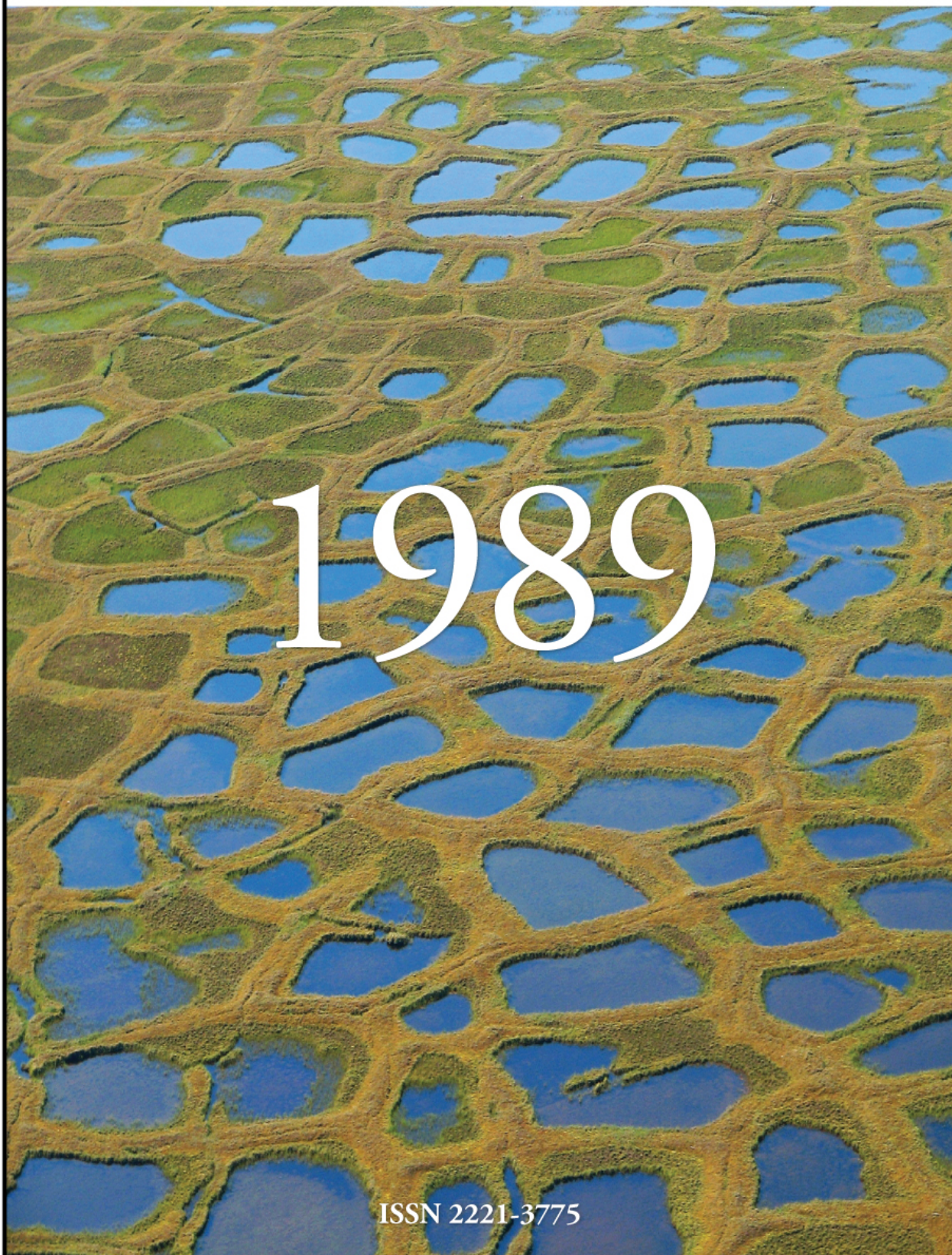


COUNTRY REPORTS



Reports from the Adhering Bodies of the International Permafrost Association



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1 Argentina (and South American Partners)

Joint Japanese-Argentine Expedition to the Antarctic for the study of permafrost at Seymour Island (Marambio) during Nov. 1987 - Jan. 1988

The Japanese team was integrated as follows: Masami Fukuda, Low Temperature Science Institute, Hokkaido University, Sapporo, Japan. Michio Nogami, Tokyo Metropolitan University, Tokyo. Kuneo Omoto, Faculty of Science, C14 Laboratory Nihon University SITAGAJAZ Tokyo, and T. Koisumi, Tokyo Gokugei University.

