REPORT OF THE SCIENTIFIC COMMITTEE ON OCEANIC RESEARCH By: E. Tidmarsh Executive Secretary, SCOR

This report covers the period from July 1987 to June 1988.

ORGANIZATION

The 28th Executive Committee Meeting of SCOR took place in Zurich from October 19 to 20, 1987. Reports were submitted to the Executive Committee by the Chairmen of all SCOR subsidiary bodies and were critically reviewed. Proposals for the establishment of three new working groups and one committee to undertake planning for a major new programme were also considered by the meeting. The highlights of the meeting will be discussed below.

With the recent acceptance of an application for SCOR membership from the Consejo Superior de Investigaciones Cientificas of Spain, the number of countries with formal membership ties to SCOR is now thirty-six.

PUBLICATIONS

Volume 23 of <u>SCOR Proceedings</u> containing the report of the Zurich meeting is in press. The SCOR Secretariat has published two reports relating to the preliminary planning activities for the Joint Global Ocean Flux Study. Information on a large number of other publications arising from recent SCOR activities is given in the latest issue of <u>SCOR Proceedings</u>.

SCIENTIFIC ACTIVITIES

There are currently twenty active SCOR Working Groups, Committees and Panels; a complete list of all these SCOR subsidiary bodies is given at the end of this report. During the past year several subsidiary bodies have made significant contributions to the advancement of knowledge within their fields of expertise.

The final meeting of WG 72 (The Ocean as a Source and Sink for Atmospheric Constituents) took place in November 1987. The group considered means for improving the techniques for measuring transfer velocities at the air-sea interface, the role of atmospheric inputs of nutrients on oceanic productivity and fluxes, and the role of biological and photochemical processes in air-sea exchanges of chemicals. WG 72 is preparing a final report to SCOR which will be a review of the current status of our understanding of the processes involved in the exchange of chemicals between the ocean and the atmosphere.

WG 83 on **Wave Modelling** met in March 1988 and is focusing on the problems of the development of models for medium range forecasting of waves.

The final meeting of WG 71 on **Particulate Biogeochemical Processes** will take place in France at the end of June 1988. The group will discuss the relationships between particulate transport processes and the distribution of dissolved trace elements and nutrients. It will also begin to formulate its final report to SCOR.

A meeting of WG 76 (Ecology of the Deep-Sea Floor) will be held in June 1988. The group has undertaken to produce a directory of deep-sea biologists and is preparing a report which is intended to outline the type of information on deep-sea communities which would be required in order to recognize and forecast the effects of perturbations, especially anthropogenic ones, on the deep-sea environment.

During the past year, WG 78 (Determination of Photosynthetic Pigments in Seawater) has been planning a series of important technical workshops on the intercomparison of various instruments and techniques used in the quantification of pigments in seawater. New protocols for these measurements are urgently needed since obtained are used to estimate the data oceanic productivity and a high degree of accuracy will also be required to provide "sea truths" for the new satellite ocean colour scanners which are expected to be launched in the early 1990's.

This report has thus far highlighted the activities of a few SCOR subsidiary bodies. It is not all-inclusive and many other groups have significant programmes underway. One SCOR group which is so important that it warrants special attention in every report such as this is the **Joint SCOR/IOC Committee on Climatic Changes and the Ocean.** The CCCO's functions are to identify ocean-climate research problems requiring increased international attention, stimulate research activities thereon and recommend to IOC and SCOR how these activities should be implemented. The CCCO being the main international scientific body dealing with the oceans and climate, therefore cooperates with the JSC in planning the World Climate Research Programme (WCRP).

The Ninth Session of CCCO was held in Paris in May 1987.

The Committee reviewed the progress being made on the two main oceanographic components of the World Climate Research Programme. The first of these, the Tropical Ocean Global Atmosphere (TOGA) experiment, which commenced in 1985, involves a decade of intensified observations with rapid distribution of data as a direct input to the modelling of the coupled triopical ocean-atmosphere system. The second, the World Ocean Circulation Experiment (WOCE), with an intensive 5-year observational programme, including ship-borne, satellite and drifter measurements to commence in 1990/1991, will provide a data set for the testing of models for the prediction of climatic change.

In TOGA, significant improvements have been made in the Pacific and Atlantic observational networks, and sufficient data are now becoming available in near-real time for use in the preparation of operational products and in model verification. Major progress has been made in implementing ocean circulation models which are run routinely every month as the forcing fields are updated. The results are used to diagnose the climatic state and to describe oceanif changes associated with El Nino.

Planning activities for WOCE have so far remained mostly in the domain of expert working groups and committees, and within national programme boundaries. However the implementation plan for WOCE is now in its final drafting stage and will be distributed in preparation for the WOCE International Scientific Conference in November 1988. This conference will explain WOCE, review national plans, assess national resource commitments, develop organizational strategies and hopefully stimulate wide international interest in this vital rung in the ladder to global climate prediction.

The vast potential of satellites for ocean observation provide both the impetus for these and other global environmental experiments, and the promise of permanent ocean observing systems in the future. There remains however widespread awareness that oceanographic applications are in competition with a diverse range of demands for satellite-borne measurement systems, and concern on issues of data access and management, the interpretation and surface validation of measurements from space, and the succession of satellite missions beyond an experimental phase.

These and other topics such as the relation between ocean climate programmes and the other global experiments presently being planned and the prospects for experiments directed to longer cycles of variability, provided further material for CCCO discussion.

THE JOINT GLOBAL OCEAN FLUX STUDY

A highlight of the SCOR Executive Committee meeting was the formal decision to launch the Joint Global Ocean Flux Study under the auspices of a scientific planning committee which was established by the meeting. It is expected that JGOFS will eventually constitute an important oceanic component of IGBP and close contacts have already been established between the two programmes. Readers of this report are referred to the reports of two preliminary international planning meetings which have been published by SCOR. These are the International Scientific Planning and Coordination Meeting for Global Ocean Flux Studies (ICSU Headquarters, Paris, February 17-19, 1987) and the JGOFS North Atlantic Planning Workshop (Paris, September 7-11, 1987).

A scientific coordination and planning meeting was convened by SCOR at the request of CCCO, US GOFS and GIPME and was held at ICSU Headquarters in February 1987. This meeting reviewed national plans for studies of major biogeochemical cycles in the ocean and concluded that there was a need for an internationally coordinated programme to be known as the Joint Global Ocean Flux Study. It was also agreed that this study could best be planned and implemented under the leadership of SCOR and that a formal proposal requesting that SCOR establish a scientific planning committee for JGOFS would be prepared in time for consideration by the SCOR Executive at its 1987 meeting. The planning meeting defined the broad goal of JGOFS as follows:

"to determine and understand on a global scale the timevarying fluxes of carbon and associated biogenic elements in the ocean, and to evaluate the related exchanges with the atmosphere, the sea floor and continental boundaries."

The possible elements of a JGOFS programme were discussed under the categories of global studies, process studies, coastal ocean studies and modelling activities.

The above meeting, wishing to maintain the momentum of preliminary JGOFS activities, recommended that a workshop on international coordination of flux studies in the North Atlantic be convened as soon as possible since several countries were already in the advanced planning stages for field programmes in 1989. It was felt that it would be worthwhile to consider whether these various national programmes had sufficient features in common to warrant their coordination into some sort of concerted effort related to JGOFS. This North Atlantic Planning Workshop was organized by Dr. J.C. Duplessy and took place in Paris in September 1987. The main result of the North Atlantic Planning Workshop was the recommendation that a JGOFS Pilot Study take place in 1989. This effort will be a process-oriented study, focusing on the spring bloom and associated phenomena, progressing from south to north. The major international effort would be concentrated on a series of stations and moorings along the 20° W line in the northeast Atlantic basin. The meeting broke into a series of working groups on process Studies and Integrative Topics which addressed questions arising from the various national presentations such as the needs for process studies, the advantages of time series and transect studies, the benefits of international coordination for JGOFs studies in the North Atlantic, and SO on. These groups formulated recommendations on upper ocean studies, particle flux studies, benthic flux studies, boundary exchanges, issues of modelling, sampling strategy and data management for JGOFS, remote sensing and basin-scale studies. The meeting ended with a serious consideration of the urgency and complexity of some of the planning issues which needed to be addressed in order for a JGOFS Pilot Study to be underway in early 1989. It was recognized that they presented a challenge which could only be met by a coordinated international effort.

The first meeting of the JGOFS Committee took place in Miami in January. The meeting concentrated on two major items: the development of a Science Plan for JGOFS and the establishment of planning and management strategies for the Pilot Study. The Science Plan, to be produced during 1988, will provide the scientific background and rationale for JGOFS, will identify and elaborate upon its detailed scientific objectives, discuss the technical problems to be solved in order to meet these objectives, and introduce preliminary proposals for strategies to meet them. The Pilot Study, which will begin in early 1989, is being coordinated by a group of National Chief Scientists from the participating countries (Canada, FRG, The Netherlands, UK and USA). A report of the first meeting of JGOFS will be available soon from the SCOR Secretariat.

JOINT OCEANOGRAPHIC ASSEMBLY

SCOR is now in the final planning stages for the Joint Oceanographic Assembly which will take place in Acapulco, Mexico from August 23 to 31, 1988. This assembly is held every six years and is a major international forum for oceanographers, providing a unique opportunity for interdisciplinary discussions which are not possible at most of the smaller, more specialized meetings in the field of marine science. There has been an unprecedented level of interest in this JOA from scientists in the developing countries, both through their submission of many abstracts for inclusion of papers and posters in the scientific programme, and through their indications of interest in attending the Assembly. It is a source of great regret to SCOR that insufficient funds will be available to meet all of their requests for travel support, however, every effort is being made to find more funds and to make the best use of those available.

OTHER ACTIVITIES

SCOR continues to act as the official scientific advisory body to the Division of Marine Sciences of Unesco and the Intergovernmental Oceanographic Commission. SCOR has responded, as appropriate, to the requests of several other international organizations for cosponsorship of scientific meetings. For example, SCOR will cosponsor several scientific sessions in the forthcoming COSPAR Plenary Meetings. Through a grant from the National Science Foundation, SCOR provides funds for travel by oceanographers from developing countries to international scientific meetings which are organized or cosponsored by SCOR. Between fifteen and twenty such travel awards are made annually.

Further information on these and other SCOR activities may be found in <u>SCOR Proceedings</u>, or by contacting E. Tidmarsh, Executive Secretary, SCOR, Department of Oceanography, Dalhousie University, Halifax, Nova Scotia, Canada, B3H 4J1.

SCOR SUBSIDIARY BODIES AS AT JUNE 1, 1987

WG 69 Small-scale Turbulence and Mixing in the Ocean

WG 71 Particulate Biogeochemical Processes

WG 72 The Ocean as a Source and Sink for Atmospheric Constituents

WG 75 Methodology for Oceanic CO₂ Measurements

WG 76 Ecology of the Deep Sea Floor

WG 77 Laboratory Tests Related to Basic Physical Measurements at Sea

WG 78 Determination of Photosynthetic Pigments in Seawater

WG 79 Geological Variations in Carbon Dioxide and the Carbon Cycle

WG 80 Role of Phase Transfer Processes in the Cycling of Trace

Metals in Estuaries

WG 81 Deep Water Palaeoceanography

WG 82 Polar Deep Sea Palaeoenvironments

WG 83 Wave Modelling

WG 84 Hydrothermal Emanations at Plate Boundaries

WG 85 Experimental Ecosystems

WG 86 Ecology of Sea Ice

WG 87 Fine-scale Distribution of Gelatinous Planktonic Animals

WG 88 Intercalibration of Drifting Buoys

Joint SCOR/IOC Committee on Climatic Changes and the Ocean Committee for the Joint Global Ocean Flux Study

SCOR/UNESCO/ICES/IAPSO Joint Panel on Oceanographic Tables and Standards

Editorial Group for the Ocean Modelling Newsletter