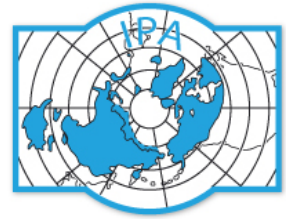
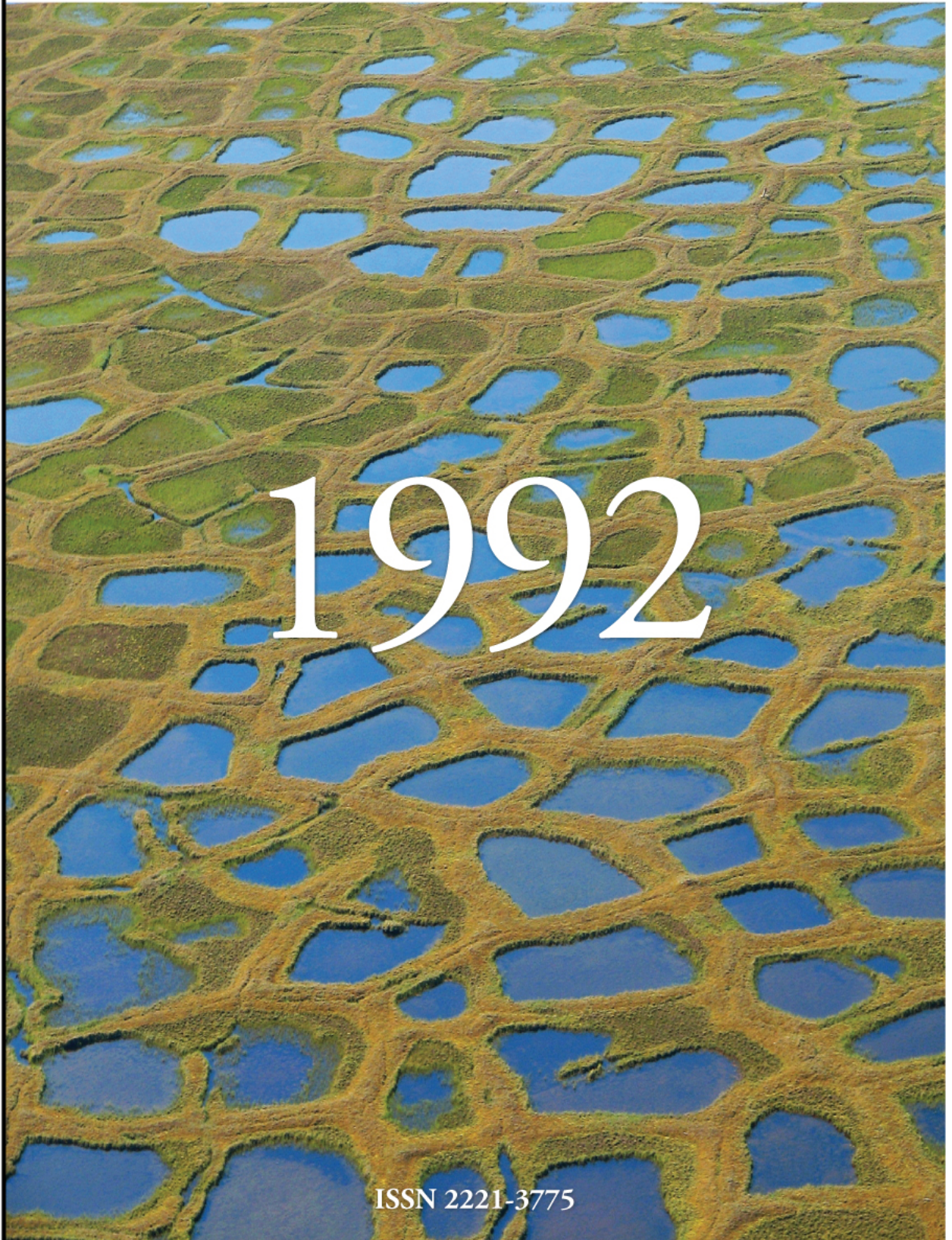


COUNTRY REPORTS



Reports from the Adhering Bodies of the International Permafrost Association



1992

ISSN 2221-3775

1 Argentina (and South American Partners)

The International Geological Correlation Programme Project No. 297, "Geocryology of the Americas," will have its fourth meeting together with the Sixth International Conference on Permafrost in Beijing. It will be joined by the IPA Working Group on Periglacial Environments. Those interested in presenting papers for these meetings should send them to Cui Zhijiu, Department of Geography, Peking University, Beijing, China, before April 30, 1993. Plans are to present these papers to the journal *Permafrost and Periglacial Processes* for publication. More information on the IGCP meeting can be obtained from Arturo Corte or Jean-Pierre Lautridou.

