983

TITL Education and Science

CITA Foreign Languages Press, Beijing, 243 pp. (1983)

ABST The handbook describes the educaitonal system in PRC with the subjects subdivided into natural and social sciences.

LANG English only

255 AUTH The China Handbook Editorial Committee

AFFI The China Handbook Editorial Committee

DATE 1983

TITL Geography

CITA Foreign Languages Press, Beijing, 260 pp. (1983)

ABST The handbook describes the territory, topography, climate, rivers, lakes, waterfalls, and administrative divisions of China

KEY climate, rivers, lakes

LANG English only

256 AUTH Tseng, C. K.

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1983-1984

TITL Preface: Oceanography in China

CITA Oceanus 26, 3-8 (1983-1984)

ABST A brief sketch of the development of marine science in China is given. The marine biological studies started in the early 1920s in China; Xiamen is the first center of marine biology. Then Chinese Institute of Marine Sciences was founded in Qingdao in 1937, which soon became the rival center of marine biological studies. The first oceanographic survey of any part of the China Sea involving hydrography and marine biological investigation was conducted in 1935. In addition to marine biology, there were some studies in the late 1920s and 1930s devoted to delta geology, coral reefs along the China coast, and the influence of southeast monsoons on the rainfall of China. Practically all activities in the marine sciences were suspended from 1937 to 1946 due to the Sino-Japanese war. From 1947 to 1949, only very little research activity was done and this was concerned with the investigation of coastal plants and animals, phytoplankton, and experimental embryology of marine animals. The Oceanography in New China can be categorized into 4 periods: The first period (1950-1956) may be regarded as the founding stage in the development of China's oceanography. The second period (1956-1964), the growing stage of China's oceanography, is marked by the drafting and execution of the nation's 12-year plan for the development of science and technology, in which oceanography is one of the important items. The third period (1965-1978) may be regarded as the partial expansion stage which was characterized by the establishment of the National Bureau of Oceanography and participation of the governmental ministries of Geology and Petroleum Industry. The fourth period (1978 to present) is regarded as the elevation stage; oceanographic investigations have extended to the eastern Pacific,

southern Pacific and the southern part of the South China Sea. Sedimentary and structural geological studies have been conducted more intensively. Theoretical and practical investigations of oceanographic phenomena are carried out and still underway.

KEY phytoplankton, marine chemistry, monsoon, South China Sea, East China Sea, seaweed, Bohai, corrosion, Changjiang, Zhujiang, continental shelf, marine resources, Huanghai, photosynthesis

LANG English

257 AUTH Tu, Xia; Cai, Huimei

AFFI unknown

DATE 1982

TITL The distribution of Foraminifera and Ostracoda in the surface sediments of central area of South China Sea

CITA Symposium on research reports on the sea area of South China Sea, 99-115 (1982)

ABST The region of our survey and sampling is a portion of the northwestern continental slope and the central basin of the South China Sea. The result of analysis reveals that the bottom sediments in this area contain abundant empty tests of Foraminifera, Ostracoda and Radiolaria etc. A total of 113 Foraminifera genera, including 317 species, and 21 Ostracoda genera, including 30 species have been identified. All of them is found to occur in this region, eurythermal and stenothermal forms preferring the tropical and subtropical environment. Based on the distribution of Foraminifera, Ostracoda and Radiolaria, three different biofacies are recognized in this region: 1) Neritic to upper bathyal biofacies less than 449 m in depth; 2) Bathyal to abyssal biofacies from 1000-3000 m in depth; 3) Abyssal biofacies 3000-4300 m in depth.

KEY distribution, foraminifera, sediments, South China Sea, abyssal, basin, analysis, continental slope

LANG Chinese, English abstract

257.1 AUTH Krause, D.C.; Simpson, E.S.W.; Otto, Li; Lal, D.

AFFI UNESCO (1); SCOR (2); ICES (3); IAPSO (4)

DATE 1982

TITL Introduction of the practical salinity scale, 1978 and the new International Equation of State of Seawater, 1980

CITA Ocean Technology 3, 2-4 (1982)

ABST The announcement on the adoption of practical salinity scale 1978 and the International Equation of State of Seawater 1980 is translated into Chinese. January 1, 1982 is set as the date to replace the procedures, formulae and tables now in use. All oceanographers are urged to use the new tables or equations after 1 January 1982. They should note in particular that the use of the new Internation Equation of State of Seawater 1980 requires the use of salinity values determined on the PSS 78.

KEY salinity, equation of state, seawater

LANG Chinese

257.2 AUTH UNESCO Technical Papers in Marine Science No. 36, 1981

AFFI UNESCO

DATE 1982

TITL Tenth report of the joint panel on oceanographic tables and standards

CITA Ocean Technology 3, 30-33 (1982)

ABST The tenth meeting of the joint panel on oceanographic tables and standards was held in September, 1980. The content of meeting includes: 1) overall conclusion of work done by the joint panel and their present responsibility; 2) the definition of electric conductivity and salinity; 3) equation of state of

international seawater; 4) report from UNESCO; 5) other definitions and equations--solubility of oxygen, freezing point, entropy and sound velocity; 6) future activities of the joint panel--refractive index, sound velocity, heat capacity, entropy and rate of adiabatic cooling.

KEY conductivity, salinity, equation of state, seawater, solubility, oxygen, refractive index, heat capacity, entropy, sound speed, freezing point, standard seawater

LANG Chinese

NOTE Translated from English

257.3 AUTH UNESCO Technical Papers in Marine Science No. 37, 1981

AFFI UNESCO

DATE 1982

TITL Background papers and supporting data on the practical salinity scale 1978

CITA Ocean Technology 3, 42-45 (1982)

ABST This paper reports the background papers and supporting data on the practical salinity scale 1978; it includes papers published in IEEE Journal of Oceanic Engineering and Deep Sea Research. The report is composed of: 1) general introduction on work and research; 2) determining electric conductivity ratio according to the functional relationship of salinity, temperature and pressure; 3) ascertaining the basic electric conductivity of standard KCl solution; 4) formulation; 5) conversion of data. The definition of practical salinity scale 1978 is given in the paper.

KEY salinity, conductivity, temperature, pressure

LANG Chinese

NOTE Translated from English

257.4 AUTH UNESCO Technical Papers in Marine Science No. 38, 1981

AFFI UNESCO

DATE 1982

TITL Background papers and supporting data on the International Equation of State of Seawater 1980

CITA Ocean Technology 3, 165-166 (1982)

ABST Two papers are introduced as the background papers on the International Equation of State of Seawater 1980: 1) Millero, Frank J. and Alain Poisson, International one-atmosphere equation of state of seawater, Deep Sea Research 28A, 625-629, 1981; 2) Millero, Frank J., C.T. Chen, A. Bradshaw and K. Schleicher, A new high pressure equation of state for seawter, Deep Sea Research 27A, 255-264, 1980. The footnotes for signs, units and technical terms are also listed in this paper.

KEY pressure, equation of state, seawater

LANG Chinese

NOTE Translated from English

257.5 AUTH UNESCO Technical Papers in Marine Science No. 39, 1981

AFFI UNESCO

DATE 1982

TITL International oceanographic tables

CITA Ocean Technology 3, 181-222 (1982)

ABST The international oceanographic tables are recommended by UNESCO/ICES/SCOR/IAPSO Joint Panel on Oceanographic Tables and Standards in September of 1980. The calculation methods and definition of practical salinity have been approved by IAPSO, ICES, SCOR and IOC. These tables are used for practical salinity (S) = 2-42 and temperature (t) = -2-35°C. The international standard seawater standardized by KCl solution is suggested as the reference seawater. The calculation for practical salinity scale and practical salinity is suitable for all seawater, but when those

equations are used for seawater with chemical composition different from standard seawater, special caution should be taken.

KEY salinity, temperature, standard seawater, composition

LANG Chinese

NOTE Translated from English

258 AUTH Veluchko, E. A.; Kuznetsov, Yu Yai; Levun, L. E.

AFFI unknown

DATE 1982

TITL Geology and mineral resources of the oceans

CITA Ocean Press, Beijing, 208 pp. (1982)

ABST This is a translation of the book by Veluchko, Kuznetsov and Levun (1978). The geology and structures of major ocean basins and the distribution of mineral resources are discussed.

KEY distribution, resources

LANG Chinese

NOTE This book is translated into Chinese by Wang Changgon

259 AUTH Wan, Zhaozhong

AFFI Institute of Environmental Protection, Guangdong

DATE 1983

TITL The ground and background of environmental science

CITA Journal of Marine Science 1, 61-62 (1983)

ABST The meanings of "ground" and "background" are specified. The author suggests that the two terms should be used carefully in environmental science, especially when one translates the word "background" into Chinese.

KEY environment

LANG Chinese

260 AUTH Wan, Zhen; Yang, Sunkai; Huang, Huiliang

AFFI Department of Chemistry, Amoy University

DATE 1981

TITL Oscillopolarographic determimation of traces nickel in natural and pollutant waters

CITA Acta Scientiarum Naturalium, Universitatis Amoiensis 20, 231-236 (1981)

ABST A polarographic adsorption wave method is applied to determine trace amounts of nickel in natural and polluted waters. The best supporting electrolyte is NH_4OH-NH_4Cl solution containing sulfo-salicyclic acid and dimethylglyoxime, with an Ep of 1.11V (vs. S.C.E.) for the nickel wave. The detection limit is given as 1×10^{-9} g/ml, the range of measurement is 10^{-9}-10^{-8} g/ml.

KEY determination, nickel, adsorption, pollution, natural waters, analytical chemistry, polarography

LANG Chinese, English abstract

261 AUTH Wang, Aizhen

AFFI Shandong Provincial Institute of Marine Fisheries

DATE 1982

TITL Preliminary analysis of total mercury on the surface of the bottom soil in Laizhou Bay during the investigation

CITA Marine Fisheries 4, 208-210 (1982)

ABST The total mercury content on the surface of bottom soil in Laizhou Bay is in the range of 0.011-0.114 ppm, the average value in the Bay is 0.068 ppm which is higher than that in the Bohai Bay (0.05 ppm); the reference standard for Hg in the bottom soil is 0.3 ppm. The mercury content on the surface of bottom soil in the nearshore area is higher than 0.1 ppm in June, which means that the area is slightly contaminated. The Hg content decreases with the increase of distance from coast in June. In October, the isopleth shows circular distribution. The mechanisms for the deposition of Hg on the surface of bottom soil in ocean mainly are: 1) the adsorption and coprecipitation on inorganic and organic particles as

well as 2) the deposition of Hg by bottom-dwelling organisms. the reasons for various distribution of mercury on the surface of bottom soil in the Bay are analyzed. The waste discharge, run-off flow and amount of river-borne suspended particles directly affect the mercury content on the surface of bottom soil. The variation of Hg content with time is mainly due to the change of meteorological and hydrological elements, which results in the transportation of mercury with the sediments. The area in the northeast of the Bay has the highest content of mercury on the surface of bottom soil because of the specific marine geological environment and hydrological conditions.

KEY mercury, adsorption, sediments, particulates, precipitation, pollution, marine organisms, mechanism, distribution, sources, seasonal variation

LANG Chinese

262 AUTH Wang, Anlong

AFFI Ministry of Transportation, Institute of Water Transportation Engineering, Tianjian

DATE 1982

TITL The application of remote sensing technique to oil pollution monitoring in the sea

CITA Hai Yang Tong Bao 1(5), 71-76 (1982)

ABST In addition to the current remote-sensing techniques used for oil pollution monitoring, a new remote-sensing system is introduced. This system uses multispectral photography, infrared sensors and microwave sensors, as well as laser-fluorescence sensors to give more accurate information.

KEY remote sensing, oil, pollution, laser, fluorescence

LANG Chinese

263 AUTH Wang, Chenghou

AFFI The Second Institute of Oceanography, National Bureau of Oceanography, Hongzhou

DATE 1983

TITL Preliminary study of diffusion and sedimentation of iron and manganese, and the manganese cycle on the continental shelf of the East China Sea

CITA Acta Oceanologica Sinica 5, 455-466 (1983)

ABST The diffusion and sedimentation of Fe^{+2}, Mn^{+2} and Mn cycle on the continental shelf of the East China Sea are studied. Results show that MnO_2 in the surficial layer (0-3 cm) of bottom sediments is the oxidant for oxidative degradation of organic matter in summer (June). Total Fe content in sediments is higher than the total Mn content, and total Fe content in interstitial water is lower. From vertical distribution of Fe^{+2} and Mn^{+2} in sediments, the ratio of Mn/Fe decreases with the depth. The distribution of Fe and Mn is affected by 1) the reaction of organic matters with the oxidates of Fe and Mn during petrification 2) interferences of benthic organisms 3) diffusion of Mn^{+2} and Fe^{+2} in interstitial water 4) sedimentation of Mn and Fe compounds. The cycle of Mn between surficial sediments and overlaying water is considered as an overall reaction of diffusion, sedimentation, oxidation, reduction and interferences of benthic organisms.

KEY diffusion, sedimentation, iron, manganese, continental shelf, East China Sea, sediments, interstitial water, distribution, depth, organic matter, redox reaction, marine organisms, geochemistry, cycle

LANG Chinese

264 AUTH Wang, Chenghou; Zhu, Jianxin

AFFI The Second Institute of Oceanography, National Bureau of Oceanography, Hongzhou

DATE 1983

TITL Preliminary study of interstital water NH_4^+ and HCO_3^- and their diffusion flux in continental shelf of East China Sea

CITA Acta Oceanologica Sinica 5, 306-315 (1983)

ABST Geochemical investigation on the bottom surface sediment interstitial water in the continental shelf of East China Sea off the Changjiang estuary was undertaken by Chinese and American scientists. Results show that the change in alkalinity and concentration of NH_4^+ and their diffusion fluxes are related to the benthic organisms. The flux value shows a positive linear relationship with the sedimentation rate of the area. The distribution of these fluxes in the area indicates that the bottom of nearshore area of Changjiang estuary provides large amounts of NH_4^+ and HCO_3^- to the water body above it.

KEY interstitial water, continental shelf, East China Sea, alkalinity, concentration, diffusion, sedimentation rates, distribution, Changjiang, estuary, ammonia, bicarbonate, geochemistry, marine organisms

LANG Chinese

265 AUTH Wang, Lizhi; Zhang, Xiaoping; Li, Dexin; Zhou, Mingyu

AFFI Institute of Atmospheric Physics, Academia Sinica

DATE 1983

TITL Preliminary study on the vertical distribution of atmospheric SO_2 in the northern suburbs of Beijing during winter

CITA Kexue Tongbao, 420-422 (1983)

ABST SO_2 is the major atmospheric pollutant; to study its distribution pattern and its relationship to the atmospheric condition is important. Concentration of atmospheric SO_2 was measured during two 10-day periods by SO_2 monitors installed at the height of 8m, 47m, 160m, and 320m. Vertical wind velocity and temperature were also recorded. Results show that the average concentration of atmospheric SO_2 doubled after warming during the day. The vertical distribution of SO_2 is more even during the period 10 a.m. to 3 p.m.; during other times of the day, the vertical gradient

is large. The effect of wind on the SO_2 concentration distribution, the vertical flow density of SO_2, and estimation of turbulence diffusion constant, etc. are also discussed.

KEY distribution, pollutant, concentrations, sulfur dioxide, air, diffusion

LANG Chinese

266 AUTH Wang, Ping

AFFI Lanzhou Institute of Glaciology and Cryopedology, Academia Sinica, Lanzhou, Gansu

DATE 1983

TITL Analysis of trace elements in snow and ice on the Hans Glacier of Mt. Youyi in Altay mountains

CITA Journal of Glaciology and Cryopedology 5, 63-70 (1983)

ABST The mechanically suspended substance exists abundantly in the river water, so turbid water has a white color. The soluble element content is less than 40 mg/l, which is in agreement with the mineralization degree of the glacial ice in Tianshan mountains and Qilian Mountains, but a little lower than that in the atmospheric precipitation in Qinghai-Xizang Plateau of China. The river water belongs to a kind of glacial run-off with low mineralization degree in Northwest China and the mineralization degree of glacial ice at Hans Glacier is the lowest (13.99 mg/l), coinciding with the mean mineralization degree of atmospheric snowfall in this region. The interrelationship between the trace element in glacial ice and altitude is that the calcium content remains constant, while the magnesium content increasing gradually with the altitude is always more than the calcium content, but the potassium content is close to the sodium content, which is different from other glaciers in Northwest China and should be classified into the subcontinental type. The element enrichment factor in atmospheric

precipitation on Hans Glacier is different from other mountain glaciers in China. The element enrichment order in Rongbuk Glacier of Mt. Qomolangma is Ca>Na>Mg in Tanggual Mountains Na>Ca>Mg, in the same way in Eastern Kunlun Mountains, on West Qiongtailan Glacier of Mt. Tuomuer in Tianshan Mountains and on the Batura Glacier of Karakoram Mountains and in Qilian Mountains Ca>Mg>Na, but on the Hans Glacier Na>Mg<Ca or Mg>Na<Ca.

KEY trace elements, snow, ice, glacier, precipitation, calcium, magnesium, potassium, sodium, enrichment, river water, lake waters, particulates, aluminum, barium, beryllium, bismuth, cadmium, cobalt, chromium, copper, manganese, iron, pollution

LANG Chinese, English abstract

267 AUTH Wang, Ping; Jiang, Lujian; Liu, Zhi; Zhu, Yongping; Ni, Tongwen

AFFI Lanzhou Institute of Glaciology and Cryopedology, Academia Sinica (1,2); Gansu Testing and Investigating Center (3,4,5)

DATE 1983

TITL Determination of acidity and heavy metal elements of rainfall in Lanzhou City

CITA Huanjing Kexue 4, 61-62 (1983)

ABST The acidity and heavy metal elements of rainfall in Lanzhou were determined every month from January 1981 to August 1982. Results show that the acidity of rainfall in the area is near neutral; the acid rain resulting from human activities is not apparent in Lanzhou. Pb, As, Sn etc. poisonous elements are found 3 times in the sample after April 1982. Zn, Cd, Ag, Ti etc. appeared in every sample after November 1981. The content of Cu, Cr, V etc. elements are closely correlated with the monthly average-temperature. Winter inversion accumulates smoke-dust in the air of

the low layer and increases the content of Cu, Cr, V; the smoke-dust diffuses rapidly during the warm spring and decreases the content of Cu, Cr, V.

KEY determination, rain, temperature, smoke, dust, lead, arsenic, tin, zinc, cadmium, silver, titanium, copper, chromium, vanadium, cobalt, heavy metals, acid rain, pH, air, diffusion, pollution

LANG Chinese

268 AUTH Wang, Ping; Liu, Zhi

AFFI Lanzhou Institute of Glaciology and Cryopedology (1); Gansu Testing and Investigating Center (2)

DATE 1982

TITL Content of trace elements in ice, snow and glacial runoff of Mt. Youyi in Altay mountains

CITA Huanjing Kexue 3, 33-35 (1982)

ABST Mechanically suspended substance exists abundantly in the river water of the upper stream of Burqin river; the trace elements and heavy metals in river water are determined; results show the presence of contamination in the area. The elements in rainfall, snowfall, glacial ice and glacial run-off of Mt. Youyi are also analyzed. In general, the concentration of biologically required trace elements such as Fe, V, Cr, Mn, Co, Ni, Cu, Zn etc. is around 20 ppb, but the concentration of Co in different water samples can be as high as 200 ppb. The poisonous elements such as As, Pb, Cd etc. are not found in the area. The riverwater of Burqin river has a self-cleansing ability; the content of such elements as Cr, Co, Ni, V etc. decreases significantly downstream. The concentration of those elements in riverwater reflects the content of the corresponding elements in the snow and ice of the mountain area suggesting that the amount in the river is controlled by the amount of

glacial runoff from the mountains. By the same token the content of minerals in the ice and snow of the glaciers is affected by the amount of rainfall.

KEY ice, snow, heavy metals, river water, minerals, iron, vanadium, chromium, manganese, cobalt, nickel, copper, zinc, arsenic, lead, cadmium, silicon, titanium, beryllium, barium, strontium, determination, pollution

LANG Chinese

269 AUTH Wang, Ping; Luo, Hongzhen

AFFI Lanzhou Institute of Glaciology and Cryopedology, Academia Sinica

DATE 1982

TITL Trace elements in ice and snow on West Qiongtailan glacier of Mt. Tuomuer

CITA Glaciology and Cryopedology, Supplement 2, 77-79 (1982)

ABST The trace elements in West Qiongtailan glacier are analyzed. The total concentration of K + Ca + Mn + Fe + Al is far greater than that of Na + Mg. The Ca content is different from that in the ice and snow of east Antarctic, suggesting that the ice and snow on the west Qiongtailan are influenced by the continental climate. The element enrichment factors from samples of different glaciers are calculated to evaluate the source of elements in the atmospheric precipitation. The element enrichment order in east Antarctic is Na>Mg>Ca; on Rongbuk glacier of Mt. Qomolangma it is Ca>Na>Mg; on the west Qiongtailan glacier of Mt. Tuomuer and Batura glacier of Karakoram mountains it is Ca>Mg>Na; in seawater it is Na>Mg>Ca. The Na-enrichment factor on Rongbuk glacier is greater than the Mg-enrichment factor of Tuomuer and Batura glaciers because of the influence from the ocean. The proximity of the Antarctic Ocean to East Antarctic explains its higher content of Na, Mg in the ice and

snow than that in the inner land. The high Ca-enrichment factor in the inner-land mountains is due to the weathering effect of uncovered carbonate rocks; the higher K-enrichment factor than the Ca-enrichment factor in east Antarctic is due to volcanic action. K, Mn, Fe etc. enrichment factors in ice and snow of the volcanic area are higher than those in other areas. The enrichment factor order for trace elements such as Ti, Cr, Co, V, Pb etc. in snow and ice of West Qiongtailan glacier is Co>Pb>Cr = V>Ti. The atmospheric trace elements in this area result from the weathering effect of crustal rocks.

KEY ice, snow, enrichment, precipitation, seawater, glacier, potassium, calcium, manganese, iron, aluminum, sodium, magnesium, trace metals, titanium, chromium, cobalt, vanadium, lead, copper, selenium, antimony, pollution

LANG Chinese

270 AUTH Wang, Qi; Zhou, Li; Lu, Yanan

AFFI Department of Geology, Shandong College of Oceanology, Qingdao

DATE 1982

TITL Characteristics of coastal sediments and their transportation trends at the east margin of Lai Zhou Bay

CITA Hai Yang Tong Bao 1(1), 32-42 (1982)

ABST The purpose of this study is to understand the transportation and diffusion patterns of coastal sediments on the east margin of Lai Zhou Bay and discover their sources. Samples were taken; the size and heavy mineral content of sample were analyzed. Two types of sediments are brought to the sea in this area: sphene type and tremolite type. In waters of 5m depth, the major sediments are medium and coarse silt; the distribution pattern changes in size and heavy mineral composition from north to south: Mz

decreases, the frequency curve changes from two peaks to one peak, and the heavy mineral composition changes from sphene type to tremolite type.

KEY sediments, sources, silt, compositions, transport, diffusion, grain size, distribution

LANG Chinese only

271 AUTH Wang, Shuchang; Shi, Zhili; Sun, Bingyi; Wang, Yongchen; Yu, Shengrui; Dai, Guosheng; Li, Liangzhong; Chang, Fenglan; Ke, Dongsheng; Chang, Yuenli

AFFI Department of Marine Chemistry, Shandong College of Oceanology, Qingdao

DATE 1980

TITL The chemical forms of zinc and its distribution in the northeast Jiaozhou Bay

CITA Journal of Shandong College of Oceanology 10, 64-78 (1980)

ABST The chemical forms of zinc and its distribution in the surface water of the Northeast Jiaozhou Bay (25 stations) have been studied. The ASV method and spectrophotometry with dithizone extraction were employed in untreated and treated sea water to identify forms of zinc in sea water. We suggest that zinc in sea water can be divided into five forms by the following ways: Particulate zinc (Zn_p). One liter sea water sample was filtrated through a membrane filter. The remains on the filter were digested in a mixture of HNO_3 and $HClO_4$, and then the content of particulate zinc was obtained by ASV; Zn_{asv} (labile zinc plus ionic zinc). They were determined by ASV method directly; Zn_{H2Dz} represent weak bound zinc (Zn_w) plus Zn_{asv}. They were obtained by spectrophotometry with dithizone extraction directly; Zn_{asv} plus Zn_w and bound zinc (Zn_b) are the total soluble zinc (Zn_{ts}). The water sample was digested with HNO_3 and heated till boiling, and the Zn_{ts} was obtained by spectrophotometry; $Zn_w = Zn_{H2Dz} - Zn_{asv}$;

$Zn_B = Zn_{ts} - Zn_{H2Dz}$; $\Sigma Zn = Zn_{ts} + Zn_p$. Results show high values near the coast area. The ΣZn mean value is 20.7μg/L(6.9 - 39.6μg/L); Zn_p 2.70μg/L (0.4 - 6.5 μg/L), $Zn_p/\Sigma Zn$ = 13.0%; Zn_{asv} 4.13μg/L (1.7 - 9.6μg/L), $Zn_{asv}/\Sigma Zn$ = 20.0%; Zn_w 5.49μg/L (1.3 - 19.6 μg/L), $Zn_w/\Sigma Zn$ = 26.5%; Zn_B = 8.42 μg/L (1.47 - 20.3 μg/L), $Zn_b/\Sigma Zn$ = 40.7%; Zn_{ts} 18.0 μg/L (5.3 - 34.5 μg/L), $Zn_{ts}/\Sigma Zn$ = 87.0%. The results show that bound zinc is the main form among the whole sea water of the Northeast Jiaozhou Bay, and its content is about half of total soluble zinc (Zn_b/ZN_{ts} = 46.7%), which agrees with Fukai's results.

KEY zinc, distribution, Jiaozhou Bay, ASV, speciation, seawater, particulates

LANG Chinese, English abstract

NOTE Same article published in "Collected Oceanic Works", V. 3, 51-63 (1980); see Note 240

272 DELETED

273 AUTH Wang, Shunrong; Xu, Fuzheng; Zhou, Hengfu

AFFI Institute of Environmental Protection, Academia Sinica

DATE 1980

TITL Determination of chromium by inorganic gas chromatography

CITA Hai Yong Ke Xue 3, 8-11 (1980)

ABST Cr(VI) is reduced to Cr(III) by sodium sulfite, then chromium is extracted from trifluoroacetylacetone-benzene solution and determined by gas chromatography. In this method, only a small amount of chemicals is used; the heating rate is fast; the extraction rate is high, and the sensitivity is high.

KEY determination, chromium, analytical chemistry, pollution, seawater, chromatography

LANG Chinese

274 AUTH Wang, Wei; Sun, Yushan; Chen, Dechang; Lu, Yujing

AFFI Department of Chemistry, Shandong College of Oceanology, Qingdao

DATE 1983

TITL Chemistry of marine resources IV. The synthesis of hydrated titanium(VI)bis(hydrogenphosphate) and its ion-exchange characteristics with potassium ion in sea water

CITA Journal of Shandong College of Oceanology 13, 35-42 (1983)

ABST $Ti(HPO_4)_2$, $Ti(HPO_4)_2 \cdot 0\text{-}1/2H_2O$, $Ti(HPO_4)_2 \cdot 1/2H_2O$ and $Ti(HPO_4)_2 \cdot 2H_2O$ were synthesized by using $TiCl_4$ and industrial grade $TiO_2 \cdot xH_2O$ in order to identify if hydrated titanium(VI)bis(hydrogenphosphate) can be used for extracting potassium ion from sea water. The ion-exchange capacities and factors affecting them were determined. The experimental results show that $Ti(HPO_4)_2$, $Ti(HPO_4)_2 \cdot 0\text{-}1/2H_2O$, $Ti(HPO_4)_2 \cdot 1/2H_2O$ have a better ion-exchange characteristic. Their ion-exchange capacities with potassium ion in sea wter are 30-38 mg/g by static equilibrium exchange, but measured by kinetic equilibrium exchange on column the exchange capacities are increased 30-60%. The optimum temperature range is 15-25°C and the pH of natural sea water is favorable to the ion-exchange process.

