

Intergovernmental Oceanographic Commission
Reports of Governing and Major Subsidiary Bodies

**IOC Committee on International
Oceanographic Data
and Information Exchange**

Thirteenth Session

New York, USA, 17-24 January 1990

IOC-IODE-XIII/3
Paris, 31 May 1990
English only*

In this Series	Languages
Reports of Governing and Major Subsidiary Bodies , which was initiated at the beginning of 1984, the reports of the following meetings have already been issued:	
1. Eleventh Session of the Working Committee on International Oceanographic Data Exchange	E, F, S, R
2. Seventeenth Session of the Executive Council	E, F, S, R, Ar
3. Fourth Session of the Working Committee for Training, Education and Mutual Assistance	E, F, S, R
4. Fifth Session of the Working Committee for the Global Investigation of Pollution in the Marine Environment	E, F, S, R
5. First Session of the IOC Sub-Commission for the Caribbean and Adjacent Regions	E, F, S
6. Third Session of the <i>ad hoc</i> Task Team to Study the Implications, for the Commission, of the UN Convention on the Law of the Sea and the New Ocean Regime	E, F, S, R
7. First Session of the Programme Group on Ocean Processes and Climate	E, F, S, R
8. Eighteenth Session of the Executive Council	E, F, S, R, Ar
9. Thirteenth Session of the Assembly	E, F, S, R, Ar
10. Tenth Session of the International Co-ordination Group for the Tsunami Warning System in the Pacific	E, F, S, R
11. Nineteenth Session of the Executive Council	E, F, S, R, Ar
12. Sixth Session of the IOC Scientific Committee for the Global Investigation of Pollution in the Marine Environment	E, F, S
13. Twelfth Session of the IOC Working Committee on International Oceanographic Data Exchange	E, F, S, R
14. Second Session of the IOC Sub-Commission for the Caribbean and Adjacent Regions	E, F, S
15. First Session of the IOC Regional Committee for the Central Eastern Atlantic	E, F, S
16. Second Session of the IOC Programme Group on Ocean Processes and Climate	E, F, S
17. Twentieth Session of the Executive Council	E, F, S, R, Ar
18. Fourteenth Session of the Assembly	E, F, S, R, Ar
19. Fifth Session of the IOC Regional Committee for the Southern Ocean	E, F, S, R
20. Eleventh Session of the International Co-ordination Group for the Tsunami Warning System in the Pacific	E, F, S, R
21. Second Session of the IOC Regional Committee for the Co-operative Investigation in the North and Central Western Indian Ocean	E, F
22. Fourth Session of the IOC Regional Committee for the Western Pacific	E only
23. Twenty-first Session of the Executive Council	E, F, S, R
24. Twenty-second Session of the Executive Council	E, F, S, R
25. Fifteenth Session of the Assembly	E, F, S, R
26. Third Session of the IOC Committee on Ocean Processes and Climate	E, F, S, R
27. Twelfth Session of the International Co-ordination Group for the Tsunami Warning System in the Pacific	E, F, S, R
28. Third Session of the Sub-Commission for the Caribbean and Adjacent Regions	E, S
29. First Session of the IOC Sub-Commission for the Western Pacific	E only
30. Fifth Session of the IOC Regional Committee for the Western Pacific	E only
31. Twenty-third Session of the Executive Council	E, F, S, R
32. Thirteenth Session of the IOC Committee on International Oceanographic Data and Information Exchange	E only

* The Executive Summary, Recommendations and Resolutions of the Thirteenth Session of the Committee on the IOC Committee on International Oceanographic Data and Information Exchange (IODE) were submitted in four languages (English, French, Spanish and Russian) to the Twenty-third Session of the IOC Executive Council, Paris, 7-14 March 1990. This is available as Document IOC/ODE-XIII/3S.

TABLE OF CONTENTS

SUMMARY REPORT	page
1. ORGANIZATION OF THE SESSION	1
1.1 Opening of the Session	1
1.2 Designation of the Rapporteur	1
1.3 Adoption of the Agenda	2
1.4 Arrangements for the Session	2
2. STATUS OF GLOBAL OCEANOGRAPHIC DATA EXCHANGE	2
2.1 Monitoring of Data Flow	2
2.2 Activities of WDCs (Oceanography)	4
2.3 National Data Management Activities	5
3. PARTICIPATION IN GLOBAL OCEAN SCIENCE PROGRAMMES	6
3.1 Tropical Oceans and Global Atmosphere (TOGA)	6
3.2 World Ocean Circulation Experiment (WOCE)	6
3.3 Joint Global Ocean Flux Study (JGOFS)	7
3.4 International Geosphere Biosphere Programme (IGBP)	7
3.5 Other Programmes	7
3.6 Overall Aspect of IODE Co-ordination with International Research and Monitoring Programmes	11
4. NEW DATA TYPES AND PROCESSING	13
5. DATA PRODUCTS AND SERVICES	15
5.1 Products and Services of WDCs (Oceanography), RNODCs, NODCs and DNAs	15
5.2 Global Temperature-Salinity Pilot Project (GTSP)	16
5.3 Integrated Global Ocean Services System (IGOSS)	17
6. IODE DEVELOPMENT OF TECHNOLOGY AND SYSTEMS	18
7. MARINE INFORMATION MANAGEMENT	20
8. REGIONAL PROGRAMMES AND TRAINING AND MUTUAL ASSISTANCE ACTIVITIES IN MARINE INFORMATION AND DATA MANAGEMENT	23
9. WORK PLAN AND PROGRAMME FOR THE NEXT INTERSESSIONAL PERIOD	27
10. ADOPTION OF THE SUMMARY REPORT	28
11. DATE AND PLACE OF THE NEXT SESSION	29
12. CLOSURE	29

ANNEXES

- I. Agenda**
- II. Resolutions and Recommendations**
- III. List of Participants**
- IV. List of Documents**
- V. Opening Statement of the Representative of the United Nations**
- VI. Report of the First Meeting of the Organizing Committee on
Ocean Climate Data Workshop**
- VII. Annotated List of Demonstrations**
- VIII. Summary Report of the Meeting of the Directors, WDCs (Oceanography)**
- IX. List of Acronyms**

1. ORGANIZATION OF THE SESSION

1.1 OPENING OF THE SESSION

1 The Chairman of the IOC Committee on International Oceanographic Data and Information Exchange, Dr. N.C. Flemming, opened the Session at 10.00 on 17 January 1990 at the United Nations Headquarters, New York, USA.

2 Dr. Flemming welcomed the participants to the Thirteenth Session of the Committee and called upon Mr. J-P. Levy, Director of the UN Office for Ocean Affairs and the Law of the Sea, to address the Committee.

3 Mr. Levy welcomed the participants on behalf of Mr. Satya Nandan, the Special Representative of the Secretary-General for the Law of the Sea. In his statement, Mr. Levy pointed out that the United Nations had participated in the work of the Committee in the past and intends to continue active participation in the future. He referred to the growing interest and concern of the world community about the issues of climate change and the role of the oceans in the global environment, to the Law of the Sea Convention and to the activities of the Office for Ocean Affairs and the Law of the Sea. He made particular reference to the recent decision (1989) of the General Assembly on the preparation of the report on the needs of the States in regard to the development and management of ocean resources; to the measures taken by States and by the competent international organizations in responding to those needs; and to methods and mechanisms for ensuring the benefits of the comprehensive legal regime for all States during the decade 1990-2000 and for the early realization of these opportunities.

4 Mr. Levy then described the activities of UN(OALOS) related to IODE, in particular the development of the Law of the Sea Information System (LOSIS), the National Marine Legislation Data Base (LEGISLAT), the Mineral Database, the Law of the Sea Bulletin and the continued co-operation of the office with IOC in the implementation of the Joint FAO-IOC-UN/ASFIS and the Joint IOC-UN(OALOS) Programme on Ocean Science and Non-Living Resources (OSNLR). The full text of Mr. Levy's statement is attached as Annex V.

5 Dr. A. Tolkachev, IOC Senior Assistant Secretary, welcomed the participants to the Session on behalf of the Secretary IOC and expressed appreciation to the UN Office for Ocean Affairs and Law of the Sea for hosting the Meeting and for the excellent arrangements made.

6 Dr. Tolkachev then reviewed the major developments in the IOC activities since the Twelfth Session of the Committee, Moscow, USSR, 10-17 December 1986, stressing in particular the development of the ocean climate research programmes - TOGA and WOCE, and of IOC involvement in the JGOFS and IGBP, as well as the growth in other IOC programmes such as OSLR, OSNLR, GLOSS, Ocean Mapping and GIPME. He made particular reference to the decisions of the IOC Assembly at its Fifteenth Session, Paris, 4-17 July 1989, on the development of a Global Ocean Observing System which will need the active involvement of the Committee on IODE. Dr. Tolkachev pointed out that all those research and monitoring programmes include data and information exchange as an integral component. The active collaboration of the Committee with such large-scale scientific experiments as TOGA, WOCE, JGOFS and IGBP is needed in order to ensure use of the most effective methods of data management and exchange, especially where common data sets are required by several large-scale global programmes. The IOC Assembly at its Fifteenth Session strongly supported such interaction. The IOC Assembly in this connection supported the initiative of the Committee to develop the Global Temperature Salinity Pilot Project and to organize the Workshop on Ocean Climate Data and emphasized the importance of the IODE training and assistance programme to be implemented in co-operation with IOC Regional Bodies. The Assembly urged the Committee to continue its efforts in developing methods and procedures to exploit new technology for ocean data acquisition, telecommunications and cheap transfer of large volumes of data. The Assembly also invited the Committee to improve co-ordination arrangements with the UN and FAO in further developing the Joint FAO-IOC-UN Aquatic Sciences and Fisheries Information System (ASFIS). Dr. Tolkachev informed the Committee on other decisions of the IOC Assembly related to IODE. He called on the Committee to give particular attention to the future interaction of the Committee with other research and monitoring programmes, the preparation during the session of the work programme for the next intersessional period, and to consider possible ways and means to assist IOC in implementing the proposed tasks and activities.

1.2 DESIGNATION OF THE RAPPORTEUR

7 Ms. M. Cole, USA, was designated Rapporteur for the Session.

1.3 ADOPTION OF THE AGENDA

8 **The Committee adopted the Agenda for the Session as given in Annex I.**

1.4 ARRANGEMENTS FOR THE SESSION

9 Mr. R. Gruzka, Senior Ocean Affairs and Law of the Sea Officer, informed the participants of the local arrangements.

10 Dr. Tolkachev introduced the proposed time schedule and documentation for the Session. The List of Documents presented at the Session is given in Annex IV.

11 The Committee was pleased to note that a number of participants and organizations would be demonstrating information products and services, using PCs, on-line systems and CD-ROMs, during the period of the Session. The Committee thanked all those responsible for arranging and operating these demonstrations. An Annotated List of Demonstrations is attached as Annex VII.

12 The Chairman explained that the structure of IODE Session had been deliberately changed in response to comments received following previous sessions. The Delegates had requested a reduction in the volume of documentation, and increased time to discuss policy issues and integration of different strands of information. In accordance with this request, the Officers had analyzed the problems confronting IODE (Document IOC/IODE-Cons. VI/3) and prepared a list of major themes. These themes formed the principle agenda items for IODE-XIII. Reports from subsidiary bodies and invited agencies and organizations had been summarized in condensed form with their recommendations to IODE-XIII, and these were grouped into consolidated documents relating to the themes. The Delegates were invited to summarize their intersessional work very briefly indeed, and to emphasize those decisions and recommendations for the future requiring the approval of IODE-XIII. They were also asked to highlight topics and problems which would most benefit from full discussion by the Session.

2. STATUS OF GLOBAL OCEANOGRAPHIC DATA EXCHANGE

13 The Chairman summarized the major policy issues which confront IODE, referring to the Report which he had presented to IOC-XV (Document IOC/INF-778) and Document IOC/IODE-XIII/6, the Chairman's Report to IODE-XIII.

14 The intersessional period since December 1986 had been exceptionally long, but the achievements during this period had been notable. With limited resources both at the international and Member State level, the NODCs and experts from many countries had been able to introduce much new technology, and to establish new standards and procedures which are essential for IODE to support marine research, the development of marine resources, and the implementation of the global marine science programmes. During the last intersessional period the public had become increasingly aware of the importance of environmental monitoring and management, and there was now a sign that the support for marine data management at the national level was increasing. The overriding objective of IODE is to increase the number of NODCs and marine information centres, and provide increased technical collaboration and exchange of data and information between centres.

15 The Chairman stated that the work of the Session must reflect the rapid changes which have taken place in the last three years - the greatly increased requirement for global understanding of the climate system, the political importance which is now attached to this, and the need for improved data so as to conduct predictive studies and impact studies. IODE is in a position to provide services which will benefit the technically developed countries, the international climate programmes, and the developing countries who need better data to manage their own environments and marine industries. Global research and environmental management are now planned on the decadal, and multi-decade, time-scales and IODE must plan data and information management with a similar view to the future.

2.1 MONITORING OF DATA FLOW

16 The Committee considered documents IOC/IODE-XII/14 "Monitoring of Data Flow" and IOC/IODE-XII/14 Add. "Revision of the ROSCOP Form".

- 17 **The Committee emphasized** the value of the many ROSCOP forms being used each year in tracking data inputs to the IODE System and in providing referral to oceanographic data not yet acquired by IODE. Certain major science programmes may need to collect more detailed information from their own cruises, from which ROSCOP information can later be extracted.
- 18 The Chairman of the Group of Experts on Technical Aspects of Data Exchange, Dr. M.T. Jones, introduced discussion on the fourth draft revision of the ROSCOP form which is reported fully under Agenda Item 6.
- 19 **The Committee recognized** that the ship schedule database operated within the OCEANIC on-line information system at the University of Delaware, USA, provides a good basis for a more practical and usable approach to the distribution of National Oceanographic Programmes. The OCEANIC system which currently only includes future cruises could be extended to include a separate database of past cruises. **The Committee welcomed with appreciation** the offer by the USA to collaborate with the IOC in this matter. **The Committee requested** the IOC Secretariat to pursue the planning and implementation of this approach to NOPs and to make appropriate arrangements between the IOC and the authorities responsible for OCEANIC.
- 20 The Committee noted that the MEDI System now contains entries for 35 data centres (from 24 countries + 2 international organizations) describing 207 data sets, almost all available in machine-readable form. **The Committee thanked** WDC-A for editing the MEDI data and for loading it onto NOSIE, the NODC On line Information System, and welcomed with appreciation the offer that has been made by WDC-B to load the MEDI into a searchable mini-micro CDS/ISIS database on diskette. This would make the MEDI information accessible to the many users of this Unesco software package, particularly in developing countries.
- 21 **The Committee recommended** the implementation of the following work plan for MEDI:
- (i) send regular update demands to centres already listed - centres will be sent a diskette of current entries and offered copies of updates. Identify problems with entries and request corrected/additional information.
 - (ii) identify organizations not yet listed that are known to have important oceanographic data holdings and approach them for MEDI entries. This may be best done by concentrating in turn on particular communities, e.g., WOCE, remote sensing, an IOC region, a country using a national contact.
 - (iii) implementation, dissemination and continued update of MEDI as a micro-CDS/ISIS database (WDC-B1).
 - (iv) maintain and widen on-line availability of MEDI (WDC-A)
 - (v) further dissemination of the MEDI database following priorities to be defined by the IODE officers, including possible printed products.
- 22 **The Committee noted** that IGBP is developing a Directory Interchange Format (DIF), and that there would be an advantage if the MEDI system were made compatible with the DIF.
- 23 **The Committee took note** of an European Community (EC) project at the British Oceanographic Data Centre to develop a European Directory of Marine Environmental Data Sources, which is sufficiently similar in concept to MEDI for valuable communication between the two systems to be organized, resulting in improved coverage and cost savings.
- 24 The Representative of the WMO, Dr. M. Krasnoperov, stated that the Tenth Session of the WMO Commission for Marine Meteorology (CMM-X), Paris, February 1989, agreed that the WMO activities concerned with marine climatological data are very important for climate research and for marine service activities, and should be continued. It further agreed on the closer integration of marine climatology within the CLICOM automated climate data management system (see Agenda Item 8).
- 25 The INFOCLIMA catalogue of climate data series has been updated and expanded to include remotely sensed, hydrological and proxy data and a printed version was published in August 1989. A digital version of the information on personal computer diskettes is expected to be available by mid-1990.

26 **The Committee took note of this information and requested the IOC Secretariat to explore with WMO the best way to present the data information resources of the IODE system clearly to INFOCLIMA users.**

27 **The Committee adopted Recommendation IODE-XIII-1**

2.2 ACTIVITIES OF WDCs (OCEANOGRAPHY)

28 The Directors of WDCs (Oceanography) A,B and D reported on the activities of the centres during the intersessional period. Their reports were made available to the participants in Document IOC/IODE-XIII/7.

29 The Committee noted that the flow of marine scientific data into the World Data Centres continued at a steady pace. Data received during the intersessional period total more than a quarter of a million observations. The international marine data base of the WDC (Oceanography) system contains data for more than 2,250,000 observations. It includes data from more than 960,000 oceanographic stations, 505,000 bathythermographs, 135,000 biological observations and 660,000 current measurements. The data available cover 17,042 research vessel cruises and include data from various national and international programmes (IGY, FGGE, WCRP, MONEX, BIOMASS, KER, TOGA, SECTIONS, etc.). Sixty-one countries provided data to WDCs. WDC Directors are collaborating to provide catalogues free of charge to qualified requestors in the scientific community.

30 It was also noted that during the period 1987-1989 a total of over 1700 ROSCOP-2 forms were received by the WDCs and additionally five data catalogues and publications on oceanography were published by the WDC-B. At WDC-A a total of more than 18,000 ROSCOP forms, from 34 countries, are now available.

31 **The Committee noted with satisfaction the progress made by WDC-A in developing automated catalogue systems which can be utilized to produce a common hard copy WDC (Oceanography) catalogue listing data holdings of WDCs A, B, and D (Oceanography) and to make catalogues/data bases available on-line. The Committee encouraged the WDC-A to continue this work in co-operation with WDCs B and D. The Committee also welcomed the initiatives of WDC-A to support global climate change activities including enhancement of current data acquisition and data management procedures and digitization of historical oceanographic observations. The Committee wished to encourage the WDC-A to continue this work and called upon other WDCs to make efforts in support of global programmes, such as TOGA, WOCE, JGOFS, and IGBP. The Committee noted with satisfaction that the WDCs already participate in archiving, managing, and disseminating the data derived from WOCE and TOGA, and had expressed willingness to perform these functions in a delayed mode for JGOFS, IGBP and other international programmes.**

32 The Committee noted that the WDC-B for Marine Geology and Geophysics has been established and is a part of the WDC-B co-located with the Scientific Research Institute "Okeangeofizika" at Gelendjik. The Representative of WMO informed the Committee that the establishment of World Data Centres for Sea Ice was recommended by the Ninth Session of the WMO Commission for Marine Meteorology. The Committee noted that actions are underway to establish World Data Centre-B for Sea Ice at the Arctic and Antarctic Research Institute in Leningrad.

33 The Committee considered the first report of the WDC-D (Oceanography), presented by the Director of the Centre. The Centre was established in 1989 in accordance with a recommendation of the ICSU WDC Panel, and it is maintained by the State Oceanic Administration, People's Republic of China and operated by, and co-located with, the China National Oceanographic Data Centre (CNODC). It has a variety of oceanographic data collected during routine section observations and at marine coastal stations. The centre published a data catalogue. **The Committee welcomed the formation of WDC-D (Oceanography).**

34 The Committee considered the report of a meeting of Directors of WDCs (Oceanography) held in New York on 16 January 1990 (Document IOC/IODE-XIII/19) at which Guidelines for Data Exchange between the World Data Centres (Oceanography) were agreed. The report of the meeting with the agreed guidelines for data exchange between WDCs (Oceanography) is given in Annex VIII. The Committee noted that the guidelines do not conflict with the general principles established in the present draft of the revised IOC Manual and Guides No. 9, the Manual on International Oceanographic Data Exchange. The Committee agreed with the proposal of the meeting that the Directors of WDCs (Oceanography) consult further with one another, agree upon the revisions to the text of the Manual relevant to the establishment of a new WDC (Oceanography), and submit those revisions to the IOC Secretariat for inclusion in the revised Manual on IODE.

35 The Committee was also informed of the consultation between the Directors of WDCs (Oceanography), Chairman and Vice-Chairman of the Committee on IODE, Chairman of the ICSU WDC Panel, and the IOC Secretariat, organized in response to a request of the IOC Assembly at its Fifteenth Session in order to formulate a co-ordinated policy between IOC and ICSU on international oceanographic data exchange and the activities of WDCs (Oceanography). The Committee expressed its satisfaction with the results of the consultation and supported the proposal that Joint IOC-ICSU publication of the IODE Manual would be the best means to move forward in co-operation between the ICSU World Data Centres and the IODE system.

36 The Committee adopted Recommendation IODE-XIII.2.

2.3 NATIONAL DATA MANAGEMENT ACTIVITIES

37 The Committee considered reports on national data management activities submitted by National Co-ordinators for IODE (Document IOC/IODE-XIII/9, Inf.8, Inf.12, Inf.13).

38 The Chairman, in his introductory remarks, noted that the larger NODCs especially play an increasing role in the climate programmes. He also noted with satisfaction that a number of new NODCs had been established during the last intersessional period.

39 The Senior Assistant Secretary IOC stressed the potential value of these national reports. When brought together, these form a valuable information document, especially when mention is made of participation by centres in international activities relevant to IODE.