Over the past year or more, a number of international scientists have visited field sites and laboratories in Argentina, including:

A. Gorbunov from Alma Ata, who visited several rock glacier sites.

Tatjana Kademtsova from Moscow, who is studying the relationship of snow depth to permafrost distribution in the Andes.

Xie Zichu from Lanzhou, who discussed student exchanges, and Wei Yaoshi, a student, who is now conducting field studies on pre-Cordilleran glaciation and geocryology.

Thea Vogt from Strasbourg, who conducted field research on calcium carbonate precipitation under cryogenic conditions.

Lothar Schrott, a student from Heidelberg University, spent two years in the IANIGLA conducting field studies on the relationship of incoming radiation and rock glaciers.

Report by Arturo E. Corte

2 Canada

Report from June 1992

Permafrost research in Canada is undertaken within various agencies and organizations. Most work is carried out, however, in universities, consulting engineering companies and government laboratories (see *Frozen Ground* No. 10 for a review of permafrost research at the Geological Survey of Canada). This

report comprises a short note about research on pipelines in permafrost being undertaken at Carleton University, Ottawa, and a review of permafrost engineering work done at one of Canada's major consulting engineering companies, EBA Engineering Consultants Ltd., of Edmonton.

Chilled Pipelines and Frozen Soils:

The Geotechnical Science Laboratories of Carleton University, Ottawa, cooperate with the French institutions, Laboratoire Central des Ponts et Chaussées and Centre National de la Recherche Scientifique, in operating a large controlled-environment laboratory in Caen, France. The experiments study the effects of natural gas pipelines in northern terrain. The passage of a buried chilled gas pipeline across the boundary between permafrost and unfrozen, frost-susceptible ground is simulated. Frost heave of the ground surface, stresses in the ground and soil displacement are being monitored. Data from the first phase of the experiment are presently being analyzed. High stresses develop within the frozen soil and the deformation of the pipe is characterized by a sharp inflection at the interface between the permafrost body and the adjacent soil. Sophisticated instrumentation has given much information on the thermodynamics of freezing soil. For further information contact Peter Williams or Michael Smith, Geotechnical Science Laboratory, Carleton University, Ottawa.

Consulting Engineers' Contribution to Permafrost R and D:

Consulting engineers have made substantial contributions to the advancement of permafrost engineering and science in North America over the past 20 years. The research is "demand-driven," with projects usually requiring unique engineering solutions within a set time frame and a fixed budget. Consultants also fund their own internal research in expectation that the product will provide a competitive edge. Internal R and D is often directed at sampling and testing tools or computer programs for improved analyses or possible sale.

Exploration for oil and gas in the western Canadian Arctic, in the early 1970s, provided unique opportunities for consultants to carry out industry-funded research. An immediate need was created to develop a methodology for permafrost terrain analysis, improve predictive capabilities for design and for innovative construction techniques. The following briefly describes applied research carried out

at EBA Engineering Consultants Ltd. and how it has helped to close the technology gap between fundamental research and design and construction practice.

One of the most significant contributions of the consulting industry has been the development of a number of computer programs to perform ground thermal analyses. EBA developed a finite element program that models transient heat conduction in the ground for the purpose of predicting thaw or freezing. The program can accommodate phase change over a range of temperatures which can be used to model the variation of unfrozen water content with temperature. The boundary conditions can be applied through a number of options such as meteorological data applied at the ground surface, constant heat transfer at an interface or constant temperature applied at a boundary. The program can also simulate a change of the freezing domain geometry due to thaw subsidence. It is commonly used to simulate the thermal behavior of buried pipelines, utilidor systems, heat pipe foundations, and frozen backfill for mines in permafrost. Many years of experience has established geothermal predictions as a design tool for most northern projects. It is also being used by terrain scientists to model geomorphic processes.

One of the construction methods for artificial islands used for drilling platforms in the Alaskan Beaufort Sea has been the use of frozen granular material excavated from pits and quames. EBA carried out a testing program to evaluate the engineering properties of frozen granular fill dumped through seawater at its freezing point. A number of special tests were designed to evaluate the material properties including: compacted and non-compacted densities of frozen and thawed soils; thaw strain and consolidation behavior; thermal conductivity; angle of repose; sedimentation characteristics; shear strengths for frozen and thawed soils; and the in-place density of the mass of frozen lumps placed under water at sub-zero temperatures. A number of conclusions were drawn from the laboratory results. The two most significant are: 1) the lump sizes and gradation influence the density of the fill, and 2) the strength of a subsea structure formed from frozen lumps can exceed the strength of a similar structure built from thawed fill material.