KEY resources, ion-exchange, potassium, seawater, pH, temperature

LANG Chinese, English abstract

275 AUTH Wang, Yuanzhi

AFFI unknown

DATE 1974

TITL Confucianism and environmental pollution

CITA Analytical Chemistry 3, 169-170 and 244 (1974)

ABST This article relates the environmental pollution to Confucianism.

KEY pollution

LANG Chinese

276 AUTH Wang, Zhengfang; Yao, Longkui; Yuan, Xiaozheng

AFFI Second Institute of Oceanography, National Bureau of Oceanography

DATE 1983

TITL Distribution and characteristics of nutrients (N, P, Si) in the estuary of Changjiang River in June, 1980

CITA Oceanologia et Limnologia Sinica 14, 324-332 (1983)

ABST This paper describes major features and distribution of N, P, Si during the month of June, 1980, in the estuary of Changjiang River. The distribution of nutrients appeared to be plume-shaped. Near 122°30'E, there were many packed isolines of N, P, Si. At the southern part of the estuary, the isolines were much looser. Some figures show the relationships between nutrients (N,P,Si) and salinity (S). The theoretical dilution line of SiO_3^{2-} and NO_3^- indicates that the change of SiO_3^{2-} and NO_3^- is due to the physical mixing at the estuary area. The relative figures of NO_2^- and PO_4^{3-} suggest that chemical or biological interactions might have taken place. The dilution slopes from the experimental results are: $dSio_3^{2-}/dS = -2.86$, $dNO_3^-/dS = -1.79$. The fluxes of nutrients (N,P,Si) of Changjiang River during the month of June, 1980 were estimated to be 161.3 kg/s for NO_3^-, 2.4 kg/s for PO_4^{3-}, 315.6 kg/s for SiO_3^{2-} respectively.

KEY distribution, nutrients, estuary, Changjiang, salinity, mixing, nitrate, phosphate, silicate, nitrite

LANG Chinese, English abstract

277 AUTH Wang, Zhengfang; Yao, Longkui; Fan, Ande; Fang, Zhangfu

AFFI Second Institute of Oceanography, National Bureau of Oceanography, Hangzhou

DATE 1982

TITL A preliminary study of the existence and distribution of zinc in the Changjiang River estuary

CITA Acta Oceanologica Sinica 4, 315-323 (1982)

ABST Investigations of 11 stations in the Changjiang River estuarine area (30°50'-31°30'N and 121°50'-122°22'E) were made in April 1979. On board ship, we collected water and surface sediment samples, measured pH and temperature of the water, and prepared dissolved zinc and suspended particle zinc with millipore filter (0.45μm). In the laboratory, we analyzed 4 species of zinc. The ranges of concentration change are: 28-84 ppm for total zinc of liquid phase 8.8-46.3 ppb for free zinc, 11.7-191 ppb for zinc of suspended phase and 80.0-113.7 ppm for zinc of surface sediments respectively. In this paper, it is pointed out that zinc exists mainly in the forms of free zinc, organic chelate zinc and particle zinc in the above sea area. The concentrations of zinc in these forms make up 12.5-38.0%, 26.7-51.9% and 24.3-61.8% of the total concentration of liquid zinc, respectively. Sea wards, particle zinc becomes flocculated and is quickly deposited due to the mixture of river and ocean waters. The diluted water of the Changjiang River stretch north-eastward and the particle zinc brought by the run-off of the Changjiang River is deposited in the southeast of the Changjiang estuary. Several figures plot the contents of various species of zinc versus different investigation stations and distribution of plane of free zinc, and their changes are discussed in this paper. It is shown that the mixing of river and ocean waters is the major controlling factor. Furthermore, two relationships, total zinc in liquid phase varying with salinity and free zinc with salinity, are established as follows: Total zinc of liquid phase (ppb) = $17.4\ S^{0.5} - 0.5S$; free zinc (ppb) = $12.6 + 0.4S$.

KEY distribution, zinc, estuary, Changjiang, sediments, pH, temperature, suspended matter, concentrations, river water, seawater, speciation, organic matter, flocculation, salinity

LANG Chinese, English abstract

278 AUTH Wang, Zhongzhu; Sui, Yongnian; Hao, Enliang

AFFI Shandong College of Oceanology, Qingdao

DATE 1981

TITL Stripping technology of the gas chromatography in determining gases in seawater

CITA Hai Yong Ke Xue 3, 11-13 (1981)

ABST By using improved stripping technique, the authors found that the determination of gases in seawater by gas chromatography was faster, simpler and more accurate.

KEY seawater, analytical chemistry, total carbon dioxide, oxygen, nitrogen, argon, gases, gas chromatography

LANG Chinese

279 AUTH Wei, Qingren

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1966

TITL Determination of organic nitrogen in seawater

CITA Oceanologia et Limnologia Sinica 8, 92-98 (1966)

ABST Determination of organic N is important to the study of marine life productivity and geochemistry of nitrogen. Seven Nesslers reagents with different ratios of KI to HgI_2 were tested in order to find one with the highest sensitivity for N-determination. Results show that a water solution containing 14 g/l KI and 14 g/l HgI_2 is the best reagent. The effect of alkalinity, temperature, salinity and protective colloid on the Nesslers reaction are studied; the digestion of organic matters is also discussed. This method is simple, fast, accurate, and suitable for

determining a large number of seawater samples. The sensitivity is 50 mg NH_4-N/m^3, max. error is ± 10%, average error is ± 5%.

KEY determination, organic nitrogen, seawater, geochemistry, nitrogen, alkalinity, temperature, salinity, organic matters, primary productivity, colorimetry

LANG Chinese, Russian abstract

280 AUTH Wen, Jingyan

AFFI The Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE 1982

TITL Vertical distribution of apparent oxygen utilization in mid and southern neritic zones of Fujian

CITA Acta Oceanologica Sinica 4, 697-702 (1982)

ABST The vertical distribution of apparent oxygen utilization (AOU) in the area shows a trend of increasing from top to bottom. The abnormal AOU is mainly due to the photosynthesis of phytoplankton; temperature and the stability of the thermocline are also contributing factors.

KEY distribution, apparent oxygen utilization, oxygen, phytoplankton, temperature, thermocline, phosphate, density, silicate, pH, photosynthesis

LANG Chinese

281 AUTH Wolfe, D. A.; Champ, M. A.; Cross, F. A.; Kester, D. R.; Park, P. K.; Swanson, R. L.

AFFI NOAA, Rockville, Maryland (1,2,5,6); NOAA, Beaufort, North Carolina (3); URI, Narragansett, Rhode Island (4)

DATE 1983-1984

TITL Marine pollution in China

CITA Oceanus 26, 40-46 (1983-1984)

ABST The first Chinese marine environmental law was enacted in 1983 and is a direct result of the re-emergence of environmental consciousness. This law covers

pollution and damage from coastal projects, offshore petroleum exploration, land-originated pollutants, boats and ships, and the dumping of wastes. Marine water-quality standards in response to the Marine Environmental Protection law were issued by the National Bureau of Oceanography. Approximately 400,000 Km^2 of coastal waters are currently being monitored for about 20 parameters, with routine sampling three times per year. The monitoring parameters include: Hg, Cd, Zn, Cu, Cr, Pb, chemical oxygen demand (COD), biological oxygen demand (BOD), dissolved oxygen (DO), chlorinity, petroleum, DDT and DDE, hexachlorobenzene (BHC) and hexachlorocyclohexane (666), and radionuclides (total alpha emitters and Sr-90). Some 6 billion tons of domestic and industrial wastes are introduced annually into Chinese coastal waters, mainly from runoff from rivers, ships and harbors. Petroleum and metals are the main pollutants of concern. The largest polluted area is the Bohai; off-shore waters are generally unpolluted. An estimated 60% of the petroleum pollution in coastal waters is derived from riverine sources. Concentration of total petroleum hydrocarbons at the marine-monitoring stations range from 0.01-0.32 ppm, with an average of 0.05 ppm. Two levels of water-quality standard for petroleum have been designated in China: first-rate is 0.05 ppm and second-rate is 0.100 ppm. About 600,000 to 700,000 tons of COD enter China's coastal water annually, with approximately half of that coming from Changjiang. The water-quality standard is 3 ppm, and observed values are in the range of 0.19-5.5 ppm. The standard is exceeded most frequently in the Bohai. It was reported that heavy-metal concentrations were not considered a problem. The fisheries production has declined due to overfishing. New laws have been passed to regulate fishing, especially during spawning

periods, and the number of fishing boats is now controlled. The general areas of marine pollution of concern to Chinese scientists include petroleum hydrocarbons, pesticides, radionuclides, and heavy metals. With respect to marine-process studies, Chinese scientists generally know where problems lie and how they can be approached, but they were only in the early stages of conducting such studies. The instrumentation and methodology for marine environmental research in China are introduced in the article.

KEY pollution, petroleum, chemical oxygen demand, oxygen, chlorinity, DDT, DDE, BHC, radionuclides, Bohai, Changjiang, mercury, cadmium, zinc, copper, chromium, lead, strontium, biological oxygen demand, heavy metals, marine pollution, strontium-90, waste water, rivers, sources, pesticides

LANG English

282 AUTH Wong, C. S.; Cretney, W. J.; Piuze, J.; Christensen, P.; Berrang, P. G.

AFFI Institute of Ocean Sciences, Sidney, British Columbia, Canada

DATE 1982

TITL Clean laboratory methods to achieve contaminant-free processing and determination of ultra-trace samples in marine environmental studies

CITA Journal of Marine Science 1, 60-62 (1982)

ABST This paper reviews briefly the methods used by the Ocean Chemistry Division, Institute of Ocean Sciences, at Victoria B.C., in obtaining trace analysis data. The article puts particular emphasis on the description of two portable shipboard seagoing laboratory modules complete with clean room sections. These modules can be hoisted and bolted on to decks of different research vessels. Analysis of ultra-traces

of metals and petroleum or petroleum-like hydrocarbons in sea water can thus be accomplished with minimal contamination.

KEY determination, petroleum, seawater, trace metals, analytical chemistry, hydrocarbons

LANG Chinese

NOTE Translated by Li Quansheng from National Bureau of Standards Special Publication 464 (issued November, 1977); our abstract

283 AUTH Wu, Bao Ling; Clark, R. B.

AFFI Institute of Oceanology, Academia Sinica, Qingdao (1)

DATE 1983

TITL Marine pollution research in China

CITA Marine Pollution Bulletin 14, 210-212 (1983)

ABST The rapid growth of industry coupled with an awareness of the hazards of discharging industrial wastes into coastal waters, many of which are also intensively fished, has encouraged a considerable development of both basic oceanographic research and pollution-oriented research in the People's Republic of China. A variety of government ministries and other institutions have an interest in marine or maritime affairs and by now there is a considerable range of institutes involved in oceanographic and pollution-oriented research. (An introduction to the organization principally involved in the marine pollution research activity is given in this paper, and this is accompanied by a summary of the pollution research carried out by the Institute of Oceanology of the Academia Sinica at Qingdao.

KEY marine pollution

LANG English

NOTE Wu Bao Ling is also spelled Wu Baoling

284 AUTH Wu, Baoling

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1980

TITL Marine environmental sciences in Japan

CITA Hai Yong Ke Xue 4, 57-59 (1980)

ABST In this paper, the author reports on Japanese organizations formed for oceanic environmental protection. The managing system, policies and laws for preventing marine pollution, pollution investigating and monitoring techniques, as well as their current researches in marine environmental sciences are all discussed.

KEY pollution, environment

LANG Chinese

NOTE See Note 283

285 AUTH Wu, Baoling

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1980

TITL The relationship between petroleum and fossil of serpulids

CITA Hai Yong Ke Xue 1, 19-22 (1980)

ABST This paper claims that underwater petroliferous areas can be located by studying fossil serpulids.

KEY resources, petroleum

LANG Chinese

NOTE See Note 283

286 AUTH Wu, Baoling; Li, Yongqi

AFFI Institute of Oceanology, Academia Sinica, Qingdao (1); Shandong College of Oceanology, Qingdao (2)

DATE 1983

TITL Recent studies on "Enclosed Experimental Ecosystems"

CITA Journal of Marine Science 2, 44-47 (1983)

ABST Four different types of enclosed experimental ecosystems (EEE) and their structures are reported. So far, hundred of papers on EEE have been published. Subjects include "natural ecosystems of marine life," "change and transfer of dissolved gases, organic and

inorganic chemical in the sea," "the influence of low concentrated pollutants on the ecosystem," "design of controlled experimental ecosystem" and "comparison of the inner chemical-physical environment with the outer environment."

KEY ecology, pollution, primary productivity, seawater, sediments, diffusion, bacteria, marine organisms, trace metals, radionuclides, nutrients, hydrogen, methane, carbon monoxide, gases

LANG Chinese

NOTE See Note 283

287 AUTH Wu, H. W.; Tang, S. F.

AFFI unknown

DATE 1937

TITL Report on the oceanographical and biological survey in the gulf of Po-Hai and along the coast of Shantung Peninsula: Part III. Chemical conditions of sea water

CITA Sinensia 8(1), 51-60 (1937)

ABST The records in the chemical analysis of sea water of the Gulf of Po-Hai (Bohai) and the coastal region of Shantung (Shandong) Peninsula derived from the Oceanographic and Biological Survey during the months of June to November, 1935, are reported. The chlorinity varies among different stations at the same time, at different times in the same station and at different depths of each station. The stations located along the coast of the eastern part of Shantung Peninsula have the highest chlorinity, because they are directly connected with the open sea. As a rule, chlorinity increases with the depth of the sea. The highest chlorinity is recorded in June and the lowest is in August. The salinity inside of Po-Hai is much lower than that outside of the Gulf. The determination of pH value was carried on only in September and October; the pH value of this area

surveyed appears to increase towards the bottom. The soluble silicates in the seawater were determined only in the month of October. Results show that the silicon content of the seawater in the surveyed region is quite low.

KEY Bohai, chlorinity, salinity, pH, seawater, silicate, depth, seasonal variation

LANG English

288 AUTH Wu, Hongfa

AFFI unknown

DATE 1980

TITL Underground brine of seashore plain at Laizhou Bay, Bohai

CITA Hai Yong Ke Xue 3, 18-19 (1980)

ABST The contributing factors for the formation of underground brine in this area are discussed.

KEY Bohai, brine

LANG Chinese

289 AUTH Wu, Jiajun

AFFI unknown

DATE 1982

TITL The fourth national conference on "the extraction of uranium from seawater"

CITA Journal of Marine Science 6, 50 (1982)

ABST Recent researches on uranium extraction from seawater were introduced in the meeting. 34 papers were reported; subjects include "the mechanism of extraction", "preparation of adsorbents", "physical and chemical measurements" and "environmental protection".

KEY uranium, seawater, mechanism, resources, extraction

LANG Chinese

290 AUTH Wu, Jingyang; Li, Jianbo; Yang, Huilan; Lui, Xingjun

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1976

TITL The application of ethyl purple in colorimetry V. Determination of iodine by extraction photometry

CITA Analytical Chemistry 4, 273-278 (1976)

ABST Alkaline ethyl purple is used as an indicator in the determination of iodine by extraction-photometry. Results show that the trace amounts of iodine in marine sediments can be determined directly without the procedure of separation. The authors claim that this method is simple, fast, sensitive and accurate.

KEY colorimetry, determination, iodine, extraction, indicator, sediments

LANG Chinese

291 AUTH Wu, Jingyang; Xu, Shengjie

AFFI Institute of Oceanology, Academia Sinica, Qingdao (1); Jilin Institute of Applied Chemistry, Academia Sinica (2)

DATE 1974

TITL Application of ethyl purple in colorimetric analysis IV. Determination of boron by using extraction-photometry

CITA Analytical Chemistry 2(4), 307-310 (1974)

ABST This paper discusses the conditions for extraction-photometry in the determination of boron. These conditions include: 1) the color reaction of ethyl purple and BF_4^-; 2) the extract effect of benzene; 3) the effect of pH; 4) the effect of reagent concentration; 5) the interference of other elements. The compositional ratio of colored compounds (ethyl purple: BF_4^-) is 1:1. The determination of trace B in marine sediments is also reported.

KEY determination, boron, extraction, color, pH, sediments, colorimetry, composition, analytical chemistry

LANG Chinese

NOTE See Note 96

292 AUTH Wu, Jingyang; Xu, Shengjie

AFFI Institute of Oceanology, Academia Sinica, Qingdao (1); Jilin Institute of Applied Chemistry, Academia Sinica (2)

DATE 1977

TITL Determination of gallium by rhodamine 6 G extraction - photometry

CITA Physical and Chemical Analyses No. 1-2, 32-34 (1977)

ABST The experimental conditions of determining Ga by rhodamine 6G extraction-photometry were studied: the extraction rate is 98% when benzene is used as extractant in the method; the color intensity of the colored compound shows no change in 1 hr. The optimal acidity for HCl solution is 5.5-6.5 N. One ml of 0.2% rhodamine 6G is enough for complete reaction. Sb, Bi, Sn, Tl, Hg, Au, Fe, Cr, Mo, Y etc. are the major interfering ions. Au^{+3}, Sb^{+5}, Bi^{+3}, Y^{+3}, Tl^{+3}, Fe^{+3}, Al^{+3}, Sn^{+4}, Hg^{+2}, WO_4^{-2}, MoO_4^{-2}, VO_3^{-}, $Cr_2O_7^{-2}$, SO_4^{-2} etc. ions show no interference when titanium trichloride exists in the solution. The composition of the colored compound is Ga and rhodamine 6G in the ratio of 1:1. Gram-molecular extinction coefficient of the compound in benzene is 85,000 at 528 nm. Analytical methods for trace Ga in marine sediments and aluminum alloy are introduced. Samples from marine sediments and aluminum alloy were determined, results show that this method is simple, fast and reliable. It can also be applied on samples from soil, silicate ore, metal and alloy.

KEY determination, gallium, extraction, analytical chemistry, photometry

LANG Chinese

NOTE See Note 96

293 AUTH Wu, Jun

AFFI Institute of Environmental Protection, National Bureau of Oceanography, Dalian

DATE 1982

TITL Mathematical models of environmental quality evaluation

CITA Journal of Marine Science 1, 52-56 (1982)

ABST Several mathematical models for evaluation of environmental quality are introduced in this paper; application of those models is also discussed.

KEY environment, pollution, carbon monoxide, sulfur dioxide, nitrogen dioxide, chlorinated hydrocarbon, particulates

LANG Chinese

294 AUTH Wu, Jun; Wang, Zheng-ji; He, Shao-yong

AFFI Institute of Environmental Protection, National Bureau of Oceanography, Dalian

DATE 1981

TITL Preliminary study on evaluation method of environmental quality in seawater of Dalian Gulf

CITA Hai Yong Ke Xue 1, 21-23 (1981)

ABST In order to establish a method for the evaluation of marine environmental quality, the authors analyzed the pollution data from the seawater of Dalian Gulf. In this paper, they discuss: 1) the definition of pollutants and individual evaluation reference, 2) the establishment of mathematical models, 3) the calculation of the weighted pollution index, 4) the interpretation and extrapolation of the available data, and 5) the standard for classifying a polluted area.

KEY pollution, seawater, estuary, trace metals, sediments, environment

LANG Chinese

295 AUTH Wu, Keqin

AFFI Institute of Marine Scientific and Technological Information, National Bureau of Oceanography, Tianjin

DATE 1981

TITL The upcoming marine mining industry

CITA Hai Yong Ke Xue 3, 46-47 (1981)

ABST This paper reports information on marine mining: 1) extraction of chemical elements from seawater - the chemical elements exist in seawater as solutes, with the total solute in seawater being about 15 x 10^{15} tons; the Cl content is 54.8% of the total solute, Na 30.4%, sulfate 7.5%, Mg 3.7%, Ca 1.2%, K 1.1%, carbonate 0.3%, Br 0.2%; because of the high content of Na and Cl, the extraction of NaCl is easy and the cost is low. Dyeing, pharmacy and metallurgy all consume large amounts of Br and Mg; the extraction of Br and Mg from seawater has already reached 70% and 60% of their total production, respectively; 2) manganese nodules and their mining - the basic ratio for metals contained in manganese nodules is Mg 5-30%, Fe 5-15%, Ni 0.2-1.8%, Cu 0.1-1.6%, Co 0.1-1.0%, Pb 0.002%. In 5-10 years, deep-sea manganese nodules will be mined extensively. However, the methods for extracting trace metals contained in manganese nodules have not been fully developed.

KEY extraction, manganese nodules, marine resources, sodium chloride, chloride, sodium, sulfate, magnesium, calcium, potassium, bromine, iron, nickel, copper, cobalt, lead

LANG Chinese

296 AUTH Wu, Keqin

AFFI Institute of Marine Scientific and Technological Information, National Bureau of Oceanography, Tianjin

DATE 1982

TITL The exploitative state of the marine mineral resource abroad

CITA Hai Yang Tong Bao 1(3), 102-107 (1982)

ABST Four groups of marine mineral resources and their exploitative state in foreign countries are introduced: (1) seawater chemical resource, (2)neritic mineral resource, (3) oil and gas resource, (4) deep-sea mineral resource.

KEY gases, oil, marine resources, minerals, gold, platinum, iron, tin, titanium, zirconium, rare earth elements, chromium, phosphate, coal, potassium, sulfur, petroleum, manganese nodules, desalination

LANG Chinese

297 AUTH Wu, Liangji; Qin, Peiling; Liu, Shao; Zhang, Chenghui; Xia, Ming

AFFI South China Sea Institute of Oceanology, Academia Sinica (1,2,3); Institute of Geology, Academia Sinica (4,5)

DATE 1982

TITL Chemical procedure for separating trace U and Th from ocean sediments

CITA Tropic Oceanology 1, 126-131 (1982)

ABST 10 grams of sediment samples are used in some conditional experiments, including removal of organic matter from the samples at high temperature, coprecipitation of U and Th with iron hydroxide, determination of pH of the solution while U and Th are coprecipitated, static time of the coprecipitation affecting the recovery of U and Th, etc. A chemical procedure for separating trace U and Th and their isotopes from sediments was worked out. A method of adding standard U and Th into the sample was used. In the procedure the recovery rates of U and Th were 85.9% and 97.6%, respectively. In the procedure, U and Th were separated from the samples, and then their radioactive sources were prepared by electro-deposition. These sources satisfied the requirements of the radioactivity determination. In analyzing the cores of sediments from the continental slope of the South

China Sea, isotopes ^{232}U-^{228}Th were added into the sediment samples as a tracer. Data of the contents of U and Th and their isotopes ^{234}U, ^{238}U and ^{230}Th, ^{232}Th which are distributed along the cores, and the ratios of those isotopes $^{234}U/^{238}U$ and $^{230}Th/^{232}Th$ were obtained.

KEY sediments, organic matter, pH, isotopes, radioactivity determination, uranium-232, uranium-234, uranium-238, thorium-230, thorium-232, continental slope, South China Sea, tracer

LANG Chinese, English abstract

298 AUTH Wu, Linxing

AFFI South China Sea Institute of Oceanology, Academia Sinica, Guangzhou

DATE 1983

TITL The carbon dioxide system in the northeast region of the South China Sea

CITA Oceanologia et Limnologia Sinica 14(2), 182-190 (1983)

ABST The system of CO_2 and degree of saturation of $CaCO_3$ have been calculated from measurements of pH and alkalinity in the northeast region of the South China Sea. Concentration of total CO_2, HCO_3^- and CO_3^{2-} are 1.86-2.49 mM/l, 1.60-2.38 mM/l and 0.07-0.28 mM/l respectively. According to concentration of CO_3^{2-} and Edmond and Gieskes' (1970) K'_{sp} and $\Delta\bar{V}$ of calcite and aragonite in sea water, the degrees of saturation of calcite and aragonite have been calculated. Location of the saturation horizon for calcite and aragonite are found to occur in the range of 600-1300 meters and 330-430 meters respectively.

KEY carbon dioxide, South China Sea, pH, alkalinity, calcite, aragonite, carbonates, bicarbonate, seawater, speciation, solubility product, total carbon dioxide

LANG Chinese, English abstract

299 AUTH Wu, Liqing; Zhan, Xiumei; Xu, Kuncan

AFFI Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE 1983

TITL Monitoring survey of mercury level in marine sediment around Xiamen Island

CITA Taiwan Strait 2, 39-46 (1983)

ABST The average concentration of mercury in the sediment around Xiamen Island was found to be 68.2 ppb. In the determination of the background level of mercury, several factors that may affect mercury concentration in the sediment, such as location differences, environmental factors, sediment matrix and pollution were considered. Mercury concentration/organic matter regression was used to correct mercury concentration in the calculation of its background level. As a result of the above correction, the sediments around Xiamen Island are not polluted by mercury except for a few contaminated sites. The comparison of the corrected background value between the Xiamen area and the Changjiang and Chiantangjian Estuaries suggests that their background levels are in great consistency, the slope values being 5.4 and 5.6 (ng/mg), respectively.

KEY mercury, concentrations, sediments, determination, pollution, organic matter, Changjiang

LANG Chinese, English abstract

300 AUTH Wu, Shenshang; Sun, Shuyan; Lu, Meiluan

AFFI Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE 1983

TITL The BHC residues in the Jiulong River estuary and Xiamen Harbour

CITA Taiwan Strait 2, 29-34 (1983)

ABST The BHC (α + γ) residue in the water of the area ranged 0.1-0.3 µg/l during 1980-1981. There was a high concentration and two monthly peaks in the Jiulong River estuary, thought to be due to effects of agricultural activities. The concentration of BHC residue in the Xiamen Harbour was lower than that in the Jiulong River estuary, without significant seasonal variations. The residual concentration of BHC in the plankton was 50-150 µg/kg (wet weight) in general. In warmer months, the residual concentration rose markedly. The distribution of the concentration factor of the plankton for BHC about 100-700, mostly within the range of 200-400, was one of normal distribution approximately.

KEY BHC, estuary, concentrations, plankton, pollution, seaonal variation, distribution

LANG Chinese, English abstract

301 AUTH Wu, Shiying

AFFI First Institute of Oceanography, National Bureau of Oceanography, Qingdao

DATE 1980

TITL Influence of Huanghe on sediment deposition in the Yellow Sea based on the calcium carbonate distribution

CITA Oceanic Research 4, 1-8 (1980)

ABST Huanghe contains high amounts of $CaCO_3$ from loess and transports large amounts of sandy mud down to the Huanghai and Bohai areas to form characteristic sediments. Investigating and utilizing the unique characteristics of these sediments are important for understanding the sedimentation of Huanghai. This paper reports that Huanghe is the major high $CaCO_3$ source in Huanghai sediment. The relationship of high $CaCO_3$-containing areas in modern sediments and collodial calcium in residual deposits in Huanghai is also explained. Overall study of the sedimentary characteristics of Huanghai shows that the major

sources of sediments from land are (1) river-borne sands, (2) marine erosion, and (3) wind-induced motion. River-borne sands are the most important fraction and Huanghe is the typical example of such deposition.

KEY Huanghe, Yellow Sea, calcium carbonate, distribution, Huanghai, Bohai, sediments, loess, transport, sources, sand

LANG Chinese

302 AUTH Wu, Shiying; Fang, Zecheng; Chen, Chengye; Zheng, Shuhui

AFFI The First Institute of Oceanography, National Bureau of Oceanography, Qingdao (1,2); Department of Geology, Beijing University (3,4)

DATE 1982

TITL Stratigraphic study by isotopic oxygen in core from station L2011 in west central Pacific

CITA Kexue Tongbao, 553-556 (1982)

ABST The $\delta^{18}O$ values measured from foraminifera shells in the core provides information on stratigraphy. Results show that the core of L2011 station has experienced 4 warm periods (interglacial ages) and 4 cold periods (ice ages) alternately in 259,000 years. The average sedimentation rate is 1.6 cm/10^3 yrs. The boundary of 1-2 period corresponds to the boundary of ice age to Holocene, the boundary of 5-6 period corresponds to the important boundary of cold to fairly warm in ^{18}O climate record.

