Tenth Session of the Working Committee on International Oceanographic Data Exchange
Hamburg, Federal Republic of Germany, 5-13 August 1981

SUMMARY REPORT

* Annexes III and IV to this report have not been translated and are added in English to the French, Spanish and Russian versions.
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1. **OPENING OF THE SESSION**

The Tenth Session of the Working Committee on International Oceanographic Data Exchange (WC/IODE) was opened by its Chairman, Mr. T. Winterfeld, at the Congress Centrum, Hamburg, Federal Republic of Germany, on 5 August 1981.

Dr. W. Wellhausen, Counsellor of the Foreign Office of the Federal Republic of Germany, welcomed the delegates to Hamburg and to the Federal Republic. He remarked that twenty years of constructive guidance by the IOC Working Committee on IODE had shown its ability to cope with the ever-increasing demands and responsibilities placed on it as a result of the constantly growing quantities of data, complexity, diversity, and standardization requirements brought to its attention for advice and consideration. Dr. Wellhausen stressed the need for the exchange of data and information to facilitate the transfer of knowledge among nations with a marine interest as well as in support of the various regional and global programmes sponsored and co-ordinated by the Intergovernmental Oceanographic Commission. He placed importance on the need for the Committee to accept the responsibility and efforts required to meet the demands of the future.

Speaking on behalf of Dr. Ayala-Castañares, Chairman of IOC, and on his own behalf, Dr. Mario Ruivo, Secretary of IOC, expressed his gratitude to the authorities of the Federal Republic of Germany for hosting the meeting and to the participants for the opportunity to share his views with them on the role of IODE in the IOC and the new challenges and goals now facing the Commission. He identified these new challenges in terms of the greater demands which may be placed on the IOC and Specialized Agencies of the United Nations as a result of the United Nations Conference on the Law of the Sea (UNCLOS), the emerging new ocean regime, and the objectives of a New International Economic Order and those identified by the United Nations Conference on Science and Technology for Development (UNCED). As a consequence of the expected developments resulting from the new ocean regime and enhanced importance for marine science, he pointed out the subsequent greater importance and value of the widespread and easy exchange of data and information.

The Chairman thanked Dr. Wellhausen and Dr. Ruivo for their perceptive and informative insights as to what challenges face the IOC in general and the Committee in particular, and for their stimulating words which indicated once more the interest shown in the Working Committee on IODE by the Member States and the IOC Secretariat.

In response to a request from the People's Republic of China to address the Committee, the Chairman invited Mr. Luo Chuanwei, Head of the Delegation, to take the floor. He expressed his deep satisfaction for the opportunity to attend and take part for the first time in a session of the Working Committee, and stated the intentions of his country to develop its marine sciences programmes and actively participate in IODE activities.

The full texts of Dr. Wellhausen's and Dr. Ruivo's introductory addresses appear in Annex IV.
2. **ADMINISTRATIVE ARRANGEMENTS**

2.1 **ADOPTION OF THE AGENDA**

The Provisional Agenda as adopted by the Session is shown in Annex I.

2.2 **ELECTION OF RAPPORTEUR**

Dr. P. Meersdorff (USA) and Mr. A. Vorley (U.K.) were proposed by their respective delegations to be co-Rapporteurs, seconded by several Member States and unanimously elected.

2.3 **CONDUCT AND RECOMMENDATIONS FOR THE SESSION**

The IOC Assistant Secretary, Dr. I. Oliouine, explained the timetable, identified changes in the list of documents, and briefly reviewed the documentation. The Vice-Chairman of the Working Committee on IOCDE, Mr. B. Kohnke (Federal Republic of Germany), who also represented the host government, informed the Committee on technical arrangements.

3. **WORK ACCOMPLISHED DURING THE INTERSESSIONAL PERIOD**

3.1 **REPORTS BY THE CHAIRMAN OF THE WORKING COMMITTEE AND OF THE IOC SECRETARIAT**

The Chairman summarized activities of the Working Committee on IOCDE during the intersessional period 1979-1981, and actions he and the Vice-Chairman of the Committee had undertaken on behalf of the Commission during this period. The Chairman stated that throughout this intersessional period experience had shown that the ability of the Committee to be represented by its officers or experts at meetings of other bodies was very important for the effective functioning of the Committee. The Chairman identified the challenges he believed the Committee would face in the future, among them the new challenges prompted by the World Climate Programme. IOCDE must plan for the marine components of the WCP if it is to stay in the forefront of the scientific community. Information transfer, for which the Committee is responsible, and increased levels of co-ordination in support of training activities through the IOC Training, Education and Mutual Assistance in the marine sciences (TEMA), will require more of the Committee's time and attention than it has allowed for in the past.

The IOC Assistant Secretary, Dr. I. Oliouine, informed the Session on the implementation of the recommendations of the Ninth Session of the Working Committee on IOCDE, and presented some statistics (given in document IOC/IOCDE-X/6) on the activities of the Committee during the intersessional period.

The Chairman then called on the Secretary IOC for his supplementary remarks to this discussion. Dr. Ruivo pointed out that as there is such a wealth of marine information and data existing in the world community, it gives to IOCDE an added responsibility because it is the only forum in the United Nations system where Member States can meet and discuss oceanographic data and information exchange. In
this connection it may be necessary to streamline the structure of the Commission's subsidiary bodies in order for them, and particularly the IODE, to cope with the ever-increasing demands and workload of the future. As for the substantive work of the Committee, he noted that Member States expect integrated data and information systems based on existing structures rather than the development of new organizations. Dr. Raivo emphasized further the importance attached to information as it relates in particular to the UN organizations Members of ICESPRO and the interfacing of IODE with other Agencies of the UN system, non-governmental and intergovernmental bodies. Finally, he noted that, although more Member States are attending IODE, there is still a problem of geographic distribution of membership in IODE and that efforts should be made to redress the disparities in representation.

The Committee expressed its gratitude to the Chairman and IODE Secretariat for their efforts on behalf of the Committee, noting with satisfaction the extent to which the experts of the Committee had been able to participate at the meetings of other international bodies and discuss problems of oceanographic data and information exchange and management concerns. It agreed to keep in mind the challenges specified by the Chairman while developing plans and structures for the forthcoming years, and shared the view of the IODE Secretariat on the importance of widening participation of IODE Member States in the activities of IODE.

3.2 REPORTS OF WORLD DATA CENTRES, OCEANOGRAPHY

3.2.1 World Data Centre-A, Oceanography

The Director of WDC-A, Oceanography, Mr. J. Churgin, directed the attention of the delegates to the WDC-A Report "Oceanographic Data Exchange - 1980". He noted highlights from the report including the receipt of almost 100,000 observations in 1980, bringing the total database to more than 1,500,000 observations; the receipt of more than 900 ROSCAL forms brings the total to more than 10,000; and the receipt of more than 1,300 publications. Mr. Churgin also pointed out that 1980 was the fourth consecutive year in which a trend toward greater participation by nations in the DNP/MDP scheme has been noted. He reminded the delegates that the Centre will, of course, still welcome the voluntary contributions of all marine scientific data, whether DNP/MDP-related or not. The WDC-A, Oceanography report indicates that while the ROSCAL system appears to be quite useful and is actively used in many Member States, the use of the International Geological/Geophysical Cruise Inventory (IG/SCI) has been extremely limited and does not appear to be functioning as originally intended.

Mr. Churgin suggested that the Committee may wish to consider alternatives to this system. He indicated that while WDC-A, Oceanography would continue to provide as much data and information as possible on exchange, large or specialized requests may require cost-recovery.

3.2.2 World Data Centre-B, Oceanography

Speaking on behalf of the Director of the WDC-B, Oceanography, Dr. V. Sulinov (USSR) introduced the status report of the Centre for the period 1979-1980 (document IODE/ICO-68 Annex 2.1 rev.), and noted that...
in this period WDC-B had received data from 12,000 oceanographic cruises - practically the same amount as in the 1977-1978 period. Four data catalogues, a number of publication catalogues and four ROSCOE catalogues were published. Dr. Smirnov also stressed the fact that during the intersessional period there had been a tendency to prolong the delay in forwarding data into WDC-B for international exchange. Only 5% of the total number of data presented to WDC-B was relevant to the period 1979-1980. Many countries do not submit their DNP's and the ROSCOE inventories are often filled in incorrectly. Unfortunately, up to now the data have been presented on various data carriers: listings, micro-films, data forms, publications, and only a small portion in the GF-2 or on magnetic tapes. Dr. Smirnov suggested that timely submission of data from DNP and ROSCOE inventories is necessary in order to facilitate the international oceanographic data availability and to improve the data services rendered to the users. He proposed that the Guide on International Oceanographic Data Exchange (IOC Manuals and Guides No. 9) responding to the RNQCC concept, be revised and that emphasis be placed on the chapters dealing with DNP's. In this connection, Dr. Smirnov remarked that the tendency to regionalization of the world ocean study leads to a necessary strengthening of the role of RNQCC in assisting the WDC-B in data collection and cataloguing. He also proposed that GF-3 be adopted for the international exchange of data on magnetic tapes.

Referring to the proposal, he underlined that WDC-B in Moscow is ready to accept data on magnetic tapes in GF-3 and national formats, provided the technical specifications recorded in the IOC Manuals and Guides No. 9 and in the GF-3 Guide (IOC Manuals and Guides No. 9 Annex I, Part I) are met.

3.3 REVIEW OF THE STATE OF IMPLEMENTATION OF RESOLUTIONS AND RECOMMENDATIONS RELEVANT TO IOOE

The Working Committee was informed by the IOC Assistant Secretary of the need to review its resolutions and recommendations from the Ninth Session and relevant resolutions from IOC-XI, XIII and IOC-XII and on the status of their implementation.

The Committee, having received a paper on proposed actions (document IOC/IOOE-X/7), fully concurred with these proposed actions and requested the Secretariat to prepare the respective resolution and recommendation, taking into account the implication of all recommendations and resolutions reached at its Tenth Session. (See Recommendation IOOE-X.11 and Resolution IOOE-X.10).

4. CO-OPERATION WITH INTERNATIONAL ORGANIZATIONS AND OTHER BODIES ON MATTERS CONCERNING OCEAN DATA EXCHANGE

The Chairman, in introducing this Agenda Item, drew the attention of the participants to Resolution XI-20 by which IOC invited Executive Heads of ICESPO organizations to bring to the attention of their respective bodies concerned the internationally agreed principles and procedures for international exchange of oceanographic data as outlined in the Manual on IOOE.
The Chairman urged participants to consider carefully the reports and requirements of these other bodies in their deliberations and to make appropriate recommendations on these issues.

4.1 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (FAO)

In the absence of a Representative of FAO, the IOC Assistant Secretary, Mr. S. Tibbott, presented a report jointly compiled by FAO and IOC (document IOC/IODE-X/5 Annex 4.1A). He informed the Committee that the Fisheries Department of FAO is involved in two activities with the co-operation of the Working Committee on IODE that are co-operative efforts sponsored by FAO, IOC and other agencies of the UN: the Aquatic Sciences and Fisheries Information System (ASFIS) and the Marine Environmental Data Information Referral System (MEDI). As for ASFIS, FAO acts as the lead co-ordinating agency for this system which is sponsored by FAO, IOC and UN (GEF). As regards MEDI, FAO is one of the organizational participants in this system having provided input to it with plans to contribute more in the future.

The Fisheries Department of FAO assembles relevant, reliable and timely data and other quantitative information on all aspects of fisheries to support planning and development activities in the sector and also contributes to the improvement in the quality and scope of fishery statistical information at the national, regional and global levels. These services and products are computer-supported and are of two types: fish catch statistics and fishery commodity statistics which are published in the Yearbook of Fishery Statistics.

4.2 INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

The Representative of ICES, Mr. J. Sned, reported on some of the activities of the ICES data centre, the Service Hydrographique, since IODE-IX (document IOC/IODE-X/5 Annex 4.2B), such as preparation of inventories and banking of data from the North Atlantic Ocean Weather Stations. As regional data centre for the CINECA area, it had continued its work on creating a CINECA data bank.

He informed the meeting that an ICES resolution urged national oceanographic data centres within ICES to develop the capability to exchange data on the GF-3 format and in that respect repeated the proposal of ICES to take the responsibilities of DNOC-Format.

He stressed the need for criteria for standard reduction of current meter data and tide gauge records prior to storage in the data centres. The relevant ICES Working Group plans also to look into this matter.

The Committee expressed its gratitude for the proposal of ICES and decided to examine this matter in detail while discussing the activities of the groups of experts on Format Development and for DNOC.
4.3 PERMANENT SERVICE FOR MEAN SEA LEVEL (PSMSL)

The report of the Director of PSMSL, Dr. D.T. Pugh, was presented by Dr. M.T. Jones (U.K.) (Document IOC/IOC/6-X/3 Annex 4.1C). The PSMSL, which is sponsored by IOC and the ICSU Federation of Astronomical and Geophysical Services (FAGS) and operated by the U.K., continues to collect, publish, analyze and interpret monthly and annual values of mean sea level from a global network of reporting stations.

A milestone in the activities of the Service was reached in 1979 with the completion of a major publication (Monthly and Annual Mean Heights of Sea Level) in three volumes of data from some 600 stations, each reduced to a consistent local reference level: Volume 1 containing data for Europe, Africa and India; Volume 2 for North, Central and South America and Volume 3 for Japan, Australia and the Pacific Islands. Having concentrated its limited staff resource on this publication, the Service has since undertaken a major review of all actual and potential data sources, initiated correspondence with several and anticipates improved data supply in the future.

However, the Service is aware of significant gaps in its coverage of the southern hemisphere, particularly in the Indian Ocean, and would be grateful for IOC Member States' assistance in identifying and/or encouraging the development of further measuring stations. In addition, the PSMSL is seeking to identify a small number (probably not more than five) of representative stations in areas where there is no other data coverage and where the local gauge-operating authorities do not have the staff available to reduce the data. For these stations the PSMSL will undertake to reduce data for an extended period.

Dr. M.T. Jones states that the PSMSL is grateful for its continued support from IOC, FAGS and the U.K.'s Natural Environment Research Council.

The Committee recommended that ways be found to extend PSMSL as the international data centre for sea level data.

The Committee adopted Recommendation IOC/6-X/1.

4.4 UNITED NATIONS ENVIRONMENT PROGRAMME

The UNEP Representative, Mr. P. Lees, stated that from the overall UN perspective, the objectives of IOC are closely connected to the requirements of secondary users throughout the UN Specialized Agencies (Document IOC/IOC/6-X/3 Annex 4.1D).

In the past few years, the emphasis has changed from purely scientific use of data to a much more practical use for management, development, conservation and exploitation of the ocean resources. The priorities of governments now require ever more oceanographic data for their environmental and developmental activities. The IOC activities of most interest to UNEP were pollution data management and exchange formats (particularly GP-3) and the ASFIS and MEDI systems. He enumerated international conferences which have concerned themselves
with oceanographic information and stressed that, now there is a need for the practical use of the kind of ocean data and information with which the Working Committee on IOCDE is concerned. IOCDE should seriously consider a programme to service the practical needs of governments for data and information for environment and development and there should be a very real effort to bring in the developing countries to a greater extent and give them the benefit of the oceanographic information they need for developmental and environmental management. The marine data activities of UNEP which are contained in the ten Regional Seas Action Plans in which there was a major scientific component involving a substantial monitoring and data-gathering activity closely associated with the problems and environmental management needs of the coastal zone in each region.

4.5 INTEGRATED PROGRAMME FOR BIOLOGICAL INVESTIGATION OF MARINE ANTARCTIC SYSTEMS AND STOCKS (Biomass)

The report on BIONASS activities relevant to IOCDE (Document IOC/IOCDE-X/3 Annex 4.1E) was presented by Mr. H.A.C. Jones, the IOC representative on data management to BIONASS, on behalf of Professor Sayed 2. El-Sayed, the Convenor of the SCAR/SCOR Group of Specialists on Southern Ocean Ecosystems and the Living Resources. The BIONASS programme is co-sponsored by TCSU through SCOR and SCAR, by IABO and by ACNRR.