The Argentine team was composed as follows: Arturo E. Corte, Laboratory of Geocryology, CRICYT Mendoza; Jorge Strellin, Instituto Antartico Buenos Aires and Faculty of Sciences University of Buenos Aires; Enrique M. Buk, and Luis Lenzano, Laboratory of Geocryology, CRICYT Mendoza. Field data is being analyzed and Joint report will be presented at a meeting which will be held in Tokyo next October. The following aspects will be treated in a joint report:

1. General Geology and Geomorphology
2. Physical environment of the Island
3. Geoelectrical surveys
4. General Geocryology
5. Geocryogenic forms
6. Frost action eolian and fluvial processes
7. Excavation sites at four areas in the Meseta and one in Larsen
8. Geochemistry, accumulation of salts under the stones and C14 analysis and dating
9. Discussion and summary.

Report by A. Corte

2 Canada

Both the Canadian National Committee for the IPA (CNC/IPA) and the Permafrost Subcommittee of the Associate Committee on Geotechnical Research (ACGR) met in November 1988. Permafrost activities in Canada over the past 12 months are summarized as follows:

At the Geological Association of Canada Annual Meeting in Montreal, Quebec, on May 16, 1989, a special session entitled "Massive Ground Ice: Delineation, geology and origin" was organized by F. A. Michel (Carleton University) and A. S. Judge (Geological Survey of Canada). Fifteen papers were

presented including several from Soviet participants. There were approximately 60 participants.

Following the annual meeting of the Canadian Geotechnical Society in Winnipeg, a workshop on Saline Permafrost was held at the University of Manitoba on October 26, 1989. The workshop was sponsored jointly by the Permafrost Subcommittee and the Cold Regions Geotechnology Division of the Canadian Geotechnical Society. The organizers were D. Seago (University of Alberta), T.H.W. Baker (National Research Council of Canada), P. Vidan (Government of the Northwest Territories). There were approximately forty participants.

On October 27, 1989, a workshop on Permafrost and Climate Change was organized and conducted by the Geological Survey of Canada. Conveners were J. A. Heginbottom, A.S. Judge, and D. G. Harry. The workshop was chaired by D.A. St-Onge, Director, Terrain Sciences Division. It was attended by approximately forty people and followed the Symposium on the Arctic and Global Change organized by the Climate Institute (Washington, DC) and sponsored by several U.S. and Canadian agencies.

The Permafrost Subcommittee under the chairmanship of D.W. Hayley coordinates much of the permafrost activities within Canada. The Subcommittee's priorities for the next four years are:

1. carry through the organization of the Fifth Canadian Permafrost Conference
2. complete the Permafrost Testing Manual
3. examine the scope and methods for a research test facility for pipelines with permafrost. Such a project would build upon the Carleton University-France initiative at Caen
4. investigate the possibilities of reproducing the book Permafrost Engineering and Construction, edited by G.H. Johnston.

For additional information on activities of the Subcommittee contact T.H.W. Baker, Research Advisor, Permafrost Subcommittee (ACGR), Geotechnical Section, Institute for Research in Construction, National Research Council, Ottawa KIA OR7, Canada.

The Permafrost Subcommittee continues to coordinate preparations for the Fifth Canadian Permafrost Conference which is also sponsored by the CNC/IPA, the Canadian Geotechnical Society and the Université Laval. The CNC/IPA will host the IPA Executive

Committee and Council meetings in Quebec in June 1990. Canada expressed interest at Trondheim in holding the VII International Conference on Permafrost in 1998. Discussions are currently underway in the permafrost community and it is hoped an invitation will be issued at the time of the VI Conference in China.

