

file ICSU

REPORT OF THE
SCIENTIFIC COMMITTEE ON OCEANIC RESEARCH

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This report covers the period since the last session of the General Assembly of ICSU (September, 1982).

Organization

After the sudden death of the President of SCOR, Professor Eric Simpson, in June, 1983, one of the Vice-Presidents, Professor Gerold Siedler, agreed to serve as interim President for the remainder of the term (until October, 1984). The new Presidents of IAMAP (Prof. H. J. Bolle) and IAPSO (Prof. W. Krauss) became ex-officio members of the SCOR Executive Committee in September, 1983. The SCOR Executive Committee met in September, 1983, at the ICSU Headquarters. The 26th Executive Committee Meeting will be held at the Station Marine in Roscoff, France, on October 19, 20, 1984, and will be followed by the XVII General Meeting (October 24-26). At these meetings, the scientific activities of all SCOR subsidiary bodies will be reviewed, new working groups may be established and others discharged, elections will be held, and the usual financial and administrative items will be considered. As usual, a scientific event has been organized in conjunction with the General Meeting: on this occasion, it will be an international seminar on "Biogeochemical Processes at the Land-Sea Boundary" organized by the French National Committee for SCOR with the support and sponsorship of SCOR, the French government, and UNESCO.

Publications

A large number of publications have arisen from the scientific activities of SCOR's subsidiary bodies. These are listed in SCOR Proceedings which appears after each Executive Committee or General Meeting.

Scientific Activities

There are currently twenty-four active SCOR working groups, committees, and panels. Working groups are intended to be relatively short-lived and to have well-defined tasks rather than open-ended ones. Committees or panels may be established for longer-term purposes; an excellent example of this is the joint

SCOR/IOC Committee on Climatic Changes and the Ocean.

An important scientific emphasis of SCOR in recent years has been in the field of physical oceanography. One of the great stimuli to oceanographic research during the last decade has been the rapid development of new instrumentation to replace many of the traditional time consuming sampling methods, to increase the accuracy of existing methods and to create new techniques. Some useful physical oceanographic variables can now be measured from satellites giving detailed data for whole oceanic regions. Satellites also receive and transmit data from drifting buoys, untended instrument packages which may make oceanographic measurements automatically over long periods of time and large distances. WG 66 (Oceanographic Applications of Drifting Buoys) and WG 70 (Remote Measurement of the Oceans from Satellites) have been considering various aspects of the new technology and their applications for ocean science. In late 1982, WG 66 prepared a state-of-the-art report on drifting buoys and their applications, problems, and future development at the request of IOC. This is presently being expanded in accordance with the revised terms of reference given to WG 66 in late 1982 by SCOR. WG 70 is in the process of finalizing a major report on current capabilities in the field of satellite sensing of the oceans and of the future needs in this field for publication by UNESCO in 1984.

WG 74 (General Circulation of the Southern Ocean) was established in 1982 and charged with the identification of gaps in our knowledge of the physical and chemical oceanography of the Southern Ocean and of programmes which might help to close these gaps. The group presented its first report to the IOC Programme Group for the Southern Ocean in early 1983 and has contributed substantially to the elaboration of a scientific programme for IOC PG/SOC. WG 74 has recently held its second meeting and is preparing a final report in this field which will complete its terms of reference.

Other working groups in the field of physical oceanography are actively investigating open ocean processes whether on small or regional scales or on the large scale of whole oceans. Several of these groups place special emphasis on relating observation and modelling. Some of them are also contributing directly to the work of the WCRP through the joint SCOR/IOC Committee on Climatic Changes and the Ocean (CCCO). The CCCO was established by SCOR and IOC in 1979 in order to develop the oceanographic component of the WCRP. It is doing this in collaboration with the Joint Scientific Committee (JSC) for the WCRP of WMO and ICSU. Until early 1983, CCCO was actively developing its scientific programme; this has now been approved, the Committee has carried out intensive planning and experimental design studies and some parts of the programme are ready for

implementation in the very near future. The core programme includes two large-scale oceanographic experiments and the development of a global ocean observation system. Both of the major experiments being proposed by CCCO involve oceanographic operations of a larger scale and complexity than ever before attempted. They will make use of the newest technology and some of the more traditional means of making oceanographic measurements.

One of the major experiments being planned by CCCO is designed to provide a better understanding of the mechanisms which determine interannual variability and to investigate the possible predictability of the variations. In recent years, there has been a growing realization that year-to-year variations in the tropical oceans and the overlying atmosphere are closely linked to worldwide climatic changes in the middle and high latitudes as well as to climatic events on land in low latitudes. To help in planning this experiment, an International Scientific Conference on the Interannual Variability of the Tropical Ocean and the Global Atmosphere (TOGA) will be held at UNESCO House in Paris from 17 to 22 September, 1984. The Conference will be sponsored by the Joint Scientific Committee (JSC) for WCRP and the Committee on Climatic Changes and the Ocean (CCCO) and is being organized by a Committee chaired by Professor R. Revelle. The TOGA Programme plan will be presented and reviewed in the light of the scientific discussions. Special attention will be given to the possible uses of new observing technology and to the need for oceanic and atmospheric data as a basis for climate models. Participants will be invited to comment on the proposed plan for the TOGA Programme. The actual experimental phase of TOGA is due to begin in January, 1985. To this end, an international project office has been established for TOGA in the USA. It is being staffed initially by one scientist each from the USA, India, and France. The office is charged with developing aspects of the detailed plans for the implementation of TOGA, data management, and associated organizational tasks.

The second large-scale experiment being planned by CCCO is the World Ocean Circulation Experiment (WOCE). The concept of WOCE grew out of the realization that the latest satellite instrumentation now permits the design of a truly global experiment to improve our understanding of the circulation of the world ocean and our ability to model it quantitatively. It is concerned with the prediction of the effects of the ocean on long-term climatic change (in the order of decades or longer), including the response to CO₂ pollution of the atmosphere. The Scientific Steering Group for WOCE has agreed on two main goals for the experiment: to collect the data necessary to develop and test ocean models useful for predicting climate change; and to determine the representativeness of specific WOCE data sets for

the long term behavior of the ocean and to find methods for determining long-term changes in the ocean circulation. The first version of the International Plan for WOCE will be available during the first half of 1985.

The third aspect of the CCCO programme is the establishment of an ocean observational system in order to provide data sets and time series of measurements supporting the observational strategies associated with all three WCRP streams (long-range weather forecasting, interannual variability, and longer term climatic trends). The projects being defined within this programme are long term and are expected to be continued indefinitely, providing needed data on the oceans (global sea surface temperature, mean sea level, wind stress, currents, salinity, etc.) even after the conclusion of the CCCO programme.

The CCCO Secretariat is housed at the IOC, UNESCO headquarters and is staffed by the Secretary, B. Thompson (USA, since 1980), R. Molcard (France, since 1983), and A. Tolkachev (USSR, from mid-1984). The contributions of these countries and others are gratefully acknowledged by SCOR as is the continuing financial support of CCCO by ICSU.

SCOR WG 54 (Southern Ocean Ecosystems and their Living Resources) is cosponsored by SCAR, IABO and ACMRR (of FAO). This group has developed the BIOMASS programmes which has as its goal and improved understanding of the antarctic marine ecosystem. FIBEX was completed successfully in 1981-82 and SIBEX (Second International BIOMASS Experiment) is now underway with the first phase completed during the 1983-84 austral summer. Like FIBEX, SIBEX is a large, coordinated, multi-ship experiment (15 vessels from 11 countries), and is concentrating on physical oceanography, krill distribution and relationships between krill and other organisms in the food chain. The second phase of SIBEX will take place during the 1984-85 field season. The need to analyze the large amounts of data of all types collected during FIBEX and SIBEX remains an item of great concern to the BIOMASS Executive who will meet in mid-1984 to consider problems of data management and proposals for the establishment of a BIOMASS Data Centre. The organizational lead in this large programme is taken by SCAR and readers are referred to the SCAR report for more detailed information on BIOMASS.

WG 73 (Ecological Theory in Relation to Biological Oceanography) organized an international conference on community level ecological theory and its applicability to biological oceanography which was held in Quebec City in March, 1984. The conference brought together theoreticians whose work has had significant impact on theoretical ecology and practicing biological oceanographers for the purpose of integrating current

hypotheses of ecological theory into ongoing and proposed research in biological oceanography. This theme for the meeting arose from our need to be able to make predictions about marine ecosystems and our inability to do so at the present. The proceedings of the WG 73 conference will be published by the Canadian government.

SCOR continues to respond as appropriate to the requests of other organizations for cosponsorship of international scientific meetings. For example, a scientific symposium on Space Observations for Climate Studies which will be held during the COSPAR meetings in July, 1984, is being cosponsored by SCOR, as is an ICL workshop on the Dynamic Morphology of the Ocean Floor. SCOR has also continued to act as a recognized scientific advisory body to the Division of Marine Sciences of UNESCO and the Intergovernmental Oceanographic Commission.

This report has only been able to touch upon the highlights of SCOR activities during the past two years. More detailed information will be found in SCOR Proceedings which is available from the SCOR Secretariat.

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ACMRR	Advisory Committee on Marine Resources Research (FAO)
BIOMASS	Biological Investigations of Marine Antarctic Systems and Stocks
CCCO	Committee on Climatic Changes and the Ocean (SCOR/IOC)
COSPAR	Committee on Space Research
FIBEX	First International BIOMASS Experiment
IABO	International Association for Biological Oceanography (IUBS)
IAMAP	International Association for Meteorology and Atmospheric Physics (IUGG)
IAPSO	International Association for the Physical Sciences of the Ocean (IUGG)
ICL	Inter-Union Commission on the Lithosphere
IOC	Intergovernmental Oceanographic Commission (UNESCO)
JSC	Joint Scientific Committee for the WCRP (ICSU/WMO)
PG/SOC	Programme Group for the Southern Ocean (IOC)
SCAR	Scientific Committee on Antarctic Research
SCOR	Scientific Committee on Oceanic Research
SIBEX	Second International BIOMASS Experiment
TOGA	Interannual Variability of the Tropical Oceans and Global Atmosphere
WCRP	World Climate Research Programme
WMO	World Meteorological Organization
WOCE	World Ocean Circulation Experiment