The Committee was informed that BIONASS has not yet established a Data Centre though it is still determined to do so. SCAR has welcomed the interest shown by Australia in establishing such a centre in Hobart, Tasmania, and agreed to invite an ad hoc group of H.A.C. Jones (IOC), D.I. Crum (Federal Republic of Germany) and a yet-to-be-appointed Australian data/computer expert to look in more detail into the requirements and specifications for a BIONASS Data Centre. Should Australia decide not to establish a centre, then SCAR/SCOR will explore the possibility of a centre in another country.

The Delegate of Argentina reminded the Committee that his country, at the request of IOC, had offered to become the centre responsible for physical and chemical data for BIONASS and is ready to accept all responsibilities relevant to this proposal.

The Delegate of the USSR pointed out that BIONASS is not a programme of the IOC and that the Commission was never invited by SCAR or SCOR to establish a RCDCC for BIONASS.

At its last meeting in Cambridge, the BIONASS Technical Group for Data, Statistics and Resource Evaluation (the advisory body on data management) approved a data management plan proposed by Mr. H.A.C. Jones, Dr. D.I. Crum and Dr. Aldo Tomo, but rejected a recommendation that BIONASS invite the IOC to help establish the BIONASS Data Centre which would be the key element in the approved data management plan. At the same time it has asked IOC to participate in establishing the centre, once chosen.
The Chairman, noting the Argentine proposal, inter alia, suggested that IOCDE, through the Group of Experts on NODCs and the IOC Secretariat, explore how best to utilize services and capabilities of Member State NODCs that offer to serve as NODCs for BIONASS.

The Committee supported the suggestion (see Resolution IOCDE-X-5).

4.6 EUROPEAN CO-OPERATION IN SCIENCE AND TECHNOLOGY - PROJECT 43 (COST-43)

Mr. T. Kvinge presented his report (Document IOC/IOCDE-X-8 Annex 4.1F) highlighting the importance of Ocean Data Acquisition Systems (ODAS) as a means of acquiring long time series of certain marine environmental data. While acknowledging that most of the currently available ODAS data are not oceanographic, Mr. Kvinge stated that IOCDE should be prepared for an expansion in the amount of oceanographic measurements and assess the impact of taking responsibility for co-ordinating and archiving of these data, which at present are held by the individual operators. He made the suggestion, supported by Mr. J. Shee (ICCS), to include the ODAS stations in the IOC International Catalogue of Ocean Data Stations (IOC Manuals and Guides No. 2), and accordingly to update and issue a revised version of this publication.

The Secretary of the IOC/SCOR Committee on Climatic Changes and the Ocean (CCCOC), Mr. B. Thompson, pointed out that the recent IOC/CCCOC meeting on Time Series of Ocean Measurements had expressed the opinion that existing series, such as those within the COST-43 project, would be extremely valuable for climate research and forecasting and recommended strongly that they be continued. He also noted that such series of measurements are rare and their value increases nonlinearly with longevity.

The meeting concurred with the view expressed by the CCCOC Secretary and agreed on the necessity of preparing a revised version of the IOC International Catalogue of Ocean Data Stations (see Recommendation IOCDE-X-9).

4.7 COMMITTEE ON DATA FOR SCIENCE AND TECHNOLOGY (CODATA)

The IOC Assistant Secretary, Mr. S. Tibbitt, brought the attention of the Working Committee to a report (Document IOC/IOCDE-X-8 Annex 4.1G) prepared jointly by the IOC Secretariat and by CODATA of the International Council of Scientific Unions (ICSU).

Mr. Tibbitt then informed the Committee of CODATA’s plans to produce a chapter in its CODATA Bulletin Series on the topic of availability of environmental data in oceanography and its desire to cooperate with the IOC, and MEDU in particular.

The Working Committee agreed that CODATA and the IOC Secretariat should collaborate on the acquisition of information for the production of a joint publication of this chapter entitled “Oceanography”.

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The Delegate of the Netherlands voiced concern about the plethora of questionnaires, and the Chairman of the Group of Experts on MERIT indicated that this was the reason for CODATA/BCI consultations for developing a questionnaire that would meet the requirements of both organizations.

4.8 ENGINEERING COMMITTEE ON OCEANIC RESOURCES (ECOR)

Professor S. Schuster presented the ECOR report (Document IOC/IODE-X/8 Annex 4.11) in which he outlined how well ECOR had performed in establishing and maintaining international professional engineering communication in marine affairs, in providing advice, from an engineering viewpoint, to international and intergovernmental organizations concerned with marine affairs. During the past three years, ECOR had designated a representative to the Working Committee on IODE, arranged for the one-year appointment of a petroleum data expert to ESCAP/SCOR and sponsored the organization of meetings where oceanographic data were or will be a matter of serious discussion. Relevant to this kind of activity are a workshop on Directional Wave Spectra (USA, September 1981) and the Joint Oceanographic Assembly (Canada, August 1982). Participants of the ECOR 7th General Assembly (London, April 1981) paid much attention to some aspects of the data management - first of all to the management of instrumented wave data and data necessary for sea drilling, construction of artificial islands, platforms and development of marine-related technology. ECOR is active in stimulating the sharing and exchange of information and in sponsoring conferences, but it has no formal data and information management system and invited the Working Committee to assist in that field.

During the discussion, it was pointed out that IOC has already established the RNODC Waves, which is operated by the U.K. NODC (MEDS), and that good informal communications exist between the RNODC Waves and various engineering organizations including PLANC and ECOR.

The Working Committee stressed the importance of continued communication between relevant IODE components and ECOR.

4.9 SCIENTIFIC COMMITTEE ON OCEANIC RESEARCH (SCOR)

The Representative of SCOR, Mr. J. Crease, presented the SCOR Report (Document IOC/IODE-X/8 Annex 4.11) and placed particular emphasis upon a number of SCOR Working Groups which are of direct interest to the Working Committee on IODE.

The activities of these Working Groups (10, 46, 51, 54, 55, 56, 58, 60) were likely to result in large flows of data in the IODE system. SCOR WG 51, in particular, has made proposals related to CTD processing and archiving, which were considered by the session.

SCOR and IOC (through the Chairman of the Working Committee on IODE) represent oceanography on the ICSU Panel on NDCs.
The Committee agreed on the necessity of establishing a "Task Team on Standards Criteria for Physical Oceanographic Data" with special emphasis on Oiodo, SOD data, data compression and new continuous recording devices. Terms of reference were specified.

The Committee adopted Resolution IOCDE-X.1.

4.10 UNITED NATIONS OCEAN ECONOMICS AND TECHNOLOGY BRANCH (UNOETB)

UNOETB Representative, Mr. M. Fish, informed the Committee that UNOETB is currently operating and maintaining an ocean minerals database containing marine geological and chemical data on manganese nodules (Document IOC/IOCDE-X/8 Annex 4.1d). Taking into account Resolution EC-XIV.19 endorsing the development of a programme of Ocean Science in Relation to Non-renewable Resources (Minerals), she requested the Committee to consider a proposal on a collaborative project involving the expansion of the IOCDE data exchange system to include seabed mineral resource data, to endorse the submission by Member States of these data and to designate the NDCs Oceanography for receipt of these data for archiving.

Favourable comments on this proposal were made by representatives from SCOR, NDC-A and the IOC Secretariat. The long-standing association between the UN and the IOC and the importance of this association were stressed. The proposal was discussed in detail under agenda item 8.3.


4.11 WORLD METEOROLOGICAL ORGANIZATION (WMO)

The WMO Representative, Mr. G. Verploegh, gave a brief summary of the various topics for which co-ordination of WMO and IOCDE activities was required (Document IOC/IOCDE-X/8 Annex 5.3). These are activities of long standing for which an adequate co-ordination mechanism had been established. To this category belong the activities of the Commission for Marine Meteorology (CMC) and those of the IOC/WMO Joint Working Committee for OCECS. Recognizing the working Committee on OCECS's work on instrumental wave data management, he advised that information about this work should be passed on to the CMC to enable co-ordination of efforts in data exchange and archiving for use in wave forecasting. There should be further co-operation between institutions and organizations producing wave data based on wind fields, and data on instrumental wave measurements so as to ensure compatibility and availability of both types of data for wave forecasts and climate studies.

In introducing the World Climate Programme (WCP) and, in particular, the World Climate Data Programme (WCP), Mr. Verploegh explained the general concept of the WCP, namely that existing organizations and systems should be used, to the extent possible, for furthering the objectives of the programme. Thus, for ocean data management, IOCDE is regarded as the principal group to contribute to the objectives of the WCP and WCP (World Climate Research Programme) and the Working Committee was therefore invited to consider ways and means to co-ordinate relevant activities of the IOCDE.
system and the development of the WCDP and WCRP, taking into account the requirements of the World Climate Programme. The Committee was informed that a link had already been established between IOCC and WMO in regard to the World Climate Research Programme, through INCOOS. A direct link with the data component of WCRP, namely WCDP, would be desirable since such a link would also enable co-ordination of climate-related activities other than those co-ordinated by WHO/ICCS Joint Scientific Committee (JSC) and IOCC.

Two forthcoming WCDP Informal Planning Meetings (IPM) will be convened in 1981, one on the WCDP Data Referral System (end September) and the other on the WCDP Data Management System (November). The JSC has been invited to participate in both meetings.

The Committee agreed that support of the WCRP and the WCDP was of the utmost importance and requested the IOC Secretary to arrange for IOCC representatives at the IPsMs scheduled for 1981. The Secretary of IOCC pointed out that the IOCC representative would, in effect, also represent IOCC at those meetings and should therefore be fully apprised of all IOCC activities related to data management.

In the light of the numerous reports of these other bodies, the Committee agreed that intersessional liaison, through appropriate channels, was indispensable and that its practice to establish subsidiary, subject-oriented bodies was necessary and sound.

5. IMPROVEMENT OF IOCD SYSTEM AND DATA MANAGEMENT SCHEMES

5.1 REQUIREMENTS OF OCEAN SERVICES AND GLOBAL PROGRAMMES

5.1.1 Global Investigation of Pollution in the Marine Environment (GIPME) and marine pollution monitoring programmes

The Committee received a report by the Secretariat on some future plans of GIPME (Document IOC/IOC-X/8 Annex 5.1). There was also some discussion on UNEP co-ordinated projects which may point the way in which IOC marine pollution programmes may also develop in support of regional programmes.

The Committee concurred in principle with the request by GIPME for support in the future of one or more WMOCs for marine pollution data bases, in view of the fact that the Fourth Session of the Working Committee for GIPME had not yet taken place, it was deemed too early to propose specific data management schemes.

5.1.2 Joint oceanographic meteorological programmes

The Working Committee reviewed the various interfaces between meteorological and oceanographic data management programmes. Some programmes, such as ICOS and the "El Niño" investigations, which generate data, are sponsored jointly by IOC and WMO. The World Climate Research Programme for which close co-operation exists between the WMO/ICCS Joint Scientific Committee and the IOC/COOS Committee on Climatic Changes and the Ocean, will bring a new challenge to the organization of ocean data management and to co-ordination of meteorological and oceanographic data bases.
The Committee felt that this co-ordination should be further specified under its consideration of IOC contribution to the World Climate Data Programme.

The Committee adopted Recommendation IOC-X.3.

Specific actions taken by the Working Committee are recorded under the relevant agenda items, including the need for co-ordination with regard to MTDI and in the field of wave and satellite data management.

5.1.3 Oceanographic Tables and Standards

The Representative of SCOR, Mr. J. Crease, summarized the work of the "Joint Panel on Oceanographic Tables and Standards" cosponsored by ICES/SCOR/IAPSO/UNESCO. The work with most immediate impact on IOC was the definition of the "Practical Salinity Scale (1978)" and the establishment of the new "International Equation of State of Seawater (1980)". The official definition of these new equations is contained in the UNESCO publication "Technical Papers in Marine Science No. 36": "Tenth Report of the Joint Panel on Oceanographic Tables and Standards" (UNESCO, 1981). Both the equation and scale had now been adopted by all the relevant scientific organizations with an encouragement to all producers and users of this type of data to commence using the new definitions by January 1, 1982. Mr. J. Crease also commended the IAPSO report on Symbols, Units and Nomenclature (SUN) for all those concerned with the application of the International System of Units in Oceanography.

The Committee adopted Recommendation IOC-X.2.

5.2 DEVELOPMENT OF IOC COMPONENTS

5.2.1 Group of Experts on the Development of a Pilot Programme for Responsible National Oceanographic Data Centres (RNODCs)

In the absence of Mr. K. Hughes (USA), Chairman of the Group of Experts on the Development of a Pilot Programme for RNODCs, Dr. V. Alexeev, a member of the Group of Experts on RNODCs, informed the Committee of the proceedings of the Third Session of the Group (Paris, January 1981). The Summary Report of the Session was made available to the Committee (Document IOC/RNODC-III/3). Dr. V. Alexeev highlighted the main activities of the Group and stressed that because the pilot phase of the RNODC scheme is now evolving into the implementation stage, the Group of Experts must continue its work for several years in order to assist the RNODC scheme with the many technical problems which will undoubtedly arise. He then drew the Committee's attention to the Recommendations of the Third Session of the Group, for discussion and approval.

During the preparatory meeting of the Group of Experts on RNODCs, the "Draft Guide on RNODCs" was thoroughly reviewed and was found to contain all the essential material necessary for the production of a final document. Final editing will be done by Dr. H.A.C. Jones (Canada). The Chairman of the Group of Experts on RNODCs will review the final draft for completeness, consistency and conformity with the policy and practice of the Working Committee and the IOC. The document will be forwarded to the
World Data Centres for information. The approved version of the Guide will reach the Secretariat by 1 November 1981.

The Committee adopted Resolution IODE-X.2.

The Committee approved the Recommendations of the Third Session of the Group of Experts on RNODCs with a minor change. In Recommendation RNDC-III.2, it was agreed to delete the words "late proposal" as not being consistent with the real state of things. The Committee also expressed its satisfaction with the remarkable acceptance and success of the RNDC scheme in the past Intersessional period.

5.2.2 Group of Experts on Format Development

Mr. J. Crease (U.K.) presented the Summary Report of the First Session of the Group of Experts on Format Development (Document IOC/IODE-X/8 Annex 6.3 plus corr.) and reported that the Group had had an extremely active Intersessional work programme. The detailed specification of the IOC General Magnetic Tape Format (designated GF-3) has been published as Part I, Annex I of IOC Manuals and Guides No. 9. Part II, containing supplementary tables, is due for publication this year. Part III is planned as a non-technical document on the use of GF-3 which will demonstrate the simplicity and effectiveness of the format for a number of types of data sets. An essential component of the group's activities has been the preparation of standard sub-sets of GF-3 covering CTD data, waves and currents, designed for clarity of presentation through rather simple programmes.

Although in the coming Intersessional period the Group will continue with the detailed development of GF-3 and concentrated efforts will be made on the promotion of GF-3 among a wider community of potential users, ways of improving the availability of computer software will be studied, and a collection will be made of all relevant specifications, documentation and information. A survey of delegations of Member States present showed that most RNODCs considered that they would be able to handle tapes in GF-3 by 1983.

The Working Committee considered the response to IOC Circular Letter No. 801, inviting offers to become an RNODC-Format, and made Recommendations to the Tenth Session of the Working Committee, which include proposals on training in the use of GF-3.