H.M French

3 China

The Lanzhou Institute of Glaciology and Geocryology (LIGG) celebrated its 30th anniversary and hosted the Fourth Conference on Glaciology and Geocryology from October 5-9, 1988, in Lanzhou.

A total of 142 scientists from seven nations participated. The conference was broken into concurrent sessions on glaciology and permafrost. The topics discussed under glaciology included snowfall, glaciology, geomorphology, surging glaciers and hydrology (particularly related to the glaciers of western China). The permafrost sessions dealt with periglacial landforms and processes, recharge of groundwater in permafrost regions, hydroengineering construction and the ecological environment in permafrost regions. Most papers dealt with studies in the Soviet Union and Canada, as well as glaciological studies in the Alps, also were presented.

Several key questions were discussed. One dealt with evidence for and against extensive glaciation of the Qinghai-Xizang (Tibetan) Plateau during the last glacial stage. The current estimates range from a 10% increase in ice cover to complete coverage of the plateau by an extensive ice sheet. Prof. Li Jijun from the Department of Geography of the Lanzhou University argued, based on geomorphic information, that the ice cover during the last glacial stage was about 10% greater than present. Another key issue is whether the plateau was cold and dry or cold and wet during the last glacial stage. The latter condition would allow for greater growth of glaciers. The clear message from these discussions is the need for more research with better time control.

Based on a report by L. Thompson, Ohio State University, USA

4 Denmark

We are pleased to welcome Denmark as the newest member of our association. On 18 October 1988 Denmark applied for membership with the Danish

Society for Arctic Technology (SAT) as the Adhering Body. SAT was established in 1985 with the objective of creating an interdisciplinary contact between individuals and companies with knowledge and interest in cold regions technology. SAT has 200 individual members and 35 company members. The officers of SAT are as follows:

Chairman :

Mr. Gunnar P. Rosendahl, Director, Nuna-Tek (formerly Greenland Technical Organization, GTO)

Vice Chairman:

Mr. Henrik Mai, Managing Director, Arctic Consultant Group

Secretary General:

Mr. Thorkild Thorsen, M.Sc., Nuna-Tek Surveys.

The application of Denmark for membership was approved by mail ballot of Council Members and has been confirmed by a general meeting of SAT. The Board of SAT has approved that Denmark pay dues of \$250 per year in Group 3.

5 Finland

The Finnish Geotechnical Society sponsored the International Symposium on Frost in Geotechnical Engineering on March 13-15, 1989, in Saariselka, Finland. Approximately 150 researchers from around the world attended. Three sessions were held, including special lectures on the mechanics of freezing and thawing by B. Ladanyi, the frost heave properties of soils by D.M. Anderson, and frost protection in design and construction by R. Nordal. Other lectures were:

- * Simulation of freezing and thawing of soil materials by E.A. Bondarev
- * Frost problems in road construction by H. Brandt
- * Modeling of thermal soil behavior by M. Fremont
- * Frost susceptibility of soils by H. Jessberger
- * Frost protection of design and construction in Japan by F. Kohno
- * Preventative measures against frost action in soils by S. Kinoshita
- * Freezing and thawing in cylindrical coordinates by V.J. Lunardini
- * Preventative measures against frost action in soils by A. Phukan
- * Evaluation of frost heave properties of soils by S. Saarelainen
- * Adfreeze strength of soils by A.V. Sadovsky
- * Physical changes in clay due to frost action and

their effects on engineering structures by E. Chamberlain.

52 related papers were presented and discussed and were published in two volumes, available from Technical Research Center of Finland. Following the symposium there was a two-day field trip to observe roads and road construction techniques in Lapland. Methods of dealing with road icings, cracking and snow drifting were examined. The next symposium is scheduled for Anchorage, Alaska in 1993.

Based on a report by V. Lunardini, CRREL, USA

6 France

At the Council Meeting of 2 August 1988, France's application for membership was approved by unanimous vote. The IPA welcomes France as a member. The French Permafrost Association was formed on 22 April 1988.