KEY oxygen, Pacific, foraminifera, ice age, climate, oxygen-18, sediments, shells, Holocene

LANG Chinese

303 AUTH Wu, Wenyin; Cai, Xiaojun; Zheng Shuzhen

AFFI Guangzhou Institute of Chemistry, Academic Sinica, Guangzhou

DATE 1982

TITL Chemical composition of Bangia fusco-purpurea

CITA Journal of Marine Science 6, 28-30 (1982)

ABST The chemical components of Bangia fusco-purpurea including protein, sugar, fat, amino acid, vitamins and inorganic elements were analyzed. Moreover, the effect of hydrolysis on the contents of 18 amino acids was also studied. Results show that Bangia fusco-purpurea is superior to the laver in nutritive value, sweetness and perfume.

KEY compositions, protein, carbohydrates, fat, vitamins, amino acids, hydrolysis, marine resources, potassium, sodium, calcium, magnesium, ammonia, iron, aluminum, silicon, copper, zinc, sulfate, phosphorus, iodine, manganese, aspartic acid, threonine, serine, glutamic acid, proline, glycine, alanine, valine, isoleucine, leucine, tyrosine, phenylalanine, histidine, lysine, arginine, tryptophane, cystine, atomic absorption, colorimetry, spectroscopy, emission spectroscopy

LANG Chinese, English abstract

304 AUTH Wu, Wenzhong; Zhao, Huanting

AFFI South China Sea Institute of Oceanology, Academia Sinica, Guangzhou

DATE 1982

TITL On silt sources of Lingdingyang of the Zhujiang (Pearl River) estuary by means of mineralogical analyses of the sediments

CITA Tropic Oceanology 1, 97-110 (1982)

ABST Zhujiang River Basin is vast. The sources of terrigenous materials in the river mouth are very widespread and complex. Although the distributions of strata and rocks in the branch basins of the Zhujian River are not entirely the same, the heavy mineral compositions in the sediments of the upper reaches are very much the same without any special indicator minerals. We have discovered that the heavy mineral assemblage types of the river network of Zhujiang

River Delta and those of Lingdingyang Estuary are the same, i.e., the magnetite-ilmenite-limonite-zircon assemblage type; and that on the continental shelf outside the Zhujiang River mouth is limonite-hornblende-magnetite-ilmenite assemblage type. If we assume the minerals containing heavy minerals of over 20% by relative content as predominant minerals, then the predominant minerals in Zhujiang River network are magnetite and limonite in the lower reaches of Dongjiang (East) River; ilmenite and magnetite in the lower reaches of Liuqihe River; limonite, magnetite and ilmenite in the lower reaches of Xijiang and Beijiang (West and North Rivers). The predominant minerals on the West Bank in Lingdingyang are the same as those of the Xijiang and Beijiang Rviers; on the West Trough, Central Bank (Bar) and East Bank are all ilmenite and limonite; on the east Bank are all ilmenite and zircon; by the east side on the continental shelf near Zhujian River mouth is hornblende and by the west side is limonite. We have discovered glauconites in the upper section of East Trough and in the lower section of West Trough. There is a large amount of foraminifera, coral fragments, spiculae of sponge and Diatomeae, etc. in the sediments of the shelf, of which much is on the East Bank, East Trough and Central Bank, a little in the West Trough, very little on West Bank and in lower reaches of Dongjiang, and none in Liuqihe, Xijiang and Beijiang Rivers. Based on the above-mentioned fact, we can see that the silt sources of banks and troughs in Lingdingyang are mainly Xijiang and Beijiang Rivers, next is Dongjiang River, and only a small amount of silt comes from Liuqihe River and the sea. Silt of Xijiang and Beijiang Rivers deposits mainly in the west part of Lingdingyang, and shifts downward, then turns to the west of the shelf. Silt from the sea mainly comes through the Urmston Channel to the

east part of Lingdingyang, but the amount is very small. The method of mineralogical analysis in solving the problems of silt movement and silt source is efficient. For a large river that is characterized by a distant source, a long stream, a vast river basin, complex strata and rocks, woven distributary channels and numerous distributary mouths, it is difficult to find out its indicator minerals so as to make clear the source nature of the minerals of the sediments in the river mouth. Yet, after conducting detailed analyses of heavy mineral assemblage types and predominant minerals in sediments on main distributary channel beds, and of geomorphological units of estuary and the shelf outside the river mouth, we can clearly discover the main silt sources of the geomorphological units of an estuary.

KEY silt, Zhujiang, estuary, sediments, foraminifera, corals, sponge, geochemistry, minerals, sources, distribution, continental shelf

LANG Chinese, English abstract

305 AUTH Wu, Wenzhong; Zhu, Yuanzhi

AFFI South China Sea Institute of Oceanology, Academia Sinica

DATE 1983

TITL Preliminary studies of clay minerals from the South China Sea

CITA Tropic Oceanology 2, 20-27 (1983)

ABST In the bottom sediments of the South China Sea, clay minerals mainly consist of illite, chlorite, kaolinite and montmorillonite, while the mix-layered clay minerals and vermiculite are widespread distributed but of little amounts. Illite is the dominant clay mineral, the average content of illite is 50-60%. It is characterized by a strong (001) peak at 10A in the diffractograms but no change when glycerinated. Next is chlorite in abundance, ranging from 15-20% on an

average. A 7A peak is its characteristic, and Fe-chlorite can be identified by weak peaks (001) and (003) and strong peaks (002) and (004). Kaolinite content is 5-15% on the average. The peak for identification is 7.15A which may be coincident with the peak of chlorite. Kaolinite may also be identified by slow spread scanning and the 7A peak will disappear when heated to 600°C. Montmorillonite content varies with different geographic areas, ranging from 2-16% on the average. This mineral is diagnosed by the 14.5A peak which tends to shift to 17A when glycerinated. The clay minerals in the South China Sea are mainly derived from terrigenous sources, their distribution is controlled by the environmental geology, such as stratigraphy of rocks and active volcanoes, and geography, such as climate topography, soils on land, sea current and wind. A portion of montmorillonite in the sea is suggested by the present authors as of archipelago source and may be related to volcanoes of the western Pacific archipelagoes. There are not many oceanic clay minerals of authigenic or diagenetic origin.

KEY clays, South China Sea, sediments, illite, chlorite, kaolinite, montmorillonite, Taiwan Strait, distribution, soil, sources, authigenic, X-ray diffraction, diagenesis

LANG Chinese, English abstract

306 AUTH Wu, Xianjun; Qi, Kui'ao; Gui, Congshi

AFFI Dong Hai Fisheries Research Institute

DATE 1982

TITL A preliminary study on the determination of petroleum hydrocarbons in seawater by fluorescence spectroscopy

CITA Journal of Fisheries of China 6, 209-219 (1982)

ABST The method based on ultra-violet fluorescence spectroscopy (IGOSS-Integrated Global Ocean Station System) with aromatic-free petroleum ether as the

extractant and chrysene as the intercomparison chemical, for the measurement of petroleum hydrocarbons in seawater is presented in this paper. (1) The comparison between the spectra of the excitation and fluorescence of the chrysene and sample oil extracted from the Dong Hai (East China Sea) proved that both of the chrysene and sample oil were excited most strongly in the neighborhood of 310 nm and fluoresced most intensively at 360 nm. Daqing crude oil and its kerosene were scanned with excitation at 310 nm and fluorescence spectrum also showed in the neighborhood of 360 nm. There were striking resemblances between the fluorescence spectra of the Daqing crude oil sample mixed with chrysene and that of chrysene, and it was found that fluorescence spectrum of mixed oil was simply the sum of the two individual curves. (2) Using concentrations of about 0.5 μg/ml, the fluorescence intensity of the standard oil and chrysene was measured. The value of intercomparison ratio "R" was calculated: Daqing crude oil was 8.7, sample oil extracted from seawater of the Dong Hai 21.1. The causes leading in the difference of "R" were discussed briefly. (3) Conditions for sample extracting and the effect of grease or oil from animal and plant on petroleum hydrocarbons have been studied. The linear range of the experiments indicated 0-900 μg/l for chrysene, 0-5000 μg/l for Daqing crude oil. Minimum detectable concentration was approximately 2 μg/l Daqing crude oil, the standard deviation was ±0.0004 mg/l, the coefficient of variation was 3.7% and the average recovery of Daqing crude oil was found to be 91.1%.

KEY determination, petroleum, seawater, spectroscopy, analytical chemistry, oil, hydrocarbons

LANG Chinese, English abstract

307 AUTH Wu, Yuduan

AFFI Xiamen University, Xiamen

DATE 1980

TITL Some theoretical problems in marine environmental chemistry

CITA Hai Yang Ke Xue 2, 15-18 (1980)

ABST Several seawater chemistry models have been used as the basis for marine environmental monitoring, marine environmental quality control, and marine environmental quality prediction. This paper discussed the chemical speciation of seawater, the chemical reactions of the seawater system, as well as the interfacial reactions of the oceanic environment.

KEY seawater, speciation, pollution, oxygen, photosynthesis, nitrogen, phosphate, trace metals, organic matter, salinity, humic acid, fulvic acid, colloids, thermodynamics, pH, pE, particulates, interface, air-sea exchange, clays, equilibrium constant

LANG Chinese

308 AUTH Wu, Yuduan; Chen, Cimei; Chen, Yuwang; Wang, Longfa

AFFI Xiamen University

DATE 1982

TITL On the mechanism of transport of harmful heavy metals in the Changjiang River estuary, I. Thermodynamics and kinetics for the process of fixing heavy metals on illitic, montmorillonitic and kaolinitic clays

CITA Acta Oceanologica Sinica 4(3), 303-314 (1982)

ABST The water of the Chanjiang River contains a large quantity of suspended solid matters, among which illitic, montmorillonitic and kaolinitic clays are predominant. These colloidal clays consist of two parts: one is coated with inorganic or organic matters, and another is not. Both have the function of fixing heavy metals on their surface in various degrees. This paper reports the simulation experiments of the adsorptions of Cr, Cu and Hg (from

semi-saline water) on montmorillonite, illite, etc. We have measured (1) the equilibrium time, adsorption capacity and adsorption heat for the adsorptions of Cr, Cu and Hg from synthetic sea water of different salinity, 0.5N NaCl and 0.5N NaCl-$MgCl_2$ solution systems on illite, montmorillonite, etc., (2) the effects of pH, $S^o/_{oo}$, T and humic substance on adsorption, (3) the competition of co-existent ions on adsorption, and (4) the kinetic parameters for velocity and activation energy of the adsorption processes. From the viewpoints of thermodynamics and kinetics of adsorption, we have considered the possibility and reality of the adsorption of heavy metals on illitic, montmorillonitic and kaolinitic clays. We discusssed the characteristics of high organic matter contents of the Changjiang River estuary and determined the effects of the adsorptions of water soluble (lower molecular weight) and basic soluble (medium molecular weight) humic acid on the adsorptions of Cr, Cu, and Hg on these clays. Hence we come to the conclusion that the adsorption behaviour is strongly influenced in various degrees by organic matters of different molecular weights.

KEY heavy metals, mechanism, Changjiang, estuary, thermodynamics, kinetics, clays, adsorption, salinity, pH, chromium, copper, mercury, humic material, illite, kaolinite, montmorillonite, colloids, temperature, activation energy, organic matter, molecular weight

LANG Chinese, English abstract

NOTE Similar paper was published in Oceanic Selections 2, 64-88 (1979), and Second Environmental Science Conference, Ministry of Education, 1-28 (1979).

309 AUTH Wu, Yulin; Cui, Keduo; Liu, Yumei; Hou, Lanying; Lou, Qingxiang

AFFI Institute of Oceanology, Academic Sinica, Qingdao

DATE 1983

TITL Laboratory experiment on the accumulation and depuration of mercury by arca (anadara) subcrenata Lischke

CITA Oceanologia et Limnologia Sinica 14, 30-34 (1983)

ABST Adults of Arca subcrenata were held in seawater with mercury (as mercuric chloride) concentration of 0.01 ppm for 119 days. The mercury concentration in both the soft part (meat) and shell was determined using wet digestion and spectrophotometry. For 80 days after the beginning of the accumulation experiment, Arca subcrenata rapidly accumulated mercury from seawater, followed by a fluctuation within certain limit in the succeeding month. The highest mercury concentration in the soft part was 56.91 ppm, i.e. the bioaccumulation factor was 5691. The highest mercury concentration in the shell was 1.90 ppm. We found that the soft part of smaller Arca subcrenata accumulated more mercury per gram net weight than the large one. In the depuration experiment, we removed Arca subcrenata that had been held in the seawater with mercury concentreation of 0.01 ppm for 35 days into seawater with no mercury added. At that time, the average mercury concentration of the soft part was 27.14 ppm. Depuration of mercury from Arca subcrenata was carried on for 87 days. During the initial ten days, the mercury was rapidly depurated from the soft part by 40%. From then on, there was a slow but steady depuration over the succeeding two months or so, and the mercury concentration of the soft part decreased by 50% at the end of the depuration experiment.

KEY bioaccumulation, mercury, concentrations, seawater, pollution, shells, enrichment

LANG Chinese, English abstract

310 AUTH Wu, Yulin; Zhao, Hongru; Hou, Lanying; Lou, Qingxiang

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1983

TITL Accumulation, tissue distribution and depuration of Cd, Pb, Cu, Ni by Tilapia Mossambica

CITA Oceanologia et Limnologia Sinica 14, 473-481 (1983)

ABST Tilapia mossambica were held in seawater containing Cd, Pb, Cu, Ni in the concentrations of 0.1, 0.5, 0.1 and 1.0 ppm, respectively. The salinity of seawater was about 33°/$_{oo}$, temperature 25°C. The metal concentration of fish body and tissue was determined by wet digestion and flame atomic absorption spectrophotometry. For the first 98 days, the metal concentration increased with time. Then it fluctuated within a steady range during the succeeding month or so. The largest bioaccumulation factors were Cu, 76.45; Pb, 28.08; Cd, 9.37 and Ni, 1.78, respectively. Near the end of the experiment concentration slightly declined. It was also found that, within the cadmium concentration range of 0.01-0.25 ppm, there existed no relationship between the bioaccumulation factor and cadmium concentration in seawater. The experiment showed that kidney, liver and digestive system were the principal tissues of heavy metal accumulation. Muscle was an insignificant metal accumulator. In the depuration experiment, we removed the fish held for 56 days in seawater containing heavy metals at the concentration of Cd, 0.2; Cu, 0.2; Pb, 1.0 and Ni, 2.0 ppm, respectively, to seawater with no heavy metal added. It was found that all the four metals could be depurated, but depuration was more rapid for Ni, Cd and Cu than for Pb. Their biological half-lives were: 12.3 days for Ni, 18.9 days for Cd, 25.9 days for Cu, 115.5 days for Pb.

KEY seawater, salinity, temperature, concentrations, fish, atomic absorption, bioaccumulation, cadmium, lead, copper, nickel, marine pollution, marine organisms, enrichment, half-life

LANG Chinese, English abstract

311 AUTH Wuhan Institute of Metallurgical Safety Technique, Pollution Monitoring Group

AFFI Wuhan Institute of Metallurgical Safety Technique, Pollution Monitoring Group

DATE 1974

TITL The determination of ultratrace amounts of beryllium in the air

CITA Analytical Chemistry 2, 202-207 (1974)

ABST Ultratrace amounts of Be in the air are determined by paper chromatographic-spectrophotometry. The sensitivity of this method is 4 x 10 (E-9) g; the range of values measured per cubic meter is 0.004-0.1 microgram; the standard deviation is less than ±20%. The use of appropriate amounts of a masking agent led to the conclusion that the usual elements in dust would not interfere with the determination of Be.

KEY determination, beryllium, air, chromatographic, spectroscopy

LANG Chinese

312 AUTH Xia, Ming

AFFI Institute of Geology, Academia Sinica, Beijing

DATE 1982

TITL Some problems in marine radioactive nuclide chronology

CITA Acta Oceanologica Sinica 4, 703-712 (1982)

ABST The problems discussed are: (1) the method and theory of marine radioactive nuclide chronology; (2) determination of international standard samples by Th-230/U-234 method; (3) distribution patterns of Th-230, Pa-231, Th-232, Ra-226, U-238 in marine sediments; (4) The growth rate of manganese nodules in the deep sea; the age of coral reefs; excess Th-230; (5) sedimentation rate of marine sediments.

KEY determination, distribution, growth rate, manganese nodules, coral reefs, sedimentation rates, age, dating, seawater, sediments, carbon-14, lead-210,

beryllium, aluminum-26, silicon-32, thorium-230, uranium-234, protactinium-231, thorium-232, radium-226, uranium-238, thorium-228, plutonium-239, chlorine-36, iron-55, cesium-137

LANG Chinese

313 AUTH Xia, Ming; Zhang, Chenghui; Liu, Shao; Wu, Liangji; Qin, Peiling; Zhou, Xiuyun

AFFI Institute of Geology, Academic Sinica, Beijing (1,2); East China Sea Institute of Oceanology, Academic Sinica, Guangzhou (3,4,5); Institute of Geochemistry, Academica Sinica, Guiyang (6)

DATE 1983

TITL The rate of sedimentation on the continental slope of South China Sea

ABST Th^{230} method was used to determine the sedimentation rate of slope sediments in South China Sea. Results show that the upper part of the sediment core (surface to 48 cm) might have experienced landslides, showing discontinuous sedimentation and a warming trend in the paleoclimate. Between 48 cm and 90 cm (the middle section of the core), the intensity of Th^{230} activity decreased exponentially downcore; the sedimentation rate is 1.6 cm per 1000 years, and deposition took place in a colder and deeper water environment. Under 90 cm, more active sedimentation took place; the paleoclimate was again warmer. According to the content of U^{238}, Th^{230} in different layers of the core, the U^{238}/Th^{230} value, and their relationships to Fe, Mn, C, P, the major sediment source in this area is from the land, although part of it is authigenic.

KEY rate, sedimentation rates, continental slope, South China Sea, sediments, sources, authigenic, thorium-230, temperature, climate, uranium-238

LANG Chinese

314 AUTH Xia, Ming; Zhang, Chenghui; Ma, Zhibang; Liang, Zhuocheng; Zhou, Xiuyun

AFFI Institute of Geology, Academia Sinica, Beijing (1,2,3); Institute of Geochemistry, Academica Sinica, Guiyang (4,5)

DATE 1983

TITL Pb-210 dating method and the measurement of sedimentation rate of Pearl River estuary and Jingzhou Bay, Bohai

CITA Kexue Tongbao 5, 291-295 (1983)

ABST The intensity of α-radiation is measured from Po-210, using Po-208 as an indicator, to determine the specific activity of Pb-210 which in turn is used to determine the age of sediments. The distribution patterns of Pb-210 along the depth of the sample column and the factors that influence the distribution are discussed.

KEY lead-210, sedimentation rates, estuary, Bohai, age, sediments, distribution, determination, radium-226, uranium-238, radon-222, polonium-210, bismuth-210, lead-206, particulates, adsorption, polonium, dating

LANG Chinese

NOTE English version published in Kexu Tongbao 28, 807-813 (1983)

315 AUTH Xia, Ming; Zhang, Chenghui; Ma, Zhibang; Liang, Zhuocheng; Zhou, Xiuyun

AFFI Guiyang Institute of Geochemistry, Academic Sinica

DATE 1983

TITL Pb-210 dating method and sedimentation rates in Zhujiang estuary and Jinzhou Bay

CITA Kexue Tongbao 28, 807-813 (1983)

ABST The intensity of α-radiation is measured from Po-210, using Po-208 as an indicator, to determine the specific activity of Pb-210 which in turn is used to determine the age of sediments. The distribution patterns of Pb-210 along the depth of the sample

column and the factors that influence the distribution are discussed. This paper describes the measurements of Pb-210 by using the Po-208 spike in five sediment cores collected from Zhujiang Estuary and Jinzhou Bay of the Bohai Sea. Factors that affect the distribution of Pb-210 versus depth in the cores are discussed.

KEY lead-210, sedimentation rates, estuary, Bohai, age, sediments, distribution, radium-226, uranium-238, radon-222, polonium-210, bismuth-210, lead-206, particulates, adsorption, polonium, dating, Zhujiang

LANG English

NOTE Chinese version published in Kexue Tongbao 5, 281-295 (1983)

316 AUTH Xia, Ming; Zhang, Chenhui

AFFI Institute of Geology, Academia Sinica, Beijing

DATE 1983

TITL Rate of accretion of manganese crust from the South China Sea basin and its geochemical characteristics

CITA Acta Sedimentologica Sinica 1, 131-142 (1983)

ABST One manganese crust sample taken from the South China Sea basin has been analyzed using uranium-thorium series method in an attempt to determine the growth rate and to study the geochemical characteristics of the studied area. Excess ^{230}Th concentrations in the uppermost layer (1 mm) of the crust indicate an upper limit of growth rate of 4.1 mm/10^6 yr. This rate of accretion for the crust is similar to that for 6A nodule sample from the eastern part of the Pacific Ocean. Uniform and low rates of the crust growth from the South China Sea and the nodules from various oceanic basins suggest that a similar controlling mechanism may take place during their formation in the marine environment. Since all of the thorium is authigenic, the ^{230}Th ex/^{232}Th decay curve can be used to obtain an average rate of accumulation. The

exponential decrease of ^{230}Th ex/^{232}Th ratio with depth profile for the specimen yields a growth rate similar to the ^{230}Th ex date, corresponding to 4.7 mm/10^6 yr. The observed depth gradient of the nuclides could be affected by processes other than by radiodecay, i.e., by diffusion. Taking the effective diffusion coefficient to be of the order of 10^{-8} cm^2/yr, the true growth rate of 1.8 mm/10^{6-} yr obtained from a diffusion-decay model, obviously, would be lower than the growth rate of 4.1 mm/10^6 yr obtained using a decay model. The depth integrated dpm/cm^2 of excess ^{230}Th found in the crust from the South China Sea basin is small in amount. It appears that only a small fraction of this nuclide produced in the sea is incorporated into manganese crust or nodules, and the bulk must reside in the adjacent sediments. The studied crust contains a ^{232}Th content with a mean value of about 93 ppm. This concentration is generally higher by 10 ppm than that in the surface sediments. As a consequence of the high thorium content, the U/Th in weight ratio for the crust is somewhat lower than a mean value of about 0.2. The U/Th ratio in the specimen is less than that for the adjacent sediments by about a factor of two. The surface $^{230}Th/^{232}Th$ ratio of the manganese crust in the studied area exhibits a lower value of about 3 when compared with other nodules or crusts from different localities of oceanic areas. This ratio of the surface crust conforms to its geographic distribution in surface sediments. It seems that during the last several hundred thousand years the Mn-Fe oxides were deposited with a low growth rate estimated at mm/10^6 yr for the manganese crust or concretion in the South China Sea basin. The above-mentioned data and growth rate can be closely associated with the geochemical nature of the crust or concretion in the South China Sea basin, and thus

provide useful and valuable clues to some of the investigations in the fields of geochronology and isotope geochemistry.

KEY South China Sea, uranium, thorium, growth rate, diffusion, geochemistry, thorium-230, thorium-232, radiochemistry, Pacific Ocean, manganese nodules, sediments, distribution

LANG Chinese, English abstract

317 AUTH Xia, Ming; Zhao, Shusen; Wang, Shouxin; Wu, Qianfan; Zhang, Chenghui; Liu, Minglin

AFFI Institute of Geology, Academia Sinica, Beijing

DATE 1979

TITL The determination of international standard samples using the uranium series method

CITA Chinese Science, 792-799 (1979)

ABST The uranium series method is used to determine 3 carbonate international standard samples. The chemical procedures, techniques of preparing α-source by electro-deposition, spectrum of α-radiation from uranium and thorium, and data processing are discussed. Results from this method are consistent with data from foreign laboratories.

KEY determination, carbonates, uranium, thorium, half-life, uranium-234, thorium-230, uranium-238, protactinium-231, uranium-235, thorium-232, thorium-228

LANG Chinese

318 AUTH Xiao, Yingkai

AFFI Qinghai Institute of Saline Lakes, Academia Sinica, Xining

DATE 1984

TITL Influence of $^{10}B(n,\alpha)\ ^{7}Li$ and $^{6}Li(n,\alpha)\ ^{3}H$ reaction on isotopic composition of boron and lithium in some saline lakes of Qinghaixizang plateau

CITA Kexue Tongbao 29, 224-228 (1984)

ABST Same as 236

KEY compositions, boron, lithium, isotopes, boron-10, boron-11, lithium-6, lithium-7, salt lakes, sedimentation, age, geochemistry, mass-spectroscopy

LANG English

NOTE The Chinese version published in Kexu Tongbao, 942-945 (1982); Xiao Yingkai is also Shiao Yinkai

319 AUTH Xiao, Yingkai; Wang, Yunhui; Cao, Haixia

AFFI Qinghai Institute of Saline Lakes, Academia Sinica

DATE 1983

TITL Separation of boron with ion-exchange technique for mass spectrometric determination of the abundance of isotopic boron in salt lake

CITA Analytical Chemistry 11, 604-606 (1983)

ABST A simple and rapid ion-exchange technique for separating boron has been studied. A mixture of strongly acidic cation-exchange resin in hydrogen form and "ion exchanger II" of weakly basic anion-exchange resin in bicarbonate form was filled in a special column. Boron was absorbed by the mixture and eluted with pure water. The recovery of boron is more than 98%, and the total content of impurities in the boron is reduced to less than 2%.

KEY boron, ion-exchange, determination, resin, bicarbonate, analytical chemistry, resources, mass-spectroscopy

LANG Chinese, English abstract

NOTE Xiao Yingkai is also spelled Shiao Yinkai

320 AUTH Xie, Chang-sheng

AFFI Guiyang Institute of Geochemistry, Academica Sinica, Guiyang, Guizhou Province

DATE 1982

TITL The enrichment with impregnated polyurethane foam and spectrophotometric determination of trace thorium in natural water

CITA Acta Chimica Sinica 40, 605-610 (1982)

ABST This paper reports the use of impregnated polyurethane foam for enriching trace thorium from natural water. The polyether type polyurethane foam was employed, which was impregnated with bis (2-ethylhexyl) phosphoric acid/tributyl phosphate/carbon tetrachloride (2:5:93, V/V/V) mixture. The excess reagent was removed by filter paper. The impregnated foam thus prepared is dipped into the water sample and stirred for 20 minutes. The optimum conditions for enrichment are: sample should be adjusted to about pH 1 and temperature should be kept within 30-45°C. Distribution and phase ratios were calculated to be 4.26×10^4 and 2.01×10^4, respectively, assuming that the mixture and water are totally immiscible with each other. The actual values were all slightly greater than the calculated ones. After removing the foam from the sample, the former is washed with water and subjected to wet oxidation with concentrated nitric and perchloric acids. The residue is taken up with diluted hydrochloric acid. The thorium is spectrophotometrically determined with Arsanazo III at 665 nm. The method is simple, rapid, accurate and inexpensive.

KEY thorium, natural water, pH, temperature, determination, spectroscopy

LANG Chinese, English abstract

321 AUTH Xin, Xueyi

AFFI Department of Oceanology, Shandong University, Jinan

DATE 1953

TITL Seasonal variation of phosphates and silicates in seawater at C1 station of Jiaozhou Bay in 1950

CITA Journal of Shandong University, 85-94 (1953)

ABST This paper reports the seasonal variation in phosphate and silicate of seawater at C1 station of Jiaozhou Bay in 1950. The seasonal change in the seawater salinity, transparency, dissolved oxygen, pH and total

alkalinity as well as the chemical qualities of seawater outside the bay are also reported. The phosphate content was the highest in February when the water temperature was the lowest; another peak was shown in summer, but the lowest content was also in summer. There are two rise and fall periods for the phosphate content which is once more than in other bays. The difference between the winter maximal value and the summer minimal value in surficial water was 0.36 μgP/l; the average value of the different water layers was 0.59 μgP/l. The content of silicate in winter was higher than that in spring and early summer, but the content was the highest in late August; the surficial content in summer was about twice that in winter. The difference between the winter maximal value and summer minimal value was 13.49 μgSi/l in surficial waters; the average in the water layers was 9.5 μgSi/l. In general, the phosphate content in the surficial layer was lower than that in other water layers; there was no trend for the variation of silicate content in different water layers.

KEY seasonal variation, phosphate, silicate, seawater, salinity, transparency, oxygen, pH, alkalinity, temperature, colorimetry, Jiaozhou Bay

LANG Chinese

322 AUTH Xiong, Xiaoxian; Jiang, Chuanxian

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1974

TITL Determination of uranium in seawater by using azochlorophosphonate III

CITA Analytical Chemistry 2, 171-174 (1974)

ABST This paper studies the colorimetric determination of uranium (+6) using azochlorophosphonate III and claims that when pH is 0.4-2N, the maximal absorption wavelength for azochlorophosphonate III and the

colored complex of azochlorophosphonate III and U (+6) are 555 nm and 655 nm, respectively. The appropriate acidity for coloration is 0.4N (hydrochloric acid); the reagent concentration is 1.2 x 10 (E-5) M. The destructive effect of ascorbic acid on the colored complex is also discussed. Determination of U (+6) in seawater with this method shows a better accuracy, the relative error being less than ±6%.

KEY determination, uranium, seawater, extraction, absorption, pH, colorimetry

NOTE Xiong Xiaoxian is also spelled Syun Syao-Syn

323 AUTH Xu, Baoyun; Wei, Yongzhen; Liu, Yulan

AFFI Qingdao Medical College

DATE 1983

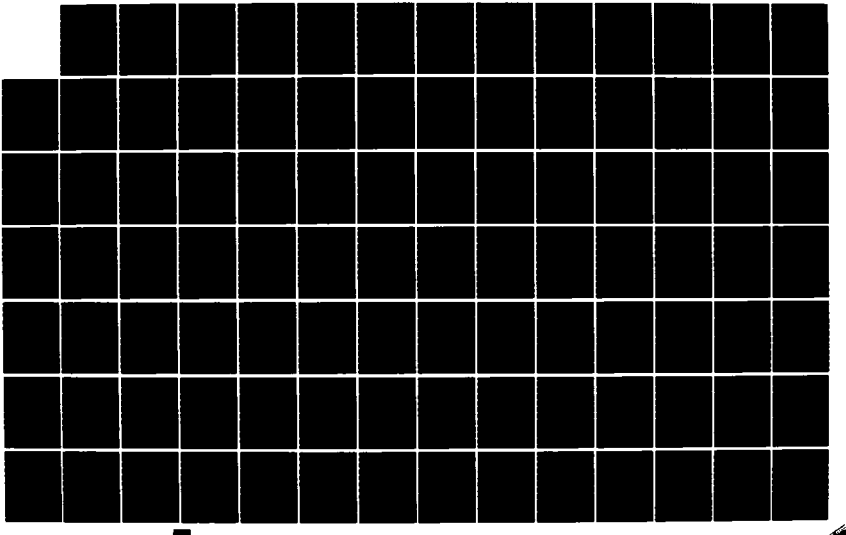
TITL Spectrophotometric determination of trace cobalt in sea-floor sediments, using 5-Br-PADAP

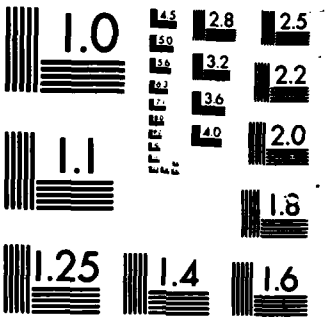
CITA Oceanologia et Limnologia Sinica 14, 191-197 (1983)

ABST The complex reaction of Co^{2+} ion with 2-(5-Bromo-2-pyridylazo)-5-diethylaminophenol (5-Br-PADAP) in ethyl alcohol-water medium is described and a simple and sensitive spectrophotometric selective procedure for determining trace cobalt in sea-floor sediments and soils has been developed. At pH 2.5-7.0, Co^{2+} ion reacts with 5-Br-PADAP to form a blue-violet complex, the mole ratio of which is Co:R = 1:2 as determined by continuous variation and mole ratio methods. The complex formed in acid solution has two absorption maxima at 555 and 590 nm. The molar absorptivity is 9.0×10^4 $mole^{-1}$ cm^{-1} at 590 nm which was used for all absorbance measurements. Beers law is obeyed for 0-6 µg/25 ml. The effect of 22 foreign ions on the determination was examined. On the addition of acid (HCl, HNO_3, H_2SO_4 or H_3PO_4) to the colored solution, the selectivity of the determination can be increased. Micrograms of Fe^{3+}, Cu^{2+}, Ni^{2+}, Hg^{2+} do not interfere with the results. Milligram amounts of Fe^{3+} can be

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masked by the addition of Zn-EDTA. The interference of Cr (VI) and Mo (VI) can be eliminated by adding hydroxylamine hydrochloride which reduces the Cr (VI) to Cr (III) and forms colorless complex with Mo (VI). Cobalt in seafloor sediments has been determined by proposed method with recovery of 94% and 97% and variable coefficient of 3.0% and 4.1%.

KEY determination, cobalt, sediments, pH, spectroscopy

LANG Chinese, English abstract

324 AUTH Xu, Chenzhong; Le, Huafu; Mao, Xianmo

AFFI The Second Institute of Oceanography, National Bureau of Oceanography, Hangzhou

DATE 1982

TITL Primary investigation for spectral characteristics and aerial sensing of suspended sediment in surface water body

CITA Hai Yang Tong Bao 1(2), 48-56 (1982)

ABST Aerial sensing of suspended sediment in water can be achieved with spectra reflectance and spectrographic analysis. The authors claim that the best wavelength for aerial sensing of the suspended sediments in surface water body is 640-800 nm (visible light to near infrared area); when the sediment concentration is 15-483 mg/l, the relationship between the average reflectance of the water sample at a selected wavelength and the concentration of suspended sediments is logarithmic.

KEY concentrations, sediments, particulates, seawater, remote sensing

LANG Chinese

325 AUTH Xu, Chenzhong; Le, Huafu; Mao, Xianmou

AFFI The Second Institute of Oceanography, National Bureau of Oceanography, Hangzhou

DATE 1982

TITL The preliminary research on aerial multispectral remote sensing of water depth

CITA Acta Oceanologica Sinica 4, 346-356 (1982)

ABST Starting from the three tests of aerial multispectral sensing at the Dahaizi reservoir, reservoirs near Changchun district and Sandawang Bay, the authors explain systematically in this paper the basic principle and the method of remote sensing for determining water depth using aerial multispectra photography. On the basis of basic principles of geometric, physical and water optics, and foreign data, we propose a depth equation with the effect of forward scattering on light radiation transmission considered, expound the specific physical significance of various parameters in the equation, and establish the respective method of measurement or estimation. According to the remote sensing instruments and equipment of our country, we mainly demonstrate each major step and concrete method associated with the determination of water depth by the single spectral channel ratio technique in aerial remote sensing, for example, the selection of best waveband, the flying conditions and the requirements for image processing, and so on. Special attention has been paid to discussion on the concept of the perspective depth and its estimation methods, the experimental approach to correcting the aerial image for radiance, the approximate measurement of the diffusion attenuation coefficient in waters, and the processings of image contrast enhancement and isodensity slicing. Finally, on the basis of foreign theoretical estimation and their data measured in situ, the possibility of water depth determination by the single spectral channel ratio analysis technique of aerial multispectral photography is discussed, and the depth by remote sensing and the accuracy reached are also estimated. Owing to our limitation of instruments, equipment and

technique levels in remote sensing, the results obtained are preliminary. So, in aerial multispectral sensing for water depth, it is necessary to create favourable conditions so as to further make use of the analysis technique of multispectral ratio and the image machine-processing method.

KEY remote sensing, optics, attenuation coefficient, seawater, depth

LANG Chinese, English abstract

326 AUTH Xu, Kuncan; Wu, Liqing; Huang, Shuilong

DATE 1982

TITL Evaluation of the background levels and judgment of the extraordinary sampling stations of heavy metals in the sediments of the East China Sea

CITA Taiwan Strait 1, 49-57 (1982)

ABST This paper provides a means of classifying a station with abnormal heavy metal concentrations. The factors affecting the background levels of heavy metal contents in the sediments are considered: 1) variation of natural conditions with survey area difference; 2) effects of environmental factors; 3) effects of pollution; 4) effects of sedimental basis. A complex correction method is provided to eliminate the effects of the factors that affect the background level of heavy metals of the East China Sea. This paper evaluates the background levels of Hg, Cu, Pb, Zn and Cr in the sediments. The abnormal stations are those with concentrations exceeding the calculated background value plus three standard deviations. The method for the judgment of abnormal concentrations of heavy metals is presented. The results of the judgment show that except for a few samples the content in Hg, Cu, Pb, Zn and Cr in most of the sediment samples are in the normal range.

KEY heavy metals, sediments, East China Sea, mercury, copper, lead, zinc, chromium

LANG Chinese, English abstract

327 AUTH Xu, Kuncan; Wu, Liqing; Wang, Ruixian

AFFI The Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE 1982

TITL Direct determination of trace mercury in seawater by using differential cold vapor atomic absorption

CITA Acta Oceanologica Sinica 4, 564-569 (1982)

ABST This study applies differential cold-vapor atomic absorption for the measurement of trace amounts of mercury in seawater. The theory on which this method is based and the instrument installation procedure are discussed. Environmental pollution, temperature, air density and water vapor, Cl_2 as well as salinity are the factors affecting measurement; the elimination of these influences are discussed. The above-mentioned method is superior to non-differentail cold-vapor atomic absorption for measuring mercury in that the pre-concentration step is omitted and the sensitivity is higher by 33 times; the minimal amount of mercury that can be measured is 0.1 ng/100 ml seawater.

KEY determination, mercury, seawater, atomic absorption, pollution, temperature, salinity, analytical chemistry

LANG Chinese

328 AUTH Xu, Mingde

AFFI First Institute, National Bureau of Oceanography, Qingdao

DATE 1981

TITL Analytical methods for the determination of Sr-90 in seawater

CITA Hai Yang Ke Xue 3, 36-38 (1981)

ABST This paper introduces several analytical methods that are commonly used for determining Sr-90 in seawater: precipitation, ion-exchange, solvent extraction, and scintillation counting.

KEY seawater, strontium-90, analytical chemistry, determination, precipitation, ion-exchange, extraction

LANG Chinese

329 AUTH Xu, Mingde; Song, Wanlin; Gao, Yan

AFFI The First Institute of Oceanography, National Bureau of Oceanography, Qingdao

DATE 1982

TITL The chemical forms of artificial radionuclides in seawater and the research methods

CITA Journal of Marine Science 1, 48-51 (1982)

ABST The distribution of radionuclides in the ocean is important to research on marine pollution resulting from radioactive substances. However, this distribution is closely related to the forms (simple ion, complex ion, neutral molecule or suspended particles) of the nuclides in seawater. Studying the radioactive colloids and the biological activities is required to ascertain the physical-chemical state of these nuclides in seawater. The methods that have been used are: 1) electrical mobility; 2) centrifugation; 3) filtration; 4) ultrafiltration; 5) imitation; and 6) an indirect method.

KEY radionuclides, seawater, distribution, pollution, equilibrium constant, adsorption, bacteria, chlorophyll, pigment, vitamin, speciation, pH, redox reaction, bioaccumulation, particulates, particle size, hydrolysis, cerium-144, praseodymium-144, cesium-137, cobalt-60, zinc-65, ruthenium-106, manganese-54, iron-59, thorium-230, thorium-234, uranium-238, strontium-90, phytoplankton, marine organisms

LANG Chinese

330 AUTH Xu, Qinghui; Zheng, Jinshu; Zhang, Gongxun

AFFI The Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE 1983

TITL On chelating resin for extracting uranium in seawater

CITA Acta Oceanologica Sinica 5, 735-742 (1983)

ABST A series of chelate resins is synthesized in order to study their abilities to estract uranium from seawater. The study proceeds in 3 ways: 1) the chelation of resin with UO_2^{+2}; 2) its competition with Ca^{+2}, Mg^{+2}; 3) competition of UO_2^{+2} with CO_3^{-2} for the resin. Results show that 508A resin which contains several alkaline coordination groups can adsorb about the same amount of uranium as the resin with uranium reagent I does; but 508A resin can adsorb directly from seawater. The resin that contains several alkaline coordination groups can overcome the competition of CO_3^{-2} with UO_2^{+2}. The resin with OH group shows lower interference of Ca^{+2}, Mg^{+2} than that with AsO_3H_2 group.

KEY resin, uranium, seawater, extraction, marine resources, adsorption, carbonates, magnesium, calcium

LANG Chinese

331 AUTH Xu, Qinqi; You, Yuzhu; Chen, Yun

AFFI Institute of Vertebrate Paleontology and Paleoanthropology, Academia Sinica; Bureau of Geology, Shaanxi Province

DATE 1981

TITL Correlation of deep-sea sediments with the loess in Luochuan, Shaanxi province

CITA Collected Oceanic Works 6, 108-111 (1981)

ABST The ratio of oxygen isotopes, $^{18}O/^{16}O$, in foraminferal tests provides a complete record of global climatic changes known to date. The record shows 19 stages in

the Brunhes noraml epoch of ~ 730,000 yr. Continental sediments also provide the record of global climatic changes due to gross changes of climate that are globally synchronous. In the loess area glacial-interglacial cycles were recorded by repeated alterations of loess and forest soils. Luochuan is chosen as a key locality of such correlation in China. Recent work shows that the loess is the product of the cold and dry steppes, while the soils are the products of the warm and moist forests. Layer 12 is the most outstanding forest soil in all the soils of the Luochuan sequence. By TL dating, the age of this layer is 180,000-210,000 yr. BP, this is correlated with the three successive warm peaks of stage 7 of the solar-insolation curve. Layer 22-26 represent the other three compact red beds. It seems that this second "three red bands" is correlated with stage 15 in both solar-insolation curve and oxygen-isotope curve. Layer 2 is black loam and layer 1 cultivated soil. Layer 1 and 2 are correlated with 0-18 stage 1. Layer 3 is Malan loess. Layers of thin greyish-brown fossil soil intercalated in Malan loess corresponds to stage 3 and Malan loess itself correlates with stage 2-4. The other layers in Luochuan sequence also correlate with stage 2-4. The other layers in Luochuan sequence also correlate easily with other stages in marine 0-18 record. Generally speaking, the Luochuan natural section provides quite a complete record of climatic changes in the past 730,000 yr.

KEY sediments, loess, dating, age, oxygen-18, climate, foraminifera, ice age

LANG English

332 AUTH Xu, Weilong

AFFI National Center of Standards and Metrology for Oceanographic Instrumentation, National Bureau of Oceanography, Tianjin

DATE 1982

TITL A brief view on oceanographic instrumentation terms

CITA Ocean Technology 2, 74-76 (1982)

ABST Oceanographic instrumentation terminology is basic to the scientific research, production and education. The author suggests the standardization of definitions of terms which should be consistent with the internationally used terms. Some discussions of definitions and categories of oceanographic instrumentation terms are presented.

KEY analytical chemistry

LANG Chinese

333 AUTH Xu, Xin; Luo, Xuezhong; Xiao, Lun

AFFI Institute of Atomic Energy, Beijing

DATE 1983

TITL A selective adsorption method for iodine and its radiochemical applications I. The adsorption and desorption of iodine on copper based platinum adsorbent

CITA He Huaxue Yu Fangshe Huaxue 5, 9-17 (1983)

ABST In this paper a selective adsorption and desorption on copper based platinum adsorbent (CBPA) of radioiodine is studied. I^- can be adosrbed on CBPA in the media like sulfuric, citric or tartaric acid at pH < 6.2. The adsorption capacity is ~ 0.7 mg/cm^3 CBPA (150-200 mesh) in the usual cycles. In the presence of enough Na_2SO_3, the adsorption efficiency is > 99.95% before the breakthrough. The adsorption takes place in < 3 seconds, permitting a flow rate of up to 90 ml/cm^2·min, while in elution, the flow rate should not exceed 10 ml/cm^2·min to avoid longer tailing. The elution efficiency depends greatly on two factors: the amount of I^- adosrbed and the concentration of NaOH in the eluant. Through the 1.5 cm^3 column, for > 80μg I^- and with 10-15 V_c of > 0.3 N NaOH, the recovery is nearly quantitative. Na^+, K^+, Cs^+, Cu^{2+},

Zn^{2+}, Fe^{2+}, Al^{3+}, Sb(III), and SO_3^{2-}, PO_4^{3-}, TeO_4^{2-}, citrate, tartarate etc., and NO_3^-, Cl^- as well (in the pH range of 4-5.5 and with enough Na_2SO_3 present), exhibit no apparent effect on either adsorption or desorption of I^-. The presence of large quantity of Br^- interferes with both processes. The separation (or decontamination) factors for Al, Te(VI), Sb(III) are > 10^3-10^5. In 0.1 N NaOH eluate, the contents of absorbent material (Cu and Pt) and other impurities are all < 1 ppm. and the radiochemical purity of radioiodine in the product is > 99.9%, with no reducing agent in it. The column can be used repeatedly. A dose of 1 x 10^8 rads of ^{60}Co γ-rays has no effect on the effectiveness of the CBPA. This inorganic selective adsorption method might find applications in many fields.

KEY adsorption, iodine, adsorbent, copper, platinum, radiochemistry, pH

LANG Chinese, English abstract

334 AUTH Xu, Xizhen

AFFI South China Sea Institute of Oceanology, Academia Sinica

DATE 1982

TITL The distributions of temperature, salinity and density and the characteristics of the water mass in the central part of South China Sea

CITA Symposium on the research reports on the sea area of South China Sea, 119-127 (1982)

ABST Based on the data collected on the cruises in the central part of South China Sea in October, 1977, and from June to July, 1978, the distributions of temperature, salinity and density, as well as the characteristics of water mass are briefly described. The continuous station data show the evident existence of internal wave action in the spring layer of this area. There exists double spring layer in the salinity

profiles of most of the stations in the area from June to July, 1978, and inversion take place within the double spring layer. Such feature is mainly related to upwelling along the coast of Vietnam and advection transport in this area. The water masses in central part of the South China Sea appear to be well stratified, and can be divided into five from surface to bottom, i.e., surface, subsurface, mid-strata, deep strata and basin water mass.

KEY distribution, temperature, salinity, density, South China Sea, water mass, oxygen, residence time

LANG Chinese, English abstract

335 AUTH Yang, Guangfu; Gao, Shenglu; Zhou, Xiuting

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL Improvement in suction with a syringe

CITA Journal of Marine Science 6, 59-60 (1982)

ABST A suction device that gives precise suction speed and volume is described.

KEY analytical chemistry

LANG Chinese

336 AUTH Yang, Guozhi

AFFI Institute of Soil Science, Academia Sinica, Nanjing

DATE 1983

TITL Cluster analysis of some elements in soils of Tianjin area

CITA Acta Scientiae Circumstantiae 3, 207-212 (1983)

ABST Some 15 chemical elements from 260 samples of Chao soil in Tianjin region were divided into three groups by using mathematical method of cluster analysis. In the first group, there are Sr and Zr, which showed strikingly negative correlation with physical clay content < 0.01 mm in soils. In the second group, there were Fe, Ti, Co, Ni, Cr, Pb, As, Cu, and Mn, which showed strikingly positive correlation with

content of physical clay < 0.01 mm in soils. In the third group, there were Hg and Cd, which had nothing to do with soil texture. Therefore, in order to study background value for the region where the parent material is the same or where the parent material in the recent alluvium and sediment, attention must be drawn to the fact that type of soil texture has effects on the background level of some elements in soil, and it would be much more significant to have the background levels of soil types with different texture.

KEY soil, clays, trace metals, pollution, strontium, zirconium, iron, titanium, cobalt, nickel, chromium, lead, arsenic, copper, manganese, mercury, cadmium

LANG Chinese, English abstract

337 AUTH Yang, Qian

AFFI The First Geological Brigade, Geological Bureau of Qinghai, Germu, Qinghai

DATE 1982

TITL The sedimentation mechanism of potash deposits in the Qarhan Inland Salt Lake

CITA Acta Geologica Sinica, 281-292 (1982)

ABST Potash salt sediments in inland salt lakes have long been a subject attracting the interest of scholars both at home and abroad. On the basis of the concrete geological conditions of the objects of their respective study, the conclusion has been drawn that potash salts are absent in halogen sediments of a continental salt lake. The Qarhan Salt Lake potash deposit of China is the sole large-sized inland salt lake potash deposit with industrial value discovered so far in the world. It provides an example for finding potash deposits in continental salt lakes. Therefore the study of its depositional mechanism is not only of practical significance but also of major theoretical significance. Two different types of

potash deposits may be recognized in the Qarhan Salt Lake: stratified and disseminated. The former forms by precipitation from surficial brines. It shows a distinct stratified structure, with carnallite layers alternating with halite layers to form a distinct rhythmic unit. The latter settles out of interstitial brines. It exhibits a disseminated structure, with carnallite disseminated in the interstices of halite crystals, no well-defined boundaries being observed between industrial potash and barren layers. Hybridization is of common occurrence in a salt basin. Under the influence of this process, complicated situations occur in a salt basin, such as the change in type of water quality, inversion of the sedimentary sequence of salts and mixing of potassium sulfates and sodium chlorides. On account of frequent changes of climatic conditions, the rhythm in salt beds is not necessarily annual, and under certain conditions a seasonal rhythmic unit or that of lesser order may be present. From the study of the Qarhan Inland Salt Lake potash deposit, one may come to the conclusion that potash deposits with industrial value may come into existence in an inland salt lake even in the case of the absence of a special source of potash supply.

KEY sedimentation, mechanism, salt lakes, precipitation, halite, potassium sulfate, sodium chloride, brine, resources

LANG Chinese, English abstract

338 AUTH Yao, Youchen

AFFI Yellow Sea Fisheries Research Institute

DATE 1980

TITL The determination of ammonia in sea water (plus amino acid)

CITA Marine Fisheries Research, 97-104 (1980)

ABST A rapid, simple and more sensitive method of determination of ammonia in sea water is described. In this method ammonia in sea water is oxidized to nitrite by alkaline hypochlorite and the residual oxidant reduced by arsenite; the amount of ammonia can be calculated from the total amount of nitrite. A considerable amount of amino-acid nitrogen is oxidized as well as free ammonia in the process. Hence, the method can be of significant utility in studying the productivity of the seas, as amino-acid nitrogen is a nitrogen source for many phytoplankta. By this method about 0.1 μg-at/liter of ammonia can be detected.

KEY determination, ammonia, amino acid, seawater, phytoplankton, analytical chemistry, colorimetry

LANG Chinese, English abstract

339 AUTH Yao, Zhonghua; Wang, Huadong; Liu, Peitong

AFFI Research Institute of Environmental Science, Department of Geography, Beijing Normal University

DATE 1982

TITL A comprehensive chemical model for heavy metal distribution in aqueous environment - Cu, Zn, Cd distribution in a water body near Yong Ping Copper Mine

CITA Acta Scientiae Circumstantiae 2, 1-19 (1982)

ABST An attempt has been tried on preliminary investigation of Cu, Zn, Cd distribution in a water body near Yong Ping copper mine. The model covers systems of heavy metals such as Cu, Zn, Cd, Co, Ni, inorganic ligands (SO_4^-, Cl^-, NH_3, HCO_3^-, CO_3^-), organic ligand (humic acid from natural sources) and a kind of adsorbent (kaolinite). The different chemical components were quantitatively correlated in accordance with the mass action law and principle of conservation after chemical equilibrium of the system had been established. The equilibrium constants of the organic complex system and adsorption of heavy

metals, in this system, were measured by modeling experiments, while the inorganic complex constants were selected from literature. Equilibrium characteristics of the system are expressed in terms of a set of non-linear equations 81 in number. This set of equations was calculated by means of steepest descent, and the calculation program was done based on ALGOL-60 language and conducted on computer TQ-16 which is made in China. Some preliminary conclusions have been reached from this work about the species distribution pattern in the aquatic environment of Yong Ping area.

KEY heavy metals, distribution, ligands, humic acid, kaolinite, equilibrium, adsorption, speciation, copper, zinc, cadmium, cobalt, nickel, sulfate, chloride, ammonia, bicarbonate, carbonates, thermodynamics, natural waters, pollution,

LANG Chinese, English abstract

340 AUTH Ye, Changming; Du, Xiuyin; Mu, Huanzhen; Li, Guolong; Jiang Hengquan

AFFI Institute of Environmental Chemistry, Academia Sinica

DATE 1983

TITL Effects of metal ions on biological oxidation reaction rate in river water

CITA Kexue Tongbao 4, 27-29 (1983)

ABST Steady-state and kinetic experiments on the effect of metal ions (Hg^{+2}, Cu^{+2}, Cd^{+2}, Cr^{+6} and Pb^{+2}) on the biological oxidation reaction rate in river water were conducted. The authors used the biological oxidation reaction dynamics formula to derive the reaction rate constant for different experimental conditions. Results show that different metal ions and the same ion with different concentrations have different effects on the biological oxidation reaction rate in river water.

KEY river water, reaction rate, rate constant, concentrations, trace metals, mercury, copper, cadmium, chromium, lead, kinetics

LANG Chinese

341 AUTH Ye, Dezan

AFFI The Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE 1982

TITL Preliminary report on biological investigation in the Antarctica

CITA Hai Yang Tong Bao 1(6), 103-108 (1982)

ABST The Antarctic ecosystem is categorized into: 1) the Antarctic ocean ecosystem; 2) the Antarctic ecosystem; and 3) the Antarctic lakes ecosystem. The food web of the Antarctic area, information on the biogenous components, and the ecologic characteristics of the area are presented.

KEY Southern Ocean, nutrients, upwelling, color, temperature, salinity, lake waters, Antarctic Convergence, primary productivity

LANG Chinese

342 DELETED

343 AUTH Yi, Liying

AFFI Institute of Geology, Academia Sinica

DATE 1979

TITL Determination of silicon in minerals using silicomolybdate blue-spectrophotoemetry

CITA Journal of Silicate 7, 75-81 (1979)

ABST This paper studies the appropriate conditions for the formation of silicomolybdate-blue and -yellow complexes. The formation of silicomolybdate-yellow complex is enhanced under the acidity of 0.05 N ~ 0.20 N HCl; stability of the complex is improved by using alcohol as stabilizer; then the silicomolybdate-yellow

complex is reduced by 4 ml of 0.5% ascorbic acid under the acidity of 0.5 N-3.0 N HCl. Allowing the solution to stand at room temperature for 1 hour will allow the maximal formation of silicomolybdate-blue complex. This color complex can last for 7 days without the change in absorption. U, Th, Fe, Ti, and rare earth elements etc. ions do not interfere with the determination; the interference of P_2O_5 (> 10 mg) can be eliminated by adjusting the acidity; EDTA can effectively cover 2 mg of ZrO_2 in the sample without affecting the result. Silicate minerals are disintegrated rapidly by sodium peroxide in Pt-crucible at 510°C, so the silicon in samples at mg level can be determined efficiently by spectrophotometry. This method is simple, stable and accurate; it is not only for silicate minerals, but also suitable for other samples containing 0.0X-XX% of silicon.

KEY determination, silicon, minerals, spectroscopy, analytical chemistry

LANG Chinese

344 AUTH Yi, Liying; Guo, Tuozhu

AFFI Institute of Geology, Academia Sinica (1); Guilin Institute of Metallurgical Geology (2)

DATE 1979

TITL The complete semimicro-analysis of zircon

CITA Scientia Geologica Sinica, 359-373 (1979)

ABST This report introduces a more successful method for decomposing the infusible minerals, that is, all zircon minerals can be sintered and completely decomposed in a platinum crucible at a temperature of 520°C by using sodium peroxide as a flux. It is satisfactory to quantitatively separate them from the associated elements by depositing zirconium and hafnium with p-bromomandelic acid and using tartaric acid as a masking agent in 2N hydrochloric acid. This procedure is more favorable than the available method

of mandelic acid in many aspects, such as less amount of reagent, fixed precipitation composition, small conversion factor, higher accuracy, as well as less loss of platinum. 5-6N nitric acid is selected as eluting agent to smoothly separate the highly inseparable rare earth, uranium and thorium. The analysis is made through a chromatographic paper treated with tri-n-octylamine to carry on the reversed phase chromatography. The Rf values obtained are 1.0, 0.40-0.48 and 0.056 for rare earth, uranium and thorium respectively. The separation is satisfactory for their ratio of from 1:100 to 100:1. In the presence of high amount of zircon, the silicon in large amounts is determined by means of silico-molybdate-blue spectrophotometry and using EDTA as masking agent. And the ethyl alcohol is utilized as stabilizing agent for increasing the accuracy and stability in determination of silicon. Besides, this paper has proposed a simple and rapid method of complete analysis of zircon, permitting the determination of 16 elements from sample of 20-30 mg, such as Zr, Hf, Si, Fe, Ca, Mg, Mn, Al, U, Th, Be, P, Nb, Ta and Ti. This method proved to be fairly successful through practical tests and calculation of mineral composition.