5.2.3 Group of Experts on Marine Environmental Data Information Referral System (MEDI)

The Chairman of the Group of Experts on MEDI, Mr. J. Churgin, referred the participants to his report and to the Summary Report of the Group of Experts on the MEDI Referral System (Document IOC/IODE-X/8 Annex 6.5). He noted that this report contains a technical discussion on the activities of the IOC and other organizations participating in MEDI; short-, medium- and long-term plans for the development of MEDI
and draft recommendations. The short- and medium-term goals (1981-83) include a number of improvements and the development of training aids. A very significant improvement in information flow would occur if MEDI was linked to scientific programmes such as the WCP and to UNEP Regional Seas Programmes. It is believed that such linkages would produce increased output of data descriptions and would permit specifications of products tailored to meet the needs of operational programmes. Some delegates stressed the necessity of direct access of Member States to MEDI. Possible ways of meeting this requirement were discussed.

The WMO Representative stated that his organization planned to take account of MEDI in its data referral activities for the WCP and looked to MEDI experience in designing the WCP system.

The Committee endorsed the plans for MEDI set forth in the Summary Report of the Third Session of MEDI (IOCC/MEDI-III/3), and adopted Recommendation IOCC-X.4.

5.2.4 Group of Experts on the Aquatic Sciences and Fisheries Information System (ASFIS) (FAO/IOCC/78)

The Chairman of the Joint FAO/IOC/UN (CEMB) Panel of Experts on Aquatic Sciences and Fisheries Information System (ASFIS), Dr. J. Caponio, reviewed the Summary Report of the Third Session of the Joint FAO/IOC/UN (CEMB) Panel of Experts on ASFIS (Paris, 8-12 April 1980). The Working Committee was reminded that ASFIS is now a successful operational system. It is clear that demands for information will increase, and the accent now should be on utilization. He requested the Tenth Session of the Working Committee to endorse and approve the Recommendations contained therein.

Dr. Caponio stressed the importance of information exchange in international marine sciences programmes and described the available ASFIS products and services. He noted problems associated with the utilization and dissemination of these products. Realizing that although IOCC's Terms of Reference include information exchange, the operating premise and concern of IOCC is to monitor exchange requirements for observational or numerical oceanographic data for the efficient operation of international marine science projects. He reminded delegates that it is often the processed and analyzed information that is of greater importance and benefit, particularly for those developing countries that do not have the resources to perform the analysis. He thus re-emphasized the need for an information as well as a data exchange mechanism. The Committee should recognize that the role of IOCC is not just limited to the exchange or transfer of data. Areas where IOCC might act to fill the needs of Member States, particularly developing countries, are the compilation and production of a "Guide to Marine Scientific and Technological Information Resources" and to increase its support for the training and education of information specialists as it already does for data specialists by organizing workshops and seminars. He proposed that the Working Committee request the IOC Secretary to take the necessary action to implement the development and publication of the guide.

Dr. Caponio quoted from the opening speech of the Secretary IOC regarding the importance of information management and transfer, especially those aspects pertaining to education and training and the application to
marine technology transfer. To substantiate ICDE's support as the parent body for ASPIS and marine information management, he proposed that ICDE acknowledge its responsibility at the same level for data and for information and demonstrate its support by amending the name of the Committee to "International Oceanographic Data and Information Exchange".

Numerous comments by participants reaffirmed the importance of information management and exchange, but cautioned ICDE to consider carefully the implications for IOC and Member States, the level of support and resources required, and the mechanisms needed to allow the profile of information management to rise to the level now accorded to data management.

Dr. J. Watson (Canada) stated that once information was fully accepted as part of ICDE, then the best approach would be for a consultant to prepare an information services management plan to be considered at the next session of ICDE. For the intersessional period, the mechanism of the ASPIS Panel of Experts should be continued to advise FAO, IOC and UN(GEMB) on ASPIS requirements.

The Committee concurred with the ideas expressed at the session and adopted Recommendation ICDE-X.3.

5.2.5 Airborne and satellite remotely sensed oceanographic data

The Chairman of the Task Team on Airborne and Satellite Remotely Sensed Oceanographic Data, Mr. P. Geerwers (Netherlands), informed the Committee that, during the intersessional period, several meetings on the use of Remote Sensing (RS) for oceanographic applications had taken place. Contacts have been established with ESA (on ERS-1), ICES (the ARSWG), the Joint Research Centre of the European Communities (on the CCGS in Nimbus-7), SCOR and WMO. The interest of IOC had been stressed in these contacts, as well as ICDE ideas on the dissemination of the data.

An increased interest in remote sensing of the oceans can be noted and this had led to an awareness of several problems regarding the format of the data and the means of obtaining such data. Also noted were the many questions regarding the value of specific RS techniques for oceanographic applications.

There are stated requirements for remotely sensed data as found in the World Climate Programme, pollution programmes and in requests from other sources inside and outside IOC. Although they concentrate - for operational work - on microwave systems because of their all-weather capabilities, infrared and visible light data are considered as well. There is a need for standardized formats, tuned to oceanographic applications, and with sufficient standard annotation. Ideas for such annotation have been developed. The Group of Experts on Format Development has commenced work on the design of GP-3 sub-sets for dissemination of "derived products" such as waves and currents based on satellite observations. Existing
problems of identifying sources of remotely sensed data, particularly for oceanographic purposes, indicate that better inventory systems are necessary to assist the user in locating remotely sensed data.

Mr. Churgin suggested that MEDI could act as part of a referral system to remotely sensed data in different centres in the world. The archiving of remotely sensed data in more or less raw form does not fall within the competence of IODE.

The Committee agreed that the Task Team will continue its functions as outlined under its Terms of Reference. Belgium, Thailand, and Iran expressed interest in joining the Task Team.

The Committee adopted Resolution IODE-X.3.

5.2.6 Integrated Global Ocean Services System (IGOSS) data archiving and exchange

The Rapporteur for IGOSS Data Archiving and Exchange, Mr. W. Winterfeld, reported on the status of BATHY and IESAC Data Archiving (Document IOC/IODE-X/3 Annex 6.9). 75,080 BATHY observations for the period 1972-1978 have been processed into the SYNDARC format by the U.S. RODC/IGOSS, but since the beginning of the Global Ocean Experiment all BATHY IESAC traffic is archived via the SOOE in EGG format. The U.S.S.R. and Japan RODC/IGOSS also store IGOSS data through in other formats.

The Committee concurred with the view that IGOSS had developed to the point that it can take over many of the data-processing functions of IGOSS data formerly assigned to RODCs.

The Representative of the Joint IOC/RAD Working Committee for IGOSS, Dr. R. Huber, informed the Session on the way the Joint IOC/RAD Working Committee for IGOSS views its role in the general task of producing and exchanging oceanographic data (Document IOC/IODE-X/3 Annex 6.9 add.1). He stressed the main function of IGOSS as being a service. IGOSS offers its service to two user groups. One needs oceanographic data within days to up to one week; these are primarily national agencies which produce forecasts - oceanographic and meteorological - and short-term analyses. The other group needs data in a more delayed mode, to produce monthly analysis of the ocean thermal structure, and climate forecasts of up to one year. Dr. Huber presented the new data flow scheme and how it is defined in the IGOSS General Plan and Implementation Programme for 1982-1985. This new flow scheme may have an impact on the relationship between IOOE and IGOSS, especially on operations of the RODC-IGOSS.

The Session expressed interest in Dr. Huber’s description of an on-going development of a new exchange format for the non-operational exchange of IGOSS data after processing via an IDPSS centre, and in plans to modify the non-operational part of the BATHY/IESAC log forms at present in use.
The above-mentioned format is intended as the exchange format among IDPSS centres, and an IDPSS centre and a user. It should also be used for the dissemination of IGOS data sets to the RNODC-IGOS.

The Committee, noting the new exchange format and revisions to the IGOSIS Log proposed by the Subgroup of Experts under IGOS, decided that IODE should give it immediate attention and to that end work jointly with the Joint IOC/MOD Working Committee for IGOS in order to arrive at a final new archiving/exchange format as early as possible. Further, the Manual on IGOS Data Archiving and Exchange should be updated prior to the Third Session of the Joint Working Committee for IGOS.

The Committee agreed to request the Joint IOC/MOD Working Committee for IGOS to incorporate depth sounding into the radio message and to investigate the possibility of using a subset of GP-3 for the exchange of data between IGOS SSCs and RNODC's RNODC.


5.2.7 Marine pollution data

The Committee was informed by Mr. D. Könne (Federal Republic of Germany) on the results of the Third IOC/MOD Workshop on Marine Pollution (Petroleum) Monitoring (New Delhi, February 1980). He mentioned that the original goal of the Marine Pollution Monitoring Pilot Project (MARPOLP), to establish sampling and analytical methods for petroleum pollution and to organize the exchange of data resulting from such a programme, has been accomplished. Data have been collected from visual observations of oil pollution, from tar balls drifting at the sea surface and stranded on beaches, and from dissolved/dispersed hydrocarbons. The data were sent to the two RNODCs for MARPOLP, the Japan Oceanographic Data Centre and the U.S. NODC. Scientific results of MARPOLP will be published by IOC later this year.

Although he reported that the pilot phase of petroleum pollution visual monitoring was terminated, permanent marine pollution monitoring activities will be established by GIPME under its Marine Pollution Monitoring Programme (MARPOLP).

The IGOS Rapporteur reported that large volumes of data, mainly visual observations of pollution, are archived in SYNDARC format on magnetic tape at the RNODC in Japan and in the U.S.A. in a special format. However, the flow of MARPOLP data has come to a virtual halt and both RNODCs envisioned that their functions vis-à-vis MARPOLP have now been completed.

The Committee noted with appreciation the efforts of the RNODCs MARPOLP over the life of that programme and concurred that they can now disband, but continue to store the data on behalf of the NODCs.

The Committee realized the importance of working on this complex matter in the intersessional period and decided that an "IODE Task Team on Marine Pollution Data" should replace the rapporteur mechanism, retaining the Terms of Reference of the present Rapporteur.

The Committee adopted Resolution IOCE-X.4.
5.2.8 Marine Biological Data

The report of the Co-Rapporteurs for marine biology data exchange was presented by Mr. H.A.C. Jones (Canada) (Document IOC/ICDE-X/8 Annex 6.11).

Two events had occurred since the written report had been filed, which caused the Co-Rapporteurs to modify their recommendations slightly. First, there had been a very successful, though informal, test of the ability of GF-3 to handle marine biology data easily when the Chairman of the Organizing Committee for the FIBEX (BIOMASS) Data Interpretation Workshop, Dr. D.L. Cram (Federal Republic of Germany) successfully transmitted a GF-3 tape of Antarctic marine biological data, with no other information, to Dr. M. Jones of the U.K. Dr. Jones read the tape with his new universal GF-3 read programme without difficulty. The data were converted to GF-3 from a PASCAL-R database during a few days by a student programmer. Thus, there is now little question that GF-3 is suitable for archiving/exchange of biological data.

The other event was the successful completion of the worldwide questionnaire survey on the need for international exchange of marine biology data. The results showed a world consensus on the kinds of data of interest: namely, Zooplankton, Phytoplankton, Primary Productivity, and Pelagic/Demersal Fishes. This consensus immediately showed the practicality of beginning international exchange of marine biological data.

The Committee was informed on the status of the preparation of the BIOMASS FIBEX Data Workshop to be held in September/October 1981 in Hamburg. However, being aware that the Workshop has no plans for long-range archiving of the specially assembled, interdisciplinary computer-linked data base, several Delegates expressed concern about its fate.

The Working Committee felt strongly that every effort should be made to preserve this data base even if it means placing the set in "cold storage" until all the Workshop participants were prepared to release them. The IOC Secretary should strongly urge SCAR/SCOR to act on this matter, and further to offer the BIOMASS programme whatever help the IOC has at its disposal to keep the dataset intact. It was felt that this would be generally beneficial, notably to the BIOMASS programme itself, especially when it is undertaking its planned FIBEX during 1983/84, at which time the FIBEX data will provide background baseline information.

Citing these concrete accomplishments on IOC's work on biological data exchange, some Delegates asked the Chairman to congratulate and thank those involved in the preparation of the Co-Rapporteurs' report and the preparation of the BIOMASS Data Workshop on behalf of the Working Committee. The Chairman did so, adding his own thanks.

The Committee agreed to establish a "Task Team on Marine Biological Data" and adopted Resolution IOC-X.5.

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5.2.9 Oceanographic data management during the First GARP Global Experiment Operational Year (FOY)

In his presentation (Document IOC/IODE-X/8 Annex 6.12) "Status Report on RNODC-FOY Activities - June 1981", Mr. E. Ridley (USA) stated that the RNODC's FOY (USA and France) are continuing until at least 1984 but have modified the details of the original commitment to produce an inventory of oceanographic data collected during the FOY oceanographic year, and to create a data base. Under the revised plan, the data base will include all data as originally agreed to, and later reaffirmed, in 1980, with the exception of sea level data. A data base of the most complete global data coverage available for FOY will be produced in GP-3 format by the end of 1983.

The Delegate of France stated that France intends to continue to collaborate with the USA and confirmed that data could be handled in GP-3 format. To that end, all Member States are urged to submit their FOY data as early as possible. He paid particular tribute to the work of Mr. R. Dennis (USA) who was unable to attend the meeting, but who had made strenuous and significant efforts in formatting and establishing the necessary procedures.

The Global Ocean Data Inventory (GODI) of "cruise" plans compiled prior to and during the FOY has met with outstanding co-operation. The extremely large volume of information received makes it necessary to distribute GODI in microfiche rather than in hard copy, and the inventory will not be accessible on-line as originally intended.

The Committee appreciated the efforts of the USA and France in the development and implementation of GODI, and the contribution by a large number of scientists throughout the world.

The report of the Consultative Meeting on RNODC-FOY which was convened at Worsley, U.K., 24–26 March 1981, provided essential guidance for certain additional tasks to be performed by the RNODC-FOY.

The Working Committee concurred with the findings of the Worsley meeting and agreed with the request of RNODC-FOY that the IODE network be canvassed for assistance in preparation of additional data files and products.

5.2.10 Marine Information Management (MIM)

Taking into account the discussions and comments concerning marine information management, as a result of reports (Document IOC/IODE-X/8 Annex 4.1A and IOC/IODE-X/8 Annex 6.7) presented to the Committee relevant to Marine Information Management (MIM), and Dr. J. Caponlo's paper on perspectives for information management (Document IOC/IODE-X/8 Annex 12) an ad hoc sessional group was formed to discuss Marine Information Management in terms of short-term (1982-83) and medium-term (1984-89) plans and financial support. The outcome of these discussions was that for the short term (1982-83) financial support for MIM by IODE would only be increased through co-ordinated efforts between the TEMA and IODE programmes of IOC and the UNESCO Division of Marine Sciences.
For the Medium-term Plan (1984-89), MMD activities would necessarily seek financial support for the implementation of large-scale development plans through contributions to the IOC Trust Fund by IOC Member States, co-ordination with the General Information Programme (GIP) of UNESCO and extra-budgetary funds as they are identified and become available. Thus, it was not always feasible to assign specific costs to the guidelines for the large-scale programme development and activities related to MMD.

The Committee carefully considered the proposals made by an ad hoc sessional group and, taking into account Dr. J. Caponio's report, adopted Resolution IOC/IDOE-X/6.

In accordance with this Resolution, relevant national and international organizations will be approached to compile a resource handbook on different aspects of marine scientific and technological information resources such as directories, periodicals, technical report literature, indexing journals, reviews, manuals, computerized and other data bases and so on. A consultant would be required for a total of approximately three months to plan the format and assemble the contents of the proposed handbook. The draft handbook would be submitted to a review panel composed of the contributing agencies and IDOE-sponsored information experts. The review panel would, as its main task, identify any substantive gaps in existing international exchange mechanisms, with particular reference to the needs of developing countries; assess the likely impact of IDOE's responsibility for information management on the structure and functioning of the Working Committee. The handbook would be published towards the end of 1982 with the assistance of the participating agencies.