40 The Committee expressed concern that most national reports to IODE sessions omit any reference to marine information management, even though at least 13 Member States are very active in this field. The Committee requested the Secretary IOC to ask IODE National Co-ordinators to either include information aspects in their reports to IODE-XIV or to obtain separate reports from an appropriate contact point in each Member State.

41 The Committee noted a request of SCAR related to the establishment of an archive of data from drifting buoys in the Antarctic Sea Ice Zone. In view of the impending establishment of the WDC-B Sea Ice Centre in Leningrad, this would call for close co-ordination with this and existing IODE activities. The Delegate of Canada confirmed that the RNODC for Drifting Buoy Data (MEDS) does include the data from drifting buoys in the Antarctic and Antarctic Sea Ice Zones in the data base of this RNODC, whether the buoys were on drifting ice or in the water. The Committee was pleased to note this statement.

42 The Committee urged the Secretary IOC to inform SCAR of the existence of the RNODC for the Southern Ocean, to obtain more information about its data requirements in the Southern Oceans and to establish, on the basis of that information, close collaboration with SCAR in the field of data and information management.

43 The Chairman noted that many NODCs still lack the support on the national level, required to fulfill the tasks demanded by the IODE system or requested by the IOC Assembly. This is further discussed under Agenda Item 9.

3. PARTICIPATION IN GLOBAL OCEAN SCIENCE PROGRAMMES

3.1 TROPICAL OCEANS AND GLOBAL ATMOSPHERE (TOGA)

44 The Representative of the International TOGA Project Office, Mr. J. Martellet, presented an overview of TOGA data management (Document IOC/IODE-XIII/13). He emphasized the importance of the relationship between IODE and the TOGA Data Centres, in archiving and disseminating increasing quantities of data. Although the TOGA data centres are not officially recognized as IODE affiliates, these data centres, set up for the TOGA period of 1985-1995, are contributing greatly to the holdings within the IODE system. He also noted the use of compact disks, in storing and easily disseminating large quantities of TOGA data.

45 A report was presented by Dr. W. White of the Scripps Institution of Oceanography which illustrates an example of co-operation between a data centre handling TOGA data and an NODC. The Joint Environmental Data Analysis Centre is managed by Scripps Institution of Oceanography and the US NODC and represents a successful effort between scientists and data managers to make available the highest quality data in a timely manner.

46 The Committee strongly supported TOGA data management activities, citing additional examples of close co-operation between NODCs and TOGA efforts. The Committee also noted the importance of continued international support for such activities and the usefulness of continued full collaboration between IODE and TOGA.

47 In response to a request by the Representative of the International TOGA Project Office, the Committee agreed that IODE schemes should be organized to take into account the requirements of the World Climate Research Programme (e.g., TOGA, WOCE, JGOFS, IGBP). It noted that readily accessible large data sets combining different data types are critical for generating input to global and ocean basin models, climate diagnostic studies, and climate change assessment.

48 Recognizing the importance of the specialized services provided by the TOGA data centres, the Committee requested that the Secretary IOC remind Member States of the need to transmit all Indian Ocean, tropical Pacific and tropical Atlantic sea-level data (hourly, filtered daily and monthly) from 1 January 1985, or earlier, if available, and future data, if possible within six months after observation, to the TOGA Sea Level Data Centre. In addition, all Member States should be asked to transmit all drifting buoy data to the RNODC for Drifting Buoys Data in Canada in the most rapid manner possible. Finally, the Committee reiterated the recent reminder by the Secretariat that Member States transmit all sub-surface temperature and salinity data collected between 30N and 30S since 1 January 1985 directly, or through the GTSP scheme, to the TOGA Sub-Surface Data Centre in Brest, France, and transmit future data, within six months of observation if possible. This reminder was emphasized in a presentation made by the Director of the TOGA Sub-Surface Data Centre who briefly described the data base available through that activity.

3.2 WORLD OCEAN CIRCULATION EXPERIMENT (WOCE)

49 The representative of the WOCE Scientific Steering Group, Mr. J. Crease, presented an overview of WOCE, with emphasis on data management aspects of this global activity (Document IOC/IODE-XIII/13). WOCE formally began on 1 January 1990 and has both a short-term and a long-term goal. Data are needed to develop and carefully test models of ocean circulation and change over a five-year period, and the key parameters required for long-term ocean monitoring need to be identified. The exchange of WOCE data in near real-time is highly desirable. Many IOC Member States are actively participating in WOCE. WOCE data management aspects include diverse institutions with diverse capabilities and diverse data sets, but uniform quality is essential. Data management as a function is being given a great deal of attention.

50 Five WOCE Data Assembly Centres and a Special Analysis Centre have been established to date (some as extensions of TOGA centres or NODCs) for the duration of WOCE in the USA, FRG, Canada, France, and the UK. Other Member States are encouraged to establish Data Assembly Centres in support of WOCE. It is intended that all data assembled will be transferred to the WDCs for permanent archiving and dissemination. In this context, the Committee noted the importance of emphasizing the implicit data management requirements and the consequent need for WDC representatives to be involved in discussions of this aspect of WOCE plans. The critical need to establish data management procedures for other data sets and remotely sensed data was also noted.

51 Additionally, WOCE has established a Data Information Unit located at the University of Delaware, USA, with the responsibility of maintaining information about WOCE data, and its present and potential availability. This system has applicability beyond WOCE and the Committee welcomed the offer by the USA that this unit serve the broader goals of IODE by expanding its system to maintain information on data other than WOCE.

52 The Committee was pleased to note the examples of excellent collaboration between IODE centres and WOCE currently taking place. The IGOSS-IODE Global Temperature-Salinity Pilot Project was cited as a good example of an IODE effort to perform the type of data management required by WOCE. The Committee emphasized the importance of addressing data management issues now, especially in view of the broad spectrum of data sets to be developed in WOCE. In an effort to meet this goal, the Committee encouraged the continued involvement of IODE representatives in WOCE meetings and the participation of WOCE representatives in IODE sessions. The Committee agreed that consideration should be given to establishing a formal liaison between IODE and the Intergovernmental WOCE Panel which will hold its First Session, 22-24 October 1990.

3.3 JOINT GLOBAL OCEAN FLUX STUDY (JGOFS)

53 A member of the JGOFS Working Group on Data Management, Dr. M.T. Jones, presented issues concerning data management requirements for JGOFS, a study of the role of the ocean in the global carbon cycle (Document IOC/IODE-XIII/13). JGOFS has identified a standard group of 20 types of measurements, many of which are not traditionally included in IODE archives. Much of the data will consist of small, complex data sets. JGOFS conducted a North Atlantic Pilot Study in 1989 and will conduct a Pilot Study Data Analysis Workshop in Kiel, FRG, in March 1990 where a prototype of a standard data format, an extension of GF3, will be tested. The Japanese representative stated that the Japan Oceanographic Data Centre has developed a biological data format for microbiology and that a report is available. The JGOFS Committee has established a policy of full access of all data to potential users, provided that credit is given to the data originator.

54 The Committee noted that archiving responsibilities have not been established, and it is important to identify JGOFS long-term archive requirements through increased interaction with JGOFS data management subgroups. The IODE Task Team on Marine Biological Data so far has been unable to attract the necessary resources to address the extremely complex problems of marine biological data management (Document IOC/IODE-XIII/10). This Task Team can potentially assist JGOFS in such efforts now that clear scientific objectives have been identified. Additionally, the IODE Task Team on Oceanographic Data Quality Control can provide assistance. Although JGOFS has interacted actively with the IODE Group of Experts on Technical Aspects of Data Exchange, concerns were expressed that presently IODE is not fully ready to manage biological and chemical data, and the Committee agreed to increase co-operation with JGOFS to ensure that the upcoming data management needs can be met and to effectively support this programme.

3.4 INTERNATIONAL PROGRAMME ON GEOSPHERE AND BIOSPHERE (IGBP)

55 Some aspects of data and information management in relation to global programmes, such as IGBP, were presented by Mr. P. Geerdens. He described requirements of a general nature, not specifically relevant for this Committee but more for IOC or Unesco. He stressed particularly the need for free access to environmental data and information. A list of suggested topics for attention was provided in Document IOC/IODE-XIII/13. In the long term, both the archiving of, and retrieval from, very large multi-disciplinary data sets will benefit from the use of expert systems and knowledge-based systems. An RNODC for IGBP/Global Change was discussed but it was felt that active use of existing contact points would suffice during the next intersessional period.

56 The Committee was informed by Mr. G. Withee, IODE representative to the Data Management Group (DMG) of IGBP, of the activities of the DMG. Four principal data projects have been identified, including pilot case studies, and analysis of data management systems on the 50-100 year time-scale. The Committee was also informed of the status of the Global Change Data Set Project.

3.5 OTHER PROGRAMMES

57 Under this item the Committee considered data management activities under other IOC programmes, particularly those on Ocean Processes and Climate, the Global Sea Level Observing System, Ocean Science and Non-Living Resources (OSNLR) and Ocean Mapping, and related activities of IODE subsidiary bodies.

- 58 The Representative of the UN(OALOS), Mr. R. Gruszka, presented the report on the IOC-UN(OALOS) Programme "Ocean Science and Non-Living Resources" (Document IOC/IODE-XIII/13). It was noted that the development of OSNLR is based on regional and global levels. On a regional basis, it is developed through the activities of IOC regional bodies and includes the following regional projects: Late Quaternary Paleogeographic Maps of the WESTPAC region; Boundary Processes along the Margin of Plates and Sediment Budget along the West Africa Coastline. Concerning the global scale projects, a project on Continental Margin Stratabound Authigenic/Diagenetic Sediments was proposed by the IOC-UN(OALOS) Guiding Group of Experts on OSNLR at its Third Session.
- 59 The report on OSNLR emphasized the need to develop the exchange of information between the participants: bibliographies, series of data, various contacts. The report also pointed out the need for a system of data co-ordination for the various data collected for OSNLR, as well as the exchange of data among participating scientists. The Committee was invited to consider possible assistance in implementing the mechanisms of data exchange by using already existing well-established mechanisms and/or developing OSNLR special data formats. Another proposal contained in the report was to establish modelling centre(s) which would play an important role in developing the modelling capacities in the regions through collaboration with interested scientists participating in OSNLR. Mr. Gruszka affirmed that co-operation between the UN Office on Ocean Affairs and the Law of the Sea and the IOC was continuing on the programme of OSNLR. The Chairman of the Committee on IODE was invited to the next meeting of OSNLR to be held in February 1990.
- 60 Dr. V. Scherbakov, Director WDC-B1 on Marine Geology and Geophysics, referring to the recommendations of the Second Session of the IOC-UN(OALOS) Guiding Group on OSNLR, pointed out that the Committee should give more attention to a multidisciplinary approach to the exploration and exploitation of mineral resources in relation to the marine environment, which requires various types of physical, chemical and biological data. He noted, in this connection, that the co-operative investigations of the USSR, USA, France and FRG could be of great interest for the Committee.
- 61 Dr. M.T. Jones, Chairman of the GEBCO Sub-Committee on Digital Bathymetry, presented the report on data management in ocean mapping (Document IOC/IODE-XIII/13 Add.). He referred to the current and planned activities of the IOC Consultative Group on Ocean Mapping (CGOM), the Joint IOC-IHO Guiding Committee for the General Bathymetric Chart of the Oceans (GEBCO) and the GEBCO Sub-Committee on Digital Bathymetry. Dr. Jones mentioned in particular the following activities: digitization of the GEBCO Fifth Edition, with the present participation of the United Kingdom, France, USSR and Japan; development of the GEBCO Digital Atlas, containing a continuously up-dated digital bathymetric contour database, together with appropriate sub-files. The work continues on the development of Digital Terrain Models that will be incorporated in the GEBCO Digital Atlas. Copies of the digital contours for the polar regions, North Atlantic and Mediterranean are available from BODC on magnetic tape in GF3 format.
- 62 The Committee was also informed on the negotiations on the establishment of an IHO Data Centre for Digital Bathymetry at the US National Geophysical Data Centre. This centre will assist the IHB in fulfilling its responsibility as the WDC for Bathymetry.
- 63 The Committee noted that there are a number of IOC regional ocean mapping projects (in the Mediterranean, the Caribbean Sea, the Gulf of Mexico and the Western Indian Ocean) and the preparation of the International Geological/Geophysical Atlases of the Atlantic and Pacific Oceans are underway. Actions are also under way to initiate preparation of bathymetric charts for the IOCEA and WESTPAC regions. In this connection, the Delegate of China informed the Committee of the offer made by China at the Fifteenth Session of the IOC Assembly to assist in the compilation and publication of a bathymetric chart for the WESTPAC area, to be undertaken by CNODC. The Delegate of Japan also reported on the activities of JODC related to the project in preparing digitized bathymetric contours and coastlines at the scale of 1 to 1 million for the Western Pacific plotting sheets in GEBCO.
- 64 The Committee agreed that it should play a more active role in promoting the exchange of bathymetric, geological and geophysical data needed for the preparation of on-going and planned IOC ocean mapping projects.

- 65 Dr. M. Loughridge, Chairman of the Task Team on Exchange of Marine Geological and Geophysical Data presented the report on its activities (Document IOC/IODE-XIII/10). He pointed out that, although the Task Team had not met during the intersessional period, much work had been accomplished through interactions between individual members of the Task Team, during the visits of representatives of NODCs, Japan and China to WDC-A-MGG and the Chairman's visits to JODC and CNODC and the UK, and with the members from the USSR during the International Geological Congress. Dr. Loughridge pointed out that during the intersessional period, substantial progress had been made in the development of bibliographies and data bases on marine minerals such as manganese nodules and crusts, polymetallic sulfides, phosphorites and heavy minerals/placer deposits. Several of these efforts are now almost current with the English language literature and consideration is being given to capturing these bibliographies and data bases on CD-ROM with up-dates in the future dependent on the rate of growth of new information, particularly with respect to the non-English literature.
- 66 During the intersessional period an interim data format subset for multi-beam echo sounder data was developed, but because of previous limitations on availability for exchange, large amounts of data have accumulated which have not been converted to the GF3 format.
- 67 Dr. Loughridge suggested that the major international efforts in the field of exchange of marine geological/geophysical data should be concentrated on:
- (i) Better inventories of available data with emphasis on availability;
 - (ii) More rapid progress in the use of emerging data dissemination technology such as CD-ROM and its use with personal computers.
- 68 He also noted the close parallelism between the Task Team activities and those of WDC-A-MGG and the extensive involvement of WDC-A-MGG staff in the activities related to OSNLR and Ocean Mapping.
- 69 The Committee noted with satisfaction that data types of great mutual interest, such as resource-oriented data, may now be more freely exchanged, particularly if the data are from regions outside a nation's exclusive economic zone.
- 70 Noting with satisfaction the progress in the activities of the Task Team, the Committee felt that closer co-operation and co-ordination should be established between the Task Team on geological and geophysical data and the international bodies dealing with the OSNLR and Ocean Mapping programmes in order to promote the exchange of marine geological/geophysical data needed for achieving the objectives of those programmes and to apply IODE methods and formats for exchange of those data. The Committee also noted the requirement of WOCE programmes for global and basin scale digital bathymetry. The Committee therefore supported a proposal of the Chairman of the Task Team on the continuation of its work and revision of its terms of reference to reflect the proposed co-ordinated efforts. **The Committee adopted Resolution IODE-XIII.1.**
- 71 The Committee then considered sea-level data management within GLOSS, noting that sea level data are required for monitoring ocean atmosphere coupling, long-term climate changes, ocean circulation modelling local and regional practical applications.
- 72 The Global Sea Level Observing System (GLOSS), initiated by IOC in 1985, includes data collection for international exchange with unified formats and procedures which may include near-real-time data collection. The data management scheme and procedures for collection and exchange of mean sea-level data from some 300 GLOSS stations are described in the Implementation Plan for GLOSS (Document IOC-XV/8 Annex 4). Monthly and annual mean sea-level data from all GLOSS stations are collected by the Permanent Service for Mean Sea Level (PSMSL). The GF3 Standard subset for mean sea-level is used for data archiving and exchange. In addition the monthly and daily mean sea level are also collected on near-real time basis by the TOGA Sea-Level Centre and the SOC for IGOSS Sea Level Programme in the Pacific (located in the University of Hawaii, USA) a network of some 60 GLOSS stations was selected for the WOCE programme and WOCE Sea-Level Data Analysis Centres are being established at the British Oceanographic Data Centre and the University of Hawaii. The IOC Group of Experts on GLOSS provides advice to IOC on the development of the system.

- 73 The Committee noted that co-ordination of GLOSS data management activities with IODE is arranged through PSMSL and the IOC Secretariat. The Committee expressed satisfaction with the arrangements for GLOSS data and recommended that they be continued.
- 74 The Committee welcomed Dr. D.J. Baker, Chairman of the IOC Committee on Ocean Processes and Climate and Co-Chairman of the WOCE Scientific Steering Group, who made a presentation on the importance of ocean data management in climate and global change studies. The large-scale programmes such as TOGA, WOCE, JGOFS, GEWEX and IGBP being undertaken to study the role of the ocean in global systems require long-term systematic ocean observations and data management, and recognition is being given to the need for a permanent global ocean observation system. The Committee on Ocean Processes and Climate, at its Third Session, June 1989, recommended that IOC, in co-operation with WMO, initiate the development of detailed plans for a long-term global ocean observing system. This recommendation was supported by the Fifteenth Session of the IOC Assembly in its Resolution XV-4.
- 75 The SCOR-IOC Committee on Climate Change and the Jean and the WMO-ICSU Joint Scientific Committee for WCRP have jointly established an Ocean Observing Systems Development Panel to design such a system. In support, the IOC has established an ad hoc Group under the Committee on Ocean Processes and Climate to determine short-term actions and advise IOC on the actions necessary to implement systematic long-term ocean observations and an efficient data management and delivery system as part of a global system for monitoring and predicting environmental changes. The need to increase support for national observation networks including satellite systems, data centres, data exchange, standards, and archiving has been identified. Dr. Baker emphasized the importance of IOC leadership in this endeavor and the need for such a system to be an intergovernmental responsibility. Additionally, because monitoring is global in scope, the full involvement of developing countries must be ensured.
- 76 Dr. Baker welcomed the initiatives of the Committee on IODE to implement, jointly with IGOSS, the GTSP and to organize the Ocean Climate Data Workshop.
- 77 Dr. Baker noted that sound scientific requirements are a prerequisite to obtaining resource commitments. The TOGA project has made an excellent beginning in identifying requirements for a long-term predictive system for its area of interest. For other geographic areas and scientific disciplines such as biology and chemistry, the requirements are less clearly defined. Implementation of observation networks for biological and chemical monitoring must wait for the further progress of JGOFS. He expressed the hope that the current interest in global change will produce a legacy of a comprehensive observation network and data management system much as the International Geophysical Year in 1957-58 produced a legacy of World Data Centres. The Committee was informed on the establishment of the IOC-WMO Intergovernmental WOCE Panel and the preparations for its First Session to be held in Paris, 22-24 October 1990.
- 78 The Committee agreed to the suggestion that a representative of IODE attend meetings of the Committee on Ocean Processes and Climate. Dr. Baker invited close collaboration between the Committee on IODE and international bodies, involved in planning and co-ordination of large-scale ocean climate programmes, and in particular, the IOC Committee on Ocean Processes and Climate and the IOC-WMO Intergovernmental WOCE Panel and close ties with the IOC ad hoc Group on long-term systematic ocean observations. The Committee recognized that tremendous new demands will be placed on the current IODE systems and there will be new responsibilities for exchange as well as archiving.

3.6 OVERALL ASPECT OF IODE CO-ORDINATION WITH INTERNATIONAL RESEARCH AND MONITORING PROGRAMMES

79 Several Member States expressed concern that important information related to data and information management in IGBP and other climate programmes was not easy to obtain. It was recognized that IODE did have representatives or contact points actively serving on many of the climate and global change programme groups. Examples of these contacts follow :

IGBP Working Group 1 on Data and Information Management -	G. Withee
JGOFS Data Management Working Group -	M. Jones
WOCE Data Management Working Group -	R. Wilson
TOGA Management Working Group -	J.P. Rebert
Ocean Processes and Climate -	Chairman of IODE
IOC-WMO Intergovernmental WOCE Panel -	Chairman of IODE

80 In view of these contacts already in place, the Committee requested the Secretary IOC to use these contacts to compile information on these groups, and to distribute this information to all IODE National Co-ordinators annually.

81 Mr. J. Churgin, Chairman of the Organizing Committee for the Ocean Climate Workshop, reported on the outcome and proposals of the first meeting of the Organizing Committee, NODC, Washington DC, USA, 10-12 January 1990 (Document IOC/IODE-XIII/15).

82 The Organizing Committee proposed to organize the Workshop in September/October 1991 in the USA to examine ocean data handling in support of ocean climate studies. The Workshop will develop requirements for ways to improve the present IODE system and to establish guidelines for the future on the basis of the discussion of a series of specific case studies on Climate and the Oceans.

83 The USA has agreed to host the Workshop and to make local arrangements. The proposed objectives, format, attendance and time-table proposed by the Organizing Committee are given in Annex VI. The programme of the Workshop will be finalized by the Organizing Committee and circulated in October 1990.

84 The Committee endorsed the recommendations of the Organizing Committee, and requested that the IOC Executive Council at its Twenty-third Session approve the convening of the Workshop on Ocean Climate Data, provide the support necessary for the preparation and organization of the Workshop, including the second meeting of the Organizing Committee in 1990, and invite other international organizations to co-sponsor the Workshop and to provide support for participation of some specialists. The Committee also invited the representatives of WOCE, TOGA, and JGOFS to take an active part in the preparation of the Workshop.