KEY minerals, determination, compositions, analytical chemistry, zirconium, hafnium, silicon, iron, calcium, magnesium, manganese, aluminum, uranium, thorium, beryllium, phosphourus, niobium, tantalum, titanium, spectroscopy

LANG Chinese, English abstract

345 AUTH Yin, Yi; Liu, Guangzhang

AFFI The First Institute of Oceanography, National Bureau of Oceanography, Qingdao

DATE 1983

TITL A preliminary study of ^{137}Cs absorption by offshore sediments

CITA Journal of Marine Science 1, 18-21 (1983)

ABST A preliminary study of ^{137}Cs absorption by offshore sediments was made by modeling the contaminated marine environment. It follows from the experiment that the distribution coefficients of ^{137}Cs absorption are nearly inversely proportional to the average grain sizes of the sediments.

KEY absorption, sediments, grain size, cesium-137, seawater, thermodynamics, pollution

LANG Chinese, English abstract

346 AUTH Yin, Yi; Wen, Congjiang

AFFI Institute of Oceanology, Academia Sinica, Qingdao (1); Municipal Sanitation Anti-epidemic Station, Qingdao (2)

DATE 1981

TITL Determination of zinc-65 in marine food products

CITA Hai Yang Ke Xue 4, 24-27 (1981)

ABST The Zn-65 content in marine food products is a clue in the effort to protect the marine environment. NaI(TI) γ-ray spectrometer is used to detect the 1.12 MeV γ-ray from Zn-65. Results show that samples from Bohai and Huanghai have increased Zn content. Fishes had lower Zn content than crustacea, algae and molluscs.

KEY Bohai, Huanghai, algae, zine-65, zinc, marine organisms, determination, concentrations, pollution

LANG Chinese

346.1 AUTH You, Fang-hu; Qiu, Yong-de

AFFI Institute of Oceanology, Academia Sinica

DATE 1964

TITL A review of the research and development of oceanographic acoustics

CITA Oceanologia et Limnologia Sinica 6, 109-119 (1964)

ABST This is a review on the research and development of ocean acoustics. Subjects covered include sound speed measurements, sound channel, bioacoustics and background noise, scattering layer, internal wave, and applications of acoustics in oceanography.

KEY acoustics, sound speed, sound channel, bioacoustics

LANG Chinese

NOTE Qiu Yong-de is also spelled Qiu Yongde

347 AUTH You, Jiang

AFFI Shanghai Communication and Transportation University, Shanghai

DATE 1982

TITL A broad-band transistor power combiner used in undersea ultrasonic band

CITA Journal of Marine Science 5, 8-11 (1982)

ABST This paper discusses the characteristics, principle of operation, theory of matching and design for a broad-band transistor power combiner used in ultrasonic frequency band. It is found that the broad-band matching is important. It requires to analyse the frequency response, optimal characteristics impedance, optimal output power and the insertion loss of a typical broad-band matching network which is implemented by the transmission line.

KEY acoustics

LANG Chinese

348 AUTH Yu, Binghai

AFFI unknown

DATE 1980

TITL The distribution patterns of chemical elements in seawater

CITA Hai Yang Ke Xue 2, 24-29 (1980)

ABST Studying the composition of seawater and the distribution of chemicals is important in chemical oceanology and geochemistry. This paper presents a

table of seawater chemical elements; it also discusses some rules for the distribution of the elements. The author suggests that the distribution of seawater chemical elements could be used to calculate the age of seawater and to predict the presence of unknown seawater chemical elements.

KEY compositions, seawater, distribution, geochemistry, solubility, gases, major ions, minor elements, heavy metals, pH, isotopes, dating, hydrogen-1, helium-2, helium-3, helium-4, berium-4, lithium-6, lithium-7, beryllium-9, neon-10, beryllium-10, carbon-11, boron-11, scandium-21, titanium-22, vanadium-23, chromium-24, manganese-25, cobalt-27, nickel-28, copper-29, zinc-30, bromine-35, strontium-38, potassium-40, argon-40, molybdenum-42, iodine-53, barium-56, rubidium-86, rubidium-87, krypton-86, krypton-87, krypton-89, bromine-89, lead-206, lead-207, lead-208, radium-226, thorium-232, uranium-235, uranium-238, age

LANG Chinese

349 AUTH Yu, Fucai; Wu, Xianhan

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL Isolation and purification of ovarian polyadenylated RNA from Amphioxus

CITA Acta Oceanologica Sinica 4, 483-489 (1982)

ABST Amphioxus, a transitory form between the invertebrate and the vertebrate, is an ideal material for the study of animal evolution. The material used in this experiment is the common Amphioxus collected from Qingdao, Branchiostoma belcheri tsingtaoense Tchang et Koo. The purpose of this study is to find out the biochemical changes taking place in the metabolic processes of this animal and to demonstrate from the standpoint of molecular biology the speciality of its ontogenetic development. By means of ultracentrifugal

technique and Oligo (dT)-cellulose affinity chromatography, ovarian Poly (A) RNA from Branchiostoma belcheri tsingtaoense Tchang et Koo was isolated and purified. The polysomes were obtained from the supernatant of the oocyte lysate through the ultracentrifugation of 1.0 M sucrose solution and the total polysomal RNA was extracted from the polysome precipitate by phenol-chloroform-isoamyl alcohol (50:48:2). Poly (A) RNA in the ovarian eggs of Amphioxus was purified by Oligo (dT)-cellulose chromatography to remove rRNA. Finally, Poly (A) RNA was precipitated by 2 volumes of ethanol and washed with 4 M LiCL and 3:1 ethanol saline to obtain Poly (A) RNA with biological activity. The recovery rate of the total polysomal RNA is 285 μg per ml homogenate of the ovarian eggs. The mRNA-containing Poly (A), purified by means of Oligo (dT)-cellulose is 5.2% of the total polysomal RNA and 4% of the total RNA. The Poly (A) RNA obtained shows the typical absorption spectrum of RNA in ultraviolet spectral analysis.

KEY RNA, analytical chemistry, biochemistry, spectroscopy, chromatography

LANG Chinese, English abstract

350 AUTH Yu, Guangyao; Chen, Shijun

AFFI Department of Physical Oceanology and Marine Meteorology, Shandong College of Oceanology, Qingdao

DATE 1983

TITL Numerical modeling of the circulation and the pollutant dispersion in Jiaozhou Bay III. The Lagrangian residual current and the pollutant dispersion

CITA Journal of Shandong College of Oceanology 13, 1-13 (1983)

ABST With the use of the method of tracking marked particles, the Lagrangian residual current in the Jiaozhou Bay are calculated. The computations show

that the Lagrangian residual current fields of the Bay are different from, and more complicated than, the Eulerian ones. The fields of Lagrangian residual current vary with the discharging instance of marked particles and give us the transport tendency of the water particles, including liquid pollutant. According to the results obtained from the simulation of nine pollutant sources the domain considered can be divided into three regions: the active region of water exchange, containing pollutant sources 1-3, in this region both the distance of drift and the variation of drift direction are large; the stagnant region of water exchange, containing pollutant sources 4-7, where the drift factors mentioned above are small; good-conditioned region of water exchange, containing pollutant sources 8-9, where the drifts of water particles are towards the main gyre, thus the pollutant is easily converged into the area of main gyre and then to be carried away to the mouth of the Bay.

KEY Jiaozhou Bay, marine pollution, sources, transport

LANG Chinese, English abstract

351 AUTH Yu, Shengsong

AFFI Qinghai Institute of Saline Lake, Academia Sinica, Xining

DATE 1980

TITL Salt lake

CITA Qinghai, People's Press publication, 80 pp. (1980)

ABST Distribution and formation of salt lakes are introduced. Resources of salt lakes are categorized into ordinary salts (NaCl, K-salt and Mg salt), precious salts (Li salt, Rb salt, Cs salt, Sr salt, and borate), halogen (Br, I) and radioactive elements (U, Th). Development and utilization of salt lake resources are also introduced.

KEY distribution, resources, salt lakes, sodium, chloride, potasium, magnesium, lithium, rubidium, cesium, strontium, borate, bromine, iodine, uranium, thorium, calcium, sodium, sulfate, chloride, carbonates, nitrate, bicarbonate, phosphate, climate, heavy water, barium, boron, tungsten, fluorine, copper, lead, zinc, nickel, cobalt, molybdenum, manganese, aluminum, arsenic, vanadium, silver, tin, beryllium, silicate, titanium, chromium, radium

LANG Chinese

352 AUTH Yu, Suhua; Wen, Qizhong; Diao, Guiyi; Sun, Fuqing

AFFI Institute of Geochemistry, Academia Sinica, Quiyang

DATE 1982

TITL Average chemical composition of Malan loess and its upper soil in areas along the mid reaches of Huanghe

CITA Environmental Science 3, 47-50 (1982)

ABST Twenty-four elements in samples of Malan loess and loess-textured soil were analyzed. Results show that Si, Al, Ca are the major elements in Malan loess and Mo, Be are the least abundant elements: the major elements in loess-textured soil are Si, Ca and Al, the least abundant being Mo. The meaning of the element distribution is discussed and the authors suggest that the alkalinity of the loess may contribute to the low content of effective Zn, Mn and Mo in loess-textured soil.

KEY compositions, loess, soil, Huanghe, distribution, alkalinity, silicon, aluminum, calcium, molybdenum, beryllium, zinc, manganese, sodium, magnesium, phosphorus, potassium, tin, titanium, vanadium, chromium, iron, cobalt, nickel, copper, gallium, strontium, zirconium, lead, barium

LANG Chinese

353 AUTH Yuan, Chengye; Ye, Weizhen; Ma, Enxin; Wu, Fubing; Yan, Xiaomin

AFFI Shanghai Institute of Organic Chemistry, Academia Sinica

DATE 1982

TITL Structure-reactivity studies on the extraction of rare earths by dialkyl isopropylphosphonates

CITA Scientia Sinica 25, 1256-1268 (1982)

ABST Dialkyl isopropylphosphonates with various alkyl groups are synthesized for the structure-reactivity studies on the extraction of rare earths. Steric effect of ligands on the extraction behaviour of rare earth is well demonstrated due to the lanthanide contraction. The thermodynamic functions of the extraction reaction are estimated and the influence of chemical structure of extractants is discussed. By the method of continuous variation as well as the elementary analysis, the composition of the extracted species is deduced as $Ln(NO_3)_3 \cdot 3L$. The structure of the coordination compound is further elucidated by IR and NMR spectra. The magnetic property and the differential thermal analysis of the complexes are also studied.

KEY extraction, ligands, rare earth elements, analytical chemistry

LANG English

354 AUTH Yuan, Chengye; Ye, Weizhen; Ma, Hengli; Wang, Guoliang; Long, Haiyan; Xie, Jifa; Qin, Xiuqing; Zhou, Yongchang

AFFI Shanghai Institute of Organic Chemistry, Academia Sinica

DATE 1982

TITL Synthesis of acidic phosphates and phosphonates and their structure-reactivity studies on the extraction of neodymium, samarium, ytterbium and ytterium

CITA Scientia Sinica 25, 7-20 (1982)

ABST Methods for the synthesis of five types of acidic phosphates, phosphonates as well as phosphinates have been described. The mechanism of extraction of rare earths from these compounds is examined. A free energy relationship existed in plotting equilibrium constants against either pKa or $\Sigma\sigma$ values of the acidic organophosphorus compounds under investigation. Steric effects play an important role in these extraction systems as expected. The reactivity-selectivity principles in solvent extraction proposed by our laboratory are well demonstrated in extraction of rare earths by acidic phosphorus-based ligands.

KEY extraction, neodymium, samarium, ytterbium, ytterium, phosphate, free energy, equilibrium constant, analytical chemistry, rare earth elements

LANG English

355 AUTH Yun, Caixing, Hu, Jiamin

AFFI Institute of Estuary and Coast, East China Normal University

DATE 1982

TITL The application of remote sensing technology in estuarine and coastal research

CITA Hai Yang Tong Bao 1(2), 61-70 (1982)

ABST This paper introduces the uses and methods of remote sensing in estuarine and coastal research. Remote sensing can be used to discern water temperature, salinity, amount of suspended sediment in the water, oil pollution on the ocean surface, coastal morphology and topography of shallow water areas and can be used for coastal mapping.

KEY remote sensing, temperature, salinity, oil, pollution, sediments, particulates

LANG Chinese

356 AUTH Yunnan University, The Department of Chemistry, Analytical Group

AFFI Yunnan University, The Department of Chemistry, Analytical Group

DATE 1977

TITL Determination of copper by Zn-EDTA - iodimetric procedure

CITA Huaxue Tongbao 4, 15-17 (1977)

ABST 0.5 M Zn-EDTA are used to cover Fe(III) at pH ~ 1, then Cu(V) can be determined by iodimetric procedure at pH ~ 3.5. Tests for finding the suitable acidity for covering of Fe(III) by Zn-EDTA and titrating of Cu(II) by $Na_2S_2O_3$ are given. For 10 mg Cu^{+2}, 1 ~ 3 g KI can be used; usually 2 g KI is used to determine Cu in the minerals. Results show that 1) Bi^{+3}, Pb^{+2}, Hg^{+2} and Ag^{+} do not interfere with the determination; 2) Fe(III) does not affect the Mn^{+2} determination when both exist in the same sample; 3) high amounts of Ca^{+2} or Mg^{+2} do not influence the result. This method totally eliminates the contamination of fluorides.

KEY determination, copper, analytical chemistry

LANG Chinese

357 AUTH Ze, Yi; Shi, An

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1980

TITL Current research on oceanography in UK and France

CITA Hai Yang Ke Xue 2, 49-54 (1980)

ABST A delegation from the Institute of Oceanology (Academia Sinica) visited some marine science institutes in the United Kingdom and France in June, 1979. This paper introduces those institutes and some projects they were conducting.

KEY seawater, sediments, algae, marine organisms, interstitial water, phosphorus, nitrogen, urea, ecology, marine resources, pollution, acoustics, air-sea exchange, hydrothermal, copper, zinc, mercury, lead,

nickel, cesium-133, lead-208, manganese nodule, amino acid, heavy metals, nutrients, isotopes, ruthenium-102, bioaccumulation, americium-243

LANG Chinese

358 AUTH Zeng, Chengkui; Zhou, Jingzhong

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1980

TITL Controlled marine ecosystem pollution experiment

CITA Hai Yang Ke Xue 2, 4-8 (1980)

ABST This paper mainly introduces the development of the "controlled ecosystem pollution experiment". The diagram of such experimental system is shown. Much basic information and some experimental results have been reported elsewhere. They can be grouped into 1) the long-term effect of pollutants on the structure and function of the ecosystem; 2) the pathway of added pollutants (i.e., Cu, naphthalene etc.) in the experimental ecosystem.

KEY ecology, pollution, transport, copper, mercury, cadmium, heavy metals, environment

LANG Chinese

359 AUTH Zhan, Bin-qiu; Gu, Quan-ying; Chang, Ting-zhi

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1981

TITL Relation of characteristic potential in corrosion of four copper materials to pH in natural sea water

CITA Hai Yang Ke Xue 1, 17-20 (1981)

ABST With the development of electrochemical experimental technique for the study of metal corrosion, the electric potential-pH graph has played an important role. In this study, the electric potential-pH graph reflects the characteristic corrosion of copper and its alloy in seawater.

KEY corrosion, pH, copper, alloy, seawater

LANG Chinese

360 AUTH Zhang, Chaoxian

AFFI The First Institute of Oceanography, National Bureau of Oceanography, Qingdao

DATE 1982

TITL Monitoring and removing of oil pollutant at sea

CITA Ocean Technology, 18-23 (1982)

ABST Marine oil pollution is disastrous, resulting in the loss of petroleum, the pollution of marine environment and destructive effects on the ecological system. The state-of-the-art technology in the world for monitoring and removal of marine oil pollutants are reviewed.

KEY oil, pollution, remote sensing

LANG Chinese, English abstract

361 AUTH Zhang, Jiancheng

AFFI Institute of Photographic Chemistry, Academia Sinica, Beijing

DATE 1983

TITL Photo-oxidation of organic matter

CITA Huaxue Tongbao, 7-14 (1983)

ABST When a sensitizer is involved in photo-oxidation, free O_2 is produced, and this process is called photo-sensitized oxidation. Photo-oxidation is important for the synthesis of organic compounds, biochemical changes, and reactions in luminous chemistry, atmospheric chemistry, air pollution, and discoloration of dye etc. There are many ways to produce free O_2, such as sensitization of dye, $NaOCl-H_2O_2$ water solution, dissociation of $(C_6H_5O)_3PO_3$ additive compound, as well as dissociation of bridged-ring peroxides. The reactions of ene-hydrocarbon with free O_2 and aryl hydrocarbon with free O_2 are two major examples of photo-oxidation; the mechanisms of these reactions are discussed in detail, including 1) ene reaction; 2) 1,2-additive reaction;

3) 1,4-additive reaction; 4) electron transferring photo-oxidation; 5) photo-oxidation of sulfide. Ene reaction has been widely studied; the characteristics of this reaction are as follows: 1) free O_2 is electrophilic; 2) the effect of tritium at the allyl H is small; 3) free radical captor has no effect on the reaction rate: 4) "same side" effect - the π bond of ene-hydrocarbon attacked by oxygen is at the same side as the allyl H reacted with oxygen; 5) oxygen always attacks π bond first and takes allyl H from the side which has more substituting groups; 6) reaction rate increases with polarity of the solvent; 7) activated energy and activated entropy for the reaction is low.

KEY pollution, photochemistry, oxygen, organic matter, mechanism, activation energy, entropy, sulfide, tritium

LANG Chinese

362 AUTH Zhang, Jinbiao; Cai, Bingji; Chen, Ruixiang; Lin, Jinmei; Chen, Xingqun; Chen, Xiaolin; Hou, Shumin; Lian, Guangshan; Dai, Yanyu; Yang, Qingliang

AFFI The Third Institute of Oceanography, National Bureau of Oceanography

DATE 1981

TITL Plankton in the region of observation

CITA R/V (Xiangyanghong 09) observational report of the Western Central Pacific, Ocean Press, Beijing, 118-136 (1981)

ABST 145 species of phytoplankton in the region of observation are identified; 364 species of zooplankton are identified. The warm-water species is predominant in the specific composition, and there is no significant seasonal variation. The average bioquantity of zooplankton is 18.24 mg/m^3 in January-February, 20.05 mg/m^3 in April-May. Copepoda has the highest quantity. The average total cell number of phytoplankton is 10496 $cells/m^3$ in January-February, 18837

cells/m^3 in April-May. Cyanophyceae has the highest cell number; Bacillariophyceae has the highest cell surface area. The tropical oceanic species is predominant in both species and quantity of plankton in the region of observation, which is due to the high temperature and salinity of the upper layer water. But the mid-layer species and deep-sea species are also found in the area because of the existence of different water mass and influence of current. Quantity distribution of diatom is related to the upwelling and downwelling of water and the depth at the lower bound of density layer. The quantity distribution of zooplankton is similar to that of diatom.

KEY phytoplankton, zooplankton, diatom, distribution, seasonal variation, temperature, salinity

LANG Chinese

363 AUTH Zhang, Jinglei; Guo, Gongyu

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1980

TITL A method for the cleaning and rust-removing of aluminum base anodes

CITA Journal of Marine Science 4, 19-21 (1980)

ABST A systematic study was done in order to choose a better method for cleaning the corrosion on aluminum base anodes. The effect of the cleaning solutions was studied in 2 ways: 1) the erosion of the base metal; 2) the dissolution rate of the erosive product. Results show that 65% HNO_3 and 20% H_3PO_4 + 8% CrO_3 at 20°C as well as 4% CrO_3 + 10% H_3PO_4 (1:1) at 80°C are 3 good cleaning solutions.

KEY corrosion, temperature

LANG Chinese

364 DELETED

365 AUTH Zhang, Jinglei; Hou, Baorong; Sun, Keliang
AFFI Institute of Oceanology, Academia Sinica, Qingdao
DATE 1983
TITL Cathodic protection of sea water condenser
CITA Journal of Marine Science 1, 14-17 (1983)
ABST Cathodic protection experiment was carried out to protect the water rooms and pipe ends of sea water condensers with impressed current and sacrificial anode method. The results show that both methods have satisfactory anti-corrosive effect. Considering other factors, such as apparatus, daily management and economic effect, the authors deem the sacrificial anode method more suitable than the impressed current method in this case.
KEY seawater, corrosion
LANG Chinese, English abstract

366 AUTH Zhang, Jingyong
AFFI Institute of Oceanology, Academia Sinica, Qingdao
DATE 1980
TITL Microbial degradation of oceanic oil pollution
CITA Hai Yang Ke Xue 3, 42-46 (1980)
ABST Some microbes can oxidize, degrade and utilize crude oil and its products in the ocean (seawater and sea-bottom sediments) and play an important role in self-purification of seawater. This paper reviews the researches on the ecological and genetic aspects of those microbes.
KEY oil, pollution, seawater, sediments, microbes
LANG Chinese

367 AUTH Zhang, Mingtao
AFFI Chinese Academy of Sciences
DATE 1982
TITL The roof of the world
CITA Foreign Languages Press, Beijing, 227 pp. (1982)

ABST This book is a record of the expeditions to the Qinghai-Tibet Plateau organized by the Chinese Academy of Sciences between 1973 and 1980. The geophysics, geology, geography, biology, agriculture, forestry, and geochemistry of this plateau are described.

KEY river water, lake waters, geothermal, resources, boron, magnesium, calcium sulfate, potassium, lithium, rubidium, cesium, strontium, uranium, thorium, geochemistry, natural waters

LANG English only

368 AUTH Zhang, Naiyu

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL Calculating the salinity

CITA Journal of Marine Science 3, 57-59 (1982)

ABST Since salinity is a function of the specific gravity and temperature of seawater, the author deduced two formulae for calculating the salinity by knowing the specific gravity and temperature of the seawater. When salinometers and titration equipment are not available, these formulae are very handy and they yield results with a small error range.

KEY salinity, specific gravity, temperature, seawater

LANG Chinese

369 AUTH Zhang, Sui; Zheng, Qinghua; Zhuang, Jihon; He, Qingxi

AFFI South China Sea Institute of Oceanology, Academia Sinica, Guangzhou

DATE 1983

TITL Preliminary study of the distribution of chromium pollution in the offshore area of western Canton

CITA Marine Environmental Science 2, 77-82 (1983)

ABST The total chromium content of water samples collected from surface and bottom layers is analyzed. The range of chromium content is less than 0.3-2.5 ng/l which is lower than the maximum-allowed content, but chromium

pollution in this area still exists. Based on the horizontal distribution of chromium, Guangzhou Bay has the highest chromium content, followed by the offshore waters. The surficial circulation current in this closed bay contributes to the high content of chromium pollution in this area; the offshore waters is mainly affected by the waste discharge from rivers. The vertical distribution of chromium in seawater is based on the speciation, the physico-chemical factors of the environment and hydrodynamic conditions etc. Cr(III) is the major form in seawater, which can be adsorbed onto organic or inorganic colloids. Prior to completely mixing of river water with seawater, the chromium content is higher in the surface than in the bottom. When the mixing is more complete, the increased salinity and pH value of seawater favor the settling of Cr-adsorbed colloids leading to the high Cr content in the bottom. The bottom of Guangzhou Bay has higher Cr content than the surface.

KEY distribution, chromium, pollution, salinity, pH, seawater, adsorption, sediments, particulates, speciation, colloids, mixing

LANG Chinese

370 AUTH Zhang, Tianfo; Gu, Tangxiu; Xu, Xianyi

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1983

TITL Determination for polychlorinated biphenyls in sea water

CITA Oceanologia et Limnologia Sinica 14, 353-356 (1983)

ABST An improved method for the determination of polychlorinated biphenyls (PCBs) in sea water is described. The macroreticular adsorbent Amberlite XAD-4 was used. PCBs were eluted with warm acetone (40°C) and were back extracted with petroleum ether (30-50°C fraction). The extracts were cleaned with the mixed chromatographic column filled with anhydrous

sodium sulfate-aluminun oxide-silica gel. The procedure described in this paper is convenient and reliable for the determination of nanogram quantities of PCBs from 2 liter samples of sea water.

KEY determination, PCB, seawater, marine pollution, analytical chemistry, gas chromatography

LANG Chinese, English abstract

NOTE Zhang Tianfo is also spelled Zhang Tianfu

371 AUTH Zhang, Tianfu; Gu, Tangxiu; Xu, Xianyi

AFFI Institute of Oceanology, Academia Sinica

DATE 1981

TITL Determination of nitrates and nitrites in sea water by gas chromatography

CITA Oceanologia et Limnologia Sinica 12, 49-52 (1981)

ABST A simple, sensitive method is presented for the determination of nitrates and nitrites in sea water. The principle of the method is that aqueous nitrate ion is converted to nitrobenzene by reaction with benzene in the presence of a catalyst. Nitrobenzene is then quantified by Electron Capture Gas Chromatography (GC-ECD). The interference of chloride is prevented by using saturated silver sulfate. The detection limit for nitrobenzene is ca. 10^{-12} g.

KEY determination, gas chromatography, nitrate, nitrite, seawater

LANG Chinese, English abstract

NOTE See Note 370

372 AUTH Zhang, Xiulian; He, Lijuan; Liu, Yawin; Ma, Shulan; Han, Junying

AFFI Institute of Oceanology, Academia Sinica, Qingdao (1,2); Institute of High Energy Physics, Academia Sinica (3,4,5)

DATE 1983

TITL Measurement of trace elements Rb and Sr in oceanic sediment by energy-dispersive X-ray fluorescence spectrometry

CITA Journal of Marine Science 1, 9-13 (1983)

ABST In this paper, Energy-dispersive X-ray fluorescence Spectrometry and thick compressed powder sample slice were used for an analogous test to measure trace element Rb and Sr in oceanic sediment in the East China Sea. The matrix of the sample has been determined and the standard sample for analysing elements Rb and Sr has been prepared. The results of the measurement are as follows: The measuring limits of concentration of elements Rb and Sr are 0.005% and 0.002% respectively. The relative error for each element is less than 10% and the relative deviation is less than 1.9%. This method provides some bases for resolving the distribution of elements Rb, Sr in oceanic sediment in continental shelf of the China Sea.

KEY sediments, East China Sea, distribution, continental shelf, rubidium, strontium, determination, analytical chemistry, spectroscopy

LANG Chinese, English abstract

373 AUTH Zhang, Xunyi

AFFI East China Sea Laboratory, Institute of Acoustics, Academia Sinica, Ningbo

DATE 1982

TITL Deep sea dynamic sealing

CITA Ocean Technology, 54-66 (1982)

ABST In this paper a method of dynamic sealing applicable to depth of 1000 meters is introduced. Squeeze-type molded packings used for reciprocal, rotatory and vibratory sealing are discussed. Based on the rubber O-ring seals the squeeze-type molded packing is theoretically analyzed. The dynamic seals design, technology, rubber materials, friction, lubrication,

examples of design and some charts are also given. Finally, the method of dynamic sealing applied in depth greater than 1000 meters is described.