5.2.11 Wave data management

The Rapporteur on Waves, Dr. J.R. Wilson (Canada), reviewed briefly the development of wave data management within IOC (Document IOC/IDOE-X/8 Annex 5.14). This review covered the establishment of the wave data inventory in the RNODC Waves at MNAS in the U.K. and the development of the list of parameters and supporting documentation for international exchange.

Work during the past intersessional period was concerned with the development of GF-3 standard subsets for wave data. Provisional drafts have been developed for the "Specification of Standard Subsets of GF-3 for Measured Wave Data" and for the "User Guide for the Exchange of Measured Wave Data in GF-3". These drafts have been reviewed by the Group of Experts on Formats and their comments are to be incorporated so that the documents can be made available through the RNODC Format early in the next intersessional period.

In response to the problem of ensuring the continued availability of the wave data now listed, it was suggested that the RNODC Waves approach the present holders of these data to ascertain which of the sets might require archival elsewhere. Where archival elsewhere is required, the RNODC should either acquire the data or arrange for some other NODC to acquire and hold the data.
Finally, it was suggested that there was a requirement to develop a GP-3 subset and data standard for the exchange of wave directional spectral data due to both the engineering and climate requirements for these data.

The report of the RNODC for instrumentally measured wave data was presented by Dr. M.T. Jones (U.K.) (Document IOC/IODE-X/8 Annex 6.XC). It was his pleasure to report that the plans outlined by the Ninth Session of the Working Committee on IODE had now been implemented, that an inventory had been established and that a first catalogue had been published and widely distributed.

The basis of the RNODC of Waves inventory system is a four-page questionnaire designed to be completed by those who have actually been involved with instrumental wave measurement; providing information on the location, dates and duration of the wave measurements, together with a description of the measurement site, the instrument, the processing carried out on the data, and the form in which it can be made available.

The first issue of the RNODC Waves Catalogue of Wave Data, comprising summary information from 551 completed questionnaire forms, was published in March 1980 based on returns up to November 1979. A supplement is planned for publication in 1982 covering information received up to the end of September 1981.

The active involvement of individuals around the world who are acquainted with wave measurements being made in their areas is vital to the success of the inventory system. To this end, area representatives have been identified from contacts in the IODE system and in PIANC - some 37 individuals from 32 countries now participate as area representatives and include individuals in national oceanographic data centres, other national marine, meteorological or engineering institutes or organizations, or in some instances, engineering consultants. RNODC Waves would welcome hearing from any volunteers who would be prepared to assist in this scheme.

At the request of the Chairman, participants confirmed that they are familiar with the Catalogue and found it to be an important and useful document.

The Committee called for the active participation of area representatives in ensuring that as many completed forms as possible are submitted to the RNODC Waves for new publication of the Catalogue.

The Committee adopted Resolution IODE-X.2.

5.2.12 Marine geological/geophysical data management

The Director of World Data Centre-A, Mr. J. Chugrin, presented the report of one of the Co-rapporteurs (Dr. M. Loughridge) on marine geological/geophysical data management. Two specific recommendations were included in the report; that is, firstly to replace the Co-rapporteurs by a task team; and, secondly, to examine the MGD-77 format in order to determine to what extent it corresponds to GP-3 and the appropriate subset established.
Dr. V. Alexeev (U.S.S.R.) presented the report by the other Co-rapporteur (Dr. V. Sheberbekov) on marine geological/geophysical data management. The focal point of this report was that, while there are differences in formats available, it is possible to include a number of types of geological/geophysical data in the GF-3 format.

The Delegate of France anticipated that in the near future there will be an increased interest in exchanging bathymetric data collected at sea by multibeam echo sounders. This exchange will need the development of a new format (probably as subset of GF-3), the definition of scientific standards for data compression and the establishment of an inventory.

The Committee supported the ideas proposed by the Co-rapporteurs. Some other aspects of marine geological/geophysical data management were discussed under agenda item 8.3 (see Recommendation IOC-D-X.10). Noting the expected future action, the Committee agreed to strengthen its mechanism for taking account of this new type of data in the international data exchange system.

5.2.13 Reports of National Co-ordinators for IOC

The Reports of the National Co-ordinator for IOC from Argentina, Chile and Thailand, were accepted as submitted. Other National Co-ordinators were requested to submit written reports, not later than end of October 1981, for subsequent distribution by the IOC Secretariat.

5.3 REQUIREMENTS FROM IOC SYSTEM OF IOC REGIONAL PROGRAMMES

5.3.1 REGIONAL STUDY OF THE PHENOMENON KNOWN AS "EL NIÑO" ("EL NIÑO"/ ENFEN)

Document IOC/IODE-X/8 Annex 7.2 was presented by Mr. Lozano Lopez (Colombia). The activities of ENFEN in the framework of IOC have been exclusively confined to the processing of data and information in each of the participating countries on an individual basis with a minimum exchange of data. This problem may constitute a restriction in the development of marine sciences in the countries of the region and have a serious effect on studies of "El Niño", effective participation in the activities of IOC and the use of the services provided by the programmes of the IOC and other organizations of the United Nations in this field.

The WMO representative recalled the close co-operation which exists in the countries concerned between meteorological and oceanographic activities related to "El Niño" investigations and the assistance WMO is providing in this area. He pointed out that WMO would be in a position to assist in solving data exchange problems.

One of the data management problems is the lack of a designated focal point of RNDC in the region.

The Committee requested the Group of Experts on RNDCs and the IOC Secretary to tackle the problem in accordance with the views expressed.
The Committee recommended the establishment of a pilot project within the IOC strategy for regional action aimed at strengthening the capabilities in the processing and exchange of data and information and in the participation of countries of the region in the activities of IOC.

The Committee agreed that it would be appropriate to call on advisory services which, in close co-operation with the National Co-ordinators of IOC in Colombia, Chile, Ecuador and Peru, determine the current capabilities and needs involved, to assist in preparing the outline of the pilot project mentioned.

The Committee adopted Recommendation IOC-X.7.

5.3.2 IOCARIPE

Under this item, the IOC meeting received reports from Mr. T. Winterfeld and Dr. J. Caponio both of whom represented IOC at the Third Session of IOCARIPE. Mr. T. Winterfeld, speaking as IOCARIPE Data Coordinator, reported that virtually no data have been collected which are specifically identified as IOCARIPE. Thus, the NODC IOCARIPE (U.S. NOC) has decided to make all data from any project collected in the area, historically and during the IOCARIPE, available to IOCARIPE participants; in fact, modest amounts of such data are already archived. The Delegate of the U.S.S.R. urged that all Member States doing work in the IOCARIPE region submit their data promptly to NODC IOCARIPE (or to the NDCs) specified as IOCARIPE data. IOCARIPE, at its Third Session, decided that there is a critical need in the area to strengthen national data-processing capabilities and called for intensified efforts by IOC in data management training.

Dr. Caponio stressed the fact that the greatest single need expressed by Delegates at the Third Session of IOCARIPE was to have access to hard copy as opposed to inventories of scientific literature. Another problem was access to unpublished governmental publications (so-called "grey" literature). IOCARIPE again called for the development of a regional information exchange network for marine sciences.

The Committee, recalling its support to IOCARIPE at the Ninth Session of the Working Committee on IOC, looked to a continuation of technical assistance by all its subsidiary bodies to IOCARIPE and expressed its hope that the IOC Secretariat could find additional support from programmes of the UN and its Specialized Agencies.

5.3.3 Co-operative Investigations in Western Part of the Pacific Ocean (WESTPAC)

The subject was introduced by Dr. K. Voigt (German Democratic Republic). Referring to decisions and recommendations of WESTPAC Workshops and Task Teams relevant to oceanographic data management and exchange (Document IOC/IOC-X/8 Annex 5.2), he emphasized that the common
goal of Member States of the Region is to increase the scientific knowledge and a vital benefit can be derived from the transfer of knowledge and technology -- the sharing of information and resources among participating Member States. He further asked the Committee to call on Member States of the region to establish national oceanographic data centres for effective co-operation.

Dr. Y. Iwasnchi (Japan) presented a report of RNODC WESTPAC on field programme activities, the status of a data management plan, which was coordinated by the Group of Experts on RNODCs, and newsletter arrangements, for WESTPAC. The WESTPAC Newsletter will be an interim means of disseminating information on national programmes, publications, cruises and the availability of data from WESTPAC activities.

The Delegates of the Philippines restated his country's continuing willingness to consider requests for specific data management tasks in the region, while noting that Philippine resources were rather limited.

The Committee noted with appreciation the reports on activities and developments under WESTPAC and requested the Chairman and the IOC Secretary to bring to the attention of the forthcoming Second Session of the IOC Programme Group for WESTPAC all relevant findings of the Tenth Session of the Working Committee on IOC.

5.3.4 Co-operative Investigation in the North and Central Western Indian Ocean (CINCOMI)

In introducing the Commission's programme to study oceanic processes in the North and Central Western Indian Ocean, Dr. K. Voigt referred to recent decisions by the Executive Council on marine scientific co-operation in Africa (Document IOC/ICDE-X/3 Annex 7.4). He recalled research undertaken in the Western Indian Ocean to clarify monsoon-related ocean circulation variability and change.

In this regard, Mr. P. Koorders (Netherlands) informed the meeting that the Netherlands Government is considering the organiziation of an oceanographic research project called "Neelsson in", in collaboration with the Indonesian Government.

Since the CINCOMI Workshop held in Nairobi, Kenya, (25 March - 2 April 1976) had already adopted recommendations on data and information management, the Committee agreed to make every effort to guide their implementation, with emphasis on relevant training courses to be considered by the forthcoming First Session of the IOC Programme Group for CINCOMI.

5.3.5 MEDALPAX - Oceanographic Investigations in the Mediterranean

The IOC Assistant Secretary, Dr. I. Olliontime, informed the Committee of the activities of the MEDALPAX planning group which was created to support the development of an oceanographic programme in the Mediterranean Sea during the GARP Alpine Experiment (Document IOC/ICDE-X/3 Annex 7.1).

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Experts from countries participating in the experiment agreed that all data gathered during MEDALPEX should be internationally exchanged according to procedures established by the IOC through its International Oceanographic Data Exchange System. Each MEDALPEX cruise should be considered by the participants as a "Declared National Programme" (DNP).

Dr. Olinnune then drew attention to the decision of the Group to call for two separate data centres for MEDALPEX – one dealing with sea-level data and the other with conventional oceanographic data. The requirements of the Centres were specified during the last Planning Meeting of the Group in February 1981. The Session was informed that FSUSL agreed to accept the responsibility of data centre for sea-level data and showed willingness to accept hourly or half-hourly values of sea level in computer-compatible format, subject these to routine checks and to apply low-pass filters. The complete data set will then be made available to users in a homogeneous format. The RDC-CIM had volunteered to act as the centre for conventional MEDALPEX oceanographic data.

The Working Committee expressed interest in the foregoing information and appreciated the proposals of FSUSL and RDC-CIM to become data centres for MEDALPEX.

5.3.6 International Co-ordination Group for the Southern Oceans (SOC)

Recalling the Resolution of the Fourteenth Session of the Executive Council that the next session of the Programme Group for the Southern Oceans (PG/SOC) be convened in the following twelve months, Dr. K. Volgi summarized the multidisciplinary research activities and initiatives of the Member States in that region. He emphasized that high priority should be given to considerations of countries, particularly in the southern hemisphere, willing to contribute national data management facilities to the system of BODC.

The Committee was further informed of the agreement of the Member States represented at the Fourteenth Session of the Council to avoid any overlapping or duplication of existing research activities in the region.

The Working Committee agreed that the proposals on the general oceanographic data-exchange scheme for southern ocean research must be prepared for, and discussed at, the next session of SOC.

5.3.7 Committee for Co-ordination of Joint Prospecting for Mineral Resources in South Pacific Offshore Areas (CCOP/SOPAC) and CCOP/IOC Joint Working Group on JOE Studies on East Asia Tectonics and Resources (GEOTAR)

Dr. G. Gliemann, IOC Consultant, introduced the item (Document IOC/TODR-X/3 Annex 5.2). He recalled that four different bodies were dealing with marine geological/geophysical data in the SB-Asia and South Pacific regions: these were WASTAC, an IOC subsidiary body, which is making its data available to the WDC system, through its WDC in Tokyo; SEATAR, which is a joint IOC/WESTPAC/CCOP Group supposed to provide its data to WDC A and B; then there is CCOP (Committee for Co-ordination of Joint Prospecting for Mineral Resources in Asian Offshore Areas), a body
Set up by ESCAP and developing its own data system with the advice of IOC, and COOP/SPAC (Committee for Co-ordination of Joint Prospecting for Mineral Resources in the South Pacific), again thinking of developing its own data and information exchange system.

CCP and COOP/SPAC handle marine geological/geophysical activities on behalf of IOC, in their respective fields. Particular attention was drawn to the activities of CCP in relation to data; CCP established a Standing Working Group on Petroleum Data; it held a workshop on standardization of terminology and format for energy data, a workshop on resource data handling - all those activities include basic marine geological/geophysical information and data, and the IOC should maintain close contact with the CCP Secretariat in Bangkok to obtain more information on those activities and to develop a common concept in order to avoid duplication.

The Committee noted with interest information presented by Dr. G. Giermann and recommended to the IOC Secretary to establish closer contacts with the CCP Secretariat in matters of data management and exchange, taking into account the decision of the Committee concerning data management and exchange of data on non-living resources in the oceans.

5.4 ACCELERATION OF CODE DATA FLOW

Mr. P. Toshika (Federal Republic of Germany) introduced Document IOC/IOC-X/8 Annex 8. He referred to Recommendations of the Second Session of the COOP/IOC Committee on Climatic Changes and the Ocean (CCDO-II, Tokyo 18–22 May 1981) which call for a submission of data relevant to the World Climate Research Programme in a timely manner and underline the need for an acceleration of the data flow within the IOODE system not only for this type of data but, in general, for a better response to secondary users of the IOODE system, and to other services such as the Hydrographic Service of the International Council for the Exploration of the Sea. An acceleration of the data flow needs more expeditious submission of data to the NOCC by the data originator. The NOCCs must expedite their data processing, however, without neglecting data quality control. More sophisticated computer systems and the use of data-bank management systems would certainly also result in an acceleration of the exchange of marine data.

He then pointed out that an expansion of the work of the Committee to data services is highly desirable, in order to give secondary users the best service possible in the form of data products such as mean values, extreme values, atlases, etc. There is a wide variety of users (e.g., biologists, ecologists, geologists, geophysicists) who will benefit from such a data service.

The Committee realized the importance of working on this matter during the intersessional period and decided to establish a Task Team dealing with problems of providing data products.

The Committee adopted Resolution IOC-X/8.
6. NEW APPROACH FOR THE TRAINING, EDUCATION AND MUTUAL ASSISTANCE IN MARINE SCIENCES (TEMA) COMPONENT OF IODE

The IOC/Co-ordinator for TEMA, Dr. V.S. Bhatt, presented his report (Document IOC/IODE-X/8 Annex 9) and a report prepared by the IOC Assistant Secretary for TEMA, Dr. S.M. Haq (Document IOC/IODE-X/8 Annex 9 Add. 1). Training, education and mutual assistance in the marine sciences is a component of IODE activities that has significant importance for developing countries wishing to participate in IODE and for IODE itself. In citing his evaluation of the FAO/IOC/UNEP Regional Workshop on ASIFS (and MBS) Cartagena, 3-14 December 1979, he noted the workshops were also of great importance for developing countries in other regions.