85 The report of the Group of Experts on RNODC and Climate Data Services was presented to the Committee by its Chairman, Mr. G. Withee (Document IOC/IODE-XIII/10).

86 The Group met at the Institute of Oceanographic Sciences, Deacon Laboratory, Wormley, UK, 15-19 February 1988 (Document IOC/IODE-CDS-I/3).

87 In his report, Mr. G. Withee highlighted major recommendations of the meeting of the Group and the status of their implementation.

- (i) The recommendation on support to the TOGA Subsurface Data Centre in Brest has been fulfilled and WDCs now receive these data as well.
- (ii) There were several recommendations on the World Ocean Circulation Experiment (WOCE). Since that time WOCE has established a Data Management Group, chaired by Mr. J. Crease. IODE representatives have been invited to attend meetings of this Group and have fully participated in the discussion and recommendations.

- (iii) The Meeting also recommended that the Joint Global Ocean Flux Study (JGOFS) include IODE representation. The JGOFS Working Group on Data has included IODE representation.
- (iv) There was also a recommendation that World Data Centres include reports of activities by climate related data centres with the annual summaries of RNO DC activities. This request has been implemented and the collection needs to be kept up-to-date as new centres are established.
- (v) Another recommendation dealt with guidelines for annual reports. WDCs have exchanged information and WDC-A has now developed an automated system for updating the catalogue. This was presented to other WDCs and discussions are under way for a joint cataloging system based on this work. The automated system would also be suitable for on-line availability in the future.
- (vi) There were also discussions on the ROSCOP form which were followed by small group meetings and suggestions for a new ROSCOP form (see Agenda Item 6).
- (vii) One of the more significant recommendations dealt with the need to provide data in a more timely manner and where the quality was indicated. Therefore, a pilot project for a "global thermal database" was highly recommended. Since that time, there have been several meetings and a schedule developed for implementation of the pilot project. The latest meeting on implementation was held 15-16 January immediately preceding IODE-XIII and will be reported under Agenda item 5.2.
- (viii) Finally, several recommendations were made regarding a Workshop on Ocean Climate Data Management as discussed above.

88 The Committee noted with satisfaction the work of the Group and agreed with the proposal of the Chairman to organize the next meeting of the Group in late 1991, in order to enable concentrated efforts during the intersessional period on the planning and implementation of the GTSP and preparation for the Ocean Climate Data Workshop provisionally scheduled for September 1991. The Committee also agreed that the Group give particular attention at its next meeting to the data needs for the ocean component of IGBP, together with ocean data management activities within TOGA, WOCE and JGOFS.

89 The Committee adopted Recommendation IODE-XIII.3.

90 The Committee considered the Executive Summary of the Task Team on Marine Biological Data, submitted by Prof. S. Van der Spoel, the Chairman of the Task Team (Document IOC/IODE-XIII/10). The Report of the Task Team on Marine Biological Data for the period 1988/1989 was also available to the participants of the Session as Document IOC/IODE-XIII/Inf.1.

91 The Task Team had worked by correspondence during the intersessional period which included the evaluation of questionnaires on this topic, which had been distributed to a small sample of 200 marine biologists and NODCs.

92 The response to the inquiries by the Task Team established that, in general, marine biological data exchange was not well developed nor had a real need for such exchange been identified up to this date (Document IOC/IODE-XIII/Inf.1). The majority of exchanged data are in the field of ecology, biogeography and secondary production collected by plankton nets, CTD and water samplers.

93 The Committee noted, however, that the Task Team had not addressed their questionnaire to a representative selection of marine biologists and data centres. For example, the Committee was informed that biological data exchange has been undertaken very actively for a number of years in the Baltic Monitoring Programme of HELCOM, in close co-operation with ICES. Furthermore, a number of developments, especially with regard to the exchange of biological data in certain marine pollution monitoring programmes, were being very actively pursued by a number of countries.

94 The Committee received with thanks the report on the activities of the Biomass data centre, submitted by Mr. B. Lamden (Document IOC/IODE-XIII/13). The report indicates that the data holdings of the Biomass Centre include: oceanography, acoustic (krill distribution and abundance), net hauls, ichthyoplankton, zooplankton and visual observations - meteorology collected during the period 1980-1985. Extensive data transfer formats specific to Biomass data were derived for transferring data from contributors to the Data Centre. No use has yet been made of standard formats, e.g., GF3. There is not yet free access to data within the Biomass community and data are not available to outside bodies. Further work on the datasets is planned by the Biomass Executive, and a formal end of project colloquium is to be held in September 1991. The Committee expressed the hope that there would be improved collaboration with WDCs in the future.

95 The Committee then considered the recommendations of the Task Team as given in the report. The Committee agreed that the Task Team should continue its work in view of the growing interest in the exchange of marine biological data in the JGOFS and IGBP and OSLR programmes. The Committee also supported the proposal to expand the composition of the Task Team and requested the Secretary IOC to approach NODCs to designate specialists in marine biology to the membership of the Task Team. The Committee recommended that the work of the Task Team be organized in future in close co-ordination with the GETADE and relevant bodies of JGOFS, IGBP and the OSLR and BIOMASS programmes. The Committee also agreed that the Task Team in co-operation with the GETADE and interested national institutions consider the development of a pilot project for GF3 formatting of Biomass and Chlorophyll data and give special attention to standardization in taxonomy, biogeography and ecology and to development of inventories of the sources of marine biological data.

4. NEW DATA TYPES AND PROCESSING

96 The Chairman listed four data types which are not yet traditionally incorporated into many IODE archives:

- (i) Acoustic Doppler Current Profile (ADCP) Data,
- (ii) Data from Radar Backscatter instruments, CODAR,
- (iii) Data from undulating recorders (such as Batfish/Delphin/SeaSoar), and
- (iv) Remotely sensed data.

97 The technology is rapidly evolving to produce and market equipment which collects tremendous volumes of data every minute, creating major data management questions.

98 The Committee considered the offer of Japan to serve as a RNODC for the Development of ADCP Data Management. Japan presently has about 100 research vessels collecting this data. The Committee adopted Resolution IODE-XIII.2 concerning the RNODC, and the Terms of Reference contained therein. The Committee also agreed that it should review in 2-3 years the state-of-the-art in exchanging ADCP data, including the results of analyses performed by the new Japanese RNODC on aspects such as formats, equipment inter-comparisons, data quality control and data reduction.

99 The Committee discussed data collected by equipment such as over-the-horizon radar and CODAR for which formats and standards have not been developed. These instruments provide surface current data over broad areas at distances of tens to hundreds of kilometers. The Committee requested the Secretary IOC to write to National Co-ordinators for IODE asking for an inventory of CODAR data holdings. A compilation of responses will be appropriate for inclusion in MEDI files. It was pointed out that some CODAR data sets may be recorded on ROSCOP forms.

100 The Committee debated the proposal that a group should be appointed to develop a strategy for incorporating each new data type as the need for data management becomes apparent. It was noted that IODE has standard procedures for a range of so-called routine or standard data types, but the rate of growth of data volumes is now much more rapid in the non-standard data types. Each time a new high-data-rate instrument was introduced, the same sequence of events tended to result. There was a need to catalog existing data holdings in institutes and NODCs and then to compare practices and procedures which were developed while the instrument was still in prototype. Next there was a phase when an expert scientific group, e.g., established through SCOR, ICES or IOC was needed so as to assess the scientific requirements in data calibration, data reduction, etc., after which it became possible for IODE to consider standard quality control procedures and data reduction, archiving and exchange. Interaction was required between different organizations at each phase of the process.

- 101 **The Committee decided** that no new group was needed at this stage to develop such a strategy, but **recommended** that future mechanisms for dealing with new data-types should be discussed at the next meeting of IODE Officers.
- 102 The Committee addressed the question of data from undulating recorders, noting that more information is needed on the amount of data now being collected, and available for international exchange. **The Committee felt** a responsibility to consider relevant data management needs, in consultation with the scientific community. Presently six countries are operating such recorders - Australia, Canada, FRG, Japan, UK, and USA. Certain types of recorders sample at a rate of 32 data cycles per second, creating daunting questions concerning data compression, reduction, and archival. However, such questions must be resolved prior to addressing data exchange, and IODE must anticipate requests for data exchange, particularly due to the importance of some of these data to major international research programmes. **The Committee requested** the Group of Experts on Technical Aspects of Data Exchange to determine the types of data now being collected and available for exchange.
- 103 **The Committee noted with satisfaction** that the forthcoming meeting of the ICES Working Group on Marine Data Management (Sopot, Poland, April 1990) will address data management issues related to ADCP and SeaSoar type data. The ICES Working Group activity had been initiated by an earlier ICES Seminar on shelf seas use of CTDs which had identified an urgent need to address data management questions in relation to these new data types. Thus in order to avoid duplicating the work of the ICES Working Group, the ICES Hydrographer agreed to ensure that this interest is noted by the Group, including the need to have close contact with non-ICES members of the IODE community (e.g. JODC for ADCP data). Since the reports of this ICES Working Group are routinely made available to IOC, the Secretary IOC should ensure that forthcoming reports are brought to the attention of GETADE.
- 104 The GETADE was requested to prepare a report on these issues in consultation with ICES for consideration by IODE-XIV.
- 105 On behalf of the Chairman of the Task Team on Remotely Sensed Oceanographic Data, Mr. P. Geerders presented the report of the meeting of this Task Team, De Bilt, The Netherlands, 5-9 December 1988 (Document IOC/INF-788). The most important problems addressed by the Task Team were: the lack of specific training and education opportunities on Remote Sensing of the marine environment; the lack of compatibility between the satellite data products from different centres; and the absence of a standard format for oceanographic satellite data products, compatible with recognized formats in the IODE community.
- 106 The Committee considered the recommendations made by the Task Team. Several delegates voiced their concern about a possibly too deep involvement with the scientific aspects of the interpretation of Remote Sensing data. Only when such data has been reduced to 'oceanographic units' and is presented as a data product e.g., in the form of contours, can data management on the basis of the existing GF3 subset for contoured data then take place.
- 107 **The Committee invited** the Task Team to realize, in the form of a demonstration, the proposed digital global SST data product, based upon the integration of satellite and *in situ* data, in GF3 format; close interaction with the GETADE was recommended in this exercise. The need for close collaboration and interaction with the appropriate bodies of WMO in general and IGOSS in particular was emphasized. Relevant forthcoming meetings were described, including a Workshop on IGOSS Products in Japan, 1991 and a recently established Joint IGOSS-CMM Group of Experts on Remote Sensing. **The Committee believed** that Remote Sensing is becoming increasingly relevant for its work and recommended that a general strategy for this type of data, analogous to other new types of data, should be developed by the Task Team.
- 108 The following NODCs confirmed that they are handling Remote Sensing data already : Brazil, Canada, Chile, People's Republic of China, France, FRG, Sweden, UK, and the USA. The NODCs in Brazil, People's Republic of China, France, FRG, Norway, UK, USA, as well as ICES regularly refer users to Remote Sensing data holding centres. In Japan, India, and the USSR, there is a strict separation between the agencies handling Remote Sensing data and those handling *in situ* oceanographic data.
- 109 **The Committee agreed** on the relevance of the work proposed by the Task Team, especially in the fields of training and education and of information provision, in view of the demands made for Remote Sensing data of the oceans, by the various global ocean related programmes, and the many groups who could benefit from simplified access to the data and data products.

110 The Committee took note of the fact that the participants in the Task Team meeting in De Bilt had agreed to provide their active support to the realization of the required actions defined. A statement of support had also been received from the USSR.

111 The Committee decided to continue the Task Team on Remotely Sensed Oceanographic Data with revised Terms of Reference.

112 The Committee adopted Resolution IODE-XIII.3

5. DATA PRODUCTS AND SERVICES

5.1 PRODUCTS AND SERVICES OF WDCs (OCEANOGRAPHY), RNODCs, NODCs, and DNAs

113 The Committee received reports, contained in Documents IOC/IODE-XIII/7 and 9 from the three World Data Centres, from RNODCs for CARIPOL, Drifting Buoy Data, FOY, IGOSS, SOC, Wave Data and WESTPAC, and from NODCs in Argentina, Australia, Brazil, Canada, China, France, FRG, India, Italy, Japan, Norway, Sweden, UK, USA and USSR on activities, products, and services. Reports were also received from the Commission of the European Communities, ICES, SCAR and SOPAC.

114 In presenting the report of the RNODC-SOC, the Delegate for Argentina offered the services of the NODC covering the South West Atlantic and the RNODC for Southern Oceans south of 50 degrees in the form of elaborated products: diagrams; profiles; isolines; three-dimensional profiles; etc., and through the annual reports of RNODC/SOC and the data catalogue of the NODCs. He also noted a reduction in the amount of data received by this centre during the intersessional period and requested that appropriate Member States submit data to this RNODC.

115 The representative of the RNODC for WESTPAC expressed concern over delays in receiving data from the WESTPAC region, and the Committee endorsed his request that regional Member States expedite transfer of data to the centre.

116 The Committee expressed its appreciation for the work done by the Task Team on Oceanographic Data Quality Control under the leadership of Dr. V. Lamanov of the USSR to draft a Manual of Data Quality Control Algorithms and Procedures (Document IOC/IODE-XIII/Inf.7). The Committee requested that the Task Team should continue its efforts to finalize this manual. It was agreed that in completion of the Manual, the Task Team should take into account the Quality Control Manuals at present developed for the TOGA Subsurface Data Centre and the planned GTSP. These documents would add to the list of algorithms covered by the Manual. The Manual should be advisory and consultative rather than mandatory, and draw attention to mandatory documents developed for specific programmes. The Committee requested the Secretary IOC to undertake publication of the Manual on Marine Data Quality Control when finalized.

117 The Committee heard descriptions of present products and services, such as CD-ROMs containing entire data bases, that reflect the technological revolution that has taken place virtually during the last intersessional period. Beneficiaries will include developing country Member States. For example, the USA announced the availability in July 1989 of a CD-ROM containing over 1.3 million temperature and salinity profiles taken in the Pacific Ocean between 1900 and 1988. WDC-A (Oceanography) has compiled inventories of oceanographic station data and CTD/STD data from programmes that did repetitive sampling over long periods at the same location. Data sets will be available on magnetic tape and later on CD-ROM. India has published two volumes of an atlas, one of oceanographic data from its EEZ and one containing the mechanical bathythermograph data base. The representative of the WMO noted the availability of the IGOSS Information Services Bulletin which is distributed annually and contains a comprehensive listing of IGOSS surface and sub-surface products.

118 The Committee received a Report on the work of the Task Team for Data Centre Services and Products. It was noted that development of the Argos Data Analysis and Presentation System by experts from the USSR and the Ocean CLICOM proposed by the USA had many points in common (see Agenda Item 8). The Committee accepted the offer of the USSR to continue to chair this Group and agreed to appoint Dr. Y.F. Syrov as Chairman of the Group.

119 In response to requests by Greece and the USSR, the Committee requested that Member States holding data from the Mediterranean Alpine Experiment (MEDALPEX) expedite transfer of these data to the RNODC for MEDALPEX. It was noted that the RNODC for MEDALPEX Sea-Level Data had completed its work and transferred the data to the WDCs.

120 The Committee welcomed the proposal to extend the RNODC-MEDALPEX responsibilities to cover other scientific experiments carried out by the IOC in the region. The scientific and technical potential of the centre as well as the experience gained in the implementation of CIM and MEDALPEX data management plans were specially noted. The Committee requested the Chairman and the Secretary IOC to consider the proposal in accordance with existing procedures for RNODC selection and accreditation.

121 Dr. M.T. Jones reported on work at BODC in producing an international inventory of moored current meter data (Document IOC/IODE-XIII/18). In October 1989, BODC issued a PC-based version of the inventory cataloging moored current meter data collected by laboratories in Europe and North America. It is available on floppy disk together with a user-friendly, menu-driven interface which enables inventory information on 25,000 data series to be selected, browsed, listed, plotted or manipulated at leisure on the user's own PC. The inventory was developed in the ICES community and contains entries from Belgium, Canada, FRG, Finland, France, Greece, Netherlands, Norway, Portugal, Sweden, UK and the USA. Funding for the software was provided by the Commission of European Communities.

122 A 12-page brochure describing the inventory and its software interface was distributed at the Session. The minimum requirement for running the system is an IBM PC or true compatible running DOS Version 3.0 or later, with 640kb RAM, a hard disk (1.3Mb free before installation) and EGA display. Given these requirements and a means of reading 3.5 or 5.25 inch floppy disks, installation on the user's own PC is very simple. Dr. Jones offered to make copies of the inventory and software available on request, free of charge, to members of IODE.

123 Dr. Jones invited other Member countries of IODE to participate in the inventory and welcomed offers of assistance in this matter from Australia, Argentina, Brazil, Chile, India, Indonesia, Japan, USSR and Yugoslavia.

124 The Committee welcomed the initiative taken by BODC in developing the international inventory and considered the system a useful example of how information could be easily disseminated with modern technology.

5.2 GLOBAL TEMPERATURE-SALINITY PILOT PROJECT (GTSP)

125 The Committee considered the report and recommendations of the Workshop on GTSP, (New York, USA, 15-16 January 1990) and the GTSP Project Proposal presented by Mr. G. Withee, Chairman of the Workshop (Documents IOC/IODE-XIII/12 Add.1 and IOC/IODE-XIII/12).

126 Mr. Withee first summarized the history of the project. The proposal to initiate the GTSP as a joint IODE-IGOSS project was made by the Group of Experts on Climate Data Services and RNODC at its meeting in February 1988 in order to promote, improve and standardize the temperature-salinity data management mechanisms which presently exist in both the IODE and IGOSS systems and to improve the support of IODE and IGOSS to Climate programmes, including TOGA, WOCE and JGOFS.

127 This initiative was supported by the Joint IOC-WMO Committee on IGOSS at its Fifth Session (Recommendation 4, JC-IGOSS-V and welcomed by the IOC Assembly, at its Fifteenth Session, July 1989. Two consultative meetings on GTSP were organized in Washington (January 1989) and Ottawa (July 1989) in order to formulate the plan and implementation programme of the project (Documents IOC-WMO/IODE-IGOSS-GTSP-1 and IOC-WMO/IODE-IGOSS-GTSP-2).

128 The Workshop was attended by some 40 participants from 13 countries and representatives of WMO, ICES, IGOSS, TOGA and WOCE. The Workshop reviewed the objectives and goals of the GTSP; its interfaces with existing programmes such as IGOSS, IODE, TOGA and WOCE; scientific requirements and participation; project elements (including real-time, delayed made and historical data); data and information strategy; implementation of the project and its management. Particular attention was given to consideration of the drafts of the Project Plan and the Quality Control Manual.

129 The GTSP is intended to develop the basis for a data management system, able to serve the requirements of present and future global science programmes as well as of various other marine-related users. Its immediate task will be to create a timely and complete data and information base of ocean temperature and salinity data in support of the World Climate Research Programme and of national requirements as well as to improve the performance of the IODE and IGOSS data exchange systems.

130 The Committee noted that the GTSP would :

- (i) increase the awareness of the IODE, its services and benefits;
- (ii) improve the data flow into IODE with particular reference to the timeliness of data submission;
- (iii) provide a quality data set to the user community to assist with climatic and other global research projects; and
- (iv) develop a continuously up-dated data base which would improve the quality of the global data set and stimulate data flow.

131 The Committee endorsed the recommendation of the Workshop on the implementation of the GTSP beginning from 1990 and recommended that IOC and WMO approve its implementation as an IODE-IGOSS project, consider providing support required for its co-ordination and management, and encourage the participation of Member States.

132 The Committee adopted Recommendation IODE-XIII.4

5.3 INTEGRATED GLOBAL OCEAN SERVICES SYSTEM (IGOSS)

133 The Chairman of the IOC-WMO Joint Working Committee for IGOSS, Dr. Y. Tourre, presented a report on IGOSS activities. The Fifth Session of this Committee developed resolutions and recommendations to advance the concept of a global ocean watch. IGOSS-sponsored efforts are being implemented that reflect the needs of various national, regional, and international programmes. Improved data bases and products are being made available in real-time, and value-added applications are many. The Third IGOSS Ship-of-Opportunity Meeting in Hamburg, FRG, in October 1989 identified new lines being implemented for collection of these data. The French Specialized Oceanographic Centre plans to participate in preparing an IGOSS Products Bulletin to be distributed regularly for a more efficient dissemination of products. The draft will be presented at the Workshop on IGOSS Products which is planned to be held in Tokyo, Japan, in April 1991.

134 In reference to a recommendation made at IGOSS-V and confirmed at IOC-XV, to establish a Joint IGOSS-IODE Task Team, the Committee noted a number of activities which have been undertaken jointly, such as two meetings on IGOSS-IODE data flow, the Global Temperature-Salinity Pilot Project, and the USA-sponsored Joint Environmental Data Analysis Centre described under Item 3.1 above. The Committee agreed that a report on the GTSP should be presented at the Workshop on IGOSS products. The Committee encouraged Member States to undertake additional similar activities at the national or international level. In view of the level of present and future collaborative efforts, the Committee felt that the creation of a Task Team was unnecessary and noted the desirability of holding a joint meeting of the IGOSS Group of Experts on Operations and Technical Applications and the IODE Group of Experts on Technical Aspects of Data Exchange in lieu of a new Task Team. The Committee also noted that advances in data management are rapidly reaching a point where a convergence of real-time and delayed mode data will soon be a reality, emphasizing the critical importance of close ongoing relationships between IGOSS and IODE. The possibility of a Joint Task Team is not excluded as a future option.