A number of studies of subsidence caused by production of hydrocarbons through permafrost have been undertaken at EBA. The theoretical analysis considered three different aspects. First- the transient thermal changes due to the temperature boundary condition on the well casing; second-prediction of the

deformation of the soil due to thaw; and third-the development of stresses and strains on the well casing. A special testing program was carried out by EBA on samples from a deep core drilled to provide data throughout the subsea permafrost horizon. The testing program was developed to assess thaw strains and consolidation properties under high stress conditions in a temperature-controlled odometer. The specially designed apparatus could measure stresses, changes in pore pressure and volumetric strains both in the vertical and radial directions upon thaw.

Another phase of the testing program established a correlation between geophysical and physical properties of the deep subsea permafrost. This component was carried out as contract research for the Geological Survey of Canada. The program was developed to measure seismic S and P wave velocities on undisturbed samples at in-situ stresses and temperatures and to correlate the laboratory results with downhole measurements.

EBA recently carried out a comparative study of two different frost heave testing procedures to select the best method for production testing for a proposed natural gas pipeline across Alaska. The two methods selected were the quick freezing insulated warm end test and the ramped temperature test. A number of improvements were made to standard equipment to achieve the desired precision during testing. The test was carried out in a water-cooled environmental enclosure instead of in a cold room. An in-line feedback temperature control system coupled with moderators and multiple heaters were provided to produce temperature stability of $\pm 0.1^\circ\text{C}$ at both end plates. The test cell was designed as a solid barrel inserted into an insulated jacket and a temperature gradient control was developed to promote one-dimensional frost front advancement during testing. The test method was developed and overview provided by a committee of experts assembled by the client.

A recent research program at EBA was a study of the mechanical behavior of saline permafrost. This study was carried out under contract for the Geological Survey of Canada with the objective of further developing the understanding of strength and time-dependent deformation properties of frozen saline soils. The study investigated the influence of soil type, salinity concentration, confining stress and strain rates on the mechanical behavior of three different frozen soils.

Research carried out within the consulting industry allows firms to develop expertise that makes them

more competitive, improving opportunities for international marketing of services. It complements and builds on the more fundamental research carried out at universities. Firms currently operating in the Canadian and Alaskan arctic regions have developed unique skills for dealing with design and construction on permafrost terrain. The skills related to planning and executing field programs, project management, analyses and design methods will be needed for development of other circumpolar regions.

Prepared by Elizabeth Hivon and Don Hayley
EBA Engineering Consultants, Ltd., Edmonton

Report from December 1992

During the winter of 1991-92, Canada had issued a formal invitation to the IPA to hold the VII International Conference on Permafrost in 1998 in Yellowknife, NWT, Canada. The invitation was issued by the National Research Council of Canada, after discussions with the Geological Survey of Canada, the Canadian Geotechnical Society, and the Science Institute of the Northwest Territories, each of which has agreed to support the organization of the conference (see IPA Council discussion, p. 6).

The Canadian National Committee for the International Permafrost Association (CNC/IPA) held its annual meeting in Toronto on 28 October 1992, directly following the Canadian Geotechnical Conference. Two new members of the committee were welcomed: Michel Allard, Centre d'études Nordiques, Université Laval, Quebec; and J.F. (Derick) Nixon, Nixon Geotech Limited, Calgary.

At the meeting, the Committee received reports from the meeting of the Council of the IPA, the Cold Regions Division of the Canadian Geotechnical Society, the Permafrost Committee of the Science Institute of the Northwest Territories, and the Canadian Polar Commission. Brief progress reports were presented on IPA activities, particularly the Multilingual Glossary project of the Terminology Working Group, and the Circumarctic Permafrost Map project. Communications issues, both internationally and within Canada, were also discussed. The next meeting of the CNC/IPA will be held in association with the 46th Canadian Geotechnical Conference, in Saskatoon, Saskatchewan, 27-29 September 1993.

The 45th Annual Meeting of the Canadian Geotechnical Society was held in Toronto, 26-28 October 1992. The Cold Regions Division sponsored a session on Permafrost Engineering, in which eight

papers were presented dealing with:

- * The distribution of landslides in the Mackenzie Valley
- * The engineering geology of Richards Island, Mackenzie Delta
- * The strength and time-dependent deformation of frozen saline soils
- * Pile load testing of grouted piles in the western Arctic
- * The prediction of creep settlements of foundations in permafrost on the basis of in situ tests
- * Investigation of permafrost in the foundations of dikes at the Gull Generating Station in northern Manitoba
- * The occurrence of permafrost in bedrock and its consequences
- * Geotechnical investigations of permafrost in Ungava (northern Quebec) using ground-probing radar.

In addition, J.M. Konrad, Laval University, Quebec, gave the Geotechnical Colloquium on the topic of "Frost Heave and Engineering Structures." Several other papers on frost-related topics were also presented in other sessions.