The Executive Committee is composed of:

- * J. Aguirre - Puente, President
- * J. Malaurie, Vice - President
- * J. P. Lautridou, Treasurer
- * A. M. Cames - Pintaux, Secretary

7 Germany

The Second International Conference on Geomorphology took place at the University of Frankfurt between September 3 and 9, 1989. More than 650 abstracts of lectures and posters were accepted for presentation at this conference and are published. Permafrost related topics were mainly treated in section 5 (climate geomorphology), with a special subsection devoted to periglacial geomorphology. During several one-day field trips, relict permafrost and periglacial features were demonstrated.

A special symposium was devoted to "Polar Geomorphology" and took place before the main conference in Bremen (August 30 to September 3). It was organized by the Institute for Physical and Polar Geography of the University of Bremen (Professor G. Stablin). 28 papers were presented to 35 participants from 15 different countries. Most of the papers presented in Frankfurt and in Bremen will be published in scientific journals, mainly in the Zeitschrift für Geomorphologie or in Permafrost and Periglacial Processes.

A group of about 50 scientists, (mainly physical geographers) will visit the Liefdefjord area in northern Spitzbergen from June to August 1990. Geomorphological, geocological and geological studies will be undertaken. A small group visited the area this past summer and brought along some of the scientific equipment and accommodation material. The head of the project is Professor W. D. Blumel, Stuttgart.

No engineering work in permafrost regions is reported so far. For road construction in areas with seasonal frost action the requirements are ready to be published by the Research Institute for Traffic and Transportation (Forschungsgesellschaft für das Strassen und Verkehrswesen). Much activity is related to artificial ground freezing for application in tunneling (Mannheim, Dilsdorf) and in shaft sinking (Gorleben, Rheinberg).

Further information on activities in the Arctic and Antarctic are available from the Alfred Wegener Institute for Polar Research.

L. King and H.L. Jessberger

8 Japan

Dr. Fujino and his members conducted a field survey near Tuktoyaktuk from late February through mid-March, 1989. A ground radar system was employed to check the distributions of massive ice bodies.

Dr. Oho, of the Environmental Science Department of Hokkaido University, and his group conducted a field survey in Svalbard from mid-June through mid-August this summer. Main objectives were the measurement of the growth of a Pingo in Advendalen, hydrological study of ground water from glaciers, and recent developments of ice-wedge relation to the cracking process. During the previous year they installed ground temperature recorders and other necessary equipment at the site. Precise ground levelings were made to detect the recent upheaval of ground associated with pingo growth. A chemical analysis of the ground water was also performed on site.

Dr. Fukuda and his group conducted a field survey at Mt. Daisetsu in central Hokkaido where they had previously reported the presence of alpine permafrost. Geophysical surveys were made by means of

electrical resistivity and seismic profiling. According to a preliminary report, the permafrost table of alpine permafrost was estimated as 15 m thick. This reading matched a previous figure determined through annual ground temperature fluctuations.

Dr. Fukuda and his group will also conduct a field survey on permafrost occurrence in the Antarctic Peninsula area. They will cooperate with Prof. E. Retarnal from the University of Chile and Dr. J. Strelin of the Instituto Antarctica Argentina. They will visit King George Island, Seymour (Marimbio) Island, and James Ross Island. The expedition will start in mid-November and will end in late January, 1990.

M. Fukuda

9 Russia

Report from the U. S. S. R.

The annual meeting of the Scientific Council for Earth Cryology of the USSR Academy of Sciences was held in March, 1987 in Moscow. About 60 papers were discussed at 8 sessions. The Plenary papers were:

- * The problems of regional study
- * Landscape mapping
- * Construction of hydros in the Far North
- * Cryogeostuctures and its regionalizing
- * Gas-hydrate accumulation in subsea permafrost
- * The cryogenic factors in soil-meliosation process
- * Heat flow in the Earth crust and its deep freezing
- * Geocryological study for the Amur-Yakutsk railway construction

The progressive agenda of permafrost research is part of the Academician program of priority studies "Cryogenesis and a Development of the North," as was elaborated by the Scientific Council.

Important meetings held by the Academy included "Site Investigations for Oil and Gas Facilities in Tyumen in April, and "Cryolithogenesis on the Arctic Sea-shelf" in Murmansk during October.

Two books prepared by the Council and edited by "Nauka" in Moscow were A Geocryological Prediction by the Development of an Area (Geocryological Prognoz i Osvoenie Territorii) edited by V. V. Baulin, and A Snow Cover in Mountains and Avalanches (Snejnii Pokrov v Gorach i Lavini) edited by K.F. Voitkovski.

At the Council's March 1988 annual meeting in Moscow, approximately 70 papers and posters were presented. The plenary session included the following paper subjects:

- * The scientific basis of hydros construction in the North
- * The influence of the gas hydrate deposits on the cryogenic structure of the marine sediments
- * Icings and the underground ice
- * The geocryological monitoring by extraction and transportation of gas in permafrost
- * The geochemical methods of prospecting in permafrost
- * A treatment of the frozen rocks
- * Research methods in geocryology

Several meetings concerning geocryologic issues held during the year. At Tallinn in May the 11 th Baltic Conference on Soil Mechanics and Foundation Engineering was held. In September, the All Union Conference on the Physics and Mechanics of Ice met in Moscow, and the International Conference on Arctic Research met in Leningrad in December. In October, the officers of the IPA (P.I. Melnikov, V.P. Melnikov, A.P. Gorbunov and N.A. Grave) attended the National Permafrost Conference at the Lanzhou Institute of Glaciology and Geocryology in China, and took part in excursions to the Tien Shan glaciological station. An agreement of common work was made.

Books prepared by the Council and edited by "Nauka" included this year The Problems of Geocryology: The Russian Papers of the V International Permafrost Conference in Norway (Problemi Geocryologii) edited by P.I. Melnikov, and Thermodynamical problems of Frozen Soil Mechanics (Thermodynamiceskie Problemi Mehaniki Merzlich Gruntov).

Details of the International Symposium on Geocryological Studies in Arctic Regions held in Yamburg, West Siberia, August 1-10, 1989, are reported in a following section of this Bulletin.

N.A Grave

The Fifth Scientific-Practical Conference "Engineering and Geological Site Investigations within the Permafrost Zone" took place October 3-6, 1989, in Magadan, U.S.S.R. It was organized by the Department of Geocryology of Moscow State University and the Northeastern Trust of Engineering and Geological Site Investigations in Magadan, with the help of the Scientific and industrial Association on Construction and Site Investigations, according to the

drafts of the Scientific Board of the U.S.S.R. Academy of Sciences on Engineering Geology and Hydrology, the Academy's Board on Earth Cryology and the Academy's Lithological Committee.

This conference was attended by 208 specialists from nine trusts of the Engineering and Geological Site Investigations located within the permafrost zone, 10 project institutes, 33 research institutes and 26 education institutions from 29 cities in the U.S.S.R. as well as four participants from the U.S. and one from China. Fifteen papers were presented and discussed in the plenary sessions including three American papers. Poster papers were discussed in five parallel sessions, as follows:

- * Scientific foundations, techniques of engineering and geological site investigations
- * Problems of cryolithogenesis in regions of intensive industrial development
- * Experience and techniques of engineering and geological site investigations in permafrost zone
- * Engineering and geological forecast and measures on environmental protection under construction
- * Engineering geocryology and design of structures on perennially frozen soils.

Proceedings were published by Kolyma. Publishers were available to participant at the Conference.