135 The Committee adopted Resolution IODE-XIII.4

6. IODE DEVELOPMENT OF TECHNOLOGY AND SYSTEMS

- 136 The Committee noted that the role of ROSCOP had been raised under Agenda item 2.1 and that Recommendation IODE-XIII.1 refers to this system. It considered revision of the ROSCOP Form (Document IOC/IODE-XIII/14 Add.). The Chairman of the Group of Experts on Technical Aspects of Data Exchange, Dr. M.T. Jones, introduced a fourth draft revision of the form, produced jointly with the ICES Hydrographer, following the recommendations of the Fourth Session of GETADE, Ottawa, Canada, 11-15 July 1988, and following consultations with other IODE experts. He highlighted the urgent need to approve a revised ROSCOP form that chief scientists of cruises would find useful and convenient to fill in, and that would give users easy to understand information on what data are being collected.
- 137 The Committee approved the revised form as amended by a Sessional Working Group and requested the ICES Hydrographer and Chairman GETADE to finalize the ROSCOP Data Type Code as a matter of urgency. The Committee requested the Secretary IOC to ensure rapid publication and distribution of the revised form in the four official languages of the Commission. The new form will be called the "Cruise Summary Report (ROSCOP)" or ROSCOP III and will include a note explaining its relation to ROSCOP Second Edition (ROSCOP II). Member States should be encouraged to change over from ROSCOP II to ROSCOP III for cruises completed after 1 January 1991, but a transitional period covering cruises ending from 1 January 1990 to 31 December 1991 will be found acceptable.
- 138 The Committee recommended that Chief Scientists (or appropriate ships officers) should be requested to complete the Cruise Summary Report just before returning to port, and to submit it to the appropriate collating centre (data centre) within one month of the completion of the cruise at the latest. Collating centres should forward the completed form to regional and World Data Centres with minimal delay.
- 139 The Committee requested GETADE to consider the computerization of the ROSCOP system at its next meeting and to examine the possibility of making track chart information available in digital form. In the meantime, the Committee encouraged scientists to evaluate the ROSIN form filling technique available on diskette from the ICES Hydrographer. The Committee stressed the important role of the new form as a first stage to an international data tracking system and for disseminating vital information to the scientific community and requested GETADE to develop these aspects further. The representatives of ICES and the Federal Republic of Germany informed the Committee that they had already developed similar systems and offered to help GETADE in this work.
- 140 The Committee expressed its sincere thanks to the Chairman and Members of GETADE, and the Hydrographer, ICES, for their successful efforts in preparation of the form.
- 141 The Chairman of the GETADE introduced his report IOC/IODE-XIII/10 Annex. The Group of Experts held its Fourth Session in Ottawa, Canada, on 11-15 July 1988 (see Document IOC/GETADE-IV/3). The main topics considered were:
- (i) Development and promotion of the GF3 system
 - (ii) Review of the ROSCOP system
 - (iii) Implications for IODE of recent advances in computer technology and global ocean science programmes
 - (iv) Training and Mutual Assistance.
- 142 The Chairman GETADE noted that Standard GF3 subsets have been approved for: Water bottle, CTD and BT data; TOGA subsurface thermal data; moored current meter data; mean sea level data; drifting buoy data; digital wave records, wave height/wave period data, wave spectra and directional wave spectra; non-real time exchange of BATHY/TESAC, DRIBU and TRACKOB reports; and digitized contour maps.
- 143 Standard subsets under development include multi-beam echo sounder data, underway geophysics data, *in situ* sea level recorders, moored thermistor chains, and the WMO synoptic ship meteorology reporting form.

- 144 During the intersessional period the British Oceanographic Data Centre (BODC) issued the level 4 release of GF3-Proc - a highly tuned version of GF3-Proc tailored for use with Fortran 77 compilers running on machines with ASCII or EBCDIC as their internal code. This version has been fully tested and has been on general release for more than 2 years. Copies of the GF3-Proc software and its supporting documentation have been distributed by BODC to 47 laboratories in 21 different countries including Argentina, Belgium, Canada, China, Denmark, Fiji, France, FRG, India, Ireland, Italy, Japan, Kenya, Netherlands, Portugal, Spain, Trinidad, UK, USA, USSR, and Yugoslavia.
- 145 Full documentation for GF3 and GF3-Proc is being published in IOC Manuals and Guides No. 17 in six separate volumes under the title 'GF3 - A General Formatting System for Geo-Referenced Data': Vol.1: 'Introductory Guide to the GF3 Formatting System'; Vol.2: 'Technical Description of the GF3 Format and Code Tables'; Vol.3: 'Standard Subsets of the GF3 Format'; Vol.4: 'User Guide to the GF3-Proc Software'; Vol.5: 'Reference Manual for the GF3-Proc Software'; Vol.6: 'Quick Reference Sheets for GF3 and GF3-Proc'.
- 146 To date, Volumes 2, 4 and 6 have been published by IOC, while Volume 5 is available in pre-publication form from BODC. Documentation is also available from BODC on the GF3 Standard Subsets agreed thus far. A simple brochure is also available for use in promoting GF3.
- 147 Consideration has been given to allowing binary data to be included within GF3 for use with special purpose high volume data sets where the character nature of GF3 is thought to be inhibitive, i.e., inefficient in terms of storage medium utilization. Two almost identical solutions have been proposed by the UK and USSR to enable binary data to be stored in GF3 Data Cycle Records. The implementation of the GF3 binary option awaits resources (about 2 man months programming effort) becoming available at BODC to undertake the necessary modifications to GF3-Proc. BODC hopes to schedule this work in Summer 1990.
- 148 The GETADE anticipates that magnetic tape will continue as an important medium for data exchange at an international level for many years to come and that GF3 will continue as an appropriate standard. However, GETADE clearly recognizes the need for GF3 to evolve for efficient use on PCs and for exchange using diskettes and over computer networks. Although GF3-Proc has been used successfully on PCs, there is a requirement for a free-format version of GF3 that can be used by the non-programmer. In essence this means creating a version unlocked from the 1920 byte fixed record size and allowing for data in comma delimited fields. This would also be more suited for exchange over computer networks.
- 149 A prototype development of a free-format version of GF3 has been produced by the JGOFS Working Group on Data Management at Bedford Institute of Oceanography in September 1988. The requirements and specifications of the format may be found in the report of the meeting published by SCOR. The format was based on a proposal by G. Flierl but adapted so as to provide compatibility with GF3. It will be reviewed in late 1990 in the light of the experience gained during the JGOFS North Atlantic Pilot Study. However, even at this stage, it appears that the JGOFS format will provide an excellent basis for the development of a free format version of GF3, suitable for use on PCs and over computer networks. The JGOFS provisional format was found to be easy to use during student exercises at the IOC-Unesco Training Course on the Use of Microcomputers for Oceanographic Data Management held in Bangkok in early 1989.
- 150 In May 1989, the Chairman of GETADE met with the Chairman of the IGOSS Group of Experts on Operations and Technical Applications, Mr. D.R. McLain, and with Mr. J.K. Gibson (European Centre for Medium-Range Weather Forecasts) - the expert on the WMO FM 94 BUFR format. The aim of the meeting was to discuss the compatibility of formats in use in IOC and WMO for data exchange, in particular GF3, BUFR and the IGOSS Flexible Code. It was agreed that a look-up/translation table should be maintained between the parameter code tables associated with each format so as to facilitate the conversion of data between the formats.

- 151 The Chairman concluded by noting that many of the activities of GETADE, over the past decade, have concentrated on the development of standards (i.e., GF3) to facilitate the exchange of data between mainframe computers through the medium of magnetic tape. Although this approach to international data management will continue to play an important role in coming years, it is clearly recognized that other approaches will also need to be considered. For example, the publication of major databases on CD-ROM, supported by user-friendly application software on floppy disk for use on PCs, has opened up a whole new range of exciting possibilities for disseminating data to the user's desk top. No longer is it essential for the prospective user of data to need the support of a mainframe programmer. The advent of personal computer technologies (both in hardware and software), computer networks and powerful workstations offers new opportunities for the management and exchange of ocean data, particularly in the context of developing nations and the small user.
- 152 The Committee recommended that GETADE in the next intersessional period address the following issues and that the IOC Secretariat provide support for related actions:
- (i) Incorporation of binary data in GF3 with supporting software preparation. The Committee recommended that GF3 binary data should be restricted to use through GF3-Proc so as to ensure proper standardization.
 - (ii) Preparation and Publication of the remaining volumes in IOC Manuals & Guides No. 17.
 - (iii) Evaluation of the JGOFS format and development of a free format version of GF3 suitable for use on microcomputers by non-programmers. Consideration should also be given to the use of such a format for environmental quality and biological data.
 - (iv) Collaboration with the IGOSS GE/OTA with a view to identifying and developing common areas of interest, improving the effectiveness of data exchange between the IGOSS and IODE systems, and continually reviewing the link between the GF3 and the BUFR formats.
 - (v) Evaluate the demands on the IODE for new technical solutions, particularly with reference to the requirements expressed by the Ocean Climate Data Workshop.
- 153 The Committee further recommended that GETADE should hold two sessions in the next IODE intersessional period. The first addressing item (iv) above should overlap with the Session of the IGOSS Group of Experts on OTA. The second should be held at the time of the Ocean Climate Data Workshop to address item (v).

7. MARINE INFORMATION MANAGEMENT

- 154 The Chairman of the Group of Experts on Marine Information Management, Dr. J. Caponio, first expressed his appreciation to those who had helped build ASFIS/ASFA to its present stature as an information system comparable in quality and professionalism to those in other larger disciplines. He highlighted the importance both to global science programmes, and to developing countries of a strategic view embracing both information and data and commended the draft document, "A Strategy for the International Aquatic Sciences and Fisheries Information System" prepared by FAO for the ASFIS sponsors (Document IOC/IODE-XIII/Inf.17).
- 155 The Representative of FAO expressed thanks to IOC, especially the Secretary, for the support to the production of ASFA commenced in 1989, which is allowing the greatest number of abstracts ever to be published in 1990, and the publication of new abstract journals covering pollution and marine biotechnology. He also noted the potential for co-operation between the ASFIS sponsors and nongovernmental Associations of Marine Science Libraries and Information Centres.
- 156 The Delegate of China thanked FAO for the help they had given to establish IMSTI as an active ASFA input centre, and noted that 50 participants at two courses had received national ASFA training. The Committee referred the generous offer to hold an international ASFA Training Course at IMSTI during the next intersessional period to the Secretariat for evaluation and possible follow-up.
- 157 The Delegate of the USSR informed the Committee that his country had experience in the field and wished to contribute actively to international activities, including MEDI, and to ASFIS by acting as a Regional ASFIS Centre for Eastern Europe.

- 158 The Committee noted the possible role of marine technology exhibition catalogues as a useful information source for inclusion in the ASFIS strategy draft document.
- 159 The Committee requested the Secretary IOC to pursue appropriate links with the UNEP INFOTERRA system.
- 160 The Committee in general favoured endorsement of the draft document, "A Strategy for the International Aquatic Sciences and Fisheries Information System" (Document IOC/IODE-XIII/Inf.17) but recognized that time should be given for more detailed study and formal clearance by Member States and the IOC and UN Secretariats. The Committee agreed that any Member State wishing to do so should submit comments to the Secretary IOC by 20 February 1990.
- 161 The IOC Assembly at its Fifteenth Session invited the FAO and the UN to jointly sponsor an Advisory Body for ASFIS (Document SC/MD/91, para. 194). The Committee welcomed the proposal of the Representative of FAO to hold a jointly sponsored ad hoc expert consultation in 1990 to determine the Terms of Reference and working arrangements for the Group.
- 162 The Committee adopted Recommendation IODE-XIII.5.
- 163 The Committee noted that, at the Twelfth Session of the IODE Committee, the status of marine information management in the IODE activities was considerably upgraded. This type of activity needs special arrangements and structure. As of today this work is being carried out at the national level by different institutions and organizations. There is also a large number of international systems involved in the same activity, e.g. ASFIS, INFOTERRA, etc.
- 164 Taking this into account, and the fact that a large gap exists in analysis and synthesis of marine information, the Delegate from the USSR introduced the possibility of establishing an International Global Centre on Marine Information under the auspices of the United Nations. This Centre could be involved in assessment, synthesis and analysis of information from relevant international organizations of the UN system, as well as others, including non-governmental international organizations, national centres and institutions tackling the problems of sea research and exploitation.
- 165 The Centre could publish a reporting series in special fields of research and information management or journals with the aim of knowledge and information dissemination in the field of marine sciences. Finally, the Centre could be involved in training activities for experts from developing countries. The activities of such a Centre could play an important role in the development of well-thought out and scientifically correct approaches by the international community to the use of the World Ocean in the interests of all mankind.
- 166 This idea raised an extensive discussion which reflected great interest in possible ways to improve existing systems for exchange and analysis of marine information. The Committee recognized that an issue like this is not for the near future but that it may become an important element of information management by the year 2000.
- 167 The Committee fully agreed on the importance of good information channels in avoiding scientific duplication and managing the oceans and ocean science well. It noted that this view was frequently put forward by IOC Regional Bodies.
- 168 The Committee accepted the offer of the Soviet Union to formulate the idea in a more detailed way, taking into account comments made at the Session and to pass it for consideration to the next session of the Group of Experts on MIM. The findings of the Group may later be presented to the IODE Committee and international organizations involved in marine information management to seek advice on further actions needed.
- 169 In this context the Committee also requested the Group of Experts on Marine Information Management to take a comprehensive view of all ocean information activities, including their links to data services, and to identify long-term marine information requirements for global research and for practical applications in scientific programmes. The review should define what improved information services or new links are needed in order to achieve increased integration and coverage of IODE systems and services.

170 The Chairman of the Group of Experts on MIM introduced the draft of the Introductory Manual on Marine Information Centre Development prepared by Mr. A. Varley, UK (Document IOC/IODE-XIII/Inf.4). The purpose of the Manual is to explain and put into context the various procedures, activities and products which comprise an information service. The Committee requested the Secretary IOC to circulate the draft to information experts and centres for review and any suggested improvements.

171 The deadline for the submission to IOC of comments and suggested improvements will be 1 May 1990. The final draft would then be prepared, with the intention of publishing the document in the IOC Manuals and Guides series by the end of 1990.

172 In considering Document IOC/IODE-XIII/17, 'Proposal on Preparation of Directories of Marine Scientists and Institutions', the Committee recognized that directories of marine scientists and institutions are a useful tool and recommended that data collection for them should focus on building and then continually updating a central database rather than on a one-off exercise to prepare a specific product. The information in the database will form a resource that will be disseminated to users by a variety of means. The Committee recommended the following workplan be implemented through the co-operation of interested Member States:

- (i) develop progressively a network of volunteers and collaborating organizations, willing and able to obtain and transmit data for their institution, country, region or specialty;
- (ii) collect data region by region (or by sub-regions), wherever possible in collaboration with IOC Regional Bodies and other organizations interested, giving timely regional products as a spin-off, commencing with pilot exercises in two regions;
- (iii) make maximum use of information already available, including existing directories, mailing lists and the author fields of the ASFA database;
- (iv) wherever possible ask institutions to check and update existing information every 1-2 years, and encourage input on computer media;
- (v) make the database entries available on diskette in several formats. Note however that the full global database will be too big to be easily issued on diskette;
- (vi) encourage online information services to mount the data, subject to agreement on conditions;
- (vii) make the database available in a CD-ROM format supported by CDS/ISIS possibly combined with other marine information products. The possibility of a version for use with CSA software should be explored;
- (viii) in spite of the development of various other product forms such as microforms, computer disk, tape and CD-ROM, users, particularly in third world countries, always prefer the printed product because of its long tradition, history and ease of use. Publication of a printed version of the International Directory of Marine Scientists is therefore essential. It can be either a commercial publication with the UN agencies purchasing copies for developing countries, or a free UN system publication perhaps issued in association with a Member State able to provide low-cost production;
- (ix) the database approach, combined with desk-top publishing, will allow production of selective print products such as an Institutions address list, regional directories and directories of specialists in particular fields.

The Committee recommended the following initial actions:

- (i) Systematically collect information on existing Directories.
- (ii) Produce and peer review draft design for CDS/ISIS database structure and revised questionnaire for IDMS.
- (iii) Set-up and commence one or two regional pilot exercises, in collaboration with regional interests.
- (iv) Prepare a global implementation plan with cost and time estimates.

173 **The Committee recognized** that other practical issues of ASFIS development, including document delivery systems and the preparation of standard software packages for ASFIS centre operations, also need to be tackled and referred these items to the Group of Experts on Marine Information Management, which should therefore meet in 1990.

174 Dr. J. Caponio, Chairman of the IODE Group of Experts on MIM, informed the Committee that he would not be able to continue his work as the Chairman of the Group. **The Committee expressed** its appreciation and thanks to Dr. Caponio for his almost 15 year active participation in this activity of the Committee and great personal contribution to the development of Marine Information Management programmes.

8. **REGIONAL PROGRAMMES AND TRAINING AND MUTUAL ASSISTANCE ACTIVITIES IN MARINE INFORMATION AND DATA MANAGEMENT**

175 Documents IOC/IODE-XIII/11, IOC/IODE-XIII/16, and IOC/IODE-XIII/Inf.10 contain information relevant to this agenda item. The Committee noted that, with minimal funding and substantial assistance from IOC Member States, much has been accomplished during the intersessional period.

176 Dr. V.I. Smirnov, Vice-Chairman of the Committee, presented a summary of courses undertaken and expressed appreciation on behalf of the Committee to Argentina, Belgium, Canada, FRG, Japan, Thailand, Turkey, USSR, UK and the USA for hosting courses or giving other TEMA support during the intersessional period.

177 **The Committee gratefully acknowledged** the help given by the staff of the IOC/TEMA unit in organizing certain of these activities.

178 Dr. Smirnov reported on the course on GF3 to be held in the USSR in May 1990, and offered to hold a marine data and information course and to provide additional short individual training in data management. Additionally, WDC-B offered to hold field courses in marine geological and geophysical data collection and management methods in 1991.

179 The Delegate of China expressed special appreciation for the contribution that the JODC has made over many years through its annual WESTPAC Data Management Training Course. China also offered to hold two courses during the next intersessional period in marine information management and in oceanographic data processing.

180 Greece renewed its offer to host a GF3 Workshop for the Eastern Mediterranean.

181 Argentina offered to provide further individual data management and GF3 training for other South American countries.

182 **The Committee noted** also the offer made at the Fifteenth Session of the IOC Assembly by Colombia to host a Training Course for Spanish-speaking countries on how to set up an NODC.

183 **The Committee noted** the need to expand training for developing countries and agreed to accept offers as resources permit, noting also the importance of balancing Training, Education, and Mutual Assistance (TEMA) activities with other IODE work. In addition, courses should be well-planned and focused on training in effective data and information management practices. An option which could be beneficial to developing countries would be an effort to notify them of marine data and information systems already available.

184 **The Committee agreed** that there is a need to prepare standard modules for courses in marine data and information management (Document IOC/IODE-XIII/16). As a first step, **the Committee requested** that the Secretary IOC query those who have organized such courses in the last intersessional period in an effort to assemble sets of training materials. The materials can be reviewed and portions selected which can be reproduced and made available to future organizers.

- 185 The IOC Assistant Secretary, Mr. T. Sankey, outlined the RECOSCIX-WIO (Regional Co-operation in Scientific Information Exchange - Western Indian Ocean) project which had commenced in early 1989 for Ethiopia and seven IOCINCWIO countries: Kenya, Madagascar, Mauritius, Mozambique, Seychelles, Somalia and Tanzania. An IOC Associate Expert, Mr. P. Pissierssens, based at the Kenya Marine and Fisheries Research Institute, Mombasa, has set up a ASFA CD-ROM based bibliographic search service and a document delivery service using photocopies bought mainly from Europe. Future plans include a regional newsletter to be called WINDOW, and the supply of PCs and associated training to co-operating marine science libraries in the region to enable them to build automated library holdings lists. The holdings lists will be combined to form a Western Indian Ocean Library database, WIOLIB, which will be used to share the literature already available in the region. This project forms a pilot exercise for the operation of regional ASFIS networks.
- 186 The Committee noted with appreciation the assistance of Belgium and the USA in supporting the initiation of the RECOSCIX-WIO project, and requested the Secretary IOC to continue to seek adequate funding for its future activities.
- 187 The Delegate of India stated that the Indian NODC has made substantial progress in oceanographic data management and is capable of handling big data bases for the Indian Ocean. The Indian Delegate requested the Committee to provide channels for the flow of oceanographic, marine geological and geophysical data from the Indian Ocean to the Indian NODC through IOC Member States and the WDC system. These databases will be used for the preparation of user-oriented data products and some databases will be transferred to WDC A and B as and when required. The Delegate appealed to Member States to forward Indian Ocean data to his Centre.
- 188 The Delegate of the USSR noted with interest the useful initiative of the NODC of India on the development of oceanographic databases for the Indian Ocean that will include new data on marine geology, geochemistry and geophysics obtained during the Joint Soviet-Indian project "Indocean Geotravers". It includes investigations along sections crossing the Indian Ocean. It is planned to give wide distribution to the project data through WDCs and other centres of the IODE system. The USSR is inviting countries of the region to participate in the expeditions aboard soviet research vessels and in the preparation of joint publications.
- 189 The Committee noted with interest this proposal and recommended that it be brought to the attention of the IOC Executive Council.
- 190 The Committee expressed concern about the difficulties in communication between the seven IOC regional programmes and the Committee, noting that only one Regional Body, the IOC Sub-Commission for the Caribbean and Adjacent Regions (IOCARIBE), had submitted a report to the Session (Document IOC/IODE-XIII/11 Add.). Because of the highly-publicized interest in global climate-related studies, the Committee may not be giving adequate attention to regional-scale issues, such as coastal and near-shore processes. Technology and systems developed to advance global programmes can in many cases be adopted to foster progress in data production and availability on the local and regional level.
- 191 The Committee noted with concern that few IOC regional bodies had RNODCs within their regions. The Committee recommended to establish a regional IODE contact point in each of the IOC regions to facilitate the transfer of IODE information and services to the regions, and instructed the Secretary IOC to identify such contact points by means of an inquiry to each regional body.
- 192 Mr. P. Geerders presented requirements for the development of standard software packages for oceanographic data management (Document IOC/IODE-XIII/16 section 2), suggested by feedback from trainees at a recent IODE Training Course. He highlighted the need to use widely available MS-DOS microcomputers (IBM and compatible PCs), to provide good graphical display facilities and a self-explanatory user interface.
- 193 The Representative of the WMO outlined the WMO CLICOM climate data management system, a PC based system originally developed for historical meteorological climatological records, which has over 140 systems currently running in more than 80 countries. CLICOM combines a defined configuration of commercially available hardware, system software and application packages with additional custom built software, and provides training for users. Although CLICOM was designed for input, quality control and application of data from fixed platforms, tests are currently underway to determine the effort required to adapt CLICOM to handle data from moving platforms.