The 46th Canadian Geotechnical Conference will include a session on "Research Needs in Cold Regions Geotechnology." The conference will also include regular sessions for submitted papers. Abstracts of 500 words or less should be submitted by 4 January 1993. Further information can be obtained from Dennis Pufahl, Dept. of Civil Engineering, University of Saskatchewan, Saskatoon, Saskatchewan S7N 0W0.

The 1993- Roger J.E. Brown Award, which was established in 1986 to honor the memory of the renowned Canadian permafrost scientist, was awarded jointly to Pavel Kurfurst and Scott Dallimore of the Geological Society of Canada. for their paper "Engineering Geology of Nearshore Areas off Richards Island, NWT: A Comparison of Stable and Actively Eroding Coastlines," in the *Canadian Geotechnical Journal* (vol. 28, no. 2, p. 179-188) and also in recognition of their many years of involvement in studies of the geotechnical properties of permafrost materials in the shore zone of the Beaufort Sea.

Prepared by J.A. Heginbottom
Secretary, CNCPA

3 China

Report from June 1992

The new Director of the Lanzhou Institute of Glaciology and Geocryology (LIGG) is Cheng Guodong.

The Fourth Council (1992-1995) of the Chinese Society of Glaciology and Geocryology (CSGG) has been established. The new officers of the CSGG are:

Honorary President--Shi Yafeng (LIGG); President--Cheng Guodong (LIGG); Vice Presidents--Cui Zhijiu (Beijing University), Huang Maohuar (LIGG), Xio Yinqi (Heilongjiang Provincial Research Institute of Water Conservancy), Ding Jingkan (Northwest Institute of Chinese Railway Academy of Sciences).

The new Editorial Board of the Journal of Glaciology and Geocryology has been approved by the CSGG Council: Consulting Editor--Shi Yafeng (LIGG); Editor in Chief--Huang Maohuan (LIGG); Deputy Chief Editors--He Xing (Standing) (LIGG) and Xu Xiaozu (LIGG).

Report from December 1992

The Lanzhou Institute of Glaciology and Geocryology has finished construction of the State Key Laboratory of Frozen Soil Engineering. The Laboratory is located in a five-floor building with a 3846 m² construction area, including 520 m² of cold rooms. It has various kinds of facilities which can be used to perform almost any type of laboratory testing of frozen soil. Experts and graduate students from all over the world are encouraged (welcomed) to work at this Laboratory; the Laboratory will cover all research and living expenses except international transportation.

The State Key Laboratory has recently completed a 500 km geological survey for a pending highway on a permafrost area in Qinghai Province, mainly through the use of a Radar Detecting System imported from Canada.

Invited by the Transportation Institute of Russia, a five-person expert group, organized by the Railway Ministry of China, performed a 2000-km field expedition for the pending Bei-Ar Railway in Russia in August 1992.

A working group for compiling new "Norms of Construction in Permafrost Areas" organized by the Construction Ministry of China has been working on the Norms for three years. A variety of engineering testing projects and field investigations of completed

construction have been accomplished this year.

Prepared by Zhu Yuanlin
Secretary General, Chinese Society of Glaciology and Geocryology

4 France

The Groupe de Recherches Arctiques (GDR 0490) of CNRS was created about 12 years ago to encourage collaboration among specialists from different disciplines. Presently, 12 laboratories are represented by about 20 research workers. The responsible person is Th. Brassard, Laboratoire de Géographie Physique du CNRS, UFR des Lettres et Sciences Humaines, Université de Franche Comté, 30 rue Megevand, F-25030 Besançon.

The GDR scientific activities arise from the geographical interest in Arctic regions and because the GDR has management responsibility for the French Spitsbergen Station. Researchers in early times came to the GDR to receive technical and logistic help to study aspects of the Arctic. Later, teams of research workers and students, acting every year around this station, found common themes of research. Presently there are two principal directions:

- * Evaluation of Arctic geosystems evolution
- * Aboriginal point of view of nature and culture

The whole problem and the motivation of these studies is environmental protection.

The French Institute for Polar Research and Technology (IFRTP) was created recently. The Scientific Council will be constituted before the beginning of 1993, but already a first event attached to this Institute is programmed. The colloquy "Arctic and Antarctic Polar Research-2000 Outlook." organized by the French Academy of Sciences and the IFRTP, was scheduled to be held in Paris from 16-18 December 1992. From 8-10 December 1992, an important congress is to be held in Paris which gathers together all the civil engineering specialties--Les Bâtisseurs du Cadre de Vie, Premières Assises du Génie Civil. This conference is organized by several partners: ministries, professional federations, contracting authorities and building companies. The scientific organization is the responsibility of two scientific associations: The National Council of Civil Engineers and Scientists and the Liaison Committee of civil Engineering Associations. J. Aguirre-Puente, President of the French Permafrost Association, is a

member of the Scientific Committee and Chairman of one of the scientific sessions, "Arctic Works and Use of Ground Freezing in Civil Engineering." The aim of the session is to treat problems encountered in polar regions and under rigorous winter conditions and the use of artificial soil freezing.

