

REPORT OF THE
SCIENTIFIC COMMITTEE ON OCEANIC RESEARCH

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This report covers the period from July 1985 to June 1986.

ORGANIZATION

The twenty-seventh Executive Committee meeting of SCOR took place at the Applied Physics Laboratory of the College of Ocean and Fishery Sciences of the University of Washington, Seattle in September 1985. The activities of all scientific working groups, committees and panels were reviewed as were proposals for the establishment of new SCOR subsidiary bodies. Some of the achievements of SCOR subsidiary bodies are discussed below. A major event in 1985 was the admission of the Chinese Committee on Oceanic Research to membership in SCOR, thereby involving the oceanographers of the People's Republic of China in SCOR activities. The President, Past-President and Executive Secretary of SCOR visited Chinese institutions of oceanography discussing current SCOR activities and SCOR's role in international marine science; this tour culminated in a meeting with the newly-formed Committee in Beijing. The Chinese Committee is the thirty-fifth adhering body in SCOR.

PUBLICATIONS

The report of the twenty-seventh Executive Committee meeting of SCOR is contained in SCOR Proceedings, Volume 21. A new version of the SCOR Handbook was published in July 1985. A large number of publications have arisen from the scientific activities of SCOR's subsidiary bodies. Information on these is given in SCOR Proceedings.

SCIENTIFIC ACTIVITIES

There are currently twenty-three active SCOR Working Groups, Committees and Panels, although several of these have submitted their final reports, (or will do so in the near future) and will be disbanded at the next meeting of SCOR in late 1986. During the past year several subsidiary bodies have made significant contributions to the advancement of knowledge within their fields of expertise. WG 70 (Remote Measurement of the Oceans from Satellites), for example, has published its final report, "Opportunities and Problems in Satellite Measurements of the Sea", in the Unesco series, Technical Papers in Marine Science. This report presents a reasonably authoritative yet concise publication of requirements, capabilities and present plans

for acquiring and using ocean data from satellites. It addresses questions related to the measurement of many oceanographic parameters from space and makes recommendations regarding future needs and priorities in the development of satellite instrumentation. Several sections of the WG 70 report refer to the Coastal Zone Colour Scanner and its use in mapping of pigment distributions in the ocean. A relatively new SCOR working group, WG 78 on Determination of Photosynthetic Pigments in Seawater, is also of interest in this context. It is undertaking an assessment of the current methods of laboratory and field determinations of pigment concentrations in the light of several new technological developments in this field. The group will make recommendations about methodology and the intercalibration of instruments and will produce a new methodological manual to replace the one currently in wide use which was produced by SCOR and Unesco some twenty years ago. The development of much more accurate methods of measuring of pigment concentration, and, consequently, of estimating biomass and primary productivity, is necessary for the establishment of "ground truths" for satellite data.

The final report of WG 74, "General Circulation of the Southern Ocean: Status and Recommendations for Research" has been published in the WCP report series of WMO. It will be of particular interest to the planners of the World Ocean Circulation Experiment (WOCE - see below), which is the principal activity of the WCRP related to climate variability and prediction over decadal time scales. The Southern Ocean plays a prominent role in the zonal exchanges between the other oceans, as a region of major heat loss to the atmosphere and as the site of formation of much of the subsurface water of the global ocean. An improved knowledge of its circulation is critical for many advances in physical oceanography and climate studies.

WG 72 (The Ocean as a Source and Sink of Atmospheric Constituents) has participated in the organization of a major international symposium on "Biosphere-Atmosphere Exchange; Influence of Marine and Terrestrial Biosphere on the Chemical Composition of the Troposphere". It is expected that the proceedings of this symposium will mark a major step forward in our understanding of this subject. The working group itself was to meet following the symposium and has been asked by SCOR to prepare a report describing the present state of knowledge in the field of air-sea exchanges.

Another working group, WG 65 on Coastal-Offshore Ecosystems Relationships, is concerned with the exchange processes between coastal and open sea marine ecosystems and especially with the transport of nutrients between these systems. A workshop organized by WG 65 which took place in April 1986, emphasized these exchanges and their effects on the relative productivity of coastal and offshore zones and on the animal populations which inhabit them. The proceedings of this workshop will be published late in 1986 by Springer-Verlag. The WG has also made recommendations for future research in its final report which is to be published by Unesco.

SCOR's present involvement in pollution studies is limited to one group, WG 42, Pollution of the Baltic. While this is a regional group, many of its activities will yield results with more general applicability. In particular, the International Patchiness Experiment taking place this year will involve fourteen ships from the Baltic countries in a coordinated study of variability in a number of physical, chemical and biological parameters at a large number of stations within well defined polygonal sampling areas. The group is also involved in a study of pollutants in sediments, a baseline study of contaminants in fish and shellfish, coastal zone studies, biological effects studies and a study of the symptoms of eutrophication in the open sea areas of the Baltic.

This report has thus far highlighted the activities of certain SCOR subsidiary bodies. It is not all-inclusive and many other groups have significant programmes underway. An attempt has been made to emphasize activities which were not mentioned in SCOR's last report to ICSU.

Joint SCOR/IOC Committee on Climatic Changes and the Ocean - this is one activity of SCOR which is so important that it warrants special attention in every report such as this.

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 seventh session of CCCO took place at Unesco Headquarters in January 1986.

The primary task of CCCO-7 was to evaluate the development and implementation of the large-scale experiments within the WCRP; the Study of the Interannual Variability of the Tropical Oceans and Global Atmosphere (TOGA) and the World Ocean Circulation Experiment (WOCE). The ten year observational period of TOGA began in January 1985 and international data centres are beginning to assemble special data sets and produce analyses of indicators of climate variability. While there are many encouraging TOGA actions underway, CCCO noted that there are also significant gaps in the ocean observational programmes and urged both the intergovernmental and scientific communities to intensify their efforts to obtain the data required for TOGA studies.

The planning for WOCE passed a mile-stone with the finalization of the scientific plan. The WOCE Scientific Steering Group is now concentrating on the implementation or detailed planning of the experiment which will be focused on three core projects, each to be discussed at major workshops to be held in 1986. These are; 1) Global Description, 2) the Southern Ocean, and 3) Gyre Dynamics. The plan will be completed during the first half of 1987 and submitted to an international conference early in 1988. The WOCE Scientific Steering Group also prepared a statement of requirement for WOCE which

was presented at the first Informal Intergovernmental Planning Meeting for the WCRP in Geneva in May 1986.

Two new endeavours studied at CCCO-7 were an Oceanic CO₂ Monitoring Research Programme and Coupled Ocean-Atmosphere Boundary Layer Research. The CCCO CO₂ research proposal deals with measurements needed to determine and understand the changes in oceanic carbon resulting from human activities - principally fossil fuel combustion and deforestation. The Committee accepted responsibility for planning studies of the changing CO₂ content of the ocean on climatic time scales and requested its Carbon Dioxide Advisory Panel to consider the possibility of obtaining ocean-wide measurements of atmospheric and oceanic partial pressure of CO₂, with the objective of determining seasonal and interannual changes and rates of net flux from the sea to the air and from the air to the sea.

The Officers of CCCO and of the Joint ICSU-WMO Scientific Committee for the WCRP (JSC) had expressed concern that no overall strategy had been developed for studying the coupling between the ocean and the atmosphere, one of the highest priorities for the WCRP. It was recognized that substantial efforts were planned as part of TOGA and WOCE, but without an overall strategy there was a risk that important aspects of the research in this crucial area might be neglected. This matter was investigated and reported to CCCO-7. The scientific problem is to specify a measurement programme that will provide data that can be used to constrain the performance of coupled ocean-atmosphere models designed for climate prediction, in particular, to establish the degree to which the models successfully simulate the seasonally-changing regional distribution of the fluxes of momentum, heat, water and gases between the ocean and atmosphere. CCCO agreed that the boundary layer problems were central to the WCRP but was not assured that programmes already agreed upon (TOGA and WOCE) would give them adequate emphasis. Therefore, the Scientific Steering Groups for TOGA and WOCE will consider the questions of ocean-atmosphere exchange so as to determine the studies which should be undertaken within these programmes. The CCCO and JSC would then ascertain what questions remain which must be dealt with through other mechanisms.

The seventh session of CCCO addressed a number of other topics including: palaeoclimatology; training, education and mutual assistance, associated with the ocean components of the WCRP; IGBP; a host of data questions; and WCRP ocean data management. The last point was given special attention as it is essential that the large quantities and various types of ocean data required by the WCRP be handled efficiently and made readily available to scientists and for practical applications. Further details on CCCO-7 and the oceanographic components of the WCRP may be obtained from the Secretary CCCO, IOC/Unesco, Place de Fontenoy, Paris 75700, France.

GENERAL MEETING

The Eighteenth General Meeting of SCOR will take place from 26 to 28 November 1986 at the CSIRO Marine Laboratories, Hobart, Australia. Each subsidiary body will be reviewed and decisions will be taken as to which ones should be renewed and which can be disbanded. New groups may be established if suitable proposals are accepted by the meeting. The election of SCOR officers will take place.

JOINT OCEANOGRAPHIC ASSEMBLY

SCOR is also in the process of planning for the next Joint Oceanographic Assembly which will take place in Mexico, probably in the second half of 1988. This two week 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.

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 other international organizations for cosponsorship of scientific meetings. For example, SCOR is cosponsoring two of the scientific sessions being held at the COSPAR Plenary Meetings in Toulouse in July. Further information on SCOR activities may be obtained in Volume 21 of SCOR Proceedings, or from E. Tidmarsh, Executive Secretary, SCOR, Department of Oceanography, Dalhousie University, Halifax, Nova Scotia, Canada, B3H 4J1.