194 The Delegate of the USA, Dr. W. Schramm, introduced Document IOC/IODE-XIII/Inf.9 "OCEAN CLICOM, A Microcomputer System for Entry and Exchange of Marine Data". NOAA is considering the development of this proposal. It will allow oceanographers to enter observations, quality control the data, analyze and display it and archive the data for local use and exchange. The system will be modelled on the CLICOM system. Initial efforts for OCEAN CLICOM will concentrate on providing customized processing for selected physical oceanographic data types such as subsurface temperature and salinity.

195 The Committee welcomed Dr. Schramm's statement and recognized the benefits of preparing a standardized software system, available to all Member States, integrating the many functions needed for effective oceanographic data management and exchange. This would:

- (i) avoid wasteful duplication of software development;
- (ii) ease the introduction of standardized quality control methods;
- (iii) encourage the use of exchange formats.

196 This could be expected to improve the quality of archived data and to lead to increased data and information exchange.

197 The Committee emphasized the need to provide adequate support for the system in the form of software updates, documentation, updates to it, and training material. Those using the system must be given access to adequate training, synchronized with the provision of any equipment required to operate the package, and assistance in case of problems. Mutual aid on a national or regional basis will help here.

198 The Committee highlighted two key aspects in the generalization of the OCEAN CLICOM proposal:

- (i) PCs are particularly appropriate for processing a relatively low volume of diverse data types, such as is often collected in studies of coastal zones, marine biology, marine chemistry and pollution in both developed and developing countries. With the advent of the SCOR IGOFS, and other oceanographic studies under the umbrella of IGBP, this data will increasingly be of global significance, and OCEAN CLICOM needs to be able to process it;
- (ii) It is important that the format or formats used to store and exchange data in OCEAN CLICOM, are suitable for all data types building on the experience gained with GF3, and the continuing work of the GETADE on format development (see Agenda Item 6, para. 152, point (iii)).

199 Bearing in mind the many applications outside the field of climate, the Committee suggested that the system might be called OCEAN-PC.

200 The Committee emphasized the importance of extensive consultation on the requirements for the system, noting that many Member States had experience of oceanographic data processing on PCs. The Committee took the view that an Expert Consultation is needed to:

- (i) review the initial design studies for OCEAN CLICOM;
- (ii) define requirements for additional data and information capabilities to be developed within the framework of the system;
- (iii) recommend actions needed to carry out the requisite software development;
- (iv) define the equipment and training needed to enable developing country scientists and data specialists to apply the system.

201 The Committee welcomed the provisional offer of the USA to host the meeting.

202 In preparation for the Consultation, the Committee requested the Secretary IOC to approach the IODE National Co-ordinators and ocean scientists working with PCs in developing countries, including participants in recent IODE training courses, for their ideas.

- 203 The Committee pointed out that the planned joint meeting of the IGOSS GE-OTA and the IODE GETADE, and consultations at the time of the Ocean Climate Data Workshop, would provide further opportunities to maintain the momentum of this project.
- 204 **The Committee adopted Recommendation IODE-XIII.4.**
- 205 **The Committee took note** of Document IOC/IODE-XIII/9, containing a contribution on relevant programmes of the Commission of the European Communities (EC). These programmes are: Co-ordination of Information on the Environment (CORINE), Marine Science and Technology (MAST) and Co-operation for Open System Interconnection Networking in Europe (COSINE). The Committee was informed about these and other relevant European programmes and activities in a presentation by Mr. P. Geerders. Besides the EC activities, Mr. Geerders mentioned the ICES Marine Data Management Group's activities, the efforts of European marine and freshwater libraries and information centres, and the possible establishment of an OMNET-Europe.
- 206 **The Committee noted with appreciation** that these programmes and activities aim at strengthening capabilities in the field of marine data and information management and exchange in Europe. **The Committee noted with satisfaction** that during recent years co-operation on a technical level between IOC/IODE and some European agencies involved in marine studies and related fields, in particular oceanographic data and information management, has been very positive.
- 207 Dr. M.T. Jones reported that the BODC had carried out, on behalf of the Commission of European Communities, a feasibility study for a European Ocean Data Applications Network to enhance marine data management and develop high quality data (EODAN) sets of the sea areas around Europe. This was funded by the MAST Supporting Initiatives Programme. An extensive report was compiled reviewing marine data management in each EC country, and assessing the potential of various computing technologies for data dissemination. Copies of the report have been made available to the IOC Secretariat. The work was carried out in close collaboration with national focal points (e.g., NODCs) in Belgium, Denmark, France, FRG, Greece, Ireland, Italy, Netherlands, Portugal, Spain and the UK. It was envisaged that EODAN will complement and strengthen the activities of IOC/IODE in the European Communities. The next step will be the development of a computerized European Directory of Marine Environmental Data Sources designed along the lines of the IODE MEDI system. **The Committee expressed its appreciation** for the progress achieved, and **encouraged** further collaboration between IOC and the EC-MAST Programme.
- 208 Some further steps are needed to establish closer links with the EC programmes CORINE and COSINE, and with the activities of the European marine libraries and documentation centres. Close links already exist with ICES, whose members additionally include many Eastern European and North American countries, mainly through the GETADE.
- 209 The Chairman IODE and the Secretary IOC were requested to consult with the authorities responsible for the implementation of these programmes and activities, with the aim of improving the exchange of information and clarifying the role and position of IODE.
- 210 The Committee felt that European co-operation, in marine data and information management, cannot be complete without active participation of the Member States of all of Europe. **The Committee recommended** that the Secretary IOC study the possibility of hiring a consultant to carry out a concise study of the state of oceanographic data collection and exchange particularly with reference to the Member States in Eastern Europe, and propose mechanisms for improving co-operation between the countries of Europe in this field.
- 211 The Representative of SOPAC informed the Committee on the data management activities within SOPAC. Besides the attention SOPAC island member countries pay to the global climate and sea level changes, or global tectonics and deep seabed mineralization processes, they are daily confronted with management of coastal/nearshore data.
- 212 The task of SOPAC data management in this respect is to provide them with PC based procedures and expertise in managing data sets such as tide gauge records, beach profile measurements, wave rider buoy measurements, nearshore field survey data, water quality control measurements, marine information, etc.

213 The Representative of SOPAC invited the IOC to consider the opportunity of fostering communications and sharing of experiences among regional and national bodies like SOPAC or developing archipelagic nations where a marine data management capability is presently being developed through a variety of unco-ordinated aid programmes, and also between these bodies and advanced organizations in developed countries.

214 The Committee instructed the Secretary IOC to take account of these comments in the planning of TEMA for IODE.

9. WORK PLAN AND PROGRAMME FOR THE NEXT INTERSESSIONAL PERIOD

215 Dr. A. Tolkachev, Senior Assistant Secretary IOC, presented the Draft IODE Work Plan for 1990-1991 and Proposed IODE Strategy for the Period 1990-1995 (Document IOC/IODE-XIII/8), prepared by the IOC Secretariat in consultation with the Chairman of the Committee. He also referred to the decisions of the IOC Assembly at its Fifteenth Session related to this matter, in particular resolution XV-10 "IOC contribution to the Third Unesco Medium-Term Plan" and Resolution XV-11 "Proposal on the IOC Programme of Work and Budget for 1990-1991" and the results of the consideration of those proposals at the Twenty-fifth Session of the General Conference of Unesco.

216 Considering the Proposed IODE Strategy for 1990-1995 and IODE Work Plan for 1990-1991, the Committee agreed revisions and changes in the light of the discussions under previous agenda items.

217 The Committee adopted Recommendation IODE-XIII.7.

218 The Committee noted that the IOC Assembly at its Fifteenth Session had expressed concern that the lack of staff in the IOC Secretariat, and financial support for IODE, did not allow the implementation of all approved IODE activities, especially those designed to strengthen training and experience for marine data managers in developing countries and to provide practical assistance for projects and course organization and expert visits. The Assembly therefore, requested the Secretary IOC and the Chairman of the Committee on IODE to develop specific proposals with regard to the increased financial support required to meet the needs of IODE and to report on this matter at the Twenty-third Session of the IOC Executive Council.

219 The Committee noted again with concern that the funds foreseen in the IOC Budget for 1990-1991 will not allow implementation of all the proposed activities which are required to improve the efficiency of the IODE in support of the global ocean climate research programmes and other IOC programmes (OSLR, OSNLR, GIPME, GLOSS, Ocean Mapping) and to assist developing countries in training specialists in the area of the oceanographic data and information management.

220 The Committee requested the Chairman to bring these views of the Committee to the attention of the IOC Executive Council and to stress that the data and information exchange are critical elements of all IOC programmes. The Committee therefore recommended that data/information management components be included in all IOC global and regional programmes. The Committee emphasized that particular attention during the intersessional period should be given to IODE activities related to global ocean science and monitoring programmes and that efforts should be made to ensure implementation of the GTSP, Ocean Climate Data Workshop and the development of required formats and data management procedures as well as IOC support for ASFIS.

221 The Committee also confirmed its determination to ensure that effective data and information systems are installed for developing countries and regions. The high technology integrated systems developed for the climate programmes could be exploited to generate efficient small-scale products for local and regional applications.

222 The Committee wished to reiterate its view expressed at its Twelfth Session concerning the important role of NODCs in the effectiveness of the IODE system and the need to support the activities of NODCs and DNAs by respective Member States so that they could play a more active role in international activities.

223 The increasing requirements for an improvement in the efficiency of marine data and information exchange, especially from global programmes such as WOCE, TOGA, JGOFS and IGBP, have to be met by the IODE system, hence by the NODCs and RNODCs within the system. Repeated requests made by the IOC Assembly for increased activity by IODE, however, are in many cases not being followed up by increased funding either for the IOC Secretariat, or in the form of support for NODCs.

224 It was therefore proposed to draw the attention of IOC to this problem, pointing out that there is a considerable return to Member States for active participation in IODE, and that a well-performing IODE system is an essential asset for approaching global environmental problems.

225 In addition, the Committee recognized the desirability of demonstrating the international importance of marine data and information management to the officials of the national funding agencies responsible for NODCs. The Committee requested that the Secretary IOC and Chairman of the Committee on IODE study the possibility of convening a meeting to be attended by representatives of the IODE community, data users and national funding agencies.

226 The Committee then considered possible ways and means to increase national contributions to IODE activities. These include:

- (i) assistance to developing countries in creating and improving marine data information management infrastructure (including training, on bilateral, or multilateral basis or through VCP of IOC and TEMA);
- (ii) provision of contributions to the IOC Trust Fund for IODE;
- (iii) acceptance by NODC of some responsibilities for implementation of specific tasks proposed by IODE using RNODC concept;
- (iv) provision of short-term assistance through consultant services;
- (v) secondment of the specialists to assist in implementing IODE programmes and projects (particularly in the field of MIM).

227 The Committee adopted Recommendation IODE-XIII.8.

228 The Delegate of the USSR noted that the technical documents of IODE contain many specialized terms and the quality of Unesco translations by non-specialists in data management is far from the desired level. He therefore offered the services of the USSR for translation and publication of IODE technical documents if some financial support could be provided by IOC. The Committee welcomed this statement and requested the Secretary IOC to actively consider the possibility of taking up the offer.

229 The Committee noted with satisfaction considerable progress in the development of modern technology for collection, management, archiving and exchange of marine data. This development strongly influenced the effectiveness of the IODE system and considerably broadened the sphere of its responsibilities. It was however noted that limitations on transfer of new technologies to some countries still exist and create a certain disproportion which hampers well balanced development of all IODE System components. Taking this into account, the Committee requested its Chairman to bring this matter to the attention of the IOC Executive Council and call on the Member States to consider possibilities and ways of reducing or abolishing the limitations on exchange of new technologies created for marine data management.

230 The Committee also requested the Chairman, in presenting his report to the IOC Executive Council, to call on Member States to consider the problem created by national restrictions on the transfer of marine scientific data. Both the global climate programme and regional environmental research depend upon marine scientific data being freely transferable in the public domain. Where Member States impose restrictions on data and information transfer, they inhibit such regional and global progress.

231 The Committee reviewed the IODE Handbook and recommended its up-dating in the light of the decisions of this Session. The Committee requested Member States to provide the IOC Secretariat with up-dated information on the names and addresses of national co-ordinators for IODE, as well as NODCs and DNAs.

10. ADOPTION OF THE SUMMARY REPORT

232 The Committee adopted the Draft Summary Report of this Session and the Resolutions and Recommendations (Annex II). It requested the Secretariat and the Chairman to make the necessary editorial corrections.

233 **The Committee requested** the Chairman to present the Executive Summary of the Report and Recommendations and Resolutions to the Twenty-third Session of the IOC Executive Council.

11. DATE AND PLACE OF THE NEXT SESSION

234 **The Committee recommended** that the next Session be organized in 1992 preferably six months prior to the Seventeenth Session of the IOC Assembly.

235 **The Committee invited** Member States to consider the possibility of hosting the next Session of the Committee and to inform the Secretary IOC well in advance and **requested** the Chairman and the IOC Secretariat to investigate this question further.

236 The Chairman stated that it was important to consider locations outside Europe, North America and the USSR in order to facilitate the attendance of delegates from developing countries. This principle was accepted, with the premise that full simultaneous interpretation facilities in the four working languages should be provided free of charge to the IOC.

237 **The Committee expressed its satisfaction** with the arrangements made for the preparation of a reduced number of working documents and **recommended** that the same approach be used for the next Session.

12. CLOSURE

238 The Chairman closed the Thirteenth Session of the Committee at 13.00 on 24 January 1990.

239 In closing the Session, the Chairman, Dr. N.C. Flemming, thanked all the participants for their friendly co-operation and assistance. He expressed sincere appreciation on behalf of the Committee and IOC to the United Nations Office for Ocean Affairs and the Law of the Sea for the excellent arrangements made for the meeting.

240 The Chairman also wished to thank the Chairman of the IODE subsidiary bodies and other organizations for their valuable contribution to the success of this Session.

ANNEX I

AGENDA

- 1. ORGANIZATION OF THE SESSION**
 - 1.1 OPENING OF THE SESSION**
 - 1.2 DESIGNATION OF THE RAPPORTEUR**
 - 1.3 ADOPTION OF THE AGENDA**
 - 1.4 ARRANGEMENTS FOR THE SESSION**
- 2. STATUS OF GLOBAL OCEANOGRAPHIC DATA EXCHANGE**
 - 2.1 MONITORING OF DATA FLOW**
 - 2.2 ACTIVITIES OF WDCs (OCEANOGRAPHY)**
 - 2.3 NATIONAL DATA MANAGEMENT ACTIVITIES**
- 3. PARTICIPATION IN GLOBAL OCEAN SCIENCE PROGRAMMES**
 - 3.1 TROPICAL OCEANS AND GLOBAL ATMOSPHERE (TOGA)**
 - 3.2 WORLD OCEAN CIRCULATION EXPERIMENT (WOCE)**
 - 3.3 JOINT GLOBAL OCEAN FLUX STUDY (JGOFS)**
 - 3.4 INTERNATIONAL PROGRAMME ON GEOSPHERE AND BIOSPHERE (IGBP)**
 - 3.5 OTHER PROGRAMMES**
 - 3.6 OVERALL ASPECTS OF IODE CO-ORDINATION WITH INTERNATIONAL RESEARCH AND MONITORING PROGRAMMES**
- 4. NEW DATA TYPES AND PROCESSING**
- 5. DATA PRODUCTS AND SERVICES**
 - 5.1 PRODUCTS AND SERVICES OF WDCs (OCEANOGRAPHY), RNODCs, NODCs AND DNAs**
 - 5.2 GLOBAL TEMPERATURE-SALINITY PILOT PROJECT (GTSP)**
 - 5.3 INTEGRATED GLOBAL OCEAN SERVICES SYSTEM (IGOSS)**
- 6. IODE DEVELOPMENT OF TECHNOLOGY AND SYSTEMS**
- 7. MARINE INFORMATION MANAGEMENT**
- 8. REGIONAL PROGRAMMES AND TRAINING AND MUTUAL ASSISTANCE ACTIVITIES IN MARINE INFORMATION AND DATA MANAGEMENT**
- 9. WORK PLAN AND PROGRAMME FOR THE NEXT INTERSESSIONAL PERIOD**
- 10. ADOPTION OF THE SUMMARY REPORT**
- 11. DATE AND PLACE OF THE NEXT SESSION**
- 12. CLOSURE**

ANNEX II

RESOLUTIONS AND RECOMMENDATIONS

Code	Title
Resolutions	
Resolution IODE-XIII.1	Exchange of Marine Geological and Geophysical Data
Resolution IODE-XIII.2	RNODC for Development of Acoustic Doppler Current Profiling (ADCP) (Ship-Mounted) Data Management
Resolution IODE-XIII.3	Task Team on Remotely Sensed Oceanographic Data
Resolution IODE-XIII.4	Co-ordination of the Activities of the IOC Committee on IODE and the Joint IOC-WMO Committee on IGOSS
Recommendations	
Recommendation IODE-XIII.1	Data Monitoring
Recommendation IODE-XIII.2	Co-ordination Between IOC and ICSU on World Data Centers, Oceanography
Recommendation IODE-XIII.3	IODE and Global Ocean Climate Research Programmes
Recommendation IODE-XIII.4	Global Temperature-salinity Pilot Project (GTSP)
Recommendation IODE-XIII.5	Joint FAO-IOC-UN Group of Experts on ASFIS and ASFIS Strategy
Recommendation IODE-XIII.6	Development of a Software Package for Oceanographic Data Processing and Exchange on Microcomputers
Recommendation IODE-XIII.7	IODE Strategy for 1990-1995 and Work Plan and Programme for 1990-1991
Recommendation IODE-XIII.8	Need for Increased Support at the National Level for Data and Information Centres

Resolution IODE-XIII.1

EXCHANGE OF MARINE GEOLOGICAL AND GEOPHYSICAL DATA

The IOC Committee on International Oceanographic Data and Information Exchange,

Having considered the Report of the Task Team on Marine Geological Geophysical Data, and the Reports on the Data Management Activities related to OSNLR and Ocean Mapping,

Noting the importance of the exchange of marine geological and geophysical data to other IOC efforts in OSNLR and Ocean Mapping,

Noting also the importance of readily available global and basin scale digital bathymetry, and in particular digital terrain models, to the success of the physical oceanographic modelling planned by WOCE,

Decides to continue the activities of the Task Team on Exchange of Marine Geological and Geophysical Data, to invite additional participation in its activities by Member States and from related activities such as OSNLR and Ocean Mapping; and

Decides to strengthen the connection with these related activities by adding to its Terms of Reference in the following way :

- (i) establish appropriate liaison with the IOC Consultative Group on Ocean Mapping and IOC-UN(OALOS) Guiding Group of Experts on OSNLR activities, and
- (ii) advise the Committee on new developments and data needs for OSNLR and Ocean Mapping activities.

Resolution IODE-XIII.2

**RNODC FOR DEVELOPMENT OF ACOUSTIC DOPPLER CURRENT PROFILING (ADCP)
(SHIP-MOUNTED) DATA MANAGEMENT**

The IOC Committee on International Oceanographic Data and Information Exchange,

Being aware of the progressive and important adoption of ship-mounted, (downward looking), Acoustic Doppler Current Profiling (ADCP) instruments by the marine scientific institutions in at least six Member States,

Noting the present scientific and practical value of ADCP in respect of gyre and sub-surface current analysis,

Taking account of the fact that properly quality controlled ADCP data may be of potential value in the future for the WOCE Surface Velocity Programme,

Having regard for the very large volumes of raw data generated by ADCPs, and the need for recognized methods of data reduction and the preparation of data products,

Considering that ADCP data can only be exchanged with confidence when the methods of data reduction and processing are fully tested and documented,

Recommends the recognition by IOC of the Japan Oceanographic Data Center (JODC), to be the Responsible National Oceanographic Data Centre (RNODC) within the IODE system subject to completion of procedures in accordance with the principles established in the IOC Manual for RNODCs (IOC Manuals and Guides No. 9, Annex II) for the development of ADCP data archiving and exchange standards and procedures, with the following terms of reference:

- (i) To compile and evaluate information on existing data sets held by Member States already active in ADCP measurements and produce a catalogue of ADCP users with referral capacity;
- (ii) Produce a detailed catalogue of ADCP users that includes information about their ADCP instrumentation, related instrumentation (GPS, Loran, measurement of ship motion, etc.), procedures, averaging/sampling (temporal and spatial vertical and horizontal), quality assurance methods, formats, products and uses of data;
- (iii) In consultation with other NODCs and SCOR, to establish provisional standards and procedures for the reduction, quality control, archiving, and exchange of ADCP data;
- (iv) To assemble a pilot ADCP data archive of samples of ADCP data from other Member States so as to assess the effectiveness of the proposed standards and procedures;
- (v) To prepare guidelines concerning the different performance characteristics and data documentation relevant to each instrument type, in order to formulate adequate data documentation and quality control;
- (vi) To report on the progress of RNODC ADCP to the Group of Experts on RNODCs and Climate Data, and to IODE-XIV.