The proposal of the Working Committee on IODE for a Manual on Oceanographic Data Processing (approved by the Executive Council at its Eleventh Session, Resolution EC-XI.14) is still of great importance for TEMA and should be given high priority for its completion during the intersessional period. The Committee agreed to examine the suggestions of Libya to seek the assistance of RIOCOs in the preparation of different chapters of the IOC Manual on Oceanographic Data Processing. The growth of IODE-TEMA activities will partly depend upon the availability of financial support and every effort should be made to explore all the possible funding from extra-budgetary sources in addition to TEMA funds. Many developing countries that cannot yet participate in data exchange are able to cooperate in information exchange, and this should be encouraged and supported. The Working Committee on IODE should more readily explore training opportunities. This would enable the TEMA Co-ordinator to work more effectively. The Chairman asked which countries were interested in hosting data management training. Argentina, Canada, Federal Republic of Germany, U.K., U.S.A., indicated that they were ready to provide training in data handling. Mr. A. Varley (U.K.) stated that for a number of years his institute had provided training in marine science information handling to trainees from developing countries, in cooperation with UNESCO, the British Council, or through bilateral arrangements.

The Committee adopted Recommendation IODE-X.8.

7. DECLARED NATIONAL PROGRAMMES (DNPs)/NATIONAL OCEANOGRAPHIC PROGRAMMES (NOPS)

The IOC/Assistant Secretary, Dr. P. Ollionnine, reviewed the status of DNPs/NOPS submissions to the IOC Secretariat and actions taken during the intersessional period to improve the situation (Document IOC/IODE-X/8 Annex 10). If DNPs and NOPS are submitted well in advance, they may be a useful tool for co-ordination and co-operation among Member States, as well as for training and preparation of mutual assistance in oceanography; they may also create a framework within which international exchange of data may be systematically conducted and monitored. Unfortunately, in spite of many efforts and a small increasing trend, the submission of information on DNPs/NOPS is far from desirable. Information is received from a limited number of Member States, irregularly in some cases, not in the standard IOC format and not in advance; only a small percentage of the DNPs actually submit data,
The Delegate of the USSR stressed the fact that the concept of DNOs submission is an important and essential element of IODE, and pointed out some drawbacks in carrying out this concept. The practice of WMO, Oceanography, shows that many data coming to the centres are not through DNOs, which reflects a misunderstanding by some Member States of the difference between DNOs and NDFPs.

The Representative of SCCR, Mr. J. Crease, also expressed his concern over the confusion that appears to have existed over many years between DNOs and NDFPs and stated that more must be done to clarify their purposes to the scientific community. It was suggested that over the next two years a group should study the problem.

The Working Committee appreciated the input of DNOs/NDFPs in response to decisions of the IOC governing bodies and the IOC Secretariat. The Committee rerecognized the difficulties for many States to follow the developed procedure of DNOs/NDFPs submission and decided to establish a group to study the problems during the next intercalcal period.

The Committee adopted Resolution IOCE-X.9.

8. FUTURE AREAS OF DEVELOPMENT OF OCEAN DATA AND MANAGEMENT SYSTEMS

8.1 WORLD CLIMATE PROGRAMME

The Representative of the ICSU/WMO Joint Scientific Committee for the WCRP, Professor J.D. Woods, provided the Committee with a general review of the scientific rationale for the oceanographic programmes being considered as basic elements of the WCRP by COCO and the ICSU/WMO Joint Scientific Committee for the WCRP. Highlighted were the World Ocean Circulation Experiment (WOCE), the heat flux experiment ("Cage"), various sub-elements of the Ocean Monitoring Study and potential data collection and data management requirements. The full text of Prof. Woods presentation is given in Annex V.

The Secretary of COCO, Mr. B. Thompson, summarized the wide range of activities that COCO had already initiated or planned for the future (Document IOC/IODE-X/3 Annex II). While definite requirements for ocean data management support from IODE could not be made at this time, since the oceanographic climate programme being considered by COCO is essentially in the feasibility assessment stage, he emphasized that the programme will evolve rather rapidly during the next IODE intersessional period and that a means of response to COCO should be in place when support or assistance is called for. The Joint COCO/JSC meeting on Time-series of Ocean Measurements and the Second Session of COCO, both held in May 1981 in Tokyo, had in fact, already made suggestions, which COCO is studying, that will require IODE attention. Examples of these are the collection of sea-level data and temperature and salinity data from coastal and inland stations and the rapid processing of CTD/SOD data. COCO, in response to requests of WMO and IOC, would prepare an ocean monitoring action plan for submission to the respective Governing Bodies early in 1982. This action plan would lead to a more focused definition of the ocean data management effort required by IODE. Lastly, he informed the Committee of the first major oceanographic conference being planned by COCO and JSC: The Joint Study Conference on Large-Scale Oceanographic Experiments in the WCRP to be held
in Tokyo from 10-21 May 1982. The Conference will address monitoring as well as experiments and definitive statements will be made regarding the eventual programme recommended for implementation by IOC and WMO. IOC should ensure that it be fully aware of the results of this conference and the potential impact on its work.

The Working Committee was informed by the WMO Representative, Mr. G. Verploegh, of the organization of the World Climate Programme (WCP), in particular, of the objectives of the World Climate Data Programme (WCDP) and the present state of its planning (Document IOC/IODE-X/3 Annex 5.3). The WCDP addresses a wide variety of type of data required for WCP purposes. Oceanographic data constitute an important category and the Committee was invited to consider possible ways by which it could contribute to the planning and implementation of the WCDP in the field of competence.

The Working Committee recalled that a first approach to the co-ordination of oceanographic and meteorological systems of data exchange and archiving was made by the Joint IOC/WMO Informal Planning Meeting on Marine Environmental Data Management (Geneva, September 1979). Such informal planning meetings were considered highly useful, particularly when addressed to specific problem areas. In view of the various research activities planned under WCP, a more continuous liaison should be established with WMO bodies supervising the development of the WCDP. In this relation the Committee was informed that the WMO Executive Committee has established an Advisory Committee for WCP (World Climate Applications Programme) and WCDP. This Advisory Committee would operate first on an interim basis; its formal establishment would be considered by the Executive Committee at its next session.

The Working Committee felt that, since the WMO Advisory Committee would consider WCDP co-ordination in detail, it would provide the means for a continuous liaison, if expert advice on ocean data management were included in its co-ordinating tasks. The WMO representative was invited to bring this opinion to the attention of the WMO.

The Working Committee further felt that there was a need for continuous review of, and advice on, IODE activities in support of WCP during the intersessional period. Several questions needed to be studied in greater detail than was possible at a session.

The Working Committee decided to establish a "Task Team on Ocean Data Management for Climate Studies" with the Terms of Reference contained in Recommendation IODE-X/3.

The Working Committee agreed that the Task Team should address the OCOO concerns and suggestions at an early date.

8.2 PERSPECTIVE FOR INFORMATION MANAGEMENT

The Chairman of the Joint FAO/IOC/UN(GEF) Panel of Experts on ASFIS, Dr. J. Caponio, presented his paper at the beginning of the discussion of ASFIS (Document IOC/IODE-X/3 Annex 6.7); the highlights of his paper are contained in the Summary Report under agenda item 5.2.4.
8.3 OCEAN SCIENCES AND NON-RENEWABLE RESOURCES

Dr. G. Glemann, IOC Consultant, introduced this item (Document IOC/TODE-X/8 Annex 13). He recalled that since the Thirteenth Session of the IOC Executive Council, there exist negotiations between the IOC Secretariat and the Ocean Economics and Technology Branch (OETB) of the UN Department of International Economic and Social Affairs in order to establish a joint programme for non-renewable ocean resources including a data bank. The data bank which is based on the Scripps Institution of Oceanography (U.S.A.) data bank is now set up in OETB. The Committee was invited to endorse this activity and to invite Member States to contribute to the bank. The Consultant then drew the attention of the Committee to Resolution OC-XIV.19 which goes a step further and also includes new and renewable resources. As both subjects, renewable resources and non-renewable resources, are of great interest to developing countries, as is closely reflected in the Draft Convention of the UN Conference on the Law of the Sea (UNCLOS), the Committee was also invited to consider, in the future, data on energy resources.

The Working Committee agreed to set up a Task Team to discuss these matters, to assess existing data facilities and to advise the Committee on future actions.

The Committee adopted Recommendation IOC-X.10.

8.4 IMPROVEMENTS ON THE EXCHANGE OF OCEAN DATA AND INFORMATION RESULTING FROM THE UN CONFERENCE ON THE LAW OF THE SEA AND THE NEW OCEAN REGIME

The Delegates to the Tenth Session of the Working Committee on IOC listened with great interest to the information provided by the IOC Secretary, Dr. M. Ruijgrok, on scientific aspects of the Law of the Sea Conference, and on the report prepared for the session by Dr. E. Miles (U.S.A.) concerning possible implications for IOC of decisions of the Third United Nations Conference on the Law of the Sea (Document IOC/TODE-X/3 Annex 14).

The Working Committee noted the need for continued study of the possible results of the work of the Third UN Conference on the Law of the Sea and for due regard for the effects of them for IOC. The Working Committee noted that specific proposals for improving the IOC mechanism can be worked out following the completion of its deliberations, and upon the establishment of the legal framework for marine research in the world's oceans.

The Working Committee agreed that the IOC network provides the most efficient system for international data exchange in common format, and for fulfilling obligations under present and future legal or quasi-legal arrangement in respect to sharing of data. IOC bodies should increase efforts to assist countries to acquire the skills for receipt of oceanographic data and information. The Working Committee noted that IOC could also advise Member States on the best formulation of requests for data, and the specification of data requirements, whether the data were to be provided under voluntary or legal arrangements.

The Committee received a report prepared by a small drafting group on the priorities of the 1980-1985 medium-term budget. The following major initiatives for which additional funding will be required (consultants, meetings, travel, publications) were identified and are given in order of priority:

i) development of IOCDE's capability to render service and data products;

ii) support in data management to major new scientific programmes especially in connection with World Climate Research Programmes;

iii) development of strategies for coping with data from anticipated automated data collection systems;

iv) establishment of an IOC structure for information exchange with special emphasis on document delivery.

The TEMA component of IOCDE is outside the priority being considered a mandatory function. The Committee endorsed the medium-term budget priority as given.

The budget drafting group also reviewed and updated programme priorities for 1982 which are given in Annex IX of the Ninth Session of the Working Committee on IOCDE's Summary Report, and provided the IOC Assistant Secretary with the guidelines for the preparation of programme activities for 1982. Bearing in mind the discussions during the Plenary and also the proposal made, the budget drafting group recommended that in 1982 meetings of all Groups of Experts be held, to allocate more funds for consultant work, to specify more clearly TEMA activities for the year and to find financial sources to meet TEMA requirements.

Much attention was paid during the Session to the involvement of IOCDE in the implementation of different components of the World Climate Programme, in particular in the preparation of ocean data management plans. It was agreed to keep aside funds for consultations with CCCC and WMO on subjects relevant to data management. Taking into account the positive experience of carrying out consultative meetings of the officers of the Working Committee, and in consultation with the IOC Secretariat, it was suggested that the next such meeting would be held at the end of the year or the beginning of next year in Paris.

The Working Committee requested the IOC Secretary to discuss with WMO the possibility of organizing the next Informal Planning Meeting on marine environmental data management and, if the agreement is achieved, to allocate money for this activity.

The Working Committee agreed with the proposed programme for 1982 on the understanding that further elaboration will be made by the Chairman and the IOC Secretary.
10. **IOCD GENERAL PLAN OF ACTION AND IMPLEMENTATION PROGRAMME**

The Working Committee agreed to request the IOCD Chairman and Vice-Chairman, in consultation with the IOC Secretary, to prepare an IOCD general plan of action and implementation programme during the session of the IOCD Consultative Meeting which is planned to be held in Paris at the end of the year or the beginning of next year. The Working Committee recommended that discussions held at the Tenth Session, adopted Recommendations and Resolutions, be taken into account while fulfilling this task.

11. **ELECTION OF THE CHAIRMAN**

Under this Agenda Item, the Working Committee heard with regret, an announcement by the Chairman of WC/IOCD about his decision to leave the post. The Chairman called the meeting to elect a new Chairman. The IOC Assistant Secretary, Dr. I. Olibouine, reminded the participants of the accepted rules of procedure for electing the Officers of the subsidiary bodies.

Mr. D. Kohnke (Federal Republic of Germany) was unanimously elected as Chairman of the Working Committee on IOCD and Mr. E. Ridley (U.S.A.) as Vice-Chairman.

12. **ADOPTION OF THE SUMMARY REPORT, RESOLUTIONS AND RECOMMENDATIONS OF THE SESSION**

The Working Committee adopted the Summary Report, Resolutions and Recommendations and requested the Chairman to endorse the final edited version to be prepared by the IOC Secretariat.

13. **DATE AND PLACE OF NEXT SESSION**

The Committee decided to have its Eleventh Session in the Autumn of 1983 in Paris, in UNESCO headquarters.
ANNEX I
AGENDA

1. Opening of the Session
2. Administrative arrangements for the Session
   2.1 Adoption of the Agenda
   2.2 Election of the Rapporteur
   2.3 Conduct of, and arrangements for, the Session
3. Work accomplished during the intersessional period
   3.1 Reports by the Chairman of the Working Committee and of the IOC Secretariat
   3.2 Reports of World Data Centres, Oceanography
      3.2.1 World Data Centre-A, Oceanography
      3.2.2 World Data Centre-B, Oceanography
   3.3 Review of the state of implementation of resolutions and recommendations relevant to IOOE
4. Co-operation with international organizations and other bodies on matters concerning ocean data exchange
   4.1 Food and Agriculture Organization of the United Nations (FAO)
   4.2 International Council for the Exploration of the Sea (ICES)
   4.3 Permanent Service for Mean Sea Level (PSMSL)
   4.4 United Nations Environment Programme (UNEP)
   4.5 Integrated programme for Biological Investigations of Marine Antarctic Systems and Stocks (BIONASS)
   4.6 European Co-operation Science and Technology project 43 (COST-43)
   4.7 Committee on Data for science and technology (CODATA)
4.8 Engineering Committee on Oceanic Resources (ECOR)
4.9 Scientific Committee on Oceanic Research (SCOR)
4.10 United Nations Ocean Economics and Technology Branch (UN(OETB))
4.11 World Meteorological Organization (WMO)

5. Improvement of IODE system and data management schemes

5.1 Requirements of ocean services and global programmes

5.1.1 Global Investigation of Pollution in the Marine Environment (GIPME) and marine pollution monitoring programmes

5.1.2 Joint oceanographic meteorological programmes

5.1.3 Oceanographic tables and standards

5.2 Development of IODE components

5.2.1 Group of Experts on the Development of a Pilot Programme for Responsible National Oceanographic Data Centers (RNODCs)

5.2.2 Group of Experts on format development

5.2.3 Group of Experts on Marine Environmental Data Information Referral System (MEDI)

5.2.4 Panel of Experts on Aquatic Sciences and Fisheries Information System (ASFIS[FAO/IODE/UN])

5.2.5 Airborne satellite remotely sensed oceanographic data

5.2.6 Integrated Global Ocean Station System (IGOSS) data archiving

5.2.7 Marine pollution data

5.2.8 Marine biological data

5.2.9 Oceanographic data management during the First SARP Global Experiment Operational Year (FEOY)
5.2.10 Marine Information Management (MIM)
5.2.11 Wave data management
5.2.12 Marine geological/geophysical data management
5.2.13 Reports of national co-ordinators for IODE

5.3 Requirements from IODE system of IOC regional programmes

5.3.1 Regional study of the phenomenon known as "El Nino" ("El Nino/ERFEN")
5.3.2 IOCARIPE
5.3.3 Co-operative investigations in the Western Part of the Pacific Ocean (WESTPAC)
5.3.4 Co-operative Investigation in the North and Central Western Indian Ocean (CINWIIO)
5.3.5 MEDAPLEX oceanographic investigations in the Mediterranean
5.3.6 International co-ordination group for the Southern Oceans (SOCE)
5.3.7 Committee for Co-ordination of Joint Prospecting for Mineral Resources in South Pacific Offshore Areas (CCOP/SCPAC) and CCOP/IOC Joint Working Group on IODE Studies on East Asia Tectonics and Resources (SEATAR)

5.4 Acceleration of IODE data flow

6. New approach for the Training, Education and Mutual Assistance in the Marine Sciences (TEMA) component of IODE

7. Declared National Programmes (DNPs)/National Oceanographic Programmes (NOPs)

8. Future areas of development of ocean data and management systems

8.1 World climate programme
8.2 Perspectives for information management
8.3 Ocean sciences and non-renewable resources

8.4 Repurcussions on the exchange of ocean data and information resulting from the UN Conference on the Law of the Sea and the new ocean regime


10. IODE general plan of action and implementation programme

11. Election of the Chairman

12. Adoption of the Summary Report, Resolutions and Recommendations of the Session

13. Other business

14. Date and place of next Session
## ANNEX II

### ADOPTED RESOLUTIONS AND RECOMMENDATIONS

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<td>Revision of Resolutions of the Ninth Session of the IOC Working Committee on IODE</td>
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<td>Improvements of the activities of the data centre for sea-level data</td>
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ANNEX II

Resolution IOOE-X.1

STANDARD CRITERIA FOR PHYSICAL OCEANOGRAPHIC DATA

The Working Committee on International Oceanographic Data Exchange,

Recognizing the rapid increase in volume and variety of data being acquired through new systems,

Noting the necessity of exchanging such data effectively,

Realizing that there is a great variety of practices in relation to data compression and quality control,

Recognizing further the need to establish scientific standards for the exchange of new types of data,

* Decides to establish a "Task Team on Standard Criteria for Physical Oceanographic Data" to address such questions and to report to the Working Committee on IOOE, with the following Terms of Reference:

- to consider the problems arising from the exchange of CTD data within the IOOE system,

- to advise the Group of Experts on Format Development, as necessary, on the content of further standard subsets,

- to consider more generally the impact of new systems with large data flow on the IOOE exchange mechanism.

* The Task Team does not concern itself with satellite data

Resolution IOOE-X.2

FURTHER DEVELOPMENT OF RNDOC PROGRAMME

The Working Committee on International Oceanographic Data Exchange,


Recognizing the progress made in the development of a programme of RNDOCs,

Recognizing further that RNDOCs have proven to be effective instruments through which the Working Committee on IOOE may enhance international data exchange,
Acknowledging that the accomplishment of its aims and objectives can be facilitated through the establishment of additional RNDOCs,

Also recognizing that guidelines must be established to permit:

- the validation of the need for additional RNDOCs; and

- evaluation of the qualifications of the applicant for RNDOC status,

Noting that some oceanographic institutions other than National Data Centres may have excellent qualifications to serve as an RNDOC,

Approves, in principle, the report of the Third Session of the Group of Experts on RNDOCs,

Agrees that the Pilot Programme of RNDOCs be made an operational programme within the framework of IODE and that the Group of Experts on RNDOCs be continued with the Terms of Reference stemming from the Recommendations of the Third Session of the aforementioned Group of Experts,

Urges the Chairman of the Group of Experts on RNDOCs to submit the final draft of the RNDOC Guide to the IOC Secretary by 1 November 1981, according to established procedures,

Urges Member States to adopt, as a temporary measure for the selection and designation of RNDOCs pending publication of the Guide on RNDOCs, the procedures given in the draft Guide on RNDOCs, Chapter 4, submitted to the Ninth Session of the Working Committee,

Recommends that the Group of Experts on RNDOCs prepare biennial reviews of the operation of RNDOCs and assess the need for their continuation, and submit such reviews to the Chairman of the Working Committee and the IOC Secretary.

Resolution IODE-X.3

EXCHANGE OF AIRBORNE AND SATELLITE REMOTELY SENSED DATA

The Working Committee on International Oceanographic Data Exchange,

Recalling Recommendation IODE-X.3 entitled "Exchange of airborne and satellite remotely sensed data",

Noting the increased interest in Remote Sensing (RS) of the oceans for operational as well as research purposes, and for scientific programmes of IOC, the WCRP and pollution programmes in particular,
Considering the need for training and education in the field of application of RS data for oceanographic purposes,

Invites its Member States actually operating remote sensing systems to present an adequate and up-to-date description of their RS data files to the MEDI Referral System,

Recommends that the Task Team on Exchange of Airborne and Satellite Remotely Sensed Data design an appropriate referral list for RS data and send it via the IOC Secretary to the Member States operating remote sensing systems for completion,

Requests the Secretary of IOC to give adequate publicity to the existence of this new service among IOC Member States and their respective oceanographic communities,

Recommends that proper steps be taken by IOC through its appropriate bodies (e.g., the Working Committee for TNA) to provide information and financial opportunities for oceanographers from its Member States to receive training and education in the use of RS data for their oceanographic work.

Resolution IOC-6-X.1
EXCHANGE OF MARINE POLLUTION DATA

The Working Committee on International Oceanographic Data Exchange,

Appreciating the previous extensive work performed by the Japan National Oceanographic Data Centre and the United States National Oceanographic Data Centre in carrying out the functions of ROOCs for MAPMOEP,

Noting that all data collection under MAPMOEP has ceased,

Recommends that ROOCs-MAPMOEP be discontinued and that data held by those ROOCs be made available to the UCCs, Oceanography,

Noting the rapidly expanding interest of governments in marine pollution data for environmental data management purposes,

Realizing that the collection of such data is being performed both in national pollution monitoring programmes and in international (regional) programmes such as those of UNEP (Regional Seas) and the Helsinki Commission for the Baltic, as well as through GLIME (MARPOLCON),

Restates the need for consistency of data exchange formats for such data, as well as for a positive effort to ensure that pollution data are available for international exchange to the maximum extent possible,

Calls upon the international bodies concerned to co-operate in making marine pollution data available to the oceanographic community according to the principles of IOC.
Recommends that the role of IOCDE Rapporteur for Marine Pollution Data be expanded and assigned to a "Task Team on Marine Pollution Data Exchange" for the next intersessional period with the Terms of Reference of the Rapporteur to be kept in force pending revision by the Chairman of the Task Team once he has been nominated.

Resolution IODE-X.5

EXCHANGE OF MARINE BIOLOGICAL DATA

The Working Committee on International Oceanographic Data Exchange,

Having considered the report of the Co-rapporteurs for marine biology data exchange and its proposals,

Noting the widespread interest in enhancing the exchange of marine biological data as demonstrated by the large response to the questionnaire survey,

Recognizing the diversity and complexity of marine biological data in general,

Confirming that GP-3 is a potential vehicle for the exchange of alphanumeric marine biological data,

Realizing that IOC Manuals and Guides No. 9 "Manual on International Oceanographic Data Exchange" lacks detailed guidance for marine biology data,

Forseeing the need to improve the flow of marine biological data from the scientist into the IOCDE system,

Recommends that Member States provide the IOC Secretary with brief summaries of their national effort in, and their need for, exchange of the various kinds of marine biological data,

Requests NODCs, RMDCs and similar organizations, in cooperation with appropriate national bodies, to promote, within their national oceanographic communities, the archiving and exchange of marine biological data through the WOC, Oceanography system,

Decides to establish a "Task Team on Marine Biological Data" to replace the mechanism of Co-rapporteurs to:

- identify the most pressing needs for the international exchange of marine biological data;

- prepare comprehensive requirements for GP-3 marine biology data sub-sets, as needed, to be forwarded to the Group of Experts on Format Development for implementation, and to support the Group in this endeavour in any way it requires;
develop more specific guidelines for the recording, documenting and exchange of marine biological data, for eventual incorporation in the "Manual on International Oceanographic Data Exchange";

- act as the focal point of the Working Committee on ICES for matters relating to marine biological data management, working in close cooperation with appropriate intergovernmental and non-governmental bodies and programmes (such as BIMAS, IABO, the Baltic Monitoring Programme, etc.);

- design promotional material explaining the merits of archiving and exchanging marine biological data,

Also requests the Secretary IOO to arrange for the IOC regional bodies as well as international organizations concerned (e.g., UNEP, FAO) to participate in, and contribute to, the work of the newly established Task Team.

Resolution IOOE-X.6

MARINE INFORMATION MANAGEMENT

The Working Committee on International Oceanographic Data Exchange,

Noting with interest the report of the Chairman of the Panel of Experts on ASRTIS on "Perspectives in Marine Information Management" and that of the Rapporteur on Marine Information Management,

Taking into account the requirements proposed by the Secretary IOO, in his opening statement, the advice of the Chairman of the ASRTIS Panel of Experts and of an ad hoc sessional group on Marine Information Management on the need for increased attention to marine information management and exchange,

Recommends that during the intersessional period a survey of available information resources and exchange mechanisms for marine scientific and technical information be undertaken in order to allow the formulation of IOC future policy on information dissemination and exchange, with particular reference to improving the present international exchange mechanisms for all types of marine-related information,

Further recommends that, as a result of the survey on information resources, in collaboration with interested agencies (FAO, UNEP, WHO, Unesco and UN (CETIS)), a Handbook on Marine Scientific and Technological Information Resources be published and distributed,

Decides to establish a "Task Team on IOOE's Role in Information Management" with the Terms of Reference to examine the implications of additional responsibilities for information management on the structure, functions and budget of the Working Committee on IOOE and to guide and carry out the recommended survey of information resources.
Resolution IODE-X.7
MEASURED WAVE DATA MANAGEMENT

The Working Committee on International Oceanographic Data Exchange,

Noting with satisfaction the report of the Rapporteur on Wave Data Management,

Recognizing the requirements and need of the engineering community and of climate programmes to exchange measured and hindcast wave data; and also the importance of historical measured wave datasets to the engineering community and the WCP,

Being aware of the intention of the WMO/OMM to initiate a wave-forecasting programme, and of the fact that synoptic surface charts produced routinely by many countries as a real-time product for ship operations are another important source of data along with wave data hindcast from winds,

Requests the RNODC Waves to ensure, as much as possible, the continued availability of the datasets in its catalogue by making suitable arrangements with the holders of the data either for the holders to continue to make the data available as necessary in the future or submit the data to RNODC Waves, or an appropriate RNODC, for archiving,

Urges the RNODC Waves to include in future catalogues a section on the existence of wave data sets hindcast from wind and of synoptic surface wave charts in analog or digital form,

Requests the Secretary of IOC to remind Member States of the potential usefulness of digital data from synoptic surface wave charts to the climate programmes and the engineering community, and

Decides to establish a “Task Team on Measured Wave Data Management” to:

- finalize and make available through the Secretariat and the RNODC-Formats the wave data sub-set format specification and the user guide for the exchange of measured wave data;

- develop in co-operation with the Task Team on Standard Criteria for Physical Oceanographic Data and with the Group of Experts on Format Development, a GE-3 standard sub-set for wave directional spectral data;

- provide a focal point for contact with WMO/OMM for questions in regard to data management, data standards and analytical techniques for wave data within the TOOS system which would be important to a wave forecasting programme;
- develop the necessary mechanisms to exchange wave spectral and
directional spectral data and data digitized from synoptic surface
wave charts;

- assist as necessary with the resolution of problems that occur
in the exchange of measured wave data during the inter-sectional
period; and

- review the use and suitabity of the wave data sub-sets and report
to the next meeting of the Working Committee.

Resolution IODE-X.3

DEVELOPMENT OF IODE DATA CENTRE SERVICES

The Working Committee on International Oceanographic Data Exchange,

Noting the great amount of oceanographic data archived in the IODE
system of data centres,

Appreciating the extensive use of these data by scientists, technicians
and International bodies,

Realizing that certain data user groups have increasing problems in
handling and processing large data volumes,

Recommends that a "Task Team on Development of IODE Data Centre Services"
be established for the development of a plan for the preparation of data
products aiming at accelerating the data flow in the IODE system and at
broadening the services of the IODE System to a wider user community than
at present and specifically to developing countries,

Decides to give to this Task Team the following Terms of Reference:

- examine the types and amounts of oceanographic data available from
  archived computer data banks;

- investigate the requirements for oceanographic data products (derived
  values, mean charts, etc.) by secondary users including international
  programmes; and

- report to the Working Committee on the technical implications of pre-
  paring standard data products and on their scientific usefulness.

Resolution IODE-X.9

REVIEW OF IOC's DNP/ODP ANNOUNCEMENT

The Working Committee on International Oceanographic Data Exchange,

Noting with satisfaction the efforts made by the IOC Secretariat in
publicizing the idea of declaration of National Oceanographic Programmes
(publications and dissemination of a brochure on DNP/ODPs, Circular
letters requesting that Declarations of National Programmes be made),

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Appreciating the increased input of DNP/NOPs in response to the Circular Letters,

Recognizing that a number of Member States have not responded to the call for declarations,

Stressing the fact that only a small percentage of the DNP/NOPs actually result in submission of data to the NDCs,

Considering the apparent difficulties in having both a NOP and a DNP announced in advance,

Recommends that a "Task Team on Review of DNP/NOP Announcements" be established with the following Terms of Reference:

- examine the usefulness of planned and realized DNP/NOPs;
- investigate and make recommendations with regard to increasing the number of Member States submitting DNP/NOPs;
- investigate and make recommendations with regard to increasing the percentage of data from DNP/NOPs being submitted to the NDC system;
- review, in close co-operation with the Group of Experts on Format Development, the form used in declaring planned and realized national programmes, and the use of ROSCOP forms;
- conduct a questionnaire survey of National Co-ordinators, scientific organizations and other appropriate groups to study these issues; and
- make recommendations to the Working Committee on ways to improve the DNP/NOP system.

Resolution IODE-X.10

REVISION OF RESOLUTIONS OF THE NINTH SESSION OF THE
IODE WORKING COMMITTEE ON IODE

The Working Committee on International Oceanographic Data Exchange,

Considering that Resolutions IODE-IX.1, IX.5 and IX.6, adopted at the Ninth Session of the Working Committee on International Oceanographic Data Exchange have been revised and incorporated in Resolutions IODE-X.5, X.2 and X.7, respectively, of its Tenth Session,

Considering further that Resolutions IODE-IX.2 and IX.4 of the Ninth Session are now obsolete,

Noting with appreciation the actions taken on the Resolutions adopted prior to its Tenth Session,

Decides:
- to keep in force Resolution IODE-IX.3 and to publish its text in the report of the Tenth Session,
not to keep in force Resolutions IOC-Ix.1, IX.2, IX.4, IX.5 and IX.6.

Recommendation IOC-Ix.1

IMPROVEMENTS IN THE ACTIVITIES OF THE DATA CENTRE
FOR SEA-LEVEL DATA

The Working Committee on International Oceanographic Data Exchange,

Noting the Summary Report of the Third Session of the Group of Experts
on the Development of a Pilot Programme for Responsible National Oceanographic Data Centres and, in particular, Recommendation RNOCC-II/3 and
the Summary Report of the Second Session of COCO,

Realizing that new methods of measuring sea level, including satellite
oceanographic altimetry, will be important in the monitoring of ocean
currents and the modelling of oceanic circulation in the context of the
World Climate Programme, and that sea-level data can be applied to
studies of extreme flood height predictions and prevention of flooding
in coastal and estuarine areas, of climate and cyclic variations in
global ice volumes and in many other spheres,

Recognizing that hourly sea-level data can also be obtained using well-
established observational methods which can be operated in many ports
and laboratories throughout the world without great expense,

Noting also that, at present, the Permanent Service for Mean Sea Level
is the only qualified and experienced service in the field and that
PSMSL serves as a sea level data centre for different international
projects, particularly by providing data management services for
MEDALPAX sea-level data,

Requests all IOC Member States to urge their relevant authorities to
maintain hourly observations of sea level, to reduce the data to a suitable
format and to submit the data in a timely fashion to PSMSL,

Recommends the Secretary IOC, in consultation with the Head of PSMSL and
its supporting authorities, to seek the agreement of PSMSL to act as an
international data centre for sea-level data and to co-operate with PSMSL
in developing the processing and banking of increased volumes of higher
resolution data.
Recommendation IODE-X.2
ADOPTION OF THE PRACTICAL SALINITY SCALE
AND INTERNATIONAL EQUATION OF STATE OF SEA-WATER

The Working Committee on International Oceanographic Data Exchange,

Noting that SCOR, IAPSO and ICES have adopted Resolutions recommending the use of the new Practical Salinity Scale, 1978, and International Equation of State of Sea-Water, 1980, and that these should be used in all publications from 1 January 1982,

Noting further Resolution CO-IV.11 which recommends to Member States the adoption of the Practical Salinity Scale and the International Equation of State of Sea-Water no later than January 1982,

Recognizing the need for scientists and data centres to use commonly agreed standard tables, equations, units and nomenclature in order to facilitate the exchange and intercomparability of data,

Being fully aware of the size of existing data sets and of the possible problems in converting them according to new scales, tables and units,

Requests the IOC Secretary to distribute copies of UNESCO Technical Papers in Marine Science No. 36 (Teenth Report of the Joint Panel on Oceanographic Tables and Standards) to all IODE National Co-ordinators, WDCs, NODCs and DNBs,

Urges all IODE National Co-ordinators, NODCs and DNBs to assist by making copies of Technical Paper No. 36 and distributing them to all relevant institutions in their respective countries,

Recommends that WDCs, Oceanography, NODCs and relevant national institutions commence, at the earliest possible moment, files based on the new scale and equations. In particular, all data collected at sea after 1 January 1982 should be recorded in the centres on the new scale,

Recommends also that conversion of existing files needs only be done as required for specific studies. Guidance for such conversion can be found, for example, in "Deep Sea Research", 28A, pt. 4, pp.307-328.

Recommendation IODE-X.3
ESTABLISHMENT OF NODC-FORMATS

The Working Committee on International Oceanographic Data Exchange,

Considering the response to IOC Circular Letter No. 801 calling on National Oceanographic Data Centres to function as an RNOC-Formats in the IODE data centre system, and the continuing requirements within ICOME for a central authority on GP-3 matters,
Appreciating the readiness of some National Oceanographic Data Centres to assume the responsibilities of an RNODC-Formats,

Recommends, after careful consideration, that IOC accept the offer of the Service Hydrographique of ICES to act as an RNODC-Formats, with the following terms of reference:

- act as an archive centre for international marine environmental data formats, maintaining a full set of documentation on all such formats;

- act as an archive centre for code tables for GF-3 and code tables for all other international archival formats, and for external code tables (e.g., taxonomic codes, chemical substances codes, etc.). The RNODC would maintain references to all such code tables;

- manage the expansion of the existing GF-3 parameter code table as necessary under the guidance of the Working Committee on TOOE (through its Group of Experts on Format Development or its successor) and to provide a focal point to which user requirements for new parameter codes may be directed;

- maintain user aids for GF-3, including a programme library for processing of GF-3, guidance notes and user guides, documentation of standard and experimental sub-sets of GF-3, and sample data tapes of GF-3 sub-sets;

- function as a centre for services to other centres in IOC and ICES Member States in such GF-3 matters as responses to requests for information about, or copies of, items mentioned above;

- prepare a report to the Working Committee, through its Group of Experts on RNODCs, together with an annual newsletter for distribution to National Co-ordinators for TOOE, National Oceanographic Data Centres, and other interested parties, such as WMO, ECOR, SIO, highlighting new developments in GF-3 and including an updated inventory of the documents, programmes, tapes, formats and code tables available;

- work closely with the Group of Experts on Format Development to ensure the provision of expert knowledge on formats to other centres, including RNODCs-A and -B (all disciplines) and subsidiary bodies of WMO, IOC and other international organizations and in the promotion of GF-3 as an exchange format. The provision of expert knowledge will be assured in fields covering

  i) guidance in the uses of GF-3,
  ii) assistance to developing countries with the development of national formats compatible with GF-3,
  iii) assistance to developing data centres and countries in collaboration with other RNODCs, in converting data into GF-3;

Requests the Secretary IOC to contact the General Secretary of ICES to obtain the necessary approval for these additional new functions of the Service Hydrographique.

Looks to the Service Hydrographique to assume its new functions as rapidly as practicable.
Recommendation IODE-X.4

MARINE ENVIRONMENTAL DATA INFORMATION REFERRAL SYSTEM (MEDI)

The Working Committee on International Oceanographic Data Exchange,

Noting the Summary Report of the Third Session of the Group of Experts on MEDI and the progress that has been made in the development of the MEDI system and its importance to international programmes of UN Specialized Agencies,

Considering a plan for the orderly, continuing development of MEDI which has been completed by the Group of Experts on MEDI,

Noting also that studies are being considered by WMO under the World Climate Data Programme to investigate the needs for and feasibility of a WCP Data Referral System and that the IOC has been invited by WMO to contribute to these studies drawing upon the experience gained in the development of MEDI which indicates that there is a need for such a system by Member States and their scientific communities,

Accepts and endorses the Summary Report and Recommendations of the Third Session of the Group of Experts on MEDI, including the plan for development of MEDI,

Requests the Group of Experts on MEDI to support the efforts of WMO in the development of the World Climate Data Referral System and in studies of the interconnections of data referral systems in the fields of oceanography and meteorology.

Recommendation IODE-X.5

AQUATIC SCIENCES AND FISHERIES INFORMATION SYSTEM (ASFIS)

The Working Committee on International Oceanographic Data Exchange,

Having reviewed the report of the Third Session of the Joint FAO/IOC/UN(CEIB) Panel of Experts on the Aquatic Sciences and Fisheries Information System (ASFIS), and the recommendations contained therein,

Taking into consideration the report of the Chairman of the Panel,

Noting that ASFIS has reached the level of technical development envisaged for it from the early stages of design when the major information requirements of the IOC and the other national, regional and international marine programmes, including those for computerized searches of the data base, can be met and that future efforts should concentrate on the promotion and expanded utilization of the system,
Recognizing the importance of strengthening IOC's participation with ASPTIS so that the system can be expanded to provide services and products and receive input from a larger number of Member States, 

Endorses the report of the Panel, especially with regard to the need to develop a comprehensive management plan, 

Requests the Secretary IOC to take necessary actions on the Recommendations of the Panel, in consultation with other sponsoring agencies, 

Recommends that the Secretary IOC take steps to maintain financial support of ASPTIS by the IOC for the next intersessional period at approximately the same level as for the last intersessional period, 

Further recommends that the Secretary of IOC make every effort in the future to enhance the financial resources so as to allow fuller IOC participation in the work of ASPTIS and the more rapid implementation of the above-mentioned Recommendations.

Recommendation IOC-E-X.6

ICGSS DATA ARCHIVING AND EXCHANGE

The Working Committee on International Oceanographic Data Exchange,

Having received the reports of the IOCDE Rapporteur on ICGSS Data Archiving and Exchange and of the Representative of the Working Committee for ICGSS,

Noting the concern expressed that there be suitable arrangements for archiving the telecommunicated data on a continuous basis,

Noting that, after some time, according to the procedure proposed in the Summary Report of the Second Session of the Working Committee for ICGSS, specialized Oceanographic Centres (SOCs) transfer the data to the RNDCs ICGSS,

Welcomes this clarification (as presented in ICGSS General Plan and Implementation Programme, 1982-85) of the availability of telecommunicated data, firstly for periods after data collection of up to one month, at the ICGSS SOCs, and thereafter, at the RNDCs ICGSS of the IOCDE data centre system,

Decides to continue the functions of the Rapporteur on ICGSS Data Archiving and Exchange during the intersessional period,

Invites the Working Committee for ICGSS to nominate a representative to participate as an observer to the IOCDE Group of Experts on Formats,

Encourages National Oceanographic Data Centres to make ICGSS data held by them available to RNDCs ICGSS, and 

Requests RNDCs ICGSS to continue to archive ICGSS data and make them available to users upon request.

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Recommendation IODE-X.7

ASSISTANCE IN THE IMPROVEMENT OF "EL NIÑO" DATA MANAGEMENT SCHEME

The Working Committee on International Oceanographic Data Exchange,

Bearing in mind Resolutions XI.8 and IX-XIV.17, and Recommendation IODE-IX.10,

Noting the need expressed by the Member States of the Region to provide assistance to countries participating in "El Niño" in order to develop their data processing and exchange capability in the marine sciences to enhance their participation in IODE programmes and to strengthen the co-ordination, collection and dissemination of data, information and products among countries of the Region,

Acknowledging the importance of the "El Niño" Investigations in programmes such as the World Climate Programme and the Programme on Ocean Sciences in Relation to Living Resources,

Requests the Secretary IOC to provide the services of a consultant who, in close co-operation with the National Co-ordinators for IODE of the countries of the Region, and WMO, will study the data processing and exchange requirements of the countries participating in the investigations of "El Niño" in order to draw up a draft pilot project designed to promote national capabilities and participation in IODE programmes with a view, in particular, to the establishment of specialized RNOCDs in the Region.

Recommendation IODE-X.8

NEW APPROACH FOR TEMA-COMPONENT OF IODE

The Working Committee on International Oceanographic Data Exchange,

Having considered the report of the IODE Co-ordinator for TEMA and the paper submitted by the Assistant Secretary IOC for TEMA,

Realizing the extensive gaps in the IODE network, especially in the continents of Africa and Asia where a large number of developing countries, Member States of IOC, have not as yet created either NODCs or NDNAs,

Realizing further that plans for the creation of and activities in oceanographic data centres in developing countries are impeded by lack of necessary equipment and trained personnel,

Recognizing the importance of information systems, such as ASPIS, MEDIT, INFOterra, in the transfer of technology to developing countries,
Being fully aware that training courses are expensive and cannot be organized every year, while the requests from developing countries for training of personnel will continue to be received from year to year not only in the field of general data processing but also for special purposes such as understanding and implementation of GP-3 and interpretation of remotely sensed data,

Being informed that a number of research vessels possess on-board facilities for data processing and recognizing that the practical experience on board these vessels would considerably help the data personnel from developing countries,

Recommends that a popular illustrated brochure on the importance of oceanographic data and information exchange and of the IOC system to the national development be prepared for wide circulation in developing countries,

Requests the Secretary IOC to seek sources of necessary support for expert missions and, if possible, for the organization of regional workshops with a view to creating interest and awareness of IOC activities in developing countries,

Further requests the Secretary IOC to make continued and special efforts to promote the establishment of National Oceanographic Data Centres or Designated National Agencies in developing countries, especially those of Africa and Asia; to seek a suitable number of fellowships to meet the requirements of developing countries in general oceanographic data processing and for special needs such as GP-3 and remote sensing; to seek and co-ordinate necessary support and help to developing centres from UNDP and VAP in so far as equipment and training are concerned,

Invites IOC Member States to arrange for experts from developing countries involved in oceanographic data management to acquire experience and training in data processing on board research vessels equipped with computing facilities.

Recommendation IOC-X.9

OCEAN DATA MANAGEMENT FOR CLIMATE STUDIES
AND APPLICATIONS

The Working Committee on International Oceanographic Data Exchange,

Noting the World Climate Programme (WCP) and its four component programmes as established by the Eighth Congress of WMO and, in particular, the WCPD, which addresses itself to all data used for the purposes of WCP including oceanographic data,
Recalling Resolution IOC-XI.20 of the Eleventh Session of the IOC Assembly by which WMO was invited to call on its subsidiary bodies, as appropriate, in order to ensure collaboration with the IOC in general and the IOC Working Committee on IOOS, in particular, on data management, formatting and exchange procedures for oceanographic and remote sensed data which may be needed inter alia for the World Climate Programme and air-sea interaction studies,

Noting further, with appreciation, the report of the Second Session of IOOS and recommendations of the SC/GEOC Meeting on Time Series of Ocean Measurements (May 1981), in particular Recommendation 2, to consider the IOOS system as the main means for international exchange of non-real-time oceanographic data,

Recognizing that the system of international oceanographic data exchange, as developed and maintained by the Working Committee, would be able to constitute an essential element in the future World Climate Data Management Scheme,

Considering that close co-ordination of the WCPD with IOOS components at all stages of development should be beneficial to both programmes in the preparation of specific oceanographic data management plans complying with agreed international procedures and standards of regular data exchange and archiving systems,

Recalling the requests from international bodies, particularly IOOS, COE-43 and IOC ES, to revise and update IOC Manuals and Guides No. 2 "International Catalogue of Ocean Data Stations",

Recommends that suitable mechanisms be developed between IOC and WMO to provide for continuous mutual consultations on ocean data management problems including those pertaining to international ocean climate experiments, at all phases of preparation of the WCP Data Management Plan,

Decides to establish an IOC "Task Team on Ocean Data Management for Climate Studies" with the following Terms of Reference:

- keep abreast of the WCP requirements and of the planning of the World Climate Data Programme (WCDP) and the World Climate Research Programme (WCRP);

- advise the Working Committee on questions related to the WCP, in particular those concerning: (i) the role of the IOOS components and, especially, the RNODC system in support of climate studies; (ii) data availability, means of access to data and information on data quality, formats, presentation and mixed data sets included in the IOOS system, as required by the WCP; and (iii) assistance required by National Oceanographic Data Centres in the compilation of composite oceanographic and meteorological data sets for research on the ocean climate;
- report yearly to the Chairman of the Working Committee and the Secretary IOC, summarizing important activities for the further information of members of the Working Committee;

- assist OCOO and the WMD/ICSU Joint Scientific Committee, through the Working Committee, in the development of the ocean data management aspects of the WCP;

- review the format of Manuals and Guides No. 2 in order to increase its usefulness in light of expected requirements of the WCRP;

- revise and update Manuals and Guides No. 2 by incorporating all newly-established ocean data acquisition systems, aids and devices, and other kinds of ocean data stations;

- instruct the Chairman of this Task Team to provide a focal point for correspondence between OCOO and IODE, keeping the Chairman of the Working Committee and the IOC Secretary informed on matters concerning data management,

- invites WMD and ICSB to consider nominating observers to the newly-established Task Team.

Recommendation IODE-X.10

CO-OPERATION WITH UN(OETB) ON THE EXCHANGE OF DATA ON NON-RENEWABLE RESOURCES (MINERALS)

The Working Committee on International Oceanographic Data Exchange,

Recalling Resolution EC-XIV.19 endorsing collaboration between the IOC and the UN(OETB) in a programme of Ocean Science in Relation to Non-renewable Resources (minerals),

Considering the progress reported by the Rapporteurs on Marine Geological and Geophysical Data Management,

Noting the increasing demands for geological/geophysical and resource-oriented data by developing and developed countries,

Decides to establish a "Task Team on Data on Non-Living Resources in the Oceans" to review the status of existing data management systems with regard to such data (within UN(OETB), ESCAP, CCOP, COCP/GOPAC, ASEAN and others) and to advise the Committee on ways to increase the international exchange of such data, with the following Terms of Reference:

- review the status of existing data management systems, including inventories, with regard to geological/geophysical and resource oriented data (within UN(OETB), ESCAP, CCOP, COCP/GOPAC, ASEAN and others);
- consider data exchange formats related to newly developed technology (e.g., the multi-beam echo sounder) in order to improve the exchange of such data;

- advise the Group of Experts on Format Development, as necessary, on the content of additional standard geological and geophysical subsets; and

- advise the Committee on ways to increase the international exchange of such data.

Invites UN (GEB) to continue its efforts to collect data related to manganese-nodule investigation, in collaboration with the Working Committee.

Urges Member States to provide those data, on a regular basis, through the World Data Centre System to the UN (GEB).

Instructs the Secretary IOC to accept the invitation of the CCOP Secretariat to discuss further, in Bangkok, joint efforts in data management in South-east Asia.

Recommendation IOC-X.11

REVISION OF RESOLUTIONS OF THE IOC EXECUTIVE COUNCIL AND ASSEMBLY RELEVANT TO THE FIELD OF ACTIVITY OF THE WORKING COMMITTEE ON IOC

The Working Committee on International Oceanographic Data Exchange,

Noting with satisfaction the action taken by the Governing Bodies of IOC on its previous Recommendations,

Considering that Recommendations IOC-X.3-10 adopted at its Ninth Session have become redundant,

Recommends that:

i) the following Resolutions of the IOC Executive Council be considered as no longer necessary:

EC-XI.14
EC-XIII.8
EC-XIV.11
ii) the following Resolutions of the ICC Assembly and of the ICC Executive Council be maintained in force:

XI-20
XI-21
XI-22
EC-XIII.7
EC-XIV.17
EC-XIV.19
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Tenth Session of the Working Committee on International  
Oceanographic Data Exchange  
Hamburg, Federal Republic of Germany, 8-13 August 1987  

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ANNEX IV

A. OPENING ADDRESS BY DR. MARIO SUIVO, SECRETARY IOC,
AT THE TENTH SESSION OF THE WORKING COMMITTEE ON
INTERNATIONAL OCEANOGRAPHIC DATA EXCHANGE

Distinguished delegates, representatives, observers, ladies and
gentlemen,

It is a great pleasure to attend this Session of the Working
Committee and to welcome you, on behalf of the Chairman of the
Commission, Dr. Ayala Costenaro, and on my own behalf. I wish
also to express the gratitude of the Commission to the authorities
of the Federal Republic of Germany for their kind invitation to
hold the Session in the beautiful town of Hamburg, so rich in mari-
time history.

As you know, the IOC was established about twenty years ago.
During that period, our concern about the ocean has changed, owing
to a redefinition of goals and to the course of events that has
altered the international community's view of the ocean, its re-
sources and its uses. This, of course, has been largely engendered
by the increasingly intensive and multiple uses of the oceans and by
the related required management and environmental protection, which
has brought the importance of marine sciences to the attention of
higher levels of government than in the past. There is also a
sharpening of focus on various aspects of the environment. This
sharpening or defining of the objectives and boundaries within which
national manpower and money are to be expended by Member States on
ocean science and technology, calls for action by the Member States,
either directly or through international organizations, particularly
UN Specialized Agencies, in the form of programmes covering climate
(the World Climate Programme), ocean sciences and non-renewable
sources, new and renewable energy resources, living resources of the
ocean, etc. As a consequence of the deliberations of Member States
at various intergovernmental conferences, the reconsideration and
definition of the goals, needs and national priorities of the Member
States, and the drastic changes in the field of marine scientific
research since IOC was founded, the IOC must adapt its programmes and
activities to meet these newly perceived needs.

Already there are new challenges facing, and greater demands being
placed on the IOC and organizations of the UN, stemming from the United
Nations Conference on the Law of the Sea (UNCLOS), from the emerging
ew ocean regime, the objectives of a new international economic order
and the United Nations Conference on Science and Technology for Develop-
ment (UNSTTD).

It is also commonplace nowadays to speak of the "information
explosion", especially with regard to transfer of technology. In
truth, the printed information alone, since 1945, has been growing at
an exponential rate. As referred to in one document circulated to
the Working Committee, one need only compare the total scientific
literature in chemistry reported in Chemical Abstracts in 1945 with
that in 1981 - from a few thousand to over half a million papers. And this same rate of literature growth applies to marine sciences and technological fields. This is, on one hand, evidence of accelerated research and development but, on the other, it is partially due to the fact that: (i) much gets into print that is redundant or irrelevant; and (ii) that the management of such a tidal wave of information is crucial if that information is to be useful. This means that we need, more than ever, much more careful evaluation of information, to reduce the glut and remove what is unnecessary.

The most crucial problem today regarding information transfer is still the document delivery problem; that is, being able to obtain a copy - microfiche or paper copy - once the citation or abstract has come to the attention of the user. I know that the ASPIS Panel has considered this problem during the last several years, and I hope that this problem can be solved in the not too distant future.

In the last ten to fifteen years, the mode of oceanography has changed from description to dynamic modeling, and this over a range of spatial and temporal scales. To develop such models requires large amounts of intercomparable data. Such large quantities of data cannot, generally speaking, be gathered by an individual scientist or by any one institute, or even, in some circumstances, by any one nation. Hence the increasing need for international cooperation, the pooling of data from many sources, and for careful quality control of data to ensure the required accuracy and intercomparability.

The development of a new ocean regime and marine science in general now depends on a great extent on the widespread and easy exchange of data and information.

Science cannot proceed effectively without free interchange of the data and information obtained through scientific research. Although the entitlement of an individual scientist to exploit his own data is a cornerstone of research, the scientist has, by definition and obligation, to expose his data, as well as his interpretation of them, in a timely fashion, to his fellow scientists. Without this, he remains isolated and impeded in reaching new scientific insights; he has an individual responsibility to himself and science, and a collective responsibility to his fellow scientists and, I would be tempted to say, to the world community. Such the same concepts apply to institutions and to nations if a thorough basis for national and international action, based on mutual interest and confidence, is to be achieved. To act in ignorance of facts - that is, data and information - is to act carelessly, at best, or foolishly, at worst. Access to data and information is one of the bases for peace, cooperation and prosperity or for facing the problems faced by human society.

The transfer of science and technology is a complex issue and can only proceed effectively on the basis of full knowledge of the related information. Thus, information and data constitute a resource of a
special nature which can be explored, exploited and managed like any other resource. In this particular case, information and data must be accessible to all to be used for research and development, education and training, transfer of marine science and technology, and co-operation in the exchange of data and information is an eventual factor for development in general.

A greater knowledge of the ocean and its resources calls for broad-scale, multi-national, interdisciplinary research. This is why your Committee becomes even more important and valuable to the IOC for the advice, expertise and guidance it can provide, as we gear up to meet the new challenges facing Member States and the world community, and embark on a new decade of marine scientific research and oceanic exploration.

This is why we attach the greatest importance to this Session of the Working Committee. I am sure that under the leadership of your Chairman, Mr. Thomas Winterfeld, and your Vice-Chairman, Mr. Dieter Kohnke, you will be able to deal with your loaded Agenda, which is an indication of the active work undertaken by your Committee.

I wish you a successful meeting.
ANNEX IV

B. STATEMENT BY DR. W. WELLEIAHSEN, COUNSELLOR OF THE
FOREIGN OFFICE OF THE FEDERAL REPUBLIC OF GERMANY AT
THE TENTH SESSION OF THE WORKING COMMITTEE ON INTERNATIONAL
OCEANOGRAPHIC DATA EXCHANGE

Mr. Chairman, distinguished delegates, representatives of international organizations, and members of the IOC Secretariat,

Early in 1960, the Federal Foreign Office, the Government department responsible for the political ties with the United Nations and its Specialized Agencies, decided to host this Tenth Session of the Working Committee on International Oceanographic Data Exchange (IOCDE). Its decision was prompted by three factors:

- first, the decisive importance which the Government of the Federal Republic of Germany attaches to the Intergovernmental Oceanographic Commission (IOC) of UNESCO,

- second, the realization that the German Oceanographic Data Centre possesses the necessary expertise for organizing such a session, and

- third, the desire to relieve the UNESCO and IOC Secretariats financially and at the same time give expression to my country's commitment to the implementation of UNESCO's scientific programme in general and the oceanographic research projects in particular.

It therefore gives me great pleasure to welcome you to Hamburg on behalf of the Government of the Federal Republic of Germany on the occasion of the Tenth Session of the Working Committee on IOCDE. The IOC was established in 1960 within the framework of UNESCO. Its purpose is "to promote scientific investigations with a view to learning more about the nature and resources of the oceans through the concerted action of its members". The IOC is now the leading co-ordinating body for marine research within the United Nations system. The co-ordination of co-operative marine scientific investigations and of world-wide ocean services, combined with a programme of training, education and mutual assistance, form the chief components of its work.

A Working Group on Exchange of Oceanographic Data was first formally established by IOC Resolution 1-9 at the very first session of the Commission. The Working Group on IOCDE (renamed Working Committee on IOCDE in 1973) held its first session in 1962. Since then, substantial progress has been made in developing international exchange mechanisms for oceanographic data. Twenty-six Member States have established their own National Oceanographic Data Centres (NODC's). The two World Data Centres (WDC's) for Oceanography, originally established for the exchange of data from the International Geophysical Year (IGY) in 1957/58, have been incorporated into the IOCDE network of
data centres. In 1975 a new type of data centre was added to the
existing system of NCCs (or Designated National Agencies) and the
two WDCs for Oceanography, namely the Responsible National Oceanog-
graphic Data Centre (RNOOC). The primary purpose of the ROOCs
is to support the WDCs for Oceanography, which are funded by the USA
and the USSR.

Permit me to cite an example: the amount of station data
archived in the WDCs for Oceanography has grown from 40,000 stations
in 1962 to 621,000 stations in 1980. The number and volume of data
requested by secondary users from the data centres is also steadily
increasing.

This reflects the ever-growing interest in the availability of
marine scientific data in standard computer-readable formats for the
benefit of research work, marine environmental planning activities,
decision-making processes and off-shore technological development.

The second important component of the work of the Working
Committee on IODE, besides data and information management, is to
advise and train people from developing countries in data collection,
processing and archiving and in the establishment of NCCs. Training
courses have been organized under the auspices of UNESCO, IOC and Member
States with the aim of furthering the international exchange of oceanog-
graphic data by incorporating the resources of the Developing countries.
The Federal Republic of Germany gives high priority to the work of the
Commission in the field of training, education and mutual assistance
(TEMRA).

A new range of activities was assigned to this Committee at its
Seventh Session when it was charged with the international management
of marine information, and in this respect, particularly with literature
documentation. The developing countries have but inadequate access to
marine scientific literature. Therefore, one of the major, albeit
difficult, tasks of the IOC must be to make literature more easily
accessible to the developing countries. To accomplish this the existing
infrastructures have to be strengthened and new ones established at the
national and regional levels. Various international bodies are co-
operating in the field of marine information management, e.g., IMO, UN(CETB),
UNESCO, UNESCO, and others, in order to improve the transfer of knowledge and technology
to the developing countries. The presence of representatives from many
other international organizations reflects the widespread interest in
efficient international management of both oceanographic data and marine
information.

This Committee is beginning to play an important role with respect
to the World Climate Programme (WCP), launched by the World Meteorological
Organization in February 1980. Both the JSC/IOC Workshop on Time Series
of Ocean Measurements (Tokyo, 11-15 May 1981) and the Second Session of
the Joint SCOR/IOC Committee on Climatic Changes and the Ocean (Tokyo,
18-22 May 1981) have addressed the IODE Working Committee for assistance
in acquiring, processing and exchanging historical and new oceanographic
data relevant to the WCP.
The international exchange of oceanographic data is well organized. But nobody should assume that it is complete. The numerous items on the Provisional Agenda demonstrate that a fairly large number of problems will have to be resolved by this Committee in the years ahead: exchange and archival activities must be extended to include data from modern observation techniques; data processing and exchange procedures must be standardized further; organizational structures have to be developed for global marine information management; the exchange of data from newly developed regional scientific programmes has to be brought in line with IODE standards, and the incorporation of developing countries in the IODE ought to be furthered. This catalogue of tasks for the Working Committee on IODE can easily be expanded. It is very much hoped that the voluntary nature of the international exchange of oceanographic data and information for peaceful purposes will not be impaired or even disappear as a result of the Third Conference on the Law of the Sea. Large areas of the ocean will come under national jurisdiction. It is conceivable that this will restrict the freedom of marine research in those areas.

The oceanographic data centres throughout the world have proved in the past that close co-operation for the benefit of all marine scientists is possible in spite of geographical limitations and different social systems. It is desirable that these centres shall be able to contribute in no small way towards offsetting the anticipated restrictions of marine research by retaining their existing freedom of action.

In conclusion, let me repeat my welcome and express my sincere good wishes for the progress of your deliberations. I hope I shall hear that they have been a success.

Thank you, Mr. Chairman.
The World Climate Research Programme (1980-2000) is motivated by the desire to explore the feasibility of forecasting fluctuations in atmospheric climate on time scales of several weeks to several decades, i.e., the lead times for adapting industry, agriculture and other climate-sensitive sections of society. Experience with weather forecasting on much shorter time scales suggests that successful climate forecasting would provide considerable economic and social benefits both in developing countries and in the industrially developed countries. The potential benefits are so great that the WCSP is widely supported, even by those scientists who are personally sceptical about the feasibility of an operational climate forecasting scheme, both because of the inherent noise in the planetary climate system and because of technical difficulties.

The World Climate Research Programme has sections concerned with research in many different aspects of the Planetary Climate System (which includes not only the atmosphere, but also the ocean, the cryosphere and the biosphere). No single component dominates the natural fluctuations of climate from year to year and decade to decade, but two components have been identified by the Joint Scientific Committee (JSC) responsible for the World Climate Research Programme as deserving priority treatment, both because they are critical elements in the Planetary Climate System responsible for changing atmospheric climate on time scales of weeks to decades, and because research into them is likely to take longer than in others. These two critical elements are the following:

1) clouds and their effect on radiation;
2) oceanic transport of heat, water and chemicals.

Our discussion today is concerned with the second of these, for which a scientific research programme is being developed by the JSC working in collaboration with the SCOR-IOC Committee on Climatic Changes and the Ocean (CCCIO). The plans for WCSP Oceanography currently involve three large projects:

1) the Cage Experiment (CAGE);
2) the World Ocean Circulation Experiment (WOCE);
3) the Pilot Ocean Monitoring Study (POMS).

These will now be briefly outlined, before discussing the data management implications they have.
The Cage Experiment is designed to lead to better methods of measuring the heat flux carried by the ocean circulation, and the flux from the ocean to the atmosphere on the scale of an ocean basin. A study group is due to report later this year on the feasibility of undertaking the experiment in the North Atlantic.

The World Ocean Circulation Experiment was proposed as a contribution to the basic understanding of the ocean circulation on a global scale, using satellite wind stress and altimeter data in combination with in situ measurements by both classical and novel methods. A design options study group is due to report in the middle of next year (1982).

The Pilot Ocean Monitoring Study has been proposed as a first step towards identifying the methods to be used in the future for operational monitoring of the ocean, if that ever becomes necessary. Theoretical studies will examine the sensitivity of the atmospheric climate to anomalies in different regions of the ocean, and experimental studies will test new methods of monitoring the ocean, and gain some preliminary results on inter-annual variability.

Time-table

The Cage and World Ocean Circulation experiments are both linked to the availability of oceanographic satellites, currently being planned for a 1987 launch. The experiments will last several (possibly five) years. They are likely to be preceded by preliminary studies in the period 1981-85, sponsored at institute and national level.

The Pilot Ocean Monitoring Study is an ensemble of institute and national programmes loosely grouped within an international framework designed to set declared goals, exchange information and arrange meetings, etc. There is no specific time-table.

Data

There will be a need for international co-ordination to provide coherent and complete data sets for the two experiments (Cage and WOCE). They can be thought of as the equivalent in the 1980s and 1990s of the IGY oceanographic programme in the 1950s, which led to the creation of the ICGS World Data Centres and the IOC network.

The data needs for POMS are less severe, but, of course, if an operational (or even a trial) monitoring system were to be introduced some time in the future, a global system for data collection and archiving would become necessary.

Efforts are being made now to determine the appropriate time scale for delivery of data. In the WOCE oceanography programme, it will be more important that the data set is clean and complete than that it is delivered rapidly. On the other hand, the data flow rate will be so
will be so large that real-time processing of data will be necessary.

The data will come from many new sources, including satellites and acoustic remote sounding, from drifting instruments and from mobile ships. There will be a need to develop new procedures to deal with new types of data.