

# A TRIP TO MOSCOW

By Ferris Webster

IN mid-May 1988, I had the opportunity to go to Moscow as part of a delegation to the first meeting of the U.S./U.S.S.R. Joint Working Group on Earth Sciences. The meeting was held under the *Agreement Between the United States of America and the Union of Soviet Socialist Republics concerning Cooperation in the Exploration and Use of Outer Space for Peaceful Purposes*, signed in April 1987. The agreement is implemented by the U.S. National Aeronautics and Space Administration (NASA) and the U.S.S.R. Academy of Sciences.

The current urgency of issues related to global change in the Earth's environment stimulated NASA to establish an earth sciences working group to consider the acquisition and exchange of space-based data related to global change. In the words of the advance document:

Global change in the Earth's environment is of universal and urgent concern. Previous and current studies have shown that the combinations of human activity and natural events has resulted in changes in the atmosphere's ozone layer, the build-up of "greenhouse" gas in the atmosphere, the expansion of deserts, acidification of precipitation, and other dramatic changes in the Earth's climate, atmospheric composition and biosphere. The causes and potential effects of the changes are not adequately understood.

The U.S. delegation was led by Sam Keller and Shelby Tilford of NASA. Of the 12 members of the U.S. delegation, half a dozen were experts in the scientific disciplines expected to be discussed at the meeting. The Soviet delegation was led by Academician K. Ya. Kondratiev, of the Institute of Lake Studies of the U.S.S.R.

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Academy of Sciences. Konstantin Fedorov, Deputy Director of the Shirshov Institute of Oceanology in Moscow was the chief oceanographic spokesman.

I went on the trip with some misgivings. I had received a single advance document from NASA that talked in generalities about the agreement but did not mention the ocean. I had visions of eight wasted days. Was a U.S. oceanographer really needed? Would I meet any Soviet oceanographers at the meeting? I hoped I would. This was to be my first trip to talk about joint work with the USSR since my involvement with Poly-MODE in the mid-seventies. After all I had been reading about glasnost and perestroika, I was curious to see if any changes were evident among Soviet oceanographers.

As it turned out, I need not have feared that the ocean would not be discussed. Several Soviet oceanographers were at the meeting (see Appendix). On the first day, the Soviet side came in with a three-page ocean proposal, entitled *Hydrophysical monitoring of marine ecosystem conditions based on remote sensing*. The document had three sections (all translations are unofficial):

*Assessing Conditions of the Marine Ecosystem and Bioproductivity of the World Ocean*. This section included:

- Intercalibration of methods for assessing water quality and bioproductivity, with emphasis on areas of intensive land runoff or ecological stress.
- Integrated satellite-ship-airplane experiments, at a variety of spatial and temporal scales in selected areas, such as the Gulf Stream, the north and tropical Atlantic, the Kuroshio, and eastern and western tropical Atlantic nearshore waters.
- Creating basic procedures for data processing, including data collection for long-term monitoring, and testing ecosystem models with remotely sensed data.

*Using aerospace data to model and monitor*

*for the thermohydrodynamics of the ocean*. This section envisaged collecting enough reliable data to specify thermal and dynamic parameters to model the field of ocean variability. Such models must include three-dimensional dynamics based on remote sensing from satellite. Elements proposed were:

- Studies of the dynamics of intensive ocean currents, eddies and fronts and the thermal state of the ocean, based on a joint analysis of data from satellites and ships.
- Studies of the synoptic global wind field.
- Ocean ice studies.
- Development of laser technologies to study upper-ocean thermodynamics.
- Global altimeter measurements.
- Developing methods for using drifting buoys for ocean dynamic studies.
- Demonstrating the accuracy of reconstructing ocean fields based on remote-sensing data and quantitative ocean circulation models in 3 or 4 energetically active zones of the ocean.
- Creation of a global model of ocean dynamics based on a long-term data base of satellite and sub-satellite measurements.

*Improving and developing models to create and transform space data for models*. Elements proposed were:

- Creating integrated models for the fluxes at the air-sea interface.
- Joint experiments on methods to improve the accuracy and evolution of models.
- Intercalibration of methods for handling inverse problems in remote sensing.
- Intercalibration of remote sensing instruments, by comparing data from different types of satellites or drifting platforms.
- Collecting sub-satellite measurements to compare with data from satellites.

I was surprised by the extensiveness of the work proposed by the Soviets. It certainly went beyond the space-based work

our delegation could agree to. I was impressed by the implied enthusiasm for joint work such as a list suggested, but wondered if the scope of the work went beyond the capabilities of the two sides. Our NASA delegation suggested that much of the work proposed was more appropriate for consideration under an oceanographic bilateral agreement known as the *World Ocean Agreement* (signed by Nixon and Brezhnev many years ago). We countered with a much simpler proposal, to begin with a quid-pro-quo exchange of satellite-based ocean data. This was generally accepted.

The text of the *Ocean Remote Sensing* part of the Agreement (signed, but still subject to confirmation) is as follows:

The US and USSR agreed to cooperate in remote sensing of the ocean for studies of productivity and global change in the Earth's environment. Both sides agreed, as a first step, to examine mechanisms for the exchange of data from existing archives of ocean-related space data and related surface information. Both sides agreed that this exchange would be done on an equivalent basis. Both sides agreed to establish an implementation team on productivity-related problems of ocean remote sensing. The team, reporting to this working group would review details of the data exchange such as quantities, formats, quality, and media for exchange of data and would consider future supporting programs. The USSR has agreed to arrange a workshop on remote sensing to study global biosphere dynamics at the Lake Baikal in 1989.

The *Summary of Results* of the meeting names Fedorov (USSR) and Webster (US) as members of the implementation team. They are to "define the scope of projects and data to be exchanged in areas of mutual

interest." I recognized some of the items proposed in the Soviet paper as work underway or proposed nearly a decade ago, under the joint *World Ocean Agreement*. Joint scientific activities, including those in oceanography, dried up following the Soviet invasion of Afghanistan and the resulting outrage in the U.S. scientific community over a number of human rights issues. A further dampening factor had been the frustration experienced by U.S. oceanographers in trying to work with Soviet colleagues. In the new climate of détente and perestroika, is this the time for picking up the pieces and starting again?

It's clear that some U.S.S.R. oceanographers are ready for joint projects. Are some U.S. oceanographers also ready? Joint work in the past has been fraught with difficulties: communications, travel, quality control, language, culture, differences in the systems for research, and the international political climate. Is the situation changing so that it's worth trying again? I was impressed by the openness of the Soviet oceanographers I met this time. In the spirit of glasnost, they frankly discussed problems we had had in PolyMODE, when they often avoided discussing problems or denied their existence. I thought the new openness was a good start.

However, working with U.S.S.R. oceanographers will likely remain difficult, at least in the short term. Communications are not easy, and there may be forces on both sides that would just as soon keep them that way.

The ways of planning experiments, of working at sea, of handling data, of analyzing results, and of writing and publishing papers, are often so different that considerable patience and understanding is required by both sides.

On the other hand, the global scale of problems in the ocean may be great enough to make the potential rewards of joint

U.S./U.S.S.R. work worth the effort. Should we try? ■

#### Appendix:

##### 1. U.S. Delegation Members:

Moustafa T. Chahine, Jet Propulsion Lab  
Ingrid Disilvestre, NASA  
Irene Firsov, U.S. State Dept  
Samuel W. Keller, NASA  
Berrien Moore, III, Univ of New Hampshire  
Marion R. Norris, NASA  
S. Ichtiague Rasool, NASA  
P. Diane Rausch, NASA  
Shelby G. Tilford, NASA  
Kenneth Watson, U.S. Geological Society  
Robert T. Watson, NASA  
Ferris Webster, Univ of Delaware

##### 2. Oceanographers on the U.S.S.R. delegation:

Konstantin N. Fedorov, Deputy Director, Shirshov Institute of Oceanography, U.S.S.R. Academy of Sciences, Moscow.  
Gennady K. Korotaev, Marine Hydrophysical Institute, Sevastopol.  
Sergei V. Victorov, Laboratory for Satellite Oceanography of the State Oceanographic Institute (Hydromet), Leningrad.  
Jaak Lokk, Institute of Thermophysics and Electrophysics, Tallinn.  
Anatoly Shevirnogov, Institute of Biophysics, Krasnoyarsk (studies of Lake Baikal).

#### NOTE

After this note was written, it was with shock and sorrow that I heard of Konstantin Fedorov's sudden death (see Omega, this issue). Konstantin was an energetic and productive physical oceanographer with great scientific insight. Oceanographers in the US and the USSR will greatly miss him.  
- F.W.

# THE DISSERTATION SYMPOSIA IN CHEMICAL OCEANOGRAPHY (DISCO)

By Neil R. Andersen

SINCE February, 1978, the Chemical Oceanography Program of the National Science Foundation and the Oceanic Chemistry Program of the Office of Naval Research have been jointly convening a series of Dissertation Symposia in Chemical Oceanography (DISCO). In recent years the Sea Grant Program of the National Oceanic and Atmospheric Administration has also co-sponsored the meetings. On several occasions, The United Nations Educational, Scientific and Cultural Organization has provided travel grants to individuals from developing countries. The National Environmental Research Council of the U.K. and the Norwegian Research Council also have sponsored several participants.

The symposia are dedicated to soon-to-be or recent Ph.D. graduates in chemical oceanography. From an agency perspective, we are interested in becoming more familiar with the ideas being formulated by these individuals as they enter the field of oceanography and pursue their research interests. It is important that these new graduates have the best information available on the research climate and opportunities in their areas of interest. It is also important for them to possess an insight into the structure, missions and modes of operation of the co-sponsoring agencies, as well as the procedures to follow in seeking research support from these agencies. The DISCO symposia thus bring together, in scientific discussion and interaction, young scientists about to enter the field of chemical oceanography as new graduates. Future professional relationships are forged at these meetings, and the entire oceanographic community benefits by becoming more aware of the innovations and efforts of young workers.

Neil R. Andersen, *Chemical Oceanography Program, National Science Foundation, Washington, DC 20550*

Because the symposia were created for the newest Ph.D.'s, certain general guidelines were formulated and have been followed since the first meeting. First, major professors of the participants and their department heads and deans are not invited to attend the meeting. The reason for this is to avoid the risk of creating barriers to open and frank discussions of papers being presented. Second, participation is limited to insure that each participant has ample time to present his or her thesis research, and that sufficient time is available for in-depth discussion and debate. Third, selection for the meeting is made on the basis of an extended abstract. The abstracts are printed in final form approximately one month after the close of the symposium, providing an opportunity for the authors to make revisions as a consequence of the discussions that took place during the meeting. The abstracts are available in bound form from the co-sponsoring agencies. Finally, time is made available to the participants not only to initiate and hold informal sessions, but also to address certain topics raised by the agencies at the opening session. The results of these informal sessions are presented by spokespersons of the groups formed to address the assignments.

The symposia have been convened at approximately 18-month intervals. Therefore, an applicant must have received his or her degree within the nine months preceding the symposium, or alternatively the department chairman or dean must certify that the applicant probably will be granted a degree within nine months after the completion of the symposium. By following this schedule we assure that all graduates will have an opportunity to be considered for participation.

As of October 1988, 190 new and soon-to-become Ph.D.'s have participated in seven DISCO symposia over the past decade. During this period we have benefitted

from having 17 foreign participants representing 10 countries outside the U.S. (Belgium, Canada, France, India, Japan, Norway, Pakistan, People's Republic of China, South Korea and the United Kingdom).

The eighth DISCO symposium was convened during 14-18 November 1988 at the East-West Center, University of Hawaii Campus, Honolulu, Hawaii. The main session topics were titled Physical Chemistry and Photochemistry, Organics and Nutrients, Tracers, Sediment Diagnosis, Trace Metals, and Federal Programs in Oceanography. The invited participants are listed in the appended table.

It is anticipated that DISCO-IX will be convened in February of 1990. Individuals interested in being considered for that symposium should be alert to announcements that will appear by Spring 1989, or alternatively at that time they should contact the organizer, Mrs. Mary-Francis Thompson, American Institute of Biological Sciences, 730 11th St., NW, Washington, DC 20001-4584, for an application.

#### DISCO-VIII Participants

James G. Acker, University of South Florida  
Christina E. Barnes, Stony Brook  
Kenneth Coale, University of California, Santa Cruz  
Margarta E. Conkright, University of South Florida  
Gregory L. Cowie, University of Washington  
Marie A. de Angeles, University of Washington  
Jack Dibb, University of New Hampshire  
John R. Donat, University of California, Santa Cruz  
Kelly K. Falkner, M.I.T.  
Christopher R. German, University of Cambridge (UK)  
Janet G. Herring, M.I.T.  
Gil S. Jacinto, University of Liverpool (UK)  
Myrna E. Jacobson, Stony Brook  
David J. Kieber, University of Miami  
D. Whitney King, University of Rhode Island  
James S. Latimer, University of Rhode Island  
Saulwood Lin, Texas A&M University  
Patricia A. Matrai, Scripps Institution of Oceanography  
Thomas J. McDonald, Texas A&M University  
William L. Miller, University of Rhode Island  
Peter J. Milne, University of Miami  
Barbara L. Nowicki, University of Rhode Island  
Kristin J. Orans, M.I.T.  
Kathleen C. Ruttenbert, Yale University  
Virender K. Sharma, University of Miami  
Robert M. Sherrill, M.I.T.  
William Spitzer, M.I.T.  
Gordon Tribble, University of Hawaii  
Alexander van Geen, M.I.T.  
Mark J. Warner, Scripps Institution of Oceanography  
Jae S. Yang, Scripps Institution of Oceanography

## ARCTIC DRILLING WORKSHOP, OTTAWA, JUNE 23-24, 1988

By Randall Jacobson

TODAY'S polar oceans represent unique environments because of their cold hydrospheres and because of ice caps on adjacent land masses. These environments are the result of a long-term climate change since the end of the Mesozoic and short-term recurring climate shifts between late Cenozoic glacial and interglacials. Studies of the marine depositional environments and sediments that record this evolution have provided important but fragmentary data to describe the onset of the cold polar climate since late Neogene time and the response of fauna and flora to the cold temperatures. Virtually nothing is known of the transition period.

The evolution of the cold hydrospheres has also had a major impact on the hydrography of the world's oceans, because as the surface waters of the polar oceans cool, they sink and flow equatorward to fill the deep-sea basins. Climatic evolution in the polar regions therefore has global impact on the world's ocean and atmosphere, as well as on the biosphere. To trace this evolution from its probable onset in the late Mesozoic to the present is a first-order geoscientific problem that can be solved only by studying the history of the polar oceans. The sediment record of the southern oceans is quite well known from long piston cores and drill samples from the Deep-Sea Drilling Project. The Arctic, however, is much less well known.

Knowledge of the Arctic Ocean has more than regional importance, because the Arctic is linked to the evolution of the adjacent oceanic basins and continents. An understanding of past and present plate movements in the Arctic will be required before a complete model of late Mesozoic and Cenozoic northern hemisphere plate motions can be achieved. These motions and the structure, paleontology and paleoenvironment of the sedimentary rock sequences of the circumpolar regions and its continental shelves are highly relevant to the exploration for hydrocarbons. Recognizing the critical need for scientific

deep-ocean sampling in the Arctic, an international effort has begun, aimed at organizing a major drilling expedition that will also serve as the focus of other polar experiments.

In December 1986, the Geological Survey of Canada (GSC) and subgroups of the International Union of Geology and Geophysics and the International Union of Geodesy and Seismology sponsored a workshop that was attended by Arctic drilling experts and aimed at assessing the technical feasibility of Arctic deep drilling. The workshop concluded that such drilling would be complicated and costly but feasible with existing industry and Ocean Drilling Project technology. A key element of an Arctic drilling effort is a Class 8 ice-rated research platform, which the Government of Canada has committed

itself to construct. A two day meeting held at the GSC in Ottawa on June 23 and 24, 1988, addressed the status of the international effort, pinpointed specific objectives and targets, evaluated the capabilities of the proposed Class 8 platform, and organized future efforts.

A number of methods were discussed for recovering Arctic seafloor samples. These included large corers operated from the new Swedish and Canadian icebreakers, "gattling gun" bottom mounted corers, remotely-operated vehicles for sampling escarpments, a light drilling rig mounted on the Canadian Class 8 platform, and a frozen-in commercial drilling rig. It was the clear consensus that a multifaceted approach to take advantage of any opportunity was needed.

In August 1988, an Executive Committee chaired by Norway was established; Canada will provide the secretariat. The relationship of this organization to the International Council of Scientific Unions and to other Arctic committees will be investigated.

The meeting was attended by representatives from Canada, the Federal Republic of Germany, Norway, the Soviet Union, Sweden, and the United States. ■

MEETINGS AND WORKSHOPS

## U.K. OCEANOGRAPHY 88

By David Pugh

TO misquote a famous Mississippi hydrologist, news of the death of British oceanography has been greatly exaggerated. This was certainly the opinion of more than 200 oceanographers who attended a one week meeting entitled "U.K. Oceanography 88," held during 12-16 September 1988 at the University of East Anglia under the auspices of The Challenger Society.

More than 70 papers were presented on topics of chemical and physical oceanography and sediment dynamics. Jim Galloway, of the University of Virginia, while presenting an invited talk on atmospheric inputs in the Atlantic Ocean from North America, commented on the high standard of papers and their presentation by young scientists. A special prize was instituted in memory of Norman Heaps, who was for many years a leading numerical modeler at the Proudman Oceanographic Laboratory.

David Pugh, *Institute of Oceanographic Sciences, Deacon Laboratory, Wormley, Godalming, U.K.*

The prize was shared between Adrian New, Institute of Oceanographic Sciences, Deacon Laboratory, for his paper on "Internal Tides and Mixing in the Bay of Biscay," and Andrew Rees and Simon Wakefield, Plymouth Polytechnic and Swansea, for their paper on "The Behaviour of Dissolved Iron and Manganese in a Highly Disturbed Sediment in Swansea Bay."

The meeting was the third in a biennial series consisting of a mixture of keynote lectures and shorter presentations. Dr. Jim Andrews (ONR, London) gave an evening lecture on "Naval Oceanography: Tautology or Oxymoron," a title sufficiently obscure to attract a large audience and generate a vigorous discussion. At the conference dinner the chairman of the organizing committee, Peter Liss, announced that the next "U.K. Oceanography" will be held in Plymouth, Devon, in September 1990; the next organizing committee will be chaired by Keith Dyer. ■

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