Resolution IODE-XIII.3

TASK TEAM ON REMOTELY SENSED OCEANOGRAPHIC DATA

The IOC Committee on International Oceanographic Data and Information Exchange,

Noting the increasing demands made by the various global ocean related programmes for Remotely Sensed Oceanographic Data, and the use of Remotely Sensed Data Products in applications to regional and local problems,

Noting that in the satellite data archives a wealth of historical information is present that needs to be made available to the global ocean related programmes and other users,

Noting further the various problems and possible solutions identified by the existing Task Team,

Decides to continue the Task Team on Remotely Sensed Oceanographic Data;

Decides to revise the Terms of Reference of the Task Team to be as follows:

- (i) develop a range of information products for the marine science community, including an update of the MEDI Catalogue on Remotely Sensed Oceanographic Data, and using, besides printed products, floppy discs, CD-ROMS and electronic mail;
- (ii) actively participate in and contribute to the development of training courses on Remote Sensing of the marine environment through the IODE TEMA activities;
- (iii) liaise with the relevant groups and committees of WMO and IGOSS, in order to develop a solution for the problems related to satellite-derived SST data products;
- (iv) assist in developing in close relation with the relevant agencies and programmes, a global satellite derived SST contour demonstration product in GF3 format, intended to demonstrate the possibility of integrating such satellite-derived data with in situ data on the format level, and subsequently evaluate the interest for such a product being produced on a regular basis;

- (v) investigate, in close collaboration with the Group of Experts on Technical Aspects of Data Exchange, the possible development of, and interest for, GF3 subsets for specific types of satellite data products;
- (vi) provide the Committee and IOC with advice and assistance in the implementation of Recommendations of IOC/IODE related to remote sensing and act as a focal point within IODE on this topic.

Resolution IODE-XIII.4

CO-ORDINATION OF THE ACTIVITIES OF THE IOC COMMITTEE ON IODE AND THE JOINT IOC-WMO COMMITTEE ON IGOSS

The IOC Committee on International Oceanographic Data and Information Exchange,

Noting Recommendation 9 of JC-IGOSS-V on improved mechanisms for IGOSS-IODE data flow, which proposes the formation of a Joint IGOSS-IODE Task Team.

Noting the acceptance of this proposal in principle at the Fifteenth Session of IOC (SC/MD/91, para.181) and at the Forty-first Session of the WMO Executive Council (Res.9 (EC-XLI)) and the support of delegates for an ad hoc meeting of the Task Team during IODE-XIII,

Recognizing the common factors in problems experienced by both IGOSS and IODE concerning the rate of flow of real-time data, the up-dating of archived real-time data with delayed mode data, incomplete delivery of delayed mode data, monitoring of data flow, use of formats such as BUFR and GF3, quality control, codes, ship lists, ship codes, and collaboration between RNODCs-IGOSS and SOC's,

Stressing the increased requirement for rapidly up-dated quality controlled data sets in support of the global programmes such as TOGA, WOCE, JGOFS, and IGBP,

Taking into account the discussion of the ad hoc Joint Task Team of IGOSS and IODE representatives held during IODE-XIII,

Taking note of the arrangements whereby the Officers of IGOSS and IODE invite representatives of the corresponding Committee to attend each others' bureau meetings,

Recognizing that approval of the proposed Global Temperature-Salinity Pilot Project will result in close operational collaboration of IGOSS and IODE in the continuous management and up-dating of Temperature and Salinity data bases with real-time and delayed-mode data,

Recognizing further the proposal to hold the Joint Meeting of the IGOSS Group of Experts on Operations and Technical Applications (OTA) with the IODE Group of Experts on Technical Aspects of Data Exchange (TADE) planned for late 1990-early 1991,

Resolves to instruct the Chairman of the Committee on IODE to continue consultations with the Chairman JC-IGOSS and the Secretariat of IOC and WMO and agree to a Joint Meeting of the IGOSS Group of Experts on Operations and Technical Applications (OTA) and the IOC/IODE Group of Experts on TADE, together with the Directors of RNODCs-IGOSS and SOC's, and Rapporteurs IGOSS/IODE, as a first step in implementing the Recommendation 9 of JC-IGOSS-V;

Furthermore,

Stresses that the various procedures, projects, and joint meetings listed above are intended to be the most effective and economical implementation of the objectives expressed in Recommendation 9 of JC-IGOSS-V and SC/MD/91 para.181, and that the outcome of these joint activities will be reported to IODE-XIV, with a review as to what further steps which may be taken, not excluding the formation of a Joint Task Team.

Recommendation IODE-XIII.1

DATA MONITORING

The IOC Committee on International Oceanographic Data and Information Exchange,

Recognizing that oceanographers, data managers and other ocean data users need up-to-date information on (i) planned oceanographic research cruises, (ii) oceanographic observations collected, (iii) sources and availability of oceanographic data sets, and that the NOP, ROSCOP and MEDI systems play an essential role in meeting this need,

Noting with appreciation the existing efforts and the offers of future collaboration made by the UK, the USSR, the USA and ICES in regard to NOPs, ROSCOPs and MEDI,

Approves the revised ROSCOP form (subject to agreement of the data codes within one month), and urges all Member States to use the revised form for data collection activities terminating on or after 1 January 1991; to allow for phased introduction, the new form may be introduced for cruises ending at any data between 1 January 1990 and 31 December 1991;

Recommends that the IOC Executive Council call on Member States to ensure that National Oceanographic Programmes (research ship cruise schedules), ROSCOP forms and MEDI entries are submitted in good time for all oceanographic research cruises and data holdings;

Requests the Secretary IOC to continue collaboration with Member States in order to establish more effective arrangements for the operation of the NOP and MEDI systems at the international level.

Recommendation IODE-XIII.2

CO-ORDINATION BETWEEN IOC AND ICSU ON WORLD DATA CENTERS, OCEANOGRAPHY

The IOC Committee on International Oceanographic Data and Information Exchange,

Noting that the IOC Assembly, at its Fifteenth Session, Paris, 4-17 July 1989, requested the Committee on IODE to consider the matters of common interest and responsibility to IOC and ICSU with regard to formulation of a coordinated policy on international oceanographic data exchange and the activities of the WDCs, Oceanography (Document SC/MD/91, para. 175),

Having considered the conclusions of consultations held in New York on 15 and 16 January 1990 between the Directors of the WDCs, Oceanography, A, B and D, the Chairman and Vice-Chairman of the IOC Committee on IODE, IOC Secretariat staff and the Chairman of the ICSU Panel on World Data Centres,

Recognizing the need to improve the efficiency of communications between IODE and ICSU,

Recommends that the following procedures be adopted:

- (i) When major international ocean science programmes are being planned in SCOR, SCOR is requested to address the data management implications early in the planning, and to consult with the IOC Committee on IODE;
- (ii) When the ICSU Panel on World Data Centres is considering items which have implications for the management of oceanographic data, the Panel is requested to consult with the Chairman of the IOC Committee on IODE and the Secretary of IOC;
- (iii) The IOC Committee on IODE will consult with the ICSU Panel on World Data Centres on matters under consideration which would have implications for the management of WDCs, Oceanography, or will affect the flow of data to WDCs;

- (iv) To avoid the duplication of specialist manuals and guides on the management of oceanographic data, and the transmission of data to WDCs, a single guide will be prepared, based on the existing draft of IOC Manuals and Guides No. 9, edited to take into account the formation of WDC-D and the Guidelines for Data Exchange between WDCs, Oceanography, agreed by the Directors of these Centres at their meeting, New York, 16 January 1990. ICSU is requested to consider joint publication of this guide with IOC, following approval of the text by ICSU and SCOR, and the IOC Committee on IODE.

Recommendation IODE-XIII.3

IODE AND GLOBAL OCEAN CLIMATE RESEARCH PROGRAMMES

The IOC Committee on International Oceanographic Data and Information Exchange,

Noting that data management is, and will be, a critical component of existing and planned large-scale research programmes, such as TOGA, WOCE, JGOFS, and IGBP,

Noting with appreciation the excellent progress made by the TOGA data management system and the solid base established by WOCE in setting up Data Assembly Centres,

Recognizing the usefulness of the Data Information Unit established by WOCE to provide information on datasets, research programme plans, and ship schedules,

Having considered that there are common data management requirements of the above programmes in which the IODE could provide assistance, in areas such as data collection and assembly, data archiving, long-term accessibility of data sets, formats, and data information services,

Recognizing the value of establishing active co-operative links between the data management activities of the large-scale research programmes, national and regional programme activities, and the IODE system,

Recommends that IOC urge Member States to ensure close liaison between their national oceanographic data management activities and the national committees dealing with the large-scale research programmes;

Recommends that representatives of IODE and the World Data Centers participate in meetings of the relevant international bodies dealing with the large-scale research programmes;

Recommends also that IODE experts and representatives participate in the meetings of the relevant data management groups supporting the large-scale research programmes;

Recommends that Member States through their national oceanographic data centers co-operate with the WOCE Data Information Unit in the establishment of two-way exchanges of information relevant to WOCE data management;

Requests the Secretary IOC to consider establishing a link to the OCEANIC information system operated by the USA in order to improve its usefulness to IOC in support of National Oceanographic Programmes (NOP), ship scheduling, data directory services and other information needs of the large-scale ocean climate research programmes;

Requests also the Secretary IOC to consider the possibility of establishing telecommunication links (electronic mail) between IODE centres and the oceanographic information system of the USA.

Recommendation IODE-XIII.4

GLOBAL TEMPERATURE-SALINITY PILOT PROJECT (GTSP)

The IOC Committee on International Oceanographic Data and Information Exchange,

Noting Recommendation 4 (JC-IGOSS-V) of the Fifth session of the Joint IOC-WMO Working Committee on IGOSS on the development of GTSP,

Noting that the IOC Assembly at its Fifteenth Session welcomed the proposed GTSP,

Having reviewed the reports of the ad hoc Consultative meetings on the GTSP held in Washington, USA (January 1989) and in Ottawa, Canada (July 1989),

Recognizing the urgent need to meet the growing requirements for a global knowledge of ocean temperature and salinity distributions,

Recognizing the need for timeliness and an improved reliability and completeness of data exchange, in particular for the needs of ocean components of the World Climate Programme,

Having considered the Report and Recommendations of the IODE Workshop on Global Temperature-Salinity Pilot Project (New York, USA, 15-16 January 1990),

Having also reviewed the draft Project Plan and the Quality Control Manual for GTSP presented at the workshop,

Recommends that the IOC:

- (i) approves the implementation of the GTSP as an IODE-IGOSS pilot project according to the concepts described in the Draft Project Plan;
- (ii) invites WMO to endorse this recommendation;
- (iii) invites Member States, participating in IODE and IGOSS, to join the GTSP;
- (iv) approves the initiation of the GTSP in 1990 for an initial period of five years;
- (v) urges Member States of IOC and WMO to support the GTSP by improving and accelerating the exchange of ocean temperature and salinity data with GTSP through the existing IODE and IGOSS channels;
- (vi) invites directors of international scientific programmes (such as TOGA and WOCE) to nominate points of contact, charged with encouraging and co-ordinating the dataflow between the programmes and GTSP;
- (vii) approves the establishment of a Steering Group on GTSP with the Terms of Reference and Proposed Composition shown in Annex 1 to this Recommendation;
- (viii) requests the Steering Group on the GTSP, in collaboration with other IOC and WMO Member States, to proceed with further planning and implementation of the GTSP;
- (ix) requests the Secretary IOC to publish as soon as possible the GTSP Project Plan and the GTSP Quality Control Manual, and to submit the manual to the Task Team on Data Quality Control.

Annex 1 to the Recommendation IODE-XIII.4

TERMS OF REFERENCE FOR THE STEERING GROUP ON THE GTSP

1. Complete development of the GTSP Project Plan and Implementation Schedule following the principles described in the current draft.
2. Complete development of the GTSP Quality Control Manual.
3. Meet semi-annually at the expense of the participating countries to review the status of the implementation and further develop the GTSP.
4. Actively promote the GTSP and provide information to the users of GTSP services, such as the planners of international Science Programmes.
5. Provide scientific and technical guidance to GTSP participants in the implementation and further development of the scientific and data management aspects of the six GTSP elements including:
 - near real-time data acquisition
 - non real-time data acquisition
 - communications infrastructures
 - quality control procedures
 - continuously managed database
 - GTSP data and information products
6. Prepare, maintain and distribute documentation relevant to operation of the project.
7. Report after each meeting and as otherwise necessary to keep all IODE and IGOSS contacts, as well as the representatives of the science programmes, informed on the status of implementation of the GTSP.
8. Submit status reports on the GTSP to the sessions of the Committee on IODE and the JC-IGOSS.
9. Prepare and submit to the sessions of the Committee on IODE and the JC-IGOSS a report on the status of IGOSS-IODE data flow.
10. The group will select a Chairman at its first session and will review the Chairmanship bi-annually. The composition of the group is as proposed below. The composition of the group will be regularly reviewed in consultation between the Chairmen of IODE and IGOSS.

The proposed Composition of the Steering Group for the coming intersessional period will be as follows:

- (i) One representative from each of the participating countries (initially Australia, Canada, France, USA, USSR) as chosen and funded by the countries, to provide expertise to the project. These representatives may be accompanied by one or more experts;
- (ii) A representative from WOCE and TOGA, each nominated by the appropriate Scientific Steering Group, to provide scientific guidance to the project;
- (iii) An additional invited scientific advisor selected by the Chairman of the Steering Group on the GTSP;
- (iv) The IGOSS-IODE and IODE-IGOSS Rapporteurs;
- (v) Representatives from the RNODC's-IGOSS will be invited to participate in this Group.

Recommendation IODE-XIII.5

JOINT FAO-IOC-UN GROUP OF EXPERTS ON ASFIS AND ASFIS STRATEGY

The IOC Committee on International Oceanographic Data and Information Exchange,

Emphasizing that, in planning IODE strategy past the year 2000, it is essential to take an integrated view of the needs for marine information management,

Recalling Resolution XIV-9 of the IOC Assembly, which stated that "a clear strategy for the marine information management endeavors of the Commission is essential..." and decided "that this strategy should include the strengthening of the ASFIS system to improve the availability of information to all Member States",

Noting that the proposed Strategy for Development of the International Aquatic Sciences and Fisheries Information was developed in response to these needs for inter-agency planning and management, and that it represents a fundamental and far-reaching decision on how ASFIS should be developed,

Further recalling that, at its Fifteenth Session, Paris, July 1989, the IOC Assembly "endorsed the development of improved co-ordination arrangements for the ASFIS Secretariat function between IOC, FAO, and the United Nations, and renewed the invitation made in Resolution XIV-9 for the FAO and the UN to jointly sponsor an advisory body for ASFIS",

Recommends:

- (i) the endorsement of the proposed Strategy for ASFIS, subject to final review by interested Member States prior to the forthcoming Session of the IOC Executive Council;
- (ii) the setting up of the proposed Joint Group of Experts, charged to serve as an advisory body for the IOC, FAO and the UN with the objective of the further development of ASFIS;
- (iii) that a small jointly sponsored ad hoc Consultation of Experts be held, in order to draft terms of reference and working arrangements for the joint Group of Experts on ASFIS;
- (iv) that this Consultation be held during 1990, in conjunction with the Third Session of the IODE Group of Experts on Marine Information Management.

Recommendation IODE-XIII.6

DEVELOPMENT OF A SOFTWARE PACKAGE FOR OCEANOGRAPHIC DATA PROCESSING AND EXCHANGE ON MICROCOMPUTERS

The IOC Committee on International Oceanographic data and Information Exchange,

Conscious of the increasing worldwide availability of microcomputers in oceanographic laboratories and data centres,

Recognizing that the development of a standardized microcomputer software system to support processing and management of oceanographic data will lead to improved exchange and application of oceanographic data by scientists, particularly in developing countries,

Noting the wide interest aroused by the plan of the USA to develop such a package, "OCEAN CLICOM", initially concentrating on physical oceanographic data,

Identifying the need to include in the system the capability to process diverse data types including marine biology, marine chemistry, pollution and coastal zone data, and to provide good facilities for the exchange of data monitoring information, data inventories and actual data sets,

Recommends that an Expert Consultation on "Standardization of Microcomputer Software for International Oceanographic Data Processing and Exchange" be held in 1990 to formulate requirements for the software;

Accepts with appreciation the offer of the United States of America to host such a Consultation;

Requests the Secretary IOC to seek the collaboration of the Unesco Division of Marine Sciences, WMO, the SCOR JGOFS programme, and other concerned bodies, in identifying user needs and obtaining the resources needed for the development of the system, its maintenance, and its effective application by developing country scientists and data managers.

Recommendation IODE-XIII.7

IODE STRATEGY FOR 1990-1995 AND WORK PLAN AND PROGRAMME FOR 1990-1991

The IOC Committee on International Oceanographic Data and Information Exchange,

Noting the Resolution XV-10 of the Fifteenth Session of the IOC Assembly on the IOC contribution to the Third Unesco Medium-Term Plan 1990-1995,

Noting also the Resolution XV-11 that contains the programme of Work and Budget for 1990-1991,

Noting with concern that the adopted budget for 1990-1991 IOC Secretariat will not allow the implementation of the major activities recommended by this Session of the Committee and that this concern had been shared by the IOC Assembly at its Fifteenth Session,

Recognizing the need to strengthen and improve its activities and efficiency in order to meet the growing demands for improved and timely exchange of oceanographic data and information arising from large scale programmes such as TOGA, WOCE, JGOFS, IGBP as well as other programmes of IOC (OSLR, OSNLR, Ocean mapping, GIPME, ocean observing system, etc.),

Recognizing also that there is a need to strengthen interaction and co-operation with all IOC major bodies in dealing with global and regional programmes (JC/IGOSS, IOC/OPC, OSNLR, OSLR, GIPME, TOGA, WOCE, Ocean observing system, ocean mapping),

Wishes to emphasize that marine oceanographic data and information exchange constitute the critical element of all international research and monitoring programmes, and that IODE should be in a position to provide services which will benefit technically developed and developing countries, for better management of their own environments and marine industries, as well as the international climate programmes;

Recommends that the IOC approve the Proposed IODE Strategy for 1990-1995 and the Work Plan and Programme for 1990-1991 (as shown in Annex 1 and 2) and ensure the provision of the financial and staff support needed for the implementation of the proposed activities;

Requests that the IOC urge Member States to consider increasing support for the IODE activities as proposed in Recommendation IODE-XIII.4;

Requests the Chairman of the Committee to bring this recommendation to the attention of the Twenty-third Session of the IOC Executive Council.

Annex 1 to Recommendation IODE-XIII.7

IOC MAJOR EFFORTS IN THE FIELD OF INTERNATIONAL OCEANOGRAPHIC DATA AND INFORMATION EXCHANGE DURING THE THIRD MEDIUM TERM PLAN, 1990-1995

The major thrust of IOC efforts for the period 1990-1995 will be to upgrade the technology, procedures and systems of IODE to meet the demand for marine data in environmental applications, economic exploitation of resources, and global climate programmes. IODE will work in close co-operation with other oceanographic programmes including the development of the proposed global ocean observing system, and international and regional organizations (FAO, WMO, UNEP, SCOR, IMO, IAEA, ICES, ICSEM, EC, ESA, ICSU, etc.) in order to meet growing demands of Member States and the international scientific community for marine data and information. Efforts will also be made to increase the dialogue with the scientific, data producer and user communities. For this purpose major efforts will be devoted to :

- (i) maintenance and expansion of the data base for the World Ocean by WDCs (Oceanography), with faster transfer of data to WDCs;
- (ii) expansion of the network of RNOECs and NODCs/DNAs, with increased speed and efficiency of data exchange;
- (iii) improvement of data service activities by IODE to meet the needs of national economic activity and industry, and international research programmes (TOGA, WOCE, JGOFS, GIPME, OSLR, OSNLR, and regional IOC programmes);
- (iv) support for the establishment of NODCs/DNAs in the developing countries;
- (v) development of improved standard formats for data exchange, which are more machine-independent, have sub-sets for more data types and which can run on small micro-computers;
- (vi) development of data management schemes for the global ocean observing system;
- (vii) addition to the IODE system of new data types, including high-level remotely-sensed data products and special aspects of marine chemistry, swath and profiling instrumental data, improved buoy data services, etc.;
- (viii) promote wider use of the best software available for quality control, data processing, and data presentation with guideline standards;
- (ix) provide relevant historical data sets and participate in the data management, distribution and final archiving of data sets produced by the global climate programmes, such as WOCE, TOGA, JGOFS and IGBP, with joint workshops and membership of data working groups;
- (x) improved information services and development of electronically available directories, inventories and catalogues; strengthen links with regional groups of marine science libraries and information centres;
- (xi) increase services to marine information systems through promotion of CD-ROMs, training and formation of more national centres, in co-operation with other international organizations, notably through ASFIS;
- (xii) improve global data monitoring and tracking, with development of electronically updated catalogues and directories showing the status of different data sets;
- (xiii) organization of training courses, workshops, expert missions and exchange of personnel and students, to improve training in marine data and information management;

- (xiv) support software development and introduction of new technology, particularly microcomputers and workstations, and communication systems.
- (xv) improving and broadening communications and dialogue with data producers and the user community.