With the help of a research contract from the Ministry of Research and Technology, the group Freezing and Sublimation of the Laboratoire d'Aérothermique du CNRS is conducting a study to compare results from numerical models and measurements made in northern Quebec, and to consider physical-chemical phenomena of frost heave in fine-textured soils. The comparison of numerical models and field measurements is the object of collaboration between the Freezing and Sublimation Group and the Northern Studies Centre of the Université Laval de Québec.

Prepared by J. Aguirre-Puente

5 Germany

After reunification of Germany and the beginning of the reorganization of the governmental and university institutes of the former German Democratic Republic, scientific cooperation has started and efforts are being made for joint projects at many places. Special mention is made of the establishment of a multi-disciplinary polar branch "Kontinentale Polarforschung" at Potsdam by the Alfred Wegener Institute for Polar Research. The aim is to offer good research opportunities for polar scientists of the former GDR at a central place within East Germany. The research institution includes 40 full-time positions. The library of the former polar research in the GDR has been integrated in this institution and will be supplemented with literature from the western countries. The following topics will be mainly researched in Potsdam:

1. Atmospheric circulation in polar areas (atmospheric aerosols)
2. Periglacial research
 - a) Quantitative analysis of cryogenic weathering and denudation processes (with physical and geochemical methods)
 - b) Permafrost, periglacial processes and "global change"
3. Reconstruction of the Holocene glaciation history from sea sediments
4. Continental ice sheets as archives for "global

change"

The National German Permafrost Committee is trying to contribute to these national efforts and distributes regularly a "Permafrost Circular" to permafrost scientists in Germany together with the IPA News Bulletin *Frozen Ground*.

The international and interdisciplinary "SPE" expedition to Liefdefjorden, northern Spitsbergen, will again take place in summer 1992. A group of 11 geographers from the universities of Basel, Giessen and Heidelberg will study processes mainly related to snow melt between May 15 and July 10. The main group, from 12 universities, will consist of 28 geoscientists and biologists with an additional marine-oriented group. Permafrost-related studies include periglacial geomorphology (ground ice and thermal erosion), glacial geomorphology (e.g. types of moraines in a permafrost environment), fluvial sediment transport and general permafrost ecology. Most of the groups listed in *Frozen Ground* No. 8 (p. 9-10) will again participate in this last Spitsbergen expedition. The base camp at Liefdefjorden, erected in the fall of 1989, will be closed at the end of August 1992 and removed. Results of the expedition 1990-91 were presented during a DFG-sponsored symposium in Stuttgart and will be published later this year in a text volume (in Stuttgart) and in a data volume (in Basel), respectively.

Engineering activities in Germany are related to artificial ground freezing for application in shaft sinking. Further permafrost-related, applied scientific activities are focused on the distribution of alpine permafrost in the Swiss Alps (Zermatt) and German Alps (Zugspitze).

Prepared by Lorenz King
Justus Liebig-Universität

6 Japan

Beginning in summer 1992, Japan and Russia will undertake joint permafrost studies. The program described below had its start in spring 1990 when the cities of Sapporo and Novosibirsk established sister city relations. Both cities agreed to support scientific exchange programs among institutes located in each city. The Siberian Branch of the Academy of Sciences in Novosibirsk asked the Permafrost Institute in Yakutsk to develop a joint scientific exchange program with the Institute of Low Temperature Science (ILTS) in Sapporo. Dr. Kamensky, Director, Permafrost Institute,

and Professor Fukuda exchanged proposals. In November 1990, Professors Fukuda and Yoshida visited both the Permafrost Institute and Biological Institute in Yakutsk. Agreement was reached to start preparations for a joint exchange program related to physical and biological aspects of permafrost. In May 1991, Dr. Kamensky and Dr. Balobaev visited Sapporo to complete the proposals for the exchange. During the Sapporo meetings, scientists from the Center for Global Environmental Research of the National Institute of Environmental Research in Tsukuba discussed joint studies on the monitoring of methane emissions from permafrost areas. The following resulted from these discussions and will take place in summer 1992.

1) Permafrost Group: Institute of Low Temperature Science (ILTS) and the Permafrost Institute.

Main objective: Permafrost occurrence and genesis related to climatic changes; permafrost changes influenced by recent global warming trends of climate. Main areas of survey: Lena River delta near Tiksi and Yenisey River area near Igaruga.

2) Biology Group: ILTS and Biological Institute.

Main objective: Biogeography, populations and community ecology of plants and insects in Siberian permafrost region.

Main areas of survey: Upper, middle and lower reaches of Lena River.

3) Forest Research Group: Forest Research Institute (FRI, Sapporo) and Biological Institute.

Main objective: Carbon storage and carbon dioxide budget in permafrost regions of Siberian forest ecosystems.

Main areas of survey: Taiga region near Yakutsk

4) Geochemistry Group: Department of Sanitation and Environmental Engineering (DSEE), Hokkaido University; Geochemistry Laboratory, Permafrost Institute; and Department of Cryolithology and Glaciology, Moscow State University.

Main objectives: Monitoring of atmospheric aerosols and emissions of methane from taiga.

Main areas of survey: Near Tiksi and Yakutsk.

(5) *Atmospheric Methane Monitoring Group*: Center for Global Environmental Research (CGER) (Tsukuba) and the Permafrost Institute.

Main objective: Monitoring of atmospheric methane concentration.

Main areas of surveys: Near Tiksi and Yakutsk. The program is planned for three years.

A group of specialists will meet in Japan in winter 1992-93 for further analyses and discussions of the investigations. An international symposium is planned to be held in either Yakutsk or Sapporo in 1995. Other Japanese participants involved are S. Yoshida (ILTS), N. Takahashi (Botanical Gardens, FRI), S. Ohta (DSEE), and G. Imone (CGER). Further information on the joint program can be obtained from Professor Fukuda.

Prepared by Masami Fukuda, Hokkaido University

7 Russia

Report from June 1992

Several anniversaries were commemorated in Yakutsk on November 1, 1991. Fifty years of systematic permafrost research investigations and the 30th anniversary of the Permafrost Institute of the Siberian Division of the Academy of Sciences were celebrated at a special session. Greetings and congratulations were presented by Academician Koptjug of the Siberian Division of the Academy and by representatives of the Yakutian Republic. A research station was first organized in Yakutsk by the Academy in 1941. This followed the discovery in 1940 of a large supply of underground water under the frozen ground of central Yakutia. In 1956, the station became the North-East Department of Moscow's Obruchev Institute. In 1957-58, geocryological and glaciological research were carried under the International Geophysical Year at a special high mountain station considered to be the Cold Pole of the Northern Hemisphere. In 1960-61, the Permafrost Institute was formed and Pavel Ivanovich Melnikov became its permanent director. The research of the Institute dealt with permafrost and its effects on construction, mining, agriculture and other human activities in the North. In 1969 Academician Melnikov organized the first international field excursion to Yakutia, thus making it feasible to host, in Yakutsk, the Second International Conference on Permafrost in 1973.

The work of the Institute has attained international recognition. Results of fundamental field and experimental investigations on thermokarst, thermal erosion and heat exchange were used in the development of northern and central Yakutia. Many geocryological, landscape, and hydrogeological maps were prepared by the Institute. Recently the Institute has begun participation in the study and monitoring of the cryolithosphere in connection with global climate change. These topics were presented in *Frozen*

Ground No. 10, and result in part from the recommendations of the Intergovernmental Panel on Climate Change and its Working Group II on Impacts Assessment. Academician Melnikov has played a leading role in developing the report on cryosphere.

Report by N.A. Grave, Secretary
Russian National Permafrost Committee *Report from December 1992*

Climate Change and Permafrost

Permafrost studies in Russia continue within the limits of state scientific-technological programs according to the activity of WMO-UNEP Intergovernmental Panel of Climate Change (see *Frozen Ground*, no. 10, p. 13, 1991). Some preliminary results of 1992 research work can be summarized as follows:

The assessment of changes in climate parameters was continued. These are based on data from meteorological stations and on ground temperature data for the upper layers of permafrost, obtained from permafrost monitoring test sites in the far north of Western Siberia and European Russia. It was found that in the western Siberian tundra contemporary climate warming is not clearly expressed. Modern climate ameliorations and deteriorations observed are within the limits of natural fluctuation. The trend of natural degradation of permafrost is obtained by temperature measurements in boreholes, though the period of observation is too short and could coincide with one of the short-wave climate fluctuations.

A more distinctive degradation of permafrost under different natural conditions has been established in the northern part of the European portion of Russia (Vorkuta region, Ust Perchora, Kozotaicha). Since 1970 the temperature of the upper 20-m layer of frozen ground has been rising, the depth of seasonal thaw increasing, and the permafrost table lowering.

Climatic warming during the last few decades, beginning in the 1950s, is clearly expressed in the continental area of permafrost (Yakutsk). A sign of long-term warming of the permafrost in Yakutsk is the slow thawing of its bottom layers—some millimeters per year.

Experimental studies are in progress of special facilities to protect construction based on frozen ground from destruction due to warming of foundations and thus diminished bearing capacity. The results allow us to recommend the use of artificial cooling of foundations combined with thermoinsulation. It is calculated that in Yakutsk, using such a method, the

temperature of a foundation might be lowered from -3°C to -13°C and the construction could be kept from being destroyed during 180 years of climatic warming.

The dynamics of arctic coastal areas are being studied on special test sites, situated in the deltas of the two biggest rivers of Siberia—the Lena and Kolyma rivers. Using benchmarks and airphotos it was found that the rate of shoreline retreat through thermoerosion and abrasion where the ground is very icy varies from year to year. The maximum rate of 36 m/yr was observed in the Kolyma River delta; 15–20 m was observed in the Lena delta. The average velocity of shoreline retreat in the area is 1–4 m/yr.

The research program is being accomplished by Russian Academy institutes, Ministry institutes, and Moscow State University in cooperation with the Institute of Low Temperature Science (Japan) and the Geological Survey of Canada. Detailed results will be published.

In 1991–1992 the Scientific Council on Earth Cryology issued through Nauka (in Russian):

1. *Denudation in the Cryolithozone*. A.J. Popov, ed.
2. *The Upper Horizon of Permafrost*. P.I. Melnikov and Yu. U. Shur, ed.
3. *Engineering Geocryological Problems in the Transbaikal Area*, V.T. Balobaev and M.R. Gavrilova, ed.

Prepared by N.A. Grave

Global Ecological Monitoring Project

The International Workshop, Global Ecological Monitoring Project was held 8–12 August 1992 in Dubna, Russia, organized by The Ecological Station of Environmental Control (ESCOS), World Laboratory Branch, Russia, and the Lawrence Livermore National Laboratory, California, USA. About 200 representatives of governmental and non-governmental agencies, scientists and managers of defense-related industries from the United States, Russia, Ukraine, Kazakhstan, Lithuania, Italy and China participated.

The participants in the workshop reviewed evidence that there is danger to human life and welfare in major regions of our planet associated with extreme ecological damage, especially in areas of republics in the territory of the former Soviet Union, including some regions of the Arctic.

An appeal of the participants in the workshop "To the Governments of the USA, Russia, Ukraine, Kazakhstan, Lithuania and the People's Republic of China" signed by Edward Teller (USA), Yevgeniy Velikhov (Russia) and Antonino Zichichi, President of the World Laboratory (Italy) stressed that an essential condition for diminishing the hazards to human welfare of these damaged ecosystems is monitoring major changes in the native biota and the overall health of the resident people, along with measurement of ongoing anthropogenic changes in environmental quality indices. An important step in addressing these problems would be the creation of an integrated ecological monitoring system that should include space-, air- and land-based measurements.

Continuation of the Arctic environment from both existing and potential sources located within the former Soviet Union's territory, as well as transport processes, i.e. movements of pollutants toward the neighboring countries, and the present state of the Russian Arctic environment were discussed in a paper presented by V.E. Roujansky, ESCOS. It pointed out that the geoecological mapping of the permafrost zone is essential to the understanding of the accumulation and release of pollutants in the active layer and in perennially frozen ground and migration of pollutants in permafrost.

Submitted by V.E. Roujansky
ESCOS World Laboratory Branch

8 United States of America

Report from June 1992

The IPA activities in the United States are supported by several organizations and individuals. Financial contributions for the annual IPA fees are provided directly to the IPA Secretary General. Thus far in 1992, contributors include:

- * Association of American Geographers (AAG)
- * American Society of Civil Engineers (ASCE)
- * American Society of Mechanical Engineers (ASME)
- * Golder Associates, Bucky Tart, Anchorage, Alaska
- * Streamborn Environment, Bill and Douglas Lovell, Berkeley, California

In addition, several government agencies are providing valuable indirect support of IPA activities, including the Cold Regions Research and Engineering Laboratory (CRREL) and the U.S. Geological Survey (USGS). The National Science Foundation has awarded the

University of Colorado a grant to provide travel assistance to U.S. authors to attend the Sixth International Conference on Permafrost. The U.S. National Academy of Sciences is hosting the IPA Council meetings in Washington, D.C., in August 1992.

Current membership on the U.S. Committee for IPA includes Bill Lovell, Chairman (Purdue University); Bernard Hallet, Vice Chairman (University of Washington); Ed Link, Secretary (CRREL); George Gryc (USGS), Bucky Tart (Golder Associates and ASCE liaison). Other liaison members are John Zarling (University of Alaska) for the ASME and Ron Abler for the AAG. Bruce Hanshaw is the staff representative from the National Research Council (NRC) and its Board on Earth Sciences and Resources.

The ASCE Technical Council on Cold Regions Engineering (TCCRE) recently announced the decision to expand the scope of the former "Committee on Control and Prevention of Frost Action" to include the consideration of permafrost. The reconstituted committee will be the "Committee on Frozen Ground." This decision resulted from an in-depth study by a TCCRE Task Force following the announcement of the NRC's Polar Research Board to discontinue activities of its long-standing Committee on Permafrost. Gary Guymon is the chairman of the newly designated committee. Members of the Task Force were Howard Thomas, David Esch, Frank Sayles and Bucky Tart. Additional information can be obtained from Gary Guymon, Department of Civil Engineering, University of California-Irvine, Irvine, California 927 17.

The NRC's Transportation Research Board Committee on Frost Action (A2L04) met on January 13, 1992, in Washington, D.C., during the TRB Annual Meeting. The Committee is chaired by Tom Kimey, Shannon and Wilson and University of Alaska, Fairbanks. The Committee sponsored and cohosted two sessions at the Annual Meeting entitled "Pavement performance during freezing and thawing" and "Physical and chemical aspects of soil freezing." During the Committee meeting presentations were given on the thermal impact of a chilled buried gas pipeline at high-way crossings, the Minnesota Road Research Project, the Seasonal Monitoring Program of the TRB's Strategic Highway Research Program (SHRP), and the newly formed Permafrost Technology Foundation in Fairbanks. The Committee periodically reviews research needs associated with freezing and thawing and plans to publish these findings in 1993.

David Esch, currently at the SHRP, reports that a pilot program to evaluate monitoring instrumentation is underway at sites in New York and Idaho. The instrumentation includes five types of soil moisture probes, two temperature measurements systems, an electrical soil resistance frost depth gauge and a water level monitor. Several designs of Time Domain Reflectometry (TDR) probes are included in the evaluation. The results of the pilot project will be utilized at 64 monitoring sites throughout North America. Additional information can be obtained from SHRP, 8 18 Connecticut Avenue, NW, 4th Floor, Washington, DC 20006 (Fax 202 223 2875).

The Institute of Arctic and Alpine Research, University of Colorado, Boulder, hosted the 22nd Arctic Workshop and the International Workshop on Classification of Circumpolar Arctic Vegetation March 5-7, 1992. A series of special sessions on the National Science Foundation's new program, Paleoclimate of Arctic Lakes and Estuaries (PALE), reported recent results from throughout the Arctic. The Vegetation workshop resulted in a series of resolutions, including the decision to prepare a circumpolar vegetation map of the Arctic. Initial results from the new Synthetic Aperture Radar (SAR) satellite were presented for an area in northern Alaska at which hydrological and active layer measurements have been obtained for the past five or more years. Copies of the abstract volume may be still available from INSTAAR, Campus Box 450, University of Colorado, Boulder, Colorado 80309-0450.

Bruce Molnia, US Geological Survey, reports the following permafrost activities of the USGS in the Arctic and Alaska. Precision borehole temperature measurements and analysis continue in Northern Alaska. In addition, six automated climate-monitoring stations were installed in 1991 to provide surface energy parameters for further analyzing the permafrost temperature changes. A gas hydrate project is focused on identifying favorable locations for testing gas-hydrate production schemes, examining the flux of methane in permafrost regions and documenting hydrate-related problems associated with oil and gas drilling and production. In a coastal erosion study in northeast Alaska observations reveal a major change in rates of erosion and accretion in the last 200 years. A continuing study in Northern Alaska of the warm period observed between 9000 and 10,000 years ago may provide a possible high latitude analog for future warming scenarios. Additional information on these activities and on other U.S. government research in the Arctic is reported in the journal *Arctic Research of the United States* (available from the National Science Foundation, DPP, Room 620, Washington, D.C.

20550).

In May 1992 the U.S. and Russia renegotiated their agreement on Cooperation in the Field of Environmental Protection. One program under the joint memorandum is Area X: Arctic and Subarctic Ecosystems. Included are several permafrost activities related to oil and gas development and data and mapping. Dr. Jerry Brown is the co-chair of Area X and can provide additional information.

Report by Jerry Brown

Report from December 1992

A joint US-Russian seminar on cryosols and global change was held in Pushchino, Russia. 15-16 November 1992, following the First International Conference on Cryopedology (see Miscellaneous). The seminar was sponsored by the National Science Foundation under the leadership of Chien Lu Ping, University of Alaska. A total of 18 US scientists attended, including representatives of the Soil Conservation Service and its Soil Survey Division and the LJS Geological Survey. Other international attendees from the conference also participated. Seven topics were addressed, including soil mapping, gas exchange, soil climate, soil organic matter, microbial activity, geochemical cycling, and agriculture and land use. A workshop report will be available.