KEY seawater, sampler

LANG Chinese, English abstract

374 AUTH Zhang, Yanan; Li, Qingzheng; Zeng, Shaowen

AFFI Beijing Institute of Uranite Geology (1,2); The Third Institute of Oceanography, National Bureau of Oceanography, Xiamen (3)

DATE 1983

TITL Determination of trace quantity of uranium in seawater by laser-fluorescence method

CITA Acta Oceanologica Sinica 5, 467-472 (1983)

ABST J-22 reagent is used with JU-1 laser uranium analyzer to determine trace uranium in seawater. The effect of salinity on the determination is studied; the sensitivity is the highest when salinity is around 12°/$_{oo}$. When salinity is constant, there is a linear relationship between fluorescence intensity and uranium concentration. The experimental procedures are listed in the paper. The detectable limit for this method is 0.04 ppb uranium, recovery of added uranium (1.20 ppb) is 96.8 ± 9.8%, recovery of 2.40 ppb uranium addition is 99.9 ± 7.8%.

KEY determination, uranium, seawater, laser, fluoresence, salinity, concentrations, analytical chemistry

LANG Chinese, English abstract

375 AUTH Zhang, Yunshan; Huang, Guozhong

AFFI North Sea Sub-bureau, National Bureau of Oceanography

DATE 1981

TITL Observational instruments and methods

CITA R/V (Xiangyanghong 09) Observational Report of the Western Central Pacific, Ocean Press, Beijing, 3-11 (1981)

ABST Characteristics of the research vessel are introduced. Most of the equipment on the vessel and the instruments used in this survey are domestic products. Analytical methods for studies on hydrometeorology, meteorological elements over the surface, sound velocity, bottom sampling and collection of plankton in the area of observation are reported in detail.

KEY sound speed, plankton, acoustics

LANG Chinese

376 AUTH Zhang, Zhengbin; Liu, Liansheng; Chen, Chen-Tung A.

AFFI Shandong College of Oceanology, Qingdao (1,2); Oregon State University, U.S.A. (3)

DATE 1983

TITL Principle of the least Σ and the chemical speciation of seawater

CITA Acta Oceanologica Sinica 5, 41-56 (1983)

ABST Based on the principle of Hard and Soft Acids and Bases we developed the principle of least Σ for use in marine chemistry. Σ is a function of the hardness or softness of acids or bases, and the acid or base concentrations. The principle was used to study the speciation of chemicals in seawater.

KEY speciation, thermodynamics, seawater, chloride, sulfate, carbonates, bicarbonate, sodium, magnesium, calcium, potassium, hydrogen, gold, silver, lead, mercury, cadmium, copper, cobalt, nickel, zinc, iron, manganese, cerium, praseodymium, neodymium, prometium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutecium, scandium, yttrium, thorium, lanthanum, chromium, gallium, zirconium, tin, titanium, aluminum, germanium, silicon, acid, base

LANG Chinese

NOTE See Note 7

377 AUTH Zhang, Zhengbin; Liu, Liansheng

AFFI Department of Marine Chemistry, Shandong College of Oceanology, Qingdao

DATE 1982

TITL Microcosmic approach to marine chemistry - A $\phi(Z/l,X)$ rule of chemical processes in seawater and its applications

CITA Chinese Journal of Oceanology and Limnology 1, 54-75 (1982)

ABST In 1976 the authors published in Chinese three consecutive papers on the following interrelated subjects: 1) A $\phi(Z/l,X)$ rule of inorganic ion-exchange reactions in sea water (Kexue Tongbao 21 (5): 231-236); 2) application of the above rule to KCl solution-the system of various inorganic ion-exchanges (ibid. 21(7): 334-336); and 3) application of the rule to the marine geochemistry of the elements (ibid. 21(12): 531-535). Since these papers are all concerned with microcosmic approach to marine chemistry, the authors put them together in this paper in order to facilitate the exchange of ideas regarding this very interesting subject among marine chemists abroad.

KEY seawater, ion-exchange, geochemistry, thermodynamics, pH, concentrations, major ions, trace metals, equilibrium constant, free energy, temperature, river water

LANG English

NOTE See Note 7

378 AUTH Zhang, Zhengbin; Liu, Liansheng; Chen, Chen-Tung A.

AFFI Shandong College of Oceanology, Qingdao (1,2); Oregon State University, U.S.A. (3)

DATE 1983

TITL Relationship between $\phi(Z/l, X)$ rule of chemical processes in seawater and HSAB principle - Principle of least Σ and chemical model of seawater

CITA Scientia Sinica (Series B), 1-12 (1983)

ABST This article reports on the application of the $\phi(Z/l,X)$ rule of chemical processes in seawater to the study of the Principle of Hard and Soft Acids and Bases (HSAB). One result is the establishment of new scales of the hardness-softness of acids and bases which are more complete than those in the literature. Based on the principle of HSAB as well as abundant experimental data, we developed a new general principle of marine chemistry viz. the principle of least Σ. Application of the principle of least Σ has produced good results in the study of chemical model of the major constituents of seawater, the chemical speciation of trace elements, inorganic ion-exchange reactions, the Irving-Williams series of transition elements, etc. Our investigations indicate that chemical models of the major constituents of seawater should take into consideration the formation of chloride ion pairs.

KEY speciation, ion-exchange, chloride, ion pairs, thermodynamics, seawater, concentrations, major ions, minor elements, gold, thallium, indium, silver, mercury, copper, iridium, lead, tin, platinum, palladium, cadmium, osmium, ruthenium, zinc, nickel, cobalt, iron, antimony, bismuth, chromium, magnesium, manganese, rhodium, plutonium, americum, neodymium, prometium, europium, gadolinium, uranium, indium, terbium, dysprosium, holmium, erbium, arsenic, scandium, lutecium, yttrium, thorium, lanthanum, cerium, praseodymium, strontium, samarium, neptunium, titanium, vanadium, thulium, gallium, hafnium, sodium, zirconium, protactinium, barium, osmium, potassium, lithium, ytterbium, aluminum, cesium, rubidium, beryllium, tantalum, niobium, germanium, tungsten, molybdenum, silicon, iodine, tellurium, rhenium, selenium, chlorine, boron, carbon, hydrogen,

phosphorus, bromine, nitrogen, oxygen, carbonates, bicarbonate, water, sulfate, cyanide, hydroxide, chloride

LANG Chinese

NOTE English version of this paper was published in Scientia Sinica (Series B) 26, 561-576 (1983); see Note 7

379 AUTH Zhang, Zhengbin; Liu, Liansheng; Chen, Chen-Tung A.

AFFI Department of Marine Chemistry, Shandong College of Oceanography, Qingdao (1,2); College of Oceanography, Oregon State University, U.S.A. (3)

DATE 1983

TITL Relationship between $\Phi(Z/l, X)$ rule of chemical processes in seawater and HSAB principle - Principle of least Σ and chemical model of seawater

CITA Scientia Sinica (Series B), 26, 561-576 (1983)

ABST See 378

KEY thermodynamics, seawater, concentrations, major ions, minor elements, gold, thallium, indium, silver, mercury, copper, iridium, lead, tin, platinum, palladium, cadmium, osmium, ruthenium, zinc, nickel, cobalt, iron, antimony, bismuth, chromium, magnesium, manganese, rhodium, plutonium, americium, neodymium, prometium, europium, gadolinium, uranium, indium, terbium, dysprosium, holmium, erbium, arsenic, scandium, lutecium, yttrium, thorium, lanthanum, cerium, praseodymium, strontium, samarium, neptunium, titanium, vanadium, thulium, gallium, hafnium, sodium, zirconium, protactinium, barium, potassium, lithium, ytterbium, aluminum, cesium, rubidium, beryllium, tantalum, niobium, germanium, tungsten, molybdenum, silicon, iodine, tellurium, rhenium, selenium, chlorine, boron, carbon, hydrogen, phosphorus, bromine, nitrogen, oxygen, carbonates, bicarbonate, water, sulfate, cyanide, hydroxide, chloride

LANG English

NOTE Chinese version of this paper was published in Scientia Sinica (Series B), No.1, 1-12 (1983); see Note 7

380 AUTH Zhang, Zhengbin; Liu, Liansheng; Wang, Qiang

AFFI Shandong College of Oceanology, Qingdao

DATE 1981

TITL A kinetic study of the inorganic ion-exchange of minor elements in seawater IV. Determination of the energy of activation and order of reaction of the ion-exchange of uranium (VI) with hydrous titanium oxide in seawater

CITA Acta Oceanologica Sinica 3, 410-422 (1981)

ABST This article deals with the determination of the order of reaction of the ion-exchange of uranium (VI) with hydrous titanium oxide in seawater by means of differentiation. We designed flowing concentrated seawater with a variety of uranium concentrations (C_R), and obtained the "Uranium extract--Time" Curve, obtained the tangent at t = 0, found the slope, which is the rate of ion-exchange $(dC_P/dt)_{t=0}$ (for simplification, foot sign t = 0 is omitted hereafter). Various concentrations of uranium C_R correspond to various values of (dC_P/dt). The "$\log(dC_P/dt)$-$\log C_R$" graph was plotted. If the results of the experiment agree with the rate of reaction shown in the formula: $(dC_P/dt) = KC_R^n$ then $\log(dC_P/dt) = \log k + n \log C_R$. From the straight line intercept and slope obtained by experiment, reaction rate constants k and order of reaction n are obtained, respectively. At 25°C, $\log k_1 = 17.8$ (μgU/g extract agent, day) n = 1; at 18°C, log k = 1.10, k = 12.6 (μgU/g extract agent, day) n = 1; and the equation of the reaction rate derived is: at 25°C, $dC_P/dt = 17.8\ C_R$; at 18°C, $dC_P/dt = 12.6\ C_R$. Further, the energy of activation E_a can be found by calculation using Arrhenius' equation: $\log 17.8/12.6 = E_a/2.303 \times 1.987\ (1/291\ 1/298)$, $E_a = 8.5$ (kcal/mol).

The results achieved by this experiment agree with the conclusions of studies I, II and III on the same topic, with results of other experiments from present study, as well as the results in (e.g. diffusion energy of activation, etc.) published literature.

KEY ion-exchange, minor elements, seawater, activation energy, hydrous titanium oxide, uranium, reaction rate, kinetics

LANG Chinese, English abstract

NOTE See Note 7

381 AUTH Zhao, Bolin; Zhao, Wenzhong; Du, Jinlin

AFFI Department of Geophysics, Peking University

DATE 1983

TITL Microwave remote sensing of oil slick on water surface

CITA Scientia Sinica 26, 978-989 (1983)

ABST Microwave reflective and emissive properties of oil slick on water surface are researched in this paper. Microwave dielectric constants of oil and water and reflectivities of oil slick on water surface at two microwave bands are experimentally measured in the laboratory. The experimental results are consistent with theoretical predictions. On this basis the relation between microwave radiation of oil slick on water surface and thickness of the oil slick, and principles of microwave surveying oil slick on water surface are discussed. According to analysis of the results, the thickness of oil slick can be surveyed by measuring the difference between s polarization brightness temperatures of oil slick and clear water surface or the radiation brightness temperature polarity. Since the thickness of oil slick on the sea is mostly smaller than 2 mm, microwave radiometer of 1.2~1.6 cm band has better resolution in remote

sensing thickness of oil slick. Instruments working millimeter band have higher sensitivity in survey thickness of oil slick.

KEY remote sensing, oil, pollution

LANG English

382 AUTH Zhao, Chuanyin; Yang, Hongshan; Zhu, Qiqin; Dai, Guoliang

AFFI East China Sea Institute of Fisheries

DATE 1983

TITL Preliminary study of the influence of environmental pollution on the fishery at Hangzhou Wan Bay

CITA an unknown journal, 77-83 (1983)

ABST This study analyzed the data from 7 ocean surveys and the information on special topics generated by visiting missions. The properties of the seawater are presented: 1) pH value; 2) dissolved oxygen; 3) oil contamination; 4) Cu and Zn content; 5) Hg content. The planktonic population is studied with respect to: 1) the characteristics of species composition; and 2) biomass and the influence of pollutants on the group structure of the plankton. The benthic population is reported with respect to: 1) species composition; 2) distribution of major species; and 3) biomass. The authors conclude that marine productivity is affected by the pollution.

KEY oxygen, oil, pH, pollution, lead, cadmium, arsenic, phenol, phosphate, silicate, copper, zinc, mercury, salinity, chemical oxygen demand, ammonia, redox potential, plankton, primary productivity

LANG Chinese

383 AUTH Zhao, Mengyue

AFFI Department of Chemical Engineering, Zhengzhou Institute of Technology, Henan

DATE 1983

TITL Application of multiple equilibrium theory in inorganic chemistry

CITA Huaxue Tongbao, 39-44 (1983)

ABST Since the equilibrium constant (Keq) of an overall reaction from consecutive reactions can be calculated as the product of individual equilibrium constants, the Keq of most inorganic reactions in solution can be calculated from the data of acid dissociation constant (Ka), base dissociation constant (Kb), solubility product (Ksp), ion product of water (Kw), cumulative stability constant of complex compound (β) and standard redox potential (E°). Whether the reaction is favored under the given conditions, then, can be calculated from the free-energy change of the reaction. Several chemical reactions are discussed based on the application of multiple equilibrium theory, such as the effect of precipitation and complexation on the reaction of metals, quantifying the minimal Ksp for the precipitants, and simplifying the deduction of formula.

KEY equilibrium, inorganic chemistry, equilibrium constant, solubility product, redox potential, precipitation, complexation, activity, thermodynamics, acid, base, free energy

LANG Chinese

384 AUTH Zhao, Qiyuan; Li, Jiafeng; Duan, Weimin; Shen, Yuling; Zhai, Shikui

AFFI Department of Marine Geology, Shandong College of Oceanology, Qingdao

DATE 1983

TITL The chemical features of nearshore sediment from Lingshan Bay to Haizhou Bay along the Shandong peninsula

CITA Journal of Shandong College of Oceanology 13, 30-44 (1983)

ABST The sedimentary samples of the studied area were analysed for Fe_2O_3, CaO, MnO_2, MgO, P_2O_5, RCO_3MnO_2 and P_2O_5 were analysed with spectrometer, the others by complexometric titration. The chemical composition features of the sediments of this area were discussed, and compared with those of the neighboring depositional environments. The isograms of mentioned components were given out. In order to clarify the main factors that control the sedimentary process of this area, the multi-element statistical analysis were carried out with computer, indicating that the method of multi-element statistical analysis, like factor analysis, correspondence analysis..., is valid for expounding the main factors that control the sedimentary process of this area. These factors include modern hydromechanic sedimentary differentiation, the existence and influence of the relict sediments and the biochemical process. On the basis of multi-element analysis, the studied area can be divided into two geochemical regions and four geochemical sub-regions.

KEY compositions, sediments, analytical chemistry, calcium, manganese, magnesium, phosphorus, geochemistry

LANG Chinese, English abstract

385 AUTH Zhao, Yiyang

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1981

TITL Geochemistry of uranium in the ocean

CITA Hai Yang Ke Xue 3, 33-35 (1981)

ABST This is a review paper. The geochemistry of uranium in seawater and ocean sediments is discussed.

KEY geochemistry, uranium, seawater, sediments, speciation, concentrations, redox reaction, adsorption, precipitation, colloids, montmorillonite, ferric hydroxide, aluminum hydroxide, marine organisms,

algae, bacteria, organic matter, organic carbon, iron, manganese, aluminum, phosphorus, calcium carbonate, calcium, manganese nodules, particulates

LANG Chinese

386 AUTH Zhao, Yiyang; Han, Guirong; Zhang, Jing; Yang, Gishun

AFFI Institute of Oceanology, Academia Sinica, Qingdao (1,2); Institute of Geochemistry, Academia Sinica, Quiyang (3,4)

DATE 1982

TITL Some geochemical characteristics of Zr and rare earth elements in sediments of the East China Sea

CITA Kexue Tongbao, 1390-1392 (1982)

ABST The geochemical characteristics of elements in marine sedimentation result from the overall effect of conditions during sedimentation. In this paper, some major factors influencing Zr and REE are mentioned: 1) size: Zr and REE are concentrated in silt and clay respectively; 2) mineralogy: Zr exists mainly as "Zircon", so it is not closely related to other elements; 3) depth of water: the sediment in the area deeper than 1000 m is mainly mud, so the Zr and REE content are high; 4) currents: the fine-sediment zone of the inner continental shelf under the influence of coastal currents is the concentration zone for Zr and REE; 5) biological effect: biological sedimentation increases at trough areas.

KEY rare earth elements, sediments, East China Sea, grain size, silt, clays, geochemistry, zinc, zirconium, continental shelf, sedimentation rate

LANG Chinese

387 AUTH Zhao, Yiyang; Qian, Jiangchu

AFFI Institute of Oceanology, Academia Sinica, Qingdao (1); Second Institute, National Bureau of Oceanography, Hangzhou (2)

DATE 1981

TITL Studying the geological chronology by using Pb-210 in the United States

CITA Hai Yang Ke Xue 3, 44-45 (1981)

ABST In this paper, the authors introduce the Pb-210 isotopic dating method which is widely used in the United States. They suggest that this method can be used for studying the geological age of the continental shelf and shallow sea areas.

KEY dating, continental shelf, lead-210, air-sea exchange, age

LANG Chinese

388 AUTH Zhao, Yiyang; Yang, Huilan; Ju, Chenghui; Han, Guirong

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1982

TITL Geochemistry of some major and trace elements in sediments of the East China Sea

CITA The Geology of Yellow Sea and the East China Sea, Science Press, 141-159 (1982)

ABST The content of elements in sediments of East China Sea is closely related to the grain size of the sediments; generally the content of elements increases with the finer size of the sediments. Areas with high content of elements are consistent with the distribution areas of mud; areas with low content of elements are similar to the distribution-areas of sand. This explains that the distribution of elements is mainly controlled by the grain size of the sediments. The element content in sediments at different depths in East China Sea shows a pattern: the content decreases with the increasing depth of water in 0-200 m; then the content increases with the increasing depth in 200-1000 m; the content reaches maximal when the depth is greater than 1000 m. The high-content belt which parallels the coast may be related to the supply intensity of land-source materials; the high-content belt in the

deep water of troughs seems to be related to the aggradation of volcanic activity. The relationships between elements exist in the sediments of East China Sea, such as Ti-Fe, Mn-Fe, Cu-Fe, Ni-Fe and Cu-Ni. The concentration of most elements is relatively similar to the granite and shale which are widely distributed on the continent and is different from the contiguous Pacific clay. The sediments in East China Sea is relatively close to the composition of continental crust and is different from deep-sea clay.

KEY sediments, East China Sea, distribution, depth, geochemistry, major ions, trace elements, particle size, particulates, sand, sources, titanium, iron, colorimetry, manganese, copper, nickel, concentrations, atomic absorption, clays, phosphorus, zinc, boron, spectroscopy

LANG Chinese

389 AUTH Zhao, Yiyang; Yu, Deke

AFFI Institute of Oceanology, Academia Sinica (1); Lanzhou Institute of Geology, Academia Sinica (2)

DATE 1983

TITL Geochemical analysis of the sediments of the Huanghai Sea

CITA Oceanologia et Limnologia Sinica 14, 432-446 (1983)

ABST This work is chiefly based on the analytical results of the chemical composition of 62 sediment samples from the Huanghai Sea (Yellow Sea) to illustrate the following points: 1) Abundance characteristic of elements in sediments of the study area; 2) Variation regularity of elemental content in the sediments of different types--the law of grain-size control of elements; 3) Geochemical province of the elements; 4) Present state of the elements; 5) Rate of accumulation of each element; 6) Primary factor controlling the element distribution. The 12 chemical elements in the

bottom sediments have been studied. Quantitative analyses of the elements Fe, Mn, Ti and P were made by colorimetry, those of Cu, Co, Ni, Zn, Cr, and Li by atomic absorption spectrophotometry, V by emission spectroscopy and Si by the usual gravimetrical method. The comparisons of the element abundances obtained in this study area with those in other sediments or rocks show that the abundance characteristic of elements in the study area is of the "philo-continental" property, i.e. the abundance pattern of elements is relatively close to that of the continent, but differ from that of the ocean. The grain size of sediments plays a distinct role in controlling the content of elements. The average contents of most elements increase gradually with decrease in grain size, only Si decreases with decreasing grain size. We call the variation regularity of element content with grain size "the law of grain-size control of elements". According to the elemental distribution, the area of study can be classified into 3 geochemical provinces: The first has high concentration for most of the elements and is covered with fine sediments. The second is characterized by the low concentration of the elements and covered by coarse sediments. The third province commonly occupies an intermediate position between the other two provinces and has a transition character. The terrigenous fraction and authigenic fraction of the elements have been determined. The terrigenous detrital index of most elements is higher than the authigenic index. The clay minerals act as a reservoir for a majority of elements studied. A clear positive correlation among the elements was found. These facts indicate that most elements are present within the lattices of various terrigenous minerals, in particular within those of the clay minerals. Based on the rate of sedimentation, the concentration of the elements and

the bulk sediment density, the accumulation rate of each element in the area of study have been calculated. It has been established that the primary factors controlling the element distribution are: 1) material source; 2) grain size; 3) mineral component; 4) hydrodynamic condition; and 5) physical-chemical environment of sedimentary region.

KEY sediments, Huanghai, compositions, rate, distribution, colorimetry, atomic absorption spectroscopy geochemistry, iron, manganese, titanium, phosphorus, copper, cobalt, nickel, zinc, chromium, lithium, vanadium, silicon, particle size, clays, minerals, authigenic, emission spectroscopy

LANG Chinese, English abstract

390 AUTH Zhao, Yu-huan; Wang, Yu-wen; Fu, Chenguan

AFFI Hebei Institute of Geography, Shijiazhuang (1,2); Department of Chemistry, Hebei University, Shijiazhuang (3)

DATE 1981

TITL Determination of trace volatile N-nitrosamine in water by nitrogen detector - gas chromatography

CITA Huaxue Tongbao, 89-91 (1981)

ABST This paper introduces a method suitable for determining trace amounts of N-nitrosamine in water. A micro active-carbon adsorption column is used for adsorption and concentration. The column (length, 20 mm, inner dia., 1.5 mm) contains 15 mg active carbon (100-120 mesh). Acetone is chosen for extraction. Then the sample is separated by gas chromatography and determined by nitrogen detector. For each determination, only a small amount of water sample (100 ml) is needed. The authors claim that this method has high sensitivity and recovery rate.

KEY determination, nitrogen, gas chromatography

LANG Chinese

391 AUTH Zheng, Changchun

AFFI Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE 1983

TITL Mercury content in phytoplankton in the area around Xiamen

CITA Taiwan Strait 2, 33-40 (1983)

ABST Mercury contents in phytoplankton in waters around Xiamen Island from September, 1980, to August, 1981, ranged from 37.9 to 162.3 ppb, with an average value of 98.3 ppb (dried weight), showing no pollution of mercury in this area. A regular seasonal variation of mercury in phytoplankton to a certain degree was found. Mercury content was low in the reproductive period of phytoplankton. Mercury content decreased from inner to outer Xiamen Harbor. The results didn't show accumulation of mercury from phytoplankton to zooplankton.

KEY mercury, phytoplankton, bioaccumulation, seasonal variation, pollution, zooplankton

LANG Chinese, English abstract

392 AUTH Zheng, Guoxing; Shi, Junxian; Chen, Zhongyuan; Hu, Xigang

AFFI The Second Institute of Oceanography, National Bureau of Oceanography, Hangzhou

DATE 1982

TITL The relationship between the bacteria and the sediments in the Changjiang estuary and adjacent continental shelf area

CITA Acta Oceanologica Sinica 4, 743-753 (1982)

ABST This paper claims that: 1) the abundance and distribution of bacteria in sediments are closely related to geographic location, the sediment type and the sediment source; 2) the numbers of bacteria in sediments increase with increasing amounts of mud, organic matter or total nitrogen; 3) the vertical

distribution of bacteria in sediments decrease with the depth of mud; 4) the bacterial assemblage is different for sediments from different geographic locations, and for different sources and sediment types; 5) comparative experiments on the physiological, biological characteristics of bacteria show that the bacteria in sediments possess a higher ability to degrade protein, lipids, carbohydrates and glucose.

KEY bacteria, sediments, Changjiang, estuary, continental shelf, distribution, sources, nitrogen, protein, organic matter, amino acids, hydrogen sulfide, lipids, glucose, carbohydrates, denitrification, ammonia, depth

LANG Chinese

NOTE A similar paper was published in International Symposium on Sedimentation on the Continental Shelf, with special reference to the East China Sea, Hangzhou, China, Treatise abstract, 166-167 (1983)

393 AUTH Zheng, Jinshu

AFFI The Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE unknown

TITL Extracting uranium from sea water

CITA unknown

ABST The oceans are almost inexhaustible natural treasure-houses. Almost all natural elements known to science are to be found in sea water including one of the most valuable - uranium. There are about 4 billion tons of uranium in sea water, several thousand times the deposits on land. In recent years, the demand for uranium has shot up drastically and in consequence, methods for its extraction from sea water have been attracting the attention of scientists all over the world. China began research in this field in 1967. The density of uranium is 3.34 micrograms (1 microgram

equals a millionth of one gram) to one litre of sea water. The key to its extraction, therefore, lies in separating the infinitesimal quantity of uranium from an immense body of sea water and large amounts of salt. For more than 10 years, the Third Institute of Oceanology under the Chinese Marine Bureau has been concentrating on finding absorbents for isolating uranium. The titanium and zinc absorbents they produce can absorb 650 and over 500 micrograms of uranium per gram respectively. The organic ion-exchange resin can absorb more than 1,000 micrograms and the record achieved so far is 1,250 micrograms per gram which comes close to matching international standards. Despite such excellent results, long-term research and more work are still necessary before industrialized production is feasible.

KEY uranium, extraction, titanium, zinc, adsorbent, ion-exchange, resin, marine resources, seawater

LANG Chinese and English

394 AUTH Zheng, Jinshu; Huang, Zijiang

AFFI The Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE unknown

TITL Extraction of uranium in seawater

CITA unknown

ABST The uranium concentration in seawater is 3.34 μg/l, it mainly comes from river-borne materials, air-borne materials and weathering of rocks in the ocean. The adsorbent for uranium in extraction should meet the following characteristics: 1) high adsorption rate; 2) adsorbent itself is not dissolved in seawater, and can be used repeatedly; 3) adsorbent can work well under the pH value and salinity of the seawater; 4) it has nice geometric shape to contact seawater; 5) inexpensive and can be prepared in large quantity.

Titanium hydroxide is considered a good adsorbent for uranium extraction. Ion-exchange resin is also a widely used method for uranium extraction. Another method is that surfactant, such as acidic phospholipid, is added to seawater, then uranium is extracted from the surface of bubbles formed by blowing air through seawater. Further researches on effective extraction of uranium from seawater are suggested.

KEY uranium, concentrations, seawater, extraction, adsorption, rate, salinity, pH, titanium hydroxide, ion-exchange, resin, marine resources

LANG Chinese

395 AUTH Zheng, Shunqin; Huang, Huarui

AFFI Institute of Oceanology, Academia Sinica, Qingdao

DATE 1981

TITL The identification of the source of oil pollution in the south Yellow Sea with UV-spectrophotometry

CITA Hai Yang Ke Xue 3, 17-19 (1981)

ABST UV-spectrophotometry is used in identifying the source of oil pollution in the south Yellow Sea. The ratio of the UV-absorption at 228 nm and 256 nm wavelengths is used as a marine-pollution index against which the UV-absorption curves of the samples are compared.

KEY spectroscopy, oil, pollution, Yellow Sea

LANG Chinese

396 AUTH Zheng, Xiyu; Yang, Shaoxiu

AFFI Institute of Saline Lakes, Academia Sinica (1); Guilin College of Metallurgical Geology (2)

DATE 1983

TITL On the components of the saline lake water in Xizang

CITA Oceanologia et Limnologia Sinica 14, 342-352 (1983)

ABST Component data of the saline lakes in Xizang were obtained from field observations in recent years (1976, 1978). Laboratory studies showed that there

were nearly 37 chemical components in 63 lakes' brine and 27 evaporative minerals in nearly 40 saline lakes that reached their depositional stage. Their formative conditions, distributive properties, assemblage properties of some salt minerals, and mechanism affecting the components of the saline lakes are discussed. A sedimentary model of the early Holocene Epoch saline lake is suggested. This work is an aid not only to the understanding of the formation of the saline lakes in the said area, but also to the use of their mineral resources.