Annex 2 to Recommendation IODE-XIII.7

PROPOSED WORK PLAN FOR 1990 - 1991

- | | | |
|-----|--|---|
| 1. | Thirteenth session of the IOC Committee on IODE | 17-24 January 1990
UN, New York |
| 2. | Workshop on Global Temperature-Salinity Pilot Project (GTSP) | 15-16 January 1990
UN, New York |
| 3. | Meeting of the Organizing Committee for the Ocean Climate Data Workshop | 10-12 January 1990
Washington, USA |
| 4. | Meeting of the Group of Experts on RNODC and Ocean Climate Data | 1991 |
| 5. | Meetings of the Group of Experts on Technical Aspects of Data Management | 1990. Jointly with the IGOSS Group of Experts on Operations and Technical Applications

1991. In conjunction with Ocean Climate Data Workshop |
| 6. | Meeting of the Group of Experts on Marine Information Management | late 1990 |
| 7. | Second Meeting of the Organizing Committee for the Ocean Climate Data Workshop | October 1990 |
| 8. | IODE Consultative Meeting (IODE Officers) | October 1991 |
| 9. | Workshop on Ocean Climate Data | Sep. 1991, Wash. |
| 10. | Participation of IODE Officers and Experts at IOC Meetings (Executive Council, IOC Assembly, GIPME, Ocean Observing Systems, WESTPAC, IOCINCWIO, IOCINDIO, etc.) and relevant meetings on such Programmes as TOGA, WOCE, JGOFS, IGBP, and Ocean Observing Systems etc., as well as of other organizations (ICES, ICSEM, EC, WMO) | 1990 - 1991 |
| 11. | Meeting of Directors of WDCs (Oceanography) | China, 1990, (second half) |

- | | | |
|-----|---|----------------------------|
| 12. | Preparation of Handbooks and Manuals on Marine Data, Information Management | |
| | - Manuals and Guides No.9 | 1990 |
| | - Manuals and Guides No.17 | 1990 - 1991 |
| | - Manual on IGOSS Data | 1991 |
| | - ROSCOP | 1990 |
| | - Handbook on Algorithms for Quality Control | 1991 |
| | - Introductory Manual on Marine Information Centre Development | 1990 |
| | - Quality Control Manual for GTSP | 1990, Oct. |
| | - IODE Handbook | 1990 |
| | - GTSP Project Plan | 1990 |
| 13. | Expert Consultations on the GTSP Implementation | 1990 - 1991 |
| 14. | Support for Regional Marine Information Projects (RECOSCIX-WIO) | 1990 - 1991 |
| 15. | Support for Individual Training at National Data and Information Centres | 1990 - 1991 |
| 16. | Experts/Consultants Advice and Assistance in Establishing NODCs | 1990 - 1991 |
| 17. | Support to ASFA database and journal | 1990 - 1991 |
| 18. | Training Courses on Marine Data/Management | |
| | USSR - Training course on GF3 | May 1990 |
| | USSR - Training course on marine Geological/Geophysical data Management | 1991 |
| | USSR - Training course on marine Information & Data Management - also individual training at NODC | 1991 |
| | China - Training course on ASFIS, 2 training courses on data management (China) | 1990 - 1991
1990 - 1991 |
| | Greece - Training course on GF3 | 1990 |
| | Japan - 2 Training courses on Oceanographic data management | 1990 - 1991 |
| | Argentina - Training on Oceanographic data management (individual training) and GF3 course | 1990 - 1991
1991 |
| | Colombia - Training course on the establishment of an NODC | 1991 |

19. Expert consultation on "Standardization of Microcomputer Software for International Oceanographic Data Processing and Exchange" 1990

Recommendation IODE-XIII.8

**NEED FOR INCREASED SUPPORT AT THE NATIONAL LEVEL
FOR DATA AND INFORMATION CENTRES**

The IOC Committee on International Oceanographic Data and Information Exchange,

Noting the concern of Member States expressed during the Fifteenth Session of IOC with regard to changes in the global environment, and possible changes in the world climate, and that the Commission has an essential contribution to make in ensuring an ocean perspective and the provision of scientific advice to the international initiatives and actions dealing with climate change (Document SC/MD/91, para. 36),

Noting that programmes established to understand and predict the changes in the global environment and global climate depend upon understanding the ocean,

Recognizing the international nature of ocean data and information management and the vital contribution of such management to the understanding of the oceans, and hence the earth's environment, on a time-scale of decades,

Recognizing further that consistent and accurate sets of data and information must be accumulated and managed on a global scale over several decades in order that progressive improvements of analysis and modelling may be carried out,

Recalling the concern of Member States expressed during IOC-XV with regard to the lack of resources and staff available to the IOC Secretariat, which do not permit IODE to carry out the activities approved by the IOC Assembly (Document SC/MD/91, para. 170-171),

Having regard for the fact that improved efficiency in the management, exchange, and dissemination of marine data and information will facilitate the better development of resources and protection of the marine environment on a regional scale and for individual States,

Stressing that those NODCs which are active in international data exchange report that they receive far more data and information from the international system than they contribute to it, and that Member States thus gain directly from IODE systems,

Noting that it is in the national interest to obtain quality controlled data from national and international projects and hence that the costs of data management should be included in project plans from the start,

Recommends that:

- (i) Member States should review the funding for NODCs and national and regional marine information centres to ensure that adequate support is being given to these organizations so that they can achieve the objectives requested of them by other resolutions adopted by the Member States at the IOC Assembly;
- (ii) Member States be urged to allocate an increased proportion of the resources and staff available for marine data and information management at the national level to participate in international data and information exchange;
- (iii) Member States be urged to support the activities and objectives of IODE by providing assistance in the form of staff located at NODCs and information centres, secondment of staff to IOC to work on IODE, voluntary contributions to the IOC Trust Fund for IODE, the adoption of responsibilities for specific IODE functions, and the formation of RNODCs and organization of training in the field of oceanographic data and information management.

ANNEX III

LIST OF PARTICIPANTS

I. PARTICIPANTS FROM MEMBER STATES

ALGERIA

Mr. Moulay-Youcef Cherif Ouazzine
Institut National des Sciences de la Mer et de
l'Amenagement du Littoral (ISMAL)
Jetee Nord - Alger
B.P. 90, Alger 1^{er} Novembre
Tel: 62 73 19 / 62 66 59

Mr. J. Robert Keeley
Marine Environmental Data Services
Dept. of Fisheries & Oceans
200 Kent street
Ottawa, Ontario K1A 0E6
Tel: (613) 990 02 46
Tlm: R.KEELEY

ARGENTINA

Mr. Carlos Daniel Carbone
Navy - Servicio Hydrografia
Avda. Montes de Oca 1271
Buenos Aires
Tel: (54-1) 21 - 0061/69
Tlx: 21338 RACEL AR
Attn. Jeserhidro

CHILE

Lt. Felix Ricardo Espinoza
Head, Oceanographic Department
National Oceanographic Data Center
Casilla 324, Valparaiso
Tel: (32) 25 10 56
Tlx: 230362 HIDRO CL
Fax: (32) 25 32 83
Tlm: TOGA.CHILE

AUSTRALIA

Mr. Ben John Searle
Head, Science & Oceanography
Australian Oceanographic Data Centre
P.O. Box 1332
North Sydney NSW 2090
Tel: (02) 925 48 70
Fax: (02) 925 48 35
Tlm: B.SEARLE

CHINA, PEOPLE'S REPUBLIC OF

Dr. Hou Wenfeng
Director, CNODC & WDC-D Oceanography
Institute of Marine Scientific & Technological
Information
State Oceanic Administration (SOA)
P.O. Box 74
118 Qiwei Road
Hedong District, Tianjin
Tel: 24 41 62
Tlx: 23138 NODC CN

BRAZIL

Commandant Persio Soares Souto
Directeur, Diretoria de Hidrografia e
Navegação (DHN)
Barao de Jaceguay S/N,
Niterio - Rio de Janeiro - CEP 24040
Tel: 719 26 26/170
Fax: (021) 717 0423

Mr. Mao Bin
Deputy Chief, Division of Science &
Technology, CNODC
77 Qiwei Road
Hedong District, Tianjin
Tel: 31 52 13
Tlx: 23138 NODC CN

CANADA

Dr. John Ronald Wilson
Director, Marine Environmental Data Service
Dept. of Fisheries & Oceans
200 Kent Street
Ottawa, Ontario K1A 0E6
Tel: (613) 990 02 64
Tlm: R.WILSON.MEDS

Mr. Li Wenhai
Chief, Data Management Division
China National Oceanographic Data Center
77, Qiwei road,
Hedong district, Tianjin
Tel: 24 41 62
Tlx: 23138 NODC CN

CHINA, PEOPLE'S REPUBLIC OF (cont.)

Mr. Guo Jialiang
Research Assistant
China National Oceanographic Data Center
7, Qiwei road,
Hedong district, Tianjin
Tel: 24 41 62
Tlx: 23138 NODC CN

FRANCE

Mr. G. Stanislas
National Co-ordinator IODE
IFREMER
66, avenue d'Iena
Paris 75016
Tel: 47 23 55 28
Tlx: 610775
Tlm: G.STANISLAS

Mr. Jean-Paul Rebert
Chief, Data Center TOGA (France)
Centre ORSTOM de Brest
IFREMER, Boite Postale 70
29263 - Plouzane
Tel: (33) 98 22 45 13
Tlm.: ORSTOM.BREST

Mr. Gerard Riou
Chief for the Processing of WOCE Data
Centre, IFREMER de Brest
IFREMER, Boite Postale 70
29263 - Plouzane
Tel: 98 22 42 04
Tlx: 940 627
Tlm: IFREMER.BNDO

GERMANY, FEDERAL REPUBLIC OF

Mr. Christoph Brockmann
Head, National Oceanographic Data Centre
Deutsches Hydrographisches Institut
Bernhard-Nocht-Strasse 78
D-2000 Hamburg 36
Tel: (40) 3190 5202
Tlx: 215448
Fax: (40) 3190 5150
Tlm: DOD.HAMBURG

GREECE

Mr. Alexander Maratos
Deputy-Director
National Center of Marine Research
Aghios Cosmas, Hellinikon 16604
Athens
Tel: 9820214
Tlx: 224135 NCMR GR
Fax: 30 9833095

Mr. Emmanuel Gounaris
Ministry of Foreign Affairs
Academias 3, Athens 10671
Tel: 3612325
Tlx: 216593 YPEX

Dr. Efstathios Balopoulos
National Center of Marine Research
Greek National Oceanographic Data Centre
Aghios Kosmas, Hellinikon 16604
Athens
Tel: 9815703
Tlx: 224135 NCMR GR
Fax: 30 1 9833095

INDIA

Mr. J.S. Sarupria
Data & Information Division
National Institute of Oceanography (NIO)
Dona Paula, Goa - 403 004
Tel: 6253-56, 5988
Tlx: 0194-216 NIO IN
0194-316 MGG IN
Cbl: OCEANOLOGY

INDONESIA

Mr. Bambang Santoso Soedibjo
Research & Development Centre for
Oceanology
Jl. Pasir Putih I, Ancol Timur
P.O. Box 580, DAK, Jakarta 11001
Tel: (62 21) 68 38 50
Tlx: 62875 PDII IA
Fax: 62 21 68 19 48
Cbl: LONAS

ITALY

Prof. Mario Astraldi
Istituto dinamica Grandi Masse
Stazione Oceanografica c/o CREA
C.P. 316, La Spezia 19100
Tel: 39 187 536 301
Tlx: 27 12 68
Fax: 39 187 536 213

Prof. Arturo De Maio
Istituto Universitario Navale
Dept. of Meteorology & Oceanography
via AMM F. Acton 38
I 80 100 Napoli
Tel: 081 551 39 79
Fax: 081 551 39 79

JAPAN

Mr. Shin Tani
Chief, International Programmes Group
Japan Oceanographic Data Center (JODC)
5-3-1, Tsukiji 5-chome,
Chuo-Ku, Tokyo 104
Tel: +81-3-541-3811 Ext. 732
Tlx: 252 2452 HD JODC J
Fax: +81-3-545-2885
Tlm: T.MORI

MEXICO

Mr. Victor Flores
Permanent Delegation of Mexico to the United
Nations
2, UN Plaza, 28th Floor
New York, NY 10017
USA
Tel: (212) 752 0220
Fax: (212) 688 8862

NETHERLANDS

Dr. D.M.A. Schaap
Director, Marine Information Service (MARIS)
Koopmansstraat 1, 2288 BC Rijswijk, Z-H
Postbus 5807, 2280 HV Rijswijk, Z-H
Tel: 070-949500, tst. 252/253
Tlx: 33782 RWSNZ
Fax: 070-900691
Tlm: MARIS.OFFICE

NORWAY

Mr. Reidar S. Leinebo
Norsk Oseanografisk Datasenter (NOD)
Institute of Marine Research
Nordnes Parken 2
P.O. Box 1870/72, 5024 Bergen
Tel: +53 27 169
Tlx: 42297 OCEAN N
Fax: 32 13 59
Tlm: NODS.NORWAY
Cbl: METEOCEAN

SWEDEN

Mr. Jan Szaron
Swedish Meteorological & Hydrological
Institute (SMHI)
P.O. Box 2212, S-403 14 Göteborg
Tel: 46 31 63 03 30
Tlx: 27108 NATFISH S
Fax: 46 31 130 447

UNION OF SOVIET SOCIALIST REPUBLICS

Dr. Viatcheslav Smirnov
Deputy Director,
All-Union Research Institute of
HydroMeteorological Information
6 Koroleva street, Obninsk 249020,
Kaluga District
Tel: (095) 546 39 10
Tlx: 412633 INFOR SU
Fax: 2556684
(Also representing World Data Centre B1)

Dr. Vyacheslav Melnikov
Senior Scientist
All-Union Research Institute of
Hydrometeorological Information
World Data Centre B
6 Koroleva street, Obninsk 249020
Kaluga region
Tel: Moscow: 546 39 50
Obninsk: 2 59 09
Tlx: 412633 INFOR SU
Fax: 2556684

Mr. Peter Agafonov
Scientific Secretary
Oceanographic Committee of the Soviet Union
11, Gorky street, Moscow 103009
Tel: 229 25 72
Tlx: 7241 GKNT SU
Cbl: MOSCOW OCEAN

Dr. Iouri Oliounine
Counselor, Scientific Section for the
Commission of the USSR for Unesco
Ministry of Foreign Affairs
9, Kalinina street, Moscow
Tel: 290 08 53

UNITED KINGDOM

Dr. Meirion Tudor Jones
British Oceanographic Data Centre
Proudman Oceanographic Laboratory
Bidston Observatory
Birkenhead, Merseyside L43 7RA
Tel: +44 (51) 653 8633
Tlx: 628591 OCEANB G
Fax: +44 (51) 653 6269
Tlm: BODC.UK

UNITED KINGDOM (cont.)

Dr. Nicholas Coit Flemming (Chairman)
Institute of Oceanographic Sciences
Deacon Laboratory, Wormley,
Godalming, Surrey GU8 5UB
Tel: 042-879 4141
Tlx: 858833 OCEANS G
Fax: 042879-3066
Tlm: N.FLEMMING

Mr. Kenneth Charles McLean
Head of MS4
Hydrographic Office, Ministry of Defence
Taunton TA1 2DN
Tel: 0823 337 900
Tlx: 0823 462 74
Fax: 0823 284 077

Mr. Allen Varley
Head, Library & Information Services
Plymouth Marine Laboratory
Citadel Hill, Plymouth PL1 2PB
Tel: (0752) 22 27 72
Tlm: MBA.LIBRARY

UNITED STATES OF AMERICA

Mr. Gregory W. Withee
Director
National Oceanographic Data Centre (NODC)
National Oceanic & Atmospheric
Administration (NOAA)
National Environmental Satellite
Data & Information Service
1825 Connecticut Avenue N.W.
Washington, DC 20235
Tel: (202) 673 55 94
Tlx: 7401815
Fax: (202) 673 55 86
Tlm: G.WITHEE

Dr. J. Caponio
Director
National Technical Information Service
United States Department of Commerce
5285 Port Royal Road
Springfield, VA 21161
Tel: (703) 487-4636
Tlm: NTIS.DIR

Mr. S.J. Tibbitt
National Oceanic & Atmospheric
Administration (NOAA)
National Oceanographic Data Center (NODC)
1825 Connecticut Avenue N.W.
Washington, DC 20235
Tel: (202) 673 55 91
Fax: (202) 673 5586
Tlm: S.TIBBITT

Dr. Michael S. Loughridge
World Data Centre A for Marine Geology &
Geophysics
Mail code E/GC 3
325 Broadway, Boulder, CO 80303
Tel: (303) 497 64 87
Tlx: 740170 WDCA
Fax: (303) 497 6513
Tlm: M.LOUGHRIDGE
[MLOUGHRIDGE/NESDIS]
TM44/USA

Dr. William Schramm
Director, Ocean Applications Group
Center for Ocean Analysis & Prediction
NPS, FNOC, Building 4
Monterey, California 93940
Tel: (408) 646 1649
Tlm: W.SCHRAMM

Dr. Warren B. White
Scripps Institute of Oceanography
University of California, San Diego
AO30 UCSD, La Jolla, California 92093
Tel: (619) 534 4826
Tlm: W.WHITE

Mr. John Withrow
National Oceanic & Atmospheric
Administration (NOAA)
Office of the Chief Scientist
1825 Connecticut Ave, NW, Room 524
Washington, DC 20235
Tel: (202) 673 53 30
Fax: (202) 673 55 86
Tlm: J.WITHROW

Mr. Christopher Noe
National Ocean Service
1825 Connecticut Ave.
Washington, DC 20235
Tel: (202) 673 3957
Tlm: C.NOE

Dr. James Baker
President, Joint Oceanographic Institutions
1755, Massachusetts Av, N.W.
Suite 800, Washington DC, 20036
Tel: (202) 232 39 00
Tlx: 257828 BAKE UR
Tlm: J.BAKERJOI

UNITED STATES OF AMERICA (cont.)

Dr. Ferris Webster
College of Marine Studies
University of Delaware
Lewes, DE 19958
Tel: (302) 645 4266
Tlx: 740 7728 WDIU UC
Fax: (302) 645 4007
Tlm: F.WEBSTER
(Also representing CCCO)

Ms. Dorothy Bergamaschi
Executive Secretary
Panel for International Programmes &
International Co-operation in Ocean Affairs
(PIPICO)
Department of State, Room 5801
Washington DC, 20520
Tel: (202) 647 02 39
Tlx: 89601 (USA) - 64144 (Intl)
Fax: (202) 647 1106
Tlm: STATE.DEPT

Ms. Muriel Cole (Rapporteur)
International Affairs of NOS
National Oceanic & Atmospheric
Administration (NOAA)
1825 Connecticut Ave, Room 607
Washington DC 20235
Tel: (202) 673 51 78
Fax: (202) 673 38 50
Tlm: M.COLE

YUGOSLAVIA

Mr. Vlado Dadic
Institute of Oceanography & Fisheries
Setaliste Mose Pijade 63
58000 - Split
Tel: (58) 46 688
Fax: (58) 46 593

**II. REPRESENTATIVES OF
ORGANIZATIONS**

ICSPRO AGENCIES

**Food and Agriculture Organization of the
United Nations (FAO)**

Mr. Robert R. Freeman
Chief
Fishery Information Data & Statistics Service
Fisheries Department
Food & Agriculture Organization of the United
Nations
Via delle Terme di Caracalla
I-00100 Rome
ITALY
Tel: (6) 57 97 64 14
Tlx: 610181 FAO I
Fax: 6799563
Tlm: FAO.FIDI
Cbl: FOODAGRI ROME

**United Nations Ocean Affairs and Law of the
Sea [UN(OALOS)]**

Mr. Jean-Pierre Levy
Director & Deputy to the Special
Representative of the Secretary-General for
the Law of the Sea
Office for Ocean Affairs & Law of Sea
2, UN Plaza, United Nations
Room DC 2-0422, New York, NY 10017
USA
Tel: (1) (212) 963
Tel: UN.OALOS

Mr. Robert J. Gruszka
Senior Officer, Law of the Sea Officer
Office for Ocean Affairs & Law of the Sea
United Nations Secretariat
2, UN Plaza, Room DC 2-0422,
New York, NY 10017
USA
Tel: (1) (212) 963 39 26
Tlm: UN.OALOS
Fax: (212) 963 58 47
Tlx: 422311

Ms. Mary Fisk
Ocean Affairs/Law of the Sea Officer
Office for Ocean Affairs & Law of the Sea
United Nations Secretariat
2, UN Plaza, United Nations
Room DC 2-0410, New York, NY 10017
USA
Tel: (1) 212 963 39 47
Fax: (212) 963 58 47
Tlm: UN.OALOS
Tlx: 422311

Mr. Gritakumar E. Chitty
Principal Law of the Sea/Ocean Affairs Officer
Office for Ocean Affairs & Law of the Sea
United Nations Secretariat
2, UN Plaza, Room DC 2-0458,
New York, NY 10017
USA
Tel: (1) (212) 963 39 26
Tlm: UN.OALOS
Fax: (212) 963 58 47
Tlx: 422311

Mr. Maurice Jorgens
Ocean Affairs/Law of the Sea Officer
Office for Ocean Affairs & Law of the Sea
United Nations Secretariat
2, UN Plaza, Room DC 2-0440,
New York, NY 10017
USA
Tel: (1) (212) 963 39 68
Tlm: UN.OALOS
Fax: (212) 963 58 47
Tlx: 422311