E.D. Ershov and V.E. Roujansky

10 United States of America

Report from April 1989

The U.S. National Research Council has announced the new membership of the Committee on Permafrost. Members are Chairman Ted Vinson, Oregon State University; David Carter and Erk Reimnitz, U.S. Geological Survey; Chris Heuer, EXXON Production Research; Duane Miller, Miller Associates, Anchorage; Tom Osterkamp, University of Alaska; Don Hayley, EBA Engineering Consultants, Edmonton. The membership of the U.S. Committee/IPA remains the same: Brown (Chairman), Lovell (Vice-chairman), Gryc, Hopkins, Lunardini, and Tart. The Committee on Permafrost cosponsored with the American Society of Civil Engineers a workshop on Permafrost and Climate Change, February 6, 1989, in St. Paul, Minnesota, as part of the ASCE Fifth International Cold Regions Specialty Conference.

The Committee on Frost Action of the Transportation Research Board, U.S. National Research Council, held its annual meeting in Washington, D.C., January 23, 1989. David Esch, Alaska Department of Transportation, chaired the meeting which discussed the CRREL Frost's Effect Laboratory, frost heave test sites in Colorado, pavement damage during thawing, and research needs on soil stiffness, icing on paving materials, and frost heave models. The incoming chairman is Tom Kinney, University of Alaska.

The Working Group to form the International Arctic Science Committee met several times in late 1988 to prepare draft founding principles for the proposed Committee. The principles are under review in each of the eight founding countries. It is anticipated that the Committee will be formally organized in mid 1989. Other multi-national Arctic activities included the International Arctic Science Conference convened by the Soviet Academy of Sciences in Leningrad, December 12-15, 1988. Permafrost specialists met informally with P. I. Melnikov and V. P. Melnikov.

Report by J. Brown

Report from October 1989

Both the US Committee for IPA (USC/IPA) and the Committee on Permafrost within the National Research Council represent the permafrost interests of scientists and engineers throughout the United States (see IPA Newsletter Number 5 for memberships). Professional membership organizations and other committees perform numerous activities related to permafrost and seasonal frost. Following are reports of some of those activities.

The Committee on Permafrost cosponsored with the American Society of Civil Engineers a workshop on Permafrost and Climate Change, February 6, 1989, in St. Paul, Minnesota, as part of the ASCE Fifth International Cold Regions Specialty Conference. A special volume will be published by the ASCE.

The ASTM Committee D18 (Soil and Rock) formed a new Subcommittee, D18.19, Frozen Soil and Rock. The Subcommittee prepared draft standards on

1. axial load tests on piles in permafrost
2. laboratory frost susceptibility testing of soils; and
3. laboratory creep testing of frozen soils.

The Subcommittee is also responsible for updating an existing standard on the Visual/Manual Classification of Frozen Soils.

Subcommittee chairman is C.W. "Bill" Lovell, School of Engineering, Purdue University, West Lafayette, Indiana, 47907, USA.

The Technical Council for Cold Regions Engineering of the American Society of Civil Engineers has been in existence for over a decade and has a membership of over 4000. TCCRE has an Executive Committee, four Administrative Committees (Awards, Programs, Publications, and Research), and three Technical Committees (Education, Design and Construction, and Control and Prevention of Frost Action). The Council sponsors International Conferences on Cold Regions at two to three year intervals. The Fifth Conference was held in St. Paul, Minnesota, in February, 1989; the Sixth will be held in Hanover, New Hampshire, February 26-28, 1991. The Council also sponsors the preparation of monographs on various civil engineering activities in the cold regions. These publications are prepared by task groups of experienced engineering specialists. Present TCCRE chairman is Howard P. Thomas, Harding Lawson Associates, 601 East 57th Place, Anchorage, Alaska, 99518, USA.

Following discussions at Trondheim (August 1988) and Leningrad (December 1988), the U.S. Geological Survey organized a small workshop in Menlo Park, California, to discuss climate and permafrost measurements. In addition to U.S. participants lead by Arthur Lachenbruch, A. Judge (Canada) and V. Melnikov (USSR) attended. Comparison of circumarctic permafrost temperatures require uniform techniques. These discussions were continued in Yamburg (August 1989) by several workshop participants. The U.S. Geological Survey is also leading an U.S. interagency data activity to acquire long-term data sets that can be used in global change research. More information can be obtained from Bruce Molnia or Douglas Posson, U.S. Geological Survey, Reston, Virginia, 22092, USA.

A workshop on Cold Regions Engineering Research was held on November 30, 1988, in Hanover, New Hampshire. Over 40 engineers and scientists identified 14 research programs in 4 broad groups: offshore technology; watersheds, rivers and coastal zones; facilities infrastructure technology; and transportation infrastructure technology.

Robert Ettema, University of Iowa, led a group that considered topics on watersheds, rivers, and nearshore coastal processes and engineered structures. The offshore technology group, led by S. Shyan Sunder of MIT, considered programs in ice

technology, offshore geotechnology, materials science and pollution control. Virgil Lunardini of CRREL led the group on facilities infrastructure technology, which addressed the special problems in designing buildings, utilities and other public and private facilities in cold regions. The transportation infrastructure technology group, led by Ted Vinson of Oregon State University, considered the problems of transporting goods and personnel in support of resource development activities in cold regions. The group selected as its first priority the impact of global climatic change on the cold regions transportation infrastructure.

The workshop report was published by the University of Alaska-Fairbanks (UAF) in September, 1989, and is available through the School of Engineering at UAF. The editors of the report are Robert F. Carlson and John Zurling of the University of Alaska-Fairbanks and Ed Link, Technical Director of CRREL.

The Alaska Department of Transportation and Public Facilities completed a 20-year performance analysis on the Chitina insulated roadway study site. This site is believed to be the first permafrost roadway insulated with foamed polyethylene insulation. The insulation has survived well, but the roadway continues to be affected by thermal instability due to the warm permafrost (-0.5° C) and the warming effects of the side slopes. In the reconstruction of 30 miles of Glennallen to Tok Highway, 12.5 miles has been reinforced with 290,000 square yards of high strength geotextile to prevent spreading and cracking of the pavement. Design of the Bethel airport road has taken into account "greenhouse warming". A rate of air temperature warming of 0.6° C per 10 years was used to analyze future thaw-settlement. Extensive use of insulation and a trial installation of thermosyphons will be used to slow permafrost thaw.

The Circum-Pacific Map Project (CPMP) has added an Arctic Sheet, scale 1 :10,000,000, to the ongoing program of compiling and publishing geological and resource information of the Pacific Basin and surrounding land areas. The new Arctic base views the region from the Pacific Basin and covers the entire Arctic Ocean Basin and surrounding land areas. Compilation of thematic maps by an international panel of experts is underway and will include the following individual maps: geographic, geologic, geodynamic, plate tectonic, mineral resource, energy resource, and tectonic. The Base Map is available from the distributor, the American Association of Petroleum Geologists, AAPG Bookstore, P.O. Box 979, Tulsa,

Oklahoma 741 01, USA. For further information on the CPMP contact George Gryc, U.S. Geological Survey, 345 Middlefield Road, MS 952, Menlo Park, CA 94025, USA.

A limited number of U.S. published permafrost volumes are still available:

- * Permafrost: A Bibliography 1978-1982 (GD 14)
- * Permafrost Bibliography update 1983-1987 (GD 21)
- * Proceedings: Permafrost Fourth international Conference, Volume 1 only, 1524 pages.

The first two items are available for \$5.00 each from the World Data Center for Glaciology, CIRES, University of Colorado, Boulder, CO 80309, USA. The last item is available prepaid for \$45.00 from Bruce Molnia, U.S. Geological Survey, MS 917, Reston, VA 22092, USA. All prices quoted are in U.S. currency.

The Cold Regions Science and Technology bibliography is now available both on-line and as a subscription on a CD-ROM. For on-line searches contact ORBIT Search Service, 8000 Westpark Drive, Mclean, Virginia 22102, USA, (703) 442-0900 or (800) 421 -7229. For CD-ROM contact Fred Durr, National Information Services Corporation (NISC), Suite 6, Wyman Towers, 31 00 St. Paul Street, Baltimore, Maryland 21218, USA, (301) 243-0797; FAX (301) 454-8061. Subscription \$595.00 per year, updated semiannually.

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