KEY salt lakes, brine, minerals, resources, geochemistry, Holocene

LANG Chinese, English abstract

397 AUTH Zhong, Bingnan

AFFI Institute of Testing and Analysis, Guangdong

DATE 1980

TITL Investigation on the evaluation indices of marine environmental quality

CITA Hai Yang Ke Xue 4, 12-15 (1980)

ABST Three indices for evaluating the marine environmental quality are discussed: 1) δ value; 2) N_b value; 3) δ_p or δ_N.

KEY pollution, environment, mercury, cyanide, radioactivity

LANG Chinese

398 AUTH Zhong, Bingnan

AFFI Institute of Testing and Analysis, Guangdong

DATE 1982

TITL The determination of radionuclides and heavy metals in marine environmental samples

CITA Journal of Marine Science 3, 50-53 (1982)

ABST The author introduces 12 methods for continuously measuring the radionuclides and heavy metals in marine environmental samples on board.

KEY radionuclides, heavy metals, pollution, analytical chemistry, seawater, natural waters, neutron activation, X-ray fluorescence spectroscopy, atomic absorption, emission spectroscopy, chromium, cadmium, nickel, copper, zinc, lead, mercury, arsenic, uranium, cobalt, iron, strontium, lanthanum, yttrium, zirconium, thorium, radium, radon, strontium-90, cobalt-60, ruthenium

LANG Chinese

399 AUTH Zhong, Qiying; Fang, Yiaosheng

AFFI South China Sea Institute of Oceanology, Academia Sinica, Guangzhou

DATE 1979

TITL A preliminary survey on summer sea water optical characteristics of the South China Sea

CITA Paper in Marine Physics, Ocean Press, 79-81 (1979)

ABST The extinction coefficient of seawater above the depth of 200 m is measured by transparency meter in the sea area near Zhongsha and Xisha archipelago as well as sea basin of South China Sea. Results show that the extinction coefficient (α) of seawater in the investigated area is changed with spectra, station and depth. Generally speaking, the white light decays more than the green light in this area ($\alpha_w > \alpha_g$). The extinction coefficient in different sea areas is also different. The vertical distribution of α_g value shows a similar trend as the density distribution of plankton. The vertical variation of α value in the surficial layer is small; maximal α value shows at the depth of 60-80 m in the vertical distribution curve of three areas. This is due to the large vertical gradients of temperature, salinity and density existing in the interface of surficial water and subtropical subjacent water; the interface is usually at the depth of 75 m. The horizontal distribution curve of α value at depth of 70 m in sea basin

reflects the characteristics of this area; the Pacific water in the south moves upward by the summer ocean current. Zhongsha and Xisha archipelago are in the north where plankton is concentrated in the summer. The Vietnamese coastal run-off in the west also affects the curve. The horizontal distributions of decay constant at the depth of 10 m in sea basin of South China Sea and Xisha archipelago were compared; the seawater optical characteristics show significant differences in the two areas.

KEY seawater, transparency, South China Sea, distribution, density, temperature, salinity, optics, laser, depth, plankton

LANG Chinese

400 AUTH Zhong, Qiying; Fang, Yiaosheng

AFFI South China Sea Institute of Oceanology, Academia Sinica, Guangzhou

DATE 1982

TITL Studies on the optical characteristics of seawater of the central area of South China Sea

CITA Symposium on Research Reports on the Sea Area of South China Sea, 187-198 (1982)

ABST The investigative results obtained with a beam transmissometer in the central waters of South China Sea during 1974-1978 are presented. The 3 different main types of the profiles of the attenuation coefficient in this area are summarized. In this paper we also discussed and analysed the time changes of the attenuation coefficient, the characteristics of their horizontal distribution and the relations between the attenuation coefficient and the hydrological-biological conditions. The results showed that the measured values of the coefficient in the adjacent waters near the Xisha Islands are as high as 0.35/m, while those in the basin waters are about 0.1/m. The former is much higher than the latter, but

their profile curves are very similar in shape. It was proved on the basis of the statistical theory that the profiles of the attenuation coefficient in the waters can be described with the same mathematical formula.

KEY optics, seawater, South China Sea, attenuation coefficient, distribution, primary productivity

LANG Chinese, English abstract

401 AUTH Zhong, Qiying; Liu, Chensong; Fang, Yiaosheng; Liu, Xuedong; Xu, Zhihui

AFFI South China Sea Institute of Oceanology, Academia Sinica, Guangzhou

DATE 1979

TITL On the marine optical method of surveying the primary productivity of the sea

CITA Papers in Marine Physics, Ocean Press, 82-91 (1979)

ABST The relationship between the primary productivity of the sea and marine optical characteristics is analyzed from the observed data and related information. The evaluation of primary productivity by oceanic optical parameters is discussed in detail, they are: 1) determination of pigment concentration by extinction coefficient of the white light scattering (K_T); 2) determination of pigment concentration by spectral coefficient of spectral scattering ($K_T\lambda$); 3) estimation of chlorophyll concentration by extinction coefficient of parallel light; 4) difference of reflecting power from backward scattering; 5) fluorescent spectrometry - stimulated emission of fluorescence from chlorophyll by laser.

KEY primary productivity, pigment, concentrations, scattering, chlorophyll, fluorescence, laser, optics

LANG Chinese

402 AUTH Zhou, Guozhi

AFFI Beijing Institute of Steel, Beijing

DATE 1979

TITL Effects of Van der Waals force on the diffusion-controlled reactions - Application of Smoluchowski formula on non-spherically symmetric diffusion system

CITA Scientia Sinica, 293-302 (1979)

ABST The application and limitation of Smoluchowski equation on a non-spherically symmetric diffusion system were discussed. The equation seems to be valid to calculate the rate of enzymatic reactions. In addition, the effects of Van der Waals force on such diffusion-controlled kinetics were discussed. The maximum rate of reaction of enzyme with subtrate in terms of a diffusion process was calculated.

KEY carbon dioxide, enzyme, active site, carbonate anhydrase, carbonic acid, Van der Waals force, diffusion, rate, kinetics, hydration

LANG Chinese

NOTE Zhou Guozhi is also spelled Chou Kuo-chih

403 AUTH Zhou, Jia-yi; McDuff, Russ; Murray, James W.

AFFI Shandong College of Oceanography, Qingdao (1); School of Oceanography, University of Washington, Seattle, Washington, U.S.A. (2,3)

DATE 1983

TITL Chromium speciation and vanadium in pore water of northeast Pacific sediments

CITA IUGG-18 (1983)

ABST Vertical profiles of V, Cr^{+3}, Mn, Fe and nutrients in pore water extracted from sediment cores of the northeast Pacific were determined at two stations of cruise TT-163. The pore water chemistry is different in the different sediments. The distribution of vanadium in pore water of box 7, cruise TT-163 shows that the concentration of vanadium is higher in the upper zone with the maximum value of 160 nM/Kg at the depth of 3.5-5 cm. Below 5 cm vanadium concentration increases again to a value of 152 nM/Kg at the base of

the sampling interval (18-20 cm). From the distributions of vanadium, manganese and nitrate in pore water, we infer that the vanadium is produced by early diagenesis from 0-5 cm and by manganese reduction from 5-20 cm. This vanadium profile in pore water can be explained consistently by a simple vertical advection-diffusion model. The production rates of vanadium in the upper and lower zones are 0.7 and 0.013 nM/cm^3-yr respectively, and the ratio of production rates of vanadium and manganese in manganese reduction zone is 1.3. The distributions of Cr^{+3} and Cr^{+6} in pore water of box core 7 of cruise TT-163 show that chromium in pore wter exists almost entirely in the form of Cr^{+3}. The concentration of Cr^{+3} is highest in the surface pore water (0-1 cm) and decreases with the increase of depth. We infer that the Cr^{+3} in pore water is mainly produced by early diagenesis. This Cr^{+3} profile can also be explained by a simple vertical advection-diffusion model. In addition, the deep sea sediment-water interfacial fluxes of vanadium and total chromium have been calculated as well.

KEY chromium, speciation, vanadium, interstitial water, Pacific, manganese, sediments, diagenesis, nitrate, diffusion, concentrations, distribution, iron, depth

LANG English

NOTE Abstract only; Zhou Jia-yi is also spelled Zhou Jiayi or Chow Chia-yi; his present address is The Second Institute of Oceanography, National Bureau of Oceanography

404 AUTH Zhou, Jia-yi; McDuff, Russ; Murray, James W.

AFFI Shandong College of Oceanography, Qingdao (1); School of Oceanography, University of Washington, Seattle, Washington, U.S.A. (2,3)

DATE 1983

TITL The distributions of vanadium, chromium and manganese in the northeast Pacific

CITA IUGG-18 (1983)

ABST Vertical profiles of dissolved and particulate vanadium, acid soluble chromium and acid soluble manganese in the northeast Pacific have been determined at station 7, Cruise TT-163. The concentration of dissolved vanadium in surface sea water is 18 nM/Kg at 200 m depth. Below the oxygen minimum the distribution of vanadium is more or less homogeneous with slight production from 900-3400 m. This is in good agreement with the θ-V curve in linear θ-S°/$_{oo}$ range. Vanadium in seawater appears to undergo both a shallow and a deep generation cycle. Correlations with NO_3, PO_4 and SiO_4 show that the vanadium concentration has close correlations ($r > 0.9$) with the concentrations of nitrate, phosphate and silicate in < 200 m surface water column. The same values of dissolved V/P ratio and particulate V/P ratio (Collier 1980) in < 200 m water column demonstrates that the V and P are regenerated and transferred simultaneously from particles into sea water and the vanadium is probably of biogenic character. Particulate fluxes of V, Cr and Mn calculated from a two-layer box model show that P_V = 0.77, P_{Cr} = 0.45 and P_{Mn} = 2.21 nM/cm^2-yr. They are consistent with the values obtained from deep sea sediment-trap experiments. Vertical advection-diffusion model was applied to this vanadium profile. The best-fit value of J/W is 3.0 ± 1 nM/Kg-Km and the rate of in situ production of vanadium in deep ocean is approximately 0.015 nM/Kg-yr. The concentration of particulate vanadium is higher in the surface and lower in the deep sea waters with the minimum at 3400 m. The vertical profile of particulate vanadium is consistent with the profile of dissolved vanadium.

KEY distribution, vanadium, chromium, manganese, Pacific, seawater, particulates, depth, concentrations, temperature, salinity, nitrite, silicate, phosphate, diffusion

LANG English

NOTE Abstract only; see Note 403

405 AUTH Zhou, Jingzhong

AFFI unknown

DATE 1981

TITL Successful experimentation with remote sensing on pollution in the Bohai Bay

CITA Hai Yang Ke Xue 1, 34 (1981)

ABST The author and his research team successfully conducted an experiment using remote sensing on pollution in the Bohai Bay. The results will provide information for the evaluation of environmental quality and the prevention of pollution in Bohai Bay.

KEY remote sensing, pollution, Bohai Bay, environment

LANG Chinese

406 AUTH Zhou, Xihuang

AFFI Department of Chemistry, Beijing University, Beijing

DATE unknown

TITL Analysis of deuterium in natural water by spectrometry with thermal conduction

CITA Kexue Tongbao, 863-865

ABST The analytical procedures include transformation of samples, determination of peak value and calculation of deuterium (D) in the sample. The natural water is transformed into $H_2(g)$ by magnesium powder method. The experimental conditions for the stable spectral peak were tested. Results show that: 1) HD in the sample should be separated from O_2, N_2 etc. impurities in order to get a symmetric peak; 2) flow rate of carrier gas in the range of 60-90 ml/min shows little influence on peak value; 3) the slight change in

pressure has no effect on peak value when the sample pressure is close to the system pressure; 4) when tank temperature changes 1 degree C, the peak value shows about 0.5% of relative change; 5) the repeatability of spectral peak is good; 6) the peak value is linear to the D content when the D content is in the range of 1-155 ppm. Ice-snow water samples were analyzed after tranformation. The electric current has the largest effect on the sensitivity of the spectrometry after the experimental conditions are fixed. The analytic error exists at the determination of peak value. The average deviation for peak-value determination is ± 0.4 mm. The accuracy for the spectrometry with thermal conduction as detector is ± 0.6 ppm D.

KEY deuterium, natural waters, analytical chemistry, ice, snow

LANG Chinese

407 AUTH Zhou, Zongchen; Ni, Chuenzhi; Li, Zhitang; Zeng, Huoshui; Xie, Jinxiang; Zhang, Nanfeng

AFFI The Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE 1983

TITL Study of the microbiological degradation on marine oil pollution II. Preliminary investigation on the oxidative degradation of hydrocarbons by bacteria

CITA Acta Oceanologica Sinica 5, 777-782 (1983)

ABST Bacteria separated from samples of Xiamen Harbor are cultured to determine their degradation ability of crude oil and 10 hydrocarbons, the self-cleaning action of microorganisms in seawater is also discussed. Results show that the gram-positive bacteria have higher degradation rate on crude oil than the gram-negative bacteria do; Flavobacterium and Xanthomonas have the highest rates among the gram-positive bacteria. Different species show different degradation rate on hydrocarbons. Most of the

bacteria can utilize hexadecane, only few can utilize methyl naphthalene, benzene. The self-cleaning ability of microorganisms in the polluted ocean is limited; when the concentration of pollutant is too high, the growth of bacteria is restrained by the insufficient supply of nutrients and oxygen.

KEY oil, bacteria, hydrocarbons, seawater, concentrations, pollutant, nutrients, oxygen, marine pollution, marine organisms

LANG Chinese

408 AUTH Zhu, Erqin

AFFI Shandong College of Oceanology, Qingdao

DATE 1983

TITL A study of ferric concretions in the north part of the East China Sea

CITA unpublished

ABST The ferric concretions in the north part of East China Sea are discussed. The author concludes that: 1) the ferric concretions are widely distributed in the area and are in a variety of shapes. The authigenic minerals among them chiefly consist of fine-grained goethite and small amounts of fine-grained lepidocrocite. These do not recrystallize. Certain amounts of terrigenous detritus are also present among them; 2) the ferric concretions of the area can be classified as marine or relict authigenic minerals. They are represented by cast concretions. The iron, supplied by the river, oxidized when the river water is mixed with seawater to form a gelatinized colloidal precipitation. The concretions were formed in the oxidation band of the fossil delta plain of the Changjiang.

KEY East China Sea, goethite, minerals, detritus, iron, rivers, river water, seawater, precipitation, oxidation, Changjiang, authigenic, colloids

LANG Chinese

NOTE Read at the International Symposium on Sedimentation on the Continental Shelf, with special reference to the East China Sea, Hangzhou, China, Treatise abstract, 122 (1983)

409 AUTH Zhu, Erqin

AFFI Institute of Oceanology, Shandong College of Oceanology, Qingdao

DATE 1983

TITL A study of ferric concretion in the northern part of the East China Sea

CITA Journal of Shandong College of Oceanology 13, 73-80 (1983)

ABST The ferric concretions in various shapes have been discovered in an area from the southern Huanghai Sea to the northern East Sea of China. They can be classified into three kinds from its forms: gelatins (reniform, buckshot, ferric pisolite and oolite), diffusion secretions (hollow crust and thin plate), and casts of organic shell. The dominant diagenetic component of the concretions is goethite, and the rest are terrigenous detritus, such as quartz, feldspar. They differ from manganese nodule of the ocean in lack of concentration of trace metal and in low Mn/Fe ratio. On the basis of the characteristics of ferric concretions, it is considered that part of the concretions are authigenic, formed on recent sea bottom and part, known as terrigenous authigenic concretions, are formed through the intensive oxidation of intergranular solutions on the fossil delta plain.

KEY East China Sea, Huanghai, goethite, quartz, detritus, feldspar, manganese nodules, concentrations, oxidation, trace metals, marine resources, oolite, shells, diagenesis, iron, manganese, authigenic

LANG Chinese, English abstract

410 AUTH Zhu, Erqin

AFFI Shandong College of Oceanology, Qingdao

DATE 1983

TITL Calcareous concretions in the northern East China Sea

CITA Scientia Sinica (Series B) 26, 1088-1098 (1983)

ABST Research is carried out on the calcareous concretions in the surface sediments of the northern East China Sea. Based on the isotopic composition of carbon and oxygen, chemical composition, radiometric dating and distribution pattern of the concretions, we infer that they are chiefly formed in the area of the fossil delta of the Changjiang River under a fresh-water environment. Therefore, the calcareous concretion can act as a facies indicator, showing that the sea bottom of the area once exposed above the seawater.

KEY East China Sea, sediments, compositions, dating, distribution, Changjiang, carbon-13, carbon-14, oxygen-18, calcium carbonate, carbon, oxygen

LANG English

NOTE Chinese version published in Scientia Sinica (Series B), 9, 849-856 (1983)

411 AUTH Zhu, Erqin

AFFI Shandong College of Oceanology, Qingdao

DATE 1983

TITL Calcareous concretions in the northern East China Sea

CITA Scientia Sinica (Series B) 9, 849-856 (1983)

ABST See 410

KEY East China Sea, sediments, compositions, carbon, oxygen, dating, distribution, Changjiang, calcium carbonate, carbon-14, carbon-13, oxygen-18

LANG Chinese

NOTE English version published in Scientia Sinica (Series B) 26, 1088-1089 (1983)

412 AUTH Zhu, Erqin

DATE 1983

TITL Discovery of ferric concretions in the north part of the East China Sea

CITA Kexue Tongbao 28, 1572-1573 (1983)

ABST Ferric concretions have been discovered in the surface sediments from the southern part of the Huanghai Sea to the northern part of the East China Sea in June, 1981. Their morphology can be classified into three kinds: gelatins, secretions and casts of organic shells. The characteristics of these samples are discussed.

KEY East China Sea, sediments, Huanghai, Changjiang, goethite, quartz, X-ray diffraction, minerals, manganese nodules, iron, marine resources, geochemistry, shells

LANG English

413 AUTH Zhu, Erqin; Wang, Qi; Hong, Xiaomei; Cheng, Jianchun

AFFI Shandong College of Oceanology, Qingdao

DATE 1982

TITL Discovery of bubble-wall structure in volcanic crystalline fragments of the East China Sea

CITA Kexue Tongbao 24, 1512-1514 (1982)

ABST The vesicular structure reported in this paper is the first discovery in China. It is important in explaining the sources of surficial sediments, the extent of volcanic material in sediments and the history of volcanic activity. The crystalline cinders mainly are quartz, feldspars and norite. The types of sediments, the characteristics of vesicular structure, as well as its formation and significance are discussed.

KEY East China Sea, sediments, quartz, feldspar, geochemistry, sources

LANG Chinese

NOTE English version published in Kexue Tongbao 28, 1662-1665 (1983)

414 AUTH Zhu, Erqin; Wang, Qi; Hong, Xiaomei; Cheng, Jianchun

AFFI Shandong College of Oceanology, Qingdao

DATE 1983

TITL The bubble-wall texture of volcanic crystalline fragments in the East China Sea

CITA Kexue Tongbao 28, 1662-1665 (1983)

ABST Thirty-eight surface sediment samples from the East China Sea have been collected during the *Dongfanghong* cruise in June, 1981. In these samples, crystalline fragments mainly consist of quartz, feldspar, and hypersthene and bubble-wall texture were found. This kind of texture has been reported in foreign countries[1], but it is discovered for the first time in the sediments of the China seas. The characteristics and chemical composition of these samples are reported.

KEY East China Sea, quartz, feldspar, sediments, compositions

LANG English

NOTE Chinese version published in Kexue Tongbao 24, 1512-1514 (1982)

415 AUTH Zhu, Guoyi; Wang, Erkang

AFFI Changchun Institute of Applied Chemistry, Academia Sinica

DATE 1983

TITL On neopolarography III - Anodic stripping neopolarography with hanging mercury drop electrode

CITA Scientia Sinica (Series B) 26, 897-903 (1983)

ABST Anodic stripping neopolarography with Hanging Mercury Drops Electrode (HMDE) has been carried out for 1.5th order (e') and 2.5th order (e") differential electroanalysis. Our experiments show that this method is very sensitive especially at fast scanning rate and reproducible and can be developed for trace analysis as pulse polarography.

KEY electrode, polarography, anodic stripping voltammetry, analytical chemistry

LANG English

416 AUTH Zhu, Meinian

AFFI Environgeology Laboratory, Guiyang Institute of Geochemistry, Academia Sinica, Guiyang

DATE 1974

TITL The action of analytical chemistry in environmental science - introduction of environmental analytical chemistry

CITA Analytical Chemistry 2, 245-250 (1974)

ABST Various analytical methods are used in environmental analytical chemistry in order to study the circulating process of elements among geological environment, plants and animals, and humans. The transportation of elements and their compounds are also studied; the studies seek to assess the influences of the distributional differences of elements and the environmental pollution on human health. Requirements for the environmental analysis are suggested, which include: 1) establish the analytical method for trace quantities (μg-ng) and ultra-trace quantities (ng-μμg); 2) determine various background values for trace elements in the environment, and accumulate original data; 3) enlarge the application of isotopic trace analysis in environmental research; 4) study and produce various automatic monitoring instruments and remote monitoring systems.

KEY analytical chemistry, transportation, pollution, environment, cycle, remote sensing, pesticides, mercury, rain water, air, trace metals, uranium, bioaccumulation, phytoplankton, fish, DDT, carbon dioxide, beryllium, cadmium, nickel, zinc, selenium, cobalt, copper, platinum, arsenic, lead

LANG Chinese

417 AUTH Zhu, Meinian

AFFI Institute of Geochemistry, Academia Sinica, Guiyang

DATE 1980

TITL Trace metals and health

CITA People's Publication Inc, 121 pp. (1980)

ABST This book introduces the relationship of trace elements to biogenesis, life activities, epidemic disease, cardiovascular disease, cancer and pollution-related diseases. The trace elements in Chinese herbal medicine is also reported.

KEY pollution, trace metals, mercury, lead, bioaccumulation, fish, environment, chromium, nickel, arsenic, cadmium, beryllium, fluorine, zinc, molybdenum, selenium, air, manganese, antimony, natural waters

LANG Chinese

418 AUTH Zhu, Qiqin

AFFI East China Sea Institute of Fisheries

DATE 1982

TITL Preliminary study on the influence of the environmental pollution in Hangzhou Bay on zooplankton

CITA Marine Fisheries 4, 211-214 (1982)

ABST The influence of environmental pollution on zooplankton in Hangzhou Bay is studied; the pollution of the bay area is also evaluated. Zooplankton distribution is mainly affected by the run-off and water system in the area. The horizontal gradient of salinity in the surficial layer is large (5-23.75°/$_{oo}$). Generally the area has low salinity. Specific composition is different from that in the open sea. 35 species have been identified and categorized into 3: semi-saline estuarine community, low-salinity coastal community and open-sea community. Quantity and distribution of species are related to the river water flow, inward flow of open seawater and water temperatrure. The bioquantity horizontal distribution and quantity variation of the zooplankton are reported in detail.

ABST The planktonic biomass distribution in the investigated area is uneven; the major enrichment area is near Xiaoji mountain, southeast of Wangpan mountain and southeast of Jinshan; the biomass is the highest in September of 1977 and the lowest in May of 1980. The biomass shows a decreasing trend, but the community basically is the same. The quantity of zooplankton is the highest in the late Spring and early Summer in the bay, which reflects the effect of seasonal variation, and explains that the zooplankton still has a relatively stable ecological balance; the structure of community has not been affected by oil, copper and zinc etc. pollutants, although the bay area has already been contaminated by these pollutants.

KEY pollution, zooplankton, distribution, salinity, zinc, oil, copper, seasonal variation

LANG Chinese

419 AUTH Zhu, Xihai; Zhang, Runjian; Mo, Jinyuan

AFFI Department of Chemistry, Zhongshan University

DATE 1962

TITL Determination of silicate in seawater

CITA Bulletin of Marine Works 2, 11-15 (1962)

ABST This paper studies the experimental conditions for silicate determination using the silicomolybdate blue method; Mohr's salt ($FeSO_4 \cdot (NH_4)_2SO_4 \cdot 6H_2O$) is used as reducer. The acidity of seawater should be adjusted to ~ 1.5 N H_2SO_4. The temperature effect can be ignored in the daytime variation range of room temperature. The effect of chlorinity on coloration also can be neglected when chlorinity is in the range of 8-19‰. PO_4^{-3}, Zn^{+2}, Al^{+3}, Fe^{+3} etc. ions do not interfere with the coloration. The color and reagents are both stable, and the color is suitable for visual colorimetry.

KEY determination, silicate, seawater, temperature, chlorinity, colorimetry, analytical chemistry, pH

LANG Chinese

420 AUTH Zhu, Xihai; Zhang, Runjian; Mo, Jinyuan

AFFI Department of Chemistry, Zhongshan University

DATE 1962

TITL Determination of silicate in seawater

CITA Oceanologia et Limnologia Sinica 4, 98 (1962)

ABST The silicate in seawater is determined by silicomolybdate blue method. Mohr's salt ($FeSO_4$ $(NH_4)_2SO_4 \cdot 6H_2O$) is used as reducer. The best acidity for coloration is 1.5 N H_2SO_4; the color shown is stable, can last for one day. PO_4^{-3}, Zn^{+2}, Al^{+3}, Fe^{+3} etc. ions do not interfere with the coloration. The temperature calibration can be omitted at the room-temperature range. The blue color is suitable for visual colorimetric determination; the accuracy of using the photocolorimetric method is less than 1%. There is no effect on the results when the range of chlorinity is 8-19°/$_{oo}$. The proposed procedures are as follows: 1) 2 drops (0.1 ml) of 1:1 H_2SO_4 is added to 50 ml seawater sample; 2) 1 ml of 10% ammonium molybdate solution is then added; 3) shake and stand for 10-20 minutes; 4) 5 ml Mohr's salt-H_2SO_4 mixture is added; 5) shake and stand for 10 minutes; 6) colorimetric determination.

KEY determination, silicate, seawater, colorimetry, analytical chemistry

LANG Chinese

NOTE Abstract only

421 AUTH Zhuang, Shijie; Yu, Zhong; Peng, Hanchang

AFFI Institute of Geology, Ministry of Metallurgical Industry (1); Beijing Institution of Petroleum Exploration and Development (2); The First Institute of Oceanography, China National Bureau of Oceanography (3)

DATE 1983

TITL Microanalytical study of some cosmic dust discovered in sea-floor sediments in China

CITA Acta Mineralogica Sinica, 8-12 (1983)

ABST Three types of cosmic dust (ferriginous, siliceous and glassy) have been recognized in sea-floor sediments from the Jiaozhouwan Bay of China and the Pacific Ocean, and from the Quaternary system of the South China Sea. Their morphological features, X-ray powder data and chemical compositions are presented in the present paper.

KEY cosmic dust, sediments, Pacific Ocean, South China Sea, compositions, Jiaozhou Bay, X-ray diffraction

LANG Chinese, English abstract

422 AUTH Zou, Hanyang; Su, Xianze; Yu, Xingguang; Zheng, Xianzhang; Xu, Pian

AFFI Third Institute of Oceanography, National Bureau of Oceanography, Xiamen

DATE 1982

TITL Determination of recent sedimentation rates on the continental shelf of the East China Sea using ^{210}Pb method

CITA Taiwan Strait 1, 30-40 (1982)

ABST Three undisturbed cores were taken with a static corer (Model LDC 1-1) from the continental shelf of the East China Sea. The excess (unsupported) ^{210}Pb profiles of the cores revealed three characteristic regions: a surface mixed layer, a region of radioactive decay, and a region of low background activities. In the region of radioactive decay, the distribution of excess ^{210}Pb decreased exponentially with depth. The compressive effect of the sediment was corrected based on the porosity of the surface layer. The corresponding sedimentation rates of the three cores were 0.83, 0.39 and 0.48 cm/yr. respectively and the sedimentation fluxes were 0.42, 0.28 and 0.21 $g/cm^2/yr$. respectively.

KEY determination, continental shelf, East China Sea, sedimentation rates, lead-210, distribution

LANG Chinese, English abstract

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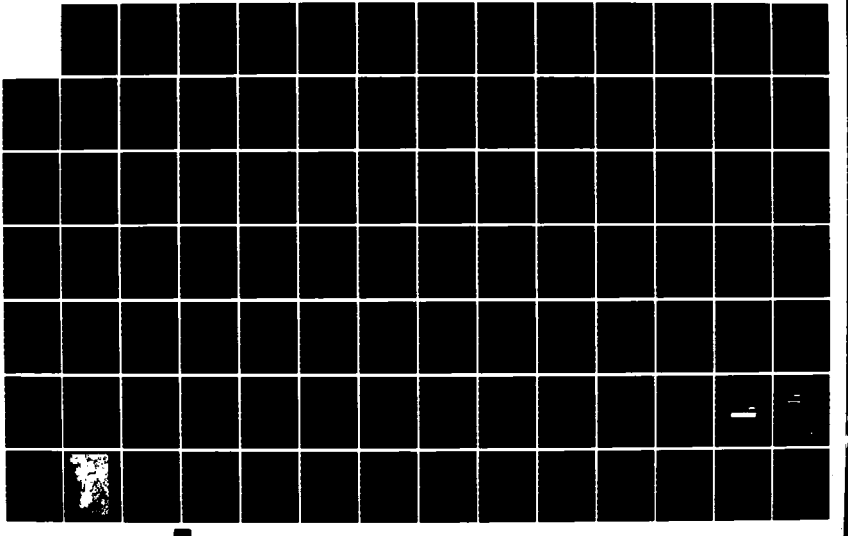
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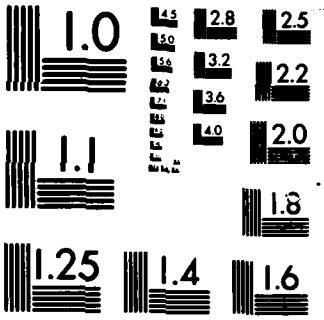
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30, 118, 142

zooplankton
97, 147, 162, 362, 391, 418

oec

Appendix I

SOME OBSERVATIONS ON THE STATUS OF MARINE SCIENCES IN THE PEOPLE'S REPUBLIC OF CHINA

The over-riding emphasis of self-reliance came to a halt with the passing of the Maoist era in the People's Republic of China (PRC); since then PRC has been far more open and receptive to foreign technology and collaboration with foreign institutions for the advancement of its program of "Four Modernizations." The learning process, however, is mutual: because of the long hiatus in communication with PRC and the inability of most westerners to read the original Chinese literature, a great deal of marine chemistry research in PRC is not known to the outside world. I have felt that progress in Marine Chemistry in general could be accelerated with better awareness of the existence of a large Chinese data base. Also, unnecessary and sometimes embarrassing duplication of efforts caused by lags in communication could be averted if a review of the status of Marine Chemistry research in PRC were available. I have consequently collected my research-related reprints from PRC in the past few years while I was supported by the National Science Foundation and the Department of Energy. Funding was subsequently obtained from the Office of Naval Research to conduct the review in a thorough and systematic manner.

At the invitation of Shandong College of Oceanography, I visited PRC for a month with the primary goal of ensuring a thorough and efficient acquisition of marine chemistry publications, particularly items published in the "gray literature." My itinerary was coordinated by the Shandong College of Oceanography and the institutions visited are: the Shandong College of Oceanography; the Institute of Oceanology and the South China Sea Institute of Oceanology of the Academia Sinica; the First and the Second Institutes of Oceanography, the Institute of Marine Scientific and Technological Information, the Institute of Oceanographic Instrumentation, and the Ocean Press, all of the National Bureau of Oceanography (NBO). In addition, I have met and consulted with scientists from the NBO headquarters and the Third Institute of

oceanography of NBO; the Institute of Geochemistry of the Academia Sinica; the Department of Oceanography, Xiamen University; and the Institute of Estuarine and Coastal Research, East China Normal University. The results of my information collecting efforts are mixed. The PRC scientists I visited with are very cautious and some are reluctant to give me reprints. I was also told that institutional reports and student theses are not exportable. Two packages of publications that I sent from PRC did not arrive and a third arrived with only half of the original contents.

My impressions of oceanographic research in PRC obtained from my site visit, and from my conversations with visiting PRC marine chemists in America are given below. I must point out at once, however, that I have received contradictory information on almost every subject from my PRC colleagues, and exceptions to my qualified description below certainly exist.

Marine Scientific and Technological Information

Scientific and technological information is flowing relatively freely in PRC, albeit at a slow pace and with certain restrictions. I will discuss the availability of scientific information in three categories:

(1) Exchange of Information within PRC: Every major research or teaching institute seems to publish at least one technical journal, which is widely distributed in PRC. All institutes have their own libraries and the current publications are displayed. Researchers can check out a limited amount of material. Usually the total number of publications one can have outstanding is fewer than 10. Students can check out few books, if at all. Since xerox machines are all but unavailable and expensive to use, xeroxing papers is rare. There are also few microfilm readers and no computer data base in PRC. IBM 1620 type computers are the main work horse in several of the oceanographic centers and some computing is done in regional computer centers such as that in Jinan. Understandably, hard copies are normally used to transmit numerical data. Nationwide technical meetings are held frequently where researchers exchange information and criticize each other freely.

(2) Flowing of Information into PRC: Major foreign oceanographic journals are available in all oceanographic institutions but few are original. Most of the journals were reproduced in Peking (Beijing) and later distributed, with a delay of 8 to 18 months. Reports published by foreign institutions are available through exchange. There is a large number of Russian publications, but Japanese and English publications are expanding at a faster rate. Few researchers can afford the postage for requesting reprints from abroad. Many foreign scientists visit and lecture at the PRC oceanographic institutions. PRC remains, however, cautious about such visits and checks potential contacts carefully and makes the invitation only after much deliberation. It also perceives links as being more between institutions, and better yet, between states, than on a personal level. Itinerary for foreign visitors is arranged weeks in advance and remains fairly rigid. Which scientist or laboratory a foreign visitor wishes to see must also be pre-arranged. Temporary moves of the living quarters for the host are not unheard of. Foreign visitors are generally treated exceedingly well.

(3) Flowing of Information out of PRC: This is the area that receives most restrictions. Essentially no gravity, acoustics, coastal current, and tidal data, maps, or even staff directories can be taken out of PRC. Marine Chemistry data are less restricted unless cross sections of data reveal topography. The policy of PRC, however, is such that every thing is classified unless it is specifically unclassified. Very few journals published in Chinese before 1980 could be taken out, although foreign language publications were under no such restrictions. Even now the Chinese researchers routinely request permission from their institutions, which, in turn, request permission from Customs for sending publications abroad (Figs. I-1 and I-2). Shipping samples, data and preprints abroad and revealing sampling sites, even to a foreign co-investigator, are even more involved. Such complicated procedures hindered collaborative research between PRC and foreign countries. Some journals are removed from display areas in the libraries when foreign visitors are present. Certain sections of bookstores are off-limits for foreigners. Also a foreigner can seldom see unpublished data, or maps showing disputed territory claimed by PRC.

山东海洋学院公用笺

外出交换科技书刊的证明

根据国务院１９７９年２月１日国发（１９７９）２７号文批准国家科委、中国科学院、外交部《关于颁发科学技术人员对外通讯联系和交换书刊资料两个规定的请示》中附件二《对外交换科技书刊资料等工作的暂行规定》，我院[redacted]拟送出国交换、赠送下列书刊资料：[redacted]

经审查，符合该规定中第　　条规定，特此证明。

山东海洋学院　　年　月　日

Fig. I-1　A certificate from the Shandong College of Oceanography showing that two reprints are suitable for exchange.

蘭州大學

海关：

我校[redacted]同志向美

[redacted]发资料、论文

壹[illegible]份，经我们审查，不涉及保[illegible]

密问题，请准予带出。

特此证明

蘭州大學

1 9 8[redacted]年[redacted]月[redacted]日

便字第[redacted]号

Fig. I-2 A request from Lanzhou University for the Custom's approval for sending a reprint abroad.

There are signs, however, indicating that information is beginning to flow out of PRC more freely. A prominant leader in PRC marine research told me privately that he thinks perhaps up to 95% of Marine Chemistry papers should not be classified. Others concur. Indeed several journals changed names in 1982. These "new" journals are not classified, whereas the "old" ones were. The China National Publishing Industry Trading Corporation, which is in charge of exporting PRC publications, accepts orders for some marine science publications. One should expect to pay up to 35 times the list price.

A data center similar to the National Oceanographic Data Center (NODC) is being established, with NODC's assistance, in the Institute of Marine Scientific and Technological Information, NBO, in Tianjin. The institute collects, processes, stores, and provides marine scientific and technological information and data from PRC and abroad. It also functions as an IOC depository center.

Most tasks are still performed manually. For instance, monthly hand-written tidal tables from 51 ocean stations are tabulated and plotted here, by hand. A Chinese-made computer is available (which uses punch tape) but a modern mini-computer is being imported. The institute is being expanded: A building damaged in the 1976 Tangshan earthquake was being torn down and replaced during my visit (Fig. I-3).

Publications

East major institute or organization publishes at least a journal; some have high professional standards, but others are less discriminating in the quality of the articles printed. Typographical errors, especially in the foreign language abstracts and citations, are numerous even in some of the most prestigious journals. Page numbers are frequently inaccurate and the names of foreign authors are often in error. Conclusions were frequently related to the political slogans. Many symbols are undefined. Few errata or comments are published.

Authorships were often not revealed during the political turmoil: few people would risk the danger of being criticized as trying to claim individual credit or of taking the responsibility if



Fig. I-3 A building (the Old Russian Consulate) damaged in the 1976 Tangshan earthquake was being rebuilt at the Institute of Marine Scientific and Technological Information, NBO.

the paper turned out to be politically unfit. Citations were limited to those from friendly countries. These situations, however, have changed in the last few years. For instance, authors now list their names, and paper published in Taiwan are cited.

Sampling sites are frequently not revealed: statements such as "samples collected from a lake" are abundant. Bottom topography is rarely shown. Sources of funding are not acknowledged. Papers often do not have an abstract. Only 46 of the 668 papers written in Chinese reviewed in this report give an abstract in Chinese; 351 have English abstracts; 3 have Russian abstracts and 268 give no abstract at all. None of the 80 papers written in English gives a Chinese abstract and only 39 give an abstract in English. Symposium abstract volumes, however, are mostly published in both Chinese and English.

Instrumentation

The use of advanced instrumentation is now widespread. The Chinese manufacture various spectrophotometers, anodic stripping voltimeters and mass spectrophotometers. Development of marine instruments and equipment is carried out in essentially all marine research and teaching institutions. But these efforts seem to be focused on easier-to-make instruments such as pH meters (I did not see any pH meter that could read to better and 1 mv in the PRC laboratories that I visited; I was told that several research units are developing units that can read to 0.1 mv). Chinese-made, large instruments such as AA and spectrophotometers are available but the higher-priced major instruments are mainly purchased from Japan and western countries, at two to three times the normal price. Procurement of foreign items receives much review at all layers of bureaucratic maze. All approved requests are finally funneled through a central Instruments Import and Export Corporation. It takes two to three years to receive an item after a successful request.

PRC seems to have followed the practice of Japan soon after the second world war in importing a limited amount of advanced instrumentation, then modify and manufacture them. Pass of the patent law in 1984 may open the way for licensing or joint production with foreign manufacturers of state-of-the-art equipment.

Ship Operations

PRC has an oceanographic research fleet of 150 vessels totaling over 100,000 tons. Some are quite large, with several exceeding 3000 tons. Until recently the ships have been operating in coastal and continental shelf regions, as even the large ships sometimes do not have deep-water sampling capability. (Rumors are that PRC cut an imported 6000m conducting cable into 3 even sections to satisfy the needs of three institutes). On-board instrumentation is scarce but laboratory space is ample. Shandong College of Oceanography's 2740-ton "East is Red" even has a lecture hall which seats at least 50. Some recent geophysical survey vessels are equipped with state-of-the-art instrumentation, perhaps reflecting PRC's strong emphasis on offshore exploration of petroleum.

The three sub-bureaus of NBO operate the NBO ships whereas the Academia Sinica and the Ministry of Education ships are run by the institutions which own them. Cruise plans are usually pre-arranged in great detail and the scientists do not seem to have the habit of requesting the captain to modify the track or schedule once the ship is underway. At any rate, authorization of changing plans must come from Beijing even if the captain approves. Scientists on academic ships have more freedom, but clearly the captain is in charge of the ship's operation, even on non-safety related matters.

Surveys

China maintains long records of coastal salinity data, some date back more than 100 years. Continuous water chemistry data for Huanghe, in Jiaozhou Wan and in the Changjiang estuary date back several decades. Most of the ocean surveys have been performed in the PRC territorial waters. PRC, however, has started to make routine surveys in the Taiwan Strait, which until recently was totally controlled by the Republic of China on Taiwan.

Deep ocean surveys began only recently. Early blue-water works were all part of international multi-ship programs. The first single-ship expedition was carried out by the PRC-made 4000-ton - R/V

Xiangyanghong 16 in Western Pacific (7-13°N,167-178°W) between 7 May and 10 July, 1983. Manganese modules were recovered from the 5000m-deep bottom.

Research on and around Antarctica has recently begun. Initial efforts were in collaboration with Australian and New Zealand scientists and concentrated on marine biological studies and living resources. PRC achieved a form of observer status under the 1959 Antarctic Treaty in June, 1983.

Funding for Research

Most research is supported by block operational funding to the institutions, which in turn provide "hard" salary and research funding internally to the staff. Research money competes internally with all other expenses, such as salary, building and maintenance, ship operation etc. It may vary anywhere from an average of $500 a year for an individual at the teaching institutions to $25,000 for a small research team at the research institutes. A selected few obtain research funding from the Academia Sinica Science Fund. More money per grant is available from this source but competition is fierce.

A small amount of money is provided to a faculty for research if he has graduate students under his guidance. All research topics must be approved by the Office of Scientific Research at each institution. Serving the needs of the people carries a lot of weight regarding whether a research topic is approved. Duplication of effort among various institutions is frequent; notably studies regarding uranium speciation and extraction. Quick approval of a research topic is possible when national prestige is at stake, such as when someone is invited to participate in an international scientific committee.

Promotion and Tenure

Tenure is a non-problem in PRC because most positions are assigned, and once assigned, are extremely secure but are left with little flexibility. Salary is not tied to research proposals or

grants, and is guaranteed. Changing posts is a tedious process, and permission must be granted not only from current and would-be employers, but also from the local authorities involved.

Promotion is a major problem which apparently is affecting morale. Essentially no promotion was granted between 1964 and 1978 and no salary increase has been approved for a quarter of a century. Most college graduates graduated since the early sixties are still ranked at the lecturer level (earning approximately $35 a month). Scientists graduated in the fifties are mostly ranked at the associate professor level. Most professor-level scientists (starting at about $100 a month) were graduated in the forties, many from U.S. institutions. Promotion process is being speeded up but still seems to be at a slow pace. Non-teaching and non-research related considerations still carry much weight in the decision-making, and the final decision is made at the Ministry level of the central government.

Students

College entrance examinations resumed in 1977 after the long period of turmoil during the Cultural Revolution. The first group of students entered in early 1978 and graduated in early 1982. Students (20% female) are highly motivated - they must be younger than 30 years old, are not allowed to marry while in school, and must live in dormitories. They receive free room and board plus stipends.

Both teaching and research institutions admit graduate students, but only Shandong College of Oceanography, Department of Oceanography (Xiamen University), Institute of Estuarine and Coastal Research (East China Normal University) and the Institute of Oceanology currently have oceanography graduate students. The three institutes of NBO may soon admit graduate students too. At the time of this writing, only three professors (Professors Tseng T.Q. and Mao Han-Li at the Institute of Oceanography and Professor Wen S.C. at the Shandong College of Oceanography) are allowed to have Ph.D. students.

Students now face the possibility of failing a course. Only a few years ago professors did not dare to fail a student for poor performance. The action of failing a student would have been

considered as diluting the authority of the party and as challenging the party supremacy. Student theses are for internal use only but may be de-classified in the near future.

Study in Foreign Countries

Most of the professor-level marine scientists in PRC received advanced education from western countries before 1950. Since the end of the political turmoil researchers are again allowed to study abroad (mostly on PRC fellowships).

Initially only faculty members went abroad, because the first class of college students for over a decade did not graduate until 1982. Generally speaking, research assistants or lecturer-level scientists who are younger than 35 are allowed to perform research abroad for two years, associate professor-level (younger than 50), one year, and shorter for more senior scientists. The PRC government does not encourage these researchers to seek an advanced degree. Instead, they are expected to learn a selected research topic and transfer the knowledge back quickly in order to fill an existing gap.

On the other hand, the cream of the recent college graduates are sent abroad (on one-year PRC fellowships) to receive a more balanced training and to earn an advanced degree. These students are expected to obtain financial support from the host institutions after one year. Most of those who come to the U.S. hold J-1 exchange visas, and must return immediately to PRC after their study, because the holders of a J-1 visa do not have the option of seeking practical training or employment here. Until a very short while ago, students had to be married before they were allowed to leave PRC. Now the rule has been relaxed somewhat and some single students have gone abroad. Except for the ones with good connections, wives are not allowed to go with their husbands, a policy that applies to students and faculty alike.

Competition for fellowships is fierce (about 10% of the faculty have been sent abroad). After passing tests and other considerations, those who would stay abroad for a year or longer, faculty and students alike, are sent to foreign-language institutes for six months of intensive language training. Those who

successfully pass the training are then sent to Beijing for a week-long orientation before being allowed to board a plane. The financial incentive is strong, as the faculty member draws his regular salary during all the training and orientation period as well as the time he spends abroad. In addition he receives living expenses while abroad (in the U.S. these amount to about $380 a month), given $350 for clothes, and allowed upon his return duty-free entry of luxury items.

Private funding, usually provided by overseas relatives, is used by a growing number of students to study abroad. There are fewer restrictions applied to these students.

International Collaborative Field Program

This is a rather politically-sensitive subject. Although essentially all scientists and administrators I talked to agree that international collaborative programs are beneficial to all parties concerned, I repeatedly detected undercurrents.

My impressions are that the scientists and science-oriented administrators appreciate that a joint field program would greatly accelerate their transition from a laboratory-confined marine chemistry program to a balanced laboratory - and - field oceanographic program. Some administrators who wield real power, however, question the motives of foreigners, especially those who propose to study PRC territorial waters. The recent Sino-American study of the Changjiang River mouth, for instance, is rumored to be under political review regarding why the foreigners are needed for such a study. One must remember that "all important decisions must be submitted to the school's party committee for approval before they are carried out" (a254). These party committee members are usually not seen by foreign visitors. How a potential collaborative program to be implemented in PRC would benefit PRC (not the scientists, but the institutions) must be clearly conveyed to the party committee before the program can be approved.

The United Nations Development Program has had an office in Beijing since 1979 and is offering assistance to international collaborative programs.

Appendix II

CHINESE NAMES

Chinese names are a source of great confusion to westerners largely because of the traditional Chinese practice of placing the surname first, e.g. my name in Chinese is Chen Chen-Tung, in which Chen is the surname, family name, or, as English-speaking people say, last name, and Chen-Tung is the given name or, as westerners say, first name or Christian name. Most Chinese surnames are composed of one syllable, as, for example, Chen or Wang, and most given names have two syllables as in Chen-Tung. Chinese do not have middle names.

The matter is complicated by the fact that there are many exceptions to these general guidelines, so that the surname sometimes has two syllables and the given name sometimes has only one syllable as in Ouyang Fan. If you were on a first-name basis with this gentleman you would call him Fan (perhaps no one else but his senior family members would do so in China); if not, he is Mr. Ouyang to you. Of course, one can also have a one-syllable surname and a one-syllable given name as in Tsai Chen. What confuses the westerner is that both of these names, Tsai and Chen, occur often as surnames. The confusion is further compounded by those Chinese such as I, who come to the West, and in an attempt to adapt to western ways, reverse the traditional order, e.g. to Chen-Tung Chen. Most westerners are then at a loss to know for sure which is the surname and which is the given name. To make life easier for my colleagues, I picked an English name, Arthur, which I now use as a middle name; I publish under Chen-Tung A. Chen. It is almost certain that a Chinese will put his last name last if he uses his Chinese first name and his adopted English middle name.

Minor complications in written Chinese names include the practices of hyphenation and capitalization. Two-syllable given names can occur:

(1) hyphenated with the first letters of both syllables capitalized, e.g. Ming-Hou;

(2) hyphenated with only the first letter of the first syllable capitalized, e.g. Ming-hou; or

(3) written as one word and capitalized, e.g. Minghou. This is the official PRC practice.

In this report, Chinese names are always listed with surnames first followed by a comma. All names are spelled according to how they appeared in the original publication. Variations in spelling or hyphenation for the same author in different articles are noted. Differences in hyphenation usually present no problems, e.g. Chang, Chen-ping (or Chang, Chen-Ping) and Chang Chenping are obviously the same author. Changes in spelling, however, are more confusing. Spelling changes result from the switch from the old system of romanization, known as the Wade-Giles system, to the new Chinese phonetic alphabet, known as the Pinyin system. Names in the Chinese marine chemistry literature, therefore, sometimes occur in both transliterated forms. A notable example is the name Chang (in the Wade-Giles system) which is now written as Zhang (in the new Pinyin system). The name Chang, Chen-Ping in this bibliography, for example, is the same person as Chang, Chen-ping; Chang, Chenping; Zhang, Zheng-bin; Zhang, ZhenBin; or Zhang Zhengbin, as he published under his name when it was transliterated in the old style as well as now in the new system.

In order to help the reader pronounce Chinese names, we will present the Pinyin system in Appendix III. Familiarity with the differences between the Pinyin system and the old Wade-Giles system, discussed briefly in Appendix III, will help the reader to recognize and pronounce Chinese names.

Appendix III

THE PINYIN SYSTEM OF CHINESE PHONETICS

The Chinese phonetic alphabet was devised to standardize the pronunciation of Chinese characters. It uses the same twenty-six Latin letters as the English alphabet but with some changes in pronunciation and with some sounds added. The Peking dialect has been adopted by the Peoples Republic as the common language of the Chinese people and it is taught in most schools. Generally, the Pinyin system tries to reproduce the Chinese sound as pronounced in the Peking dialect more closely than in former systems of romanization such as the Wade-Giles system. For example, the word Peking bears no resemblance to the actual Chinese pronunciation of the name of the famous city. But because westerners were only familiar with the anglicized spelling of the name, the city has been universally known as Peking. It is now (and really, has always been) Beijing which is a more accurate transliteration of the words 北京, meaning northern capital. In the Pinyin system, therefore, all the Chinese words that begin with the consonant sound of b starts with b instead of p as in the old Wade-Giles system. Similarly, if a Chinese word begins with a hard g sound, it is transliterated with g instead of k as in the old Wade-Giles system. All in all, the Pinyin system provides a more accurate pronunciation of the Chinese word. If the reader familiarizes himself or herself with the pronunciation keys for the vowels and consonants listed here, he or she will be able to pronounce most transliterated Chinese words like the names in this bibliography.

Vowels in the Chinese Phonetic Alphabet

			pronunciation key
	a	pronounced as in	father
	e	"	the French article le
	i	"	see
	o	"	saw (with slightly rounded lips)
	u	"	food
	u	"	the German umlauted ü

Compound Vowels

a:	ai	pronounced as in	I
	ao	"	now
e:	ei	"	eight
i:	ia	"	yah or Asia
	ie	"	yes
	iao	"	yowl
	iou	"	you
o:	ou	"	old
u:	ua	"	waft
	uo	"	woman
	uai	"	wife
	uei	"	way
ü:	ue	"	French muet (or German umlauted ü plus French é)

Consonants

There are twenty-one consonants in the Chinese Pinyin System:

b	m	ch*
c*	n	sh*
d	p	zh*
f	q*	
g	r*	
h	s	
j	t	
k	x*	
l	z	

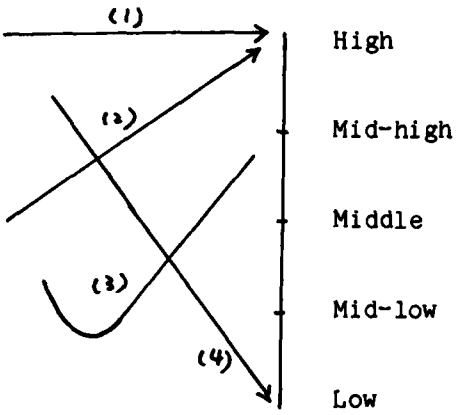
Most of the consonants are pronounced just as they appear. For example, b is pronounced as in bed and p is pronounced as in pit, etc. The following consonants (those that have asterisks above) differ in pronunciation from what one would expect:

c	pronounced as in	that's or tsar
q	"	cheer
r	"	leisure with tip of tongue curled back
x	"	shoe
ch	"	chew but with tip of tongue curled back
sh	"	shrub but with tip of tongue curled back
zh	"	large but with tip of tongue curled back

One may now combine a consonant with a vowel to produce a syllable, for example, ba, fu (pronounced foo), or qu (pronounced chu), xia (pronounced sh-yah), etc. With the above pronunciation keys for consonants and vowels, the reader should be able to sound the Chinese names fairly accurately. The Chinese name Qin in the author list of this bibliography, for example, is pronounced Chin; the name Xu, Xianyi in the list is pronounced Shu, Shianyee.

Pitch

The most difficult aspect of pronouncing Chinese for westerners is the pitch of the sound. There are four tones to every sound so that in spoken Chinese the meaning of a word depends on the tone of one's voice in sounding the word. The four different pitches are graphically represented as follows:



The word bao pronounced with pitch (1), i.e. uniformly high, means "to wrap"; but sounded with pitch (2), i.e. your voice at mid-pitch and ending at high, the word means "thin." Spoken with pitch (3), i.e. your voice starting mid-low going to low and ending mid-high, the word means "full" as in a full tummy. Spoken with pitch (4), i.e. starting high and ending low, the word means "newspaper."

One can see, therefore, inexact pitch in one's voice could result in much confusion. This matter of pitch is too complicated to be treated properly here. I will simply close with a favorite example: the sentence $ma^{(1)}$ $ma^{(4)}$ $ma^{(2)}$ $ma^{(3)}$, or as designated in some texts mā, mà, má, mǎ, sounded with the pitches as designated, means "mother scolds the goose-pimply horse." Most westerners have a hopelessly difficult time with such a sentence. Fortunately, it is not often said.

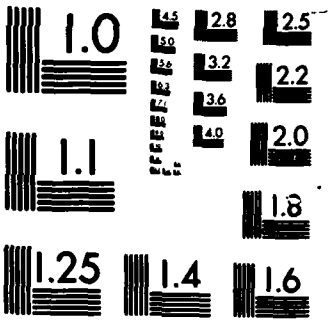
Several frequently cited cities and rivers in China under the Wade-Giles and the Pinyin systems are listed as follows:

Wade-Giles	Pinyin
Amoy	Xiamen
Canton	Guangzhou

AD-A163 254 MARINE CHEMISTRY IN THE PEOPLE'S REPUBLIC OF CHINA(U) 11/11
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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

Chiaochou Bay	Jiaozhou Wan
Hangchow	Hangzhou
Kweiyang	Guiyang
Pearl River	Zhujiang
Peking	Beijing
Po Hai Bay	Bohai Bay
Shanghai	Shanghai
Sining	Xining
Talien	Dalian
Tientsin	Tianjin
Tsingtao	Qingdao
Yangtze River	Changjiang
Yellow River	Huanghe
Yellow Sea	Huanghai

References:

The Pinyin Chinese - English Dictionary, ed., Wu, Jingrong, The Commercial Press, Beijing, 1979, 976 pp.

The Administrative divisions of the People's Republic of China, Cartographic Publishing House, Beijing, 1980, 168 pp.

China Handbook, Ta Kung Pao, Hongkong, 1982, 660 pp.

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