World Meteorological Organization (WMO)

Dr. Mikhail Krasnoperov
WMO, Case Postale No 2300
41, Giuseppe - Motta
CH-1211 Geneva 2
SWITZERLAND
Tel: 41 22 730 8111
Tlx: 23 260 OMM CM
Tlm: P.MOREL

OTHER ORGANIZATIONS

**International Association of Marine Science
Libraries and Information Centres (IAMSLIC)**

Ms. Kay Hale
Rosenstiel School of Marine & Atmospheric
Science
University of Miami
4600 Rickenbacker Causeway
Miami, FL 33149
USA
Tel: 305 361 40 21
Fax: 305 361 9306
Tlm: RSMAS.LIBRARY

**International Council for the Exploration of the
Sea (ICES)**

Dr. Harry Dooley
ICES Hydrographer
Palaegade 2-4, DK-1261 Copenhagen K
DENMARK
Tel: 33 15 42 25
33 15 70 92
Tlx: 22498 ICES DK
Fax: 33 93 42 15
Tlm: ICES.DK

**International Council of Scientific Unions
(ICSU)**

Dr. Stanley Ruttenberg
ICSU Panel on World Data Centres
c/o UCAR, P.O. Box 3000
Boulder, CO 80307
USA
Tel: (303) 497 8998
Tlx: 740 1455 TAMP UC
Fax: (303) 497 8633
Tlm: S.RUTTENBERG

**International Federation for Information and
Documentation (FID)**

Dr. Ben G. Goedegebuure
Executive Director
P.O. Box 90402
2509 LK, The Hague
NETHERLANDS
Tel: (31 70) 31 40 671
Tlx: 34402 KB GV NL Attn. FID
Fax: (31 70) 3834 827

**South Pacific Applied Geoscience Commission
(SOPAC)**

Mr. Yann Morel
SOPAC Technical Secretariat
c/o Mineral Resources Department
Private Mail Bag, Suva
FIJI
Tel: 679 381 377
Tlx: 2330 SOPACPRO FJ
Fax: 679 321040

**International TOGA Project Office (TOGA-
ITPO)**

Mr. Joel Martellet
Tropical Ocean & Global Atmosphere
c/o World Meteorological Organization
Case Postale No. 2300
CH-1211 Geneva 2
SWITZERLAND
Tel: (41) 22 730 84 30
Tlx: 23260 OMM CH
Fax: (41) 22 734 23 26
Tlm: INTL.TOGA

**World Ocean Circulation Experiment Scientific
Steering Group (WOCE)**

Mr. J. Crease
College of Marine Studies
University of Delaware
Lewes, DE 19958
USA
Tel: (302) 645 42 40 (USA)
042 873 5079 (UK)
Fax: (302) 645 4007
Tlm: J.CREASE

World Data Centre A (Oceanography)

Dr. Bruce Parker
National Oceanographic Data Centre (NODC)
National Oceanic & Atmospheric
Administration (NOAA)
National Environmental Satellite
Data & Information Service
1825 Connecticut Avenue N.W.
Washington, DC 20550
USA
Tel: (202) 673 55 46
Tlx: 197683 TRT
Tlm: B.PARKER

Mr. Ronald E. Moffatt
National Oceanic & Atmospheric
Administration (NOAA)
1825, Connecticut Ave, N.W.
Washington, DC 20235
USA
Tel: (202) 673 35 71
Tlm: NODC.WDCA

Mr. Robert Gelfeld
National Oceanic & Atmospheric
Administration (NOAA)
1825, Connecticut Ave, N.W.
Washington, DC 20235
USA
Tel: (202) 673 55 71

**World Data Centre A (Marine Geology and
Geophysics)**

Dr. Michael S. Loughridge
World Data Centre A for Marine Geology &
Geophysics
Mail code E/GC 3
325 Broadway, Boulder, CO 80303
USA
Tel: (303) 497 64 87
Tlx: 740170 WDCA
Fax: (303) 497 6513
Tlm: M.LOUGHRIDGE
[MLOUGHRIDGE/NESDIS] TM44/USA

World Data Centre B (Oceanography)

Dr. V.I. Smirnov
Director, World Data Centre (Oceanography)
6 Koroleva street, Obninsk 249020
Kaluga District
USSR
Tel: (095) 546 39 10
Tlx: 412633 INFOR SU
Fax: 2556684

**World Data Centre B (Marine Geology and
Geophysics)**

Dr. Valeri S. Scherbakov
Director
World Data Center B for Marine Geology &
Geophysics (WDC-B MGG)
Association "Yuzmorgeology"
79 Krasnogvardeiskaja Str.
Gelendzhik 353470
USSR
Tel: 861 41 24331
Tlx: 279124 GEO SU
Cbl: GELENDZHIC BRIZ

World Data Centre D (Oceanography)

Dr. Hou Wenfeng
Director
World Data Centre D (Oceanography)
Institute of Marine Scientific & Technological
Information
State Oceanic Administration (SOA)
P.O. Box 74, 118 Qiwei Road
Hedong District, Tianjin
CHINA, PEOPLE'S REPUBLIC OF
Tel: 24 41 62
Tlx: 23138 NODC CN

III. IOC SUBSIDIARY BODIES

**Committee on Climatic Change and the Ocean
(CCCCO)**

Dr. Ferris Webster
College of Marine Studies
University of Delaware
Lewes, DE 19958
USA
Tel: (302) 645 4266
Tlx: 7407728 WDIU UC
Fax: (302) 645 4007
Tlm: F.WEBSTER

**Joint IOC-WMO Committee for the Integrated
Global Ocean Services Systems (IGOSS)**

Dr. Yves Tourre
Chairman IGOSS
L-DGO of Columbia University, Oceanography
Palisades, New York 10964
USA
Tel: (914) 359 2900 Ext. 212
Tlm: Y.TOURRE

IODE-IGOSS (Rapporteur)

Mr. Dieter Kohnke
Director-Professor
Deutsches Hydrographisches Institut (DHI)
Bernhard-Nocht-Strasse 78
D-2000 Hamburg 36
GERMANY, FEDERAL REPUBLIC OF
Tel: (40) 3190 5231
Tlx: 215448
Fax: (40) 3190 5150
Tlm: DHI.HAMBURG

IV. SECRETARIAT

Dr. A. Tolkachev
Senior Assistant Secretary
Head, Ocean Services Unit
Intergovernmental Oceanographic Commission
Unesco
7 place de Fontenoy
75700 Paris
FRANCE
Tel: (33 1) 45 68 39 78
Tlx: 204461 Paris
Fax: (33 1) 40 56 93 16
Tlm: IOC.SECRETARIAT

Mr. T. Sankey
IOC Assistant Secretary
(same Address, Tlx, Fax & Tlm as above)
Tel: (33 1) 45 68 40 08

Mr. A. Wanigesekera
Ocean Services Unit, IOC
(same Address, Tlx, Fax & Tlm as above)
Tel: (33 1) 45 68 40 09

IOC Consultant

Mr. Paul Geerdens
Royal Netherlands Meteorological Institute
Wilhelminalaan 10
Postbus 201, 3730 AE De Bilt
NETHERLANDS
Tel: 31 30 206 641
Tlx: 47096 KNMI/NCOG
Fax: 31 30 210 407
Tlm: P.GEERDERS

ANNEX IV

LIST OF DOCUMENTS

Document Code	Title
WORKING DOCUMENTS	
IOC/IODE-XIII/1	Agenda
IOC/IODE-XIII/1 Add. rev.	Timetable
IOC/IODE-XIII/2	Annotated Provisional Agenda
IOC/IODE-XIII/3	Summary Report (this document)
IOC/IODE-XIII/4	List of Documents
IOC/IODE-XIII/5	List of Participants
IOC/IODE-XIII/6	Report of the Chairman of the Technical Committee on IODE
IOC/IODE-XIII/7	Reports of the World Data Centres (Oceanography)
IOC/IODE-XIII/8	Draft IODE Work Plan for 1990-1991 and Proposed IODE Strategy for the Period 1990-1995
IOC/IODE-XIII/9	National Reports on Oceanographic Data and Information activities and Reports of Other International Data Centres
IOC/IODE-XIII/10	Reports of the Subsidiary Bodies of the Technical Committee on IODE
IOC/IODE-XIII/11	Regional Activities of IODE and TEMA Related Activities
IOC/IODE-XIII/12	Project Proposal on Global Temperature-Salinity Pilot Project (GTSP)
IOC/IODE-XIII/12 Add.1	Report of the Workshop on GTSP
IOC/IODE-XIII/13	Data Management in International Research Monitoring Programmes
IOC/IODE-XIII/14	Monitoring of Data Flow
IOC/IODE-XIII/14 Add.	Revision of the ROSCOP Form
IOC/IODE-XIII/15	Summary Report of the Organizing Committee for the Ocean Climate Data Workshop, Washington D.C., USA, 10-12 January 1990
IOC/IODE-XIII/16	Draft Outline for Training Programmes on Marine Data and Information Management
IOC/IODE-XIII/17	Proposal on Preparation of Directories of Marine Scientists and Institutions
IOC/IODE-XIII/18	An International Inventory of Moored Current Meter Data

Document Code	Title
IOC/IODE-XIII/19	Summary Report of the Meeting of the Directors of World Data Centres (Oceanography) (New York, 16 January 1990)

INFORMATION AND OTHER REFERENCE DOCUMENTS

INFORMATION DOCUMENTS

IOC/IODE-XIII/Inf.1	Report over the Period 1988/1989 of the Task Team on Marine Biological Data
IOC/IODE-XIII/Inf.2	Project Plan for the Global Temperature Salinity Pilot Project (GTSP)
IOC/IODE-XIII/Inf.3	Cancelled - replaced by IOC/IODE-XIII/12 Add.1
IOC/IODE-XIII/Inf.4	Marine Information Centre Development: An Introductory Manual - Draft by A. Varley, December 1989
IOC/IODE-XIII/Inf.5	Information for Participants
IOC/IODE-XIII/Inf.6	Demonstration Timetable
IOC/IODE-XIII/Inf.7	Manual of Quality Control Algorithms and Procedures for Oceanographic Data Going into International Oceanographic Data Exchange (submitted by the Chairman of the Task Team on Oceanographic Data Quality Control)
IOC/IODE-XIII/Inf.8	Incorporated in IOC/IODE-XIII/9
IOC/IODE-XIII/Inf.9	OCEAN CLICOM: A Microcomputer System for Entry and Exchange of Marine Data
IOC/IODE-XIII/Inf.10	Training Course on Marine Information and Data Management. Draft Programme
IOC/IODE-XIII/Inf.11	Cancelled
IOC/IODE-XIII/Inf.12	Incorporated in IOC/IODE-XIII/9
IOC/IODE-XIII/Inf.13	Incorporated in IOC/IODE-XIII/9
IOC/IODE-XIII/Inf.14	RNODC-SOC. Informe Annual, 1989. Centro Nacional Responsable de Datos Oceanograficos de los Océanos Australes, Centro Argentino de Datos Oceanograficos
IOC/IODE-XIII/Inf.15	Data Quality Control at the TOGA Subsurface Data Centre (Report prepared by J.P. Rebert for the GTSP Workshop (New York, January 1990)
IOC/IODE-XIII/Inf.16	GTSP Quality Control Manual
IOC/IODE-XIII/Inf.17	A Strategy for the Development of the International Aquatic Sciences and Fisheries Information System (FAO-IOC-UN, Rome 1990)

Document Code	Title
---------------	-------

REFERENCE DOCUMENTS

IOC Manuals and Guides No. 17

Vol. 2	Technical Description of the GF3 Format and Code Tables
Vol. 4	User Guide to the GF3-Proc Software
Vol. 6	Quick Reference Sheets for GF3 and GF3-Proc.
DMC-1	Report of the First Meeting of the WOCE Data Management Committee (Washington, USA, 27 February - 1 March 1989)
DMC-2	Report of the Second Meeting of the WOCE Data Management Committee (Hamburg, FRG, 6-8 November 1989)
IOC/IODE-CDS-I/3	Report of the First Consultative Meeting on RNODCs and Climate Data Services (Wormley, UK, 15-19 February 1988)
IOC-WMO/IGOSS-V/3	Summary Report of the Fifth Session of the Joint IOC-WMO Working Committee for IGOS (Paris, 14-23 November 1988)
SC/MD/91	Report of the Fifteenth Session of the IOC Assembly (Paris, 4-19 July 1989)
IOC/INF-788	Summary Report of the IODE Task Team Meeting on Remotely Sensed Oceanographic Data (De Bilt, Netherlands, 5-9 December 1988)
IOC/Ad hoc IODE Mon/3	Summary Report of the Ad hoc Consultation of Experts on Data Monitoring in the IODE System (Ottawa, Canada, 7-8 July 1988)
IOC/GETADE-IV/3	Summary Report of the Fourth Session of the IODE Group of Experts on Technical Aspects of Data Exchange (Ottawa, Canada, 11-15 July 1988)
WMO/TD No. 280 IHO No. 2	Report of the Ad hoc Meeting of Experts on TOGA Data Management (Washington, USA, 25-28 October 1988)
IOC Manuals and Guides No. 18	User Guide for the Exchange of Measured Wave Data. Unesco 1987
IOC-WMO/IGOSS-IODE-II/3	Report of the Second Joint IOC-WMO Meeting of Experts on IGOS-IODE Data Flow (Ottawa, Canada, 18-22 January 1988)
WDGP-6, WMO/TD No. 299	CLICOM Project (Climate Data Management System)
ICES.C.M. 1989/C:7 Hydrography Committee	Report of the Working Group on Marine Data Management (Lisbon, 9-12 May 1989)
IOC/INF-747	IODE Handbook (1988 Rev. Ed.)
IOC-WMO/IODE-IGOSS-GTSP-1	Report of the First Ad hoc Consultative Meeting on the Global Temperature-Salinity Pilot Project (Washington, USA, 23-25 January 1989)

Document Code	Title
IOC-WMO/IODE-IGOSS-GTSPP-2	Summary Report of the Second <u>Ad hoc</u> Consultative Meeting on the Global Temperature-Salinity Pilot Project (a proposed IGOSS-IODE Programme) (Ottawa, Canada, 25-28 July 1989)
IOC/TC-OPC-III/9	The Evolution of Satellite Observing System in the 1990's and the Possible Role of IOC (by Dr. T. Allan)
IOC/INF-778	Report of the Chairman of the IOC Technical Committee on IODE on the Status and Future Trends in the Development of IODE
IOC/INF-722	Executive Summary and Recommendations of the <u>Ad hoc</u> Consultation of Experts on Marine Information Management (Enghien-les-Bains, France, 12-16 October 1987)
IOC Manuals and Guides No. 9 (DRAFT)	Manual on International Oceanographic Data Exchange (Revised Edition, 1990)
IOC-IHO/GEBCO/SCDB-VI/3 1980	Summary Report of the Sixth Meeting of the GEBCO Sub-Committee on Digital Bathymetry (Bidston, July 1980)
	The Joint Global Ocean Flux Study - Report of the JGOFS Working Group on Data Management (Bedford Institute of Oceanography, Canada, September 1988)
WCRP Special Report WMO/TD No. 289	IOC-WMO Intergovernmental TOGA Board Report of the Second Session (Geneva, 5-9 December 1988)
IOC-XV/8 Annex 6	Draft Unesco Medium-Term Plan: IOC Contribution and Role

ANNEX V

OPENING STATEMENT OF THE REPRESENTATIVE OF THE UNITED NATIONS
MR. JEAN-PIERRE LEVY, DIRECTOR,
OFFICE FOR OCEAN AFFAIRS AND THE LAW OF THE SEA

Mr. Chairman,
Distinguished Participants,

On behalf of Mr. Satya Nandan, the Special Representative of the Secretary-General for the Law of the Sea, I have the pleasure of welcoming you to U.N. Headquarters for the Thirteenth Session of the IOC Committee on International Oceanographic Data and Information Exchange.

The United Nations has participated in the work of this important Committee in the past and we intend to continue our active participation at the present session.

As you are all aware, there has been an upsurge in the world community in recent years of interest in, and concern with, a number of marine-related issues that fall within the purview of the IOC and the UN and other UN organizations - issues of climatic change, of the role of oceans in global environment, of the relationship between environment and development, of regulation and enforcement actions in the relation to the ocean environment, to name a few. None of these issues is new, but I believe we are now witnessing the emergence of a genuine consensus on their present and potential impact on our common well-being and, with that consensus, a far more serious commitment to dealing with them.

The 1982 Law of the Sea Convention, which provides a comprehensive framework for all marine resource development and uses of ocean space, is itself a major manifestation of consensus in the international community. Though not yet in force, as 18 ratifications of the 60 required are still needed, the Convention has had a pronounced impact on state practice, both imposing new and extensive responsibilities on States as well as offering immense benefits under the new regime for the oceans.

All of these developments have led to greater demands upon the U.N. system as a whole covering the entire range of assistance - legal, scientific, economic, technological, managerial and administrative and financial. Needless to say, while all UN organizations are faced with constraints, the collective response of the System to the needs of Member States has been substantial and is on the increase.

Here at United Nations Headquarters, the Office for Ocean Affairs and the Law of the Sea provides information, advice and assistance to State, on the legal, political, economic, environmental, scientific and technical aspects of the Convention and the implications of its implementation by States. States, particularly developing States, continue to give growing importance to the marine sector in their development policies. Their needs include advice and assistance in giving effect to and benefitting from the new regime for the oceans and in fulfilling obligations under it, overall marine policy and programmes, the institutional implications thereof, marine affairs management, and the adoption and adaptation of national laws in conformity with the Convention.

At its recent 1989 Session, the General Assembly in its Resolution A/44/42 requested *inter alia* the presentation at its Forty-fifth and Forty-sixth Sessions of a report identifying the needs of States in regard to the development and management of ocean resources and the measures currently taken by States and by the competent international organizations in responding to those needs, and to suggest methods and mechanisms for maximizing opportunities for the early realization for all States during the decade 1990 to 2000 of the benefits of the comprehensive legal regime established by the Convention. Further, it requested the submission at its Forty-fifth Session of a report on marine scientific research in the light of the provisions of the United Nations Convention on the Law of the Sea.

The Office also continues to supplement its research and reference materials and to strengthen its capacity for information/data collection, analysis and dissemination through, among other means, expanding its reference library collection and through continuing development of the Law of the Sea Information System (LOSIS).

As the Office's Law of the Sea Information System (LOSIS) is directly pertinent to some of the items to be addressed at this meeting, allow me to give you a brief overview of its current status and the direction in which it is developing. LOSIS is a computerized system composed of a group of databases, each containing information relating to the different aspects of the law of the sea. These are currently being supplemented by the collection of additional marine-related data.

Of these databases, the Country Marine Profile Database (MARPRO) has 98 categories of information for more than 240 countries and entities. The National Marine Legislation Database (LEGISLAT) currently contains 3,641 coded references to national laws and regulations. After completion of the analysis and entry of the currently available legislation and regulations from each country, the next phase of this activity will be the transmission of computerized lists of national laws to Governments for verification and updating.

The Minerals Database (MINDAT) presently contains 25 categories of information on copper, nickel, manganese and cobalt, by country and globally, covering production, consumption, imports and exports of the minerals in various forms, and prices, for the period 1971-1986. MINDAT can be statistically manipulated and has graphic representation capabilities. Further development will be to obtain information on resources and reserves.

In connection with information and data collection, analysis and dissemination, I should also mention the Office's *Law of the Sea Bulletin*. The Bulletin serves as the primary means for the timely dissemination, in one document and on a continuing basis, of updated information relating to the law of the sea and to marine affairs. Now in its seventh year, the Bulletin is viewed by States, intergovernmental bodies, non-governmental organizations, universities and scholars as a most useful vehicle for keeping abreast of important developments covering a wide range of activities in the field of marine affairs.

The 1982 United Nations Convention on the Law of the Sea and successive General Assembly Resolutions on the Law of the Sea, have placed a premium on co-operation in recognition of the fact that the problems of ocean space are closely inter-related and need to be considered as a whole. The General Assembly further recognized that all uses and resources of the sea and that all related activities within the United Nations system need to be implemented in a manner consistent with it.

To treat the problems - and I would add, the opportunities - of the oceans as a whole in a manner consistent with the new ocean regime, Governments, the United Nations system and other involved entities must co-operate. This is no less true in the field of marine data and information than in other marine-related sectors and discipline. Indeed the collection, analysis and exchange of data and information is an activity that underlies all sectoral and intersectoral issues and concerns and is a vital element in all decision-making, provided of course that data are presented in a form relevant and usable for decision making. The Office for Ocean Affairs and the Law of the Sea has continued co-operation with and assistance to other organizations, within the UN system, both formally through such mechanisms as ICSPRO and *Ad hoc* Interagency meetings and informally on a day-to-day basis. The Office is also involved in a number of joint activities among which are the Aquatic Sciences and Fisheries Information Systems (ASFIS), which the Office co-sponsors with Unesco/IOC and FAO, and the Aquatic Science and Fisheries Abstracts (ASFA) for which the Office serves as an international co-ordinating input centre. In this connection, we will follow with particular interest your agenda item on marine information management.

In closing, may I tell you that we are gratified to act as host for this session and we wish you a productive and successful meeting.

ANNEX VI

REPORT OF THE FIRST MEETING OF THE ORGANIZING COMMITTEE ON OCEAN CLIMATE DATA WORKSHOP

INTRODUCTION

The First Consultative Meeting on Responsible Oceanographic Data Centres (RNODCs) and Climate Data Services held in February 1988 recommended an Ocean Climate Data Workshop be convened to examine ocean data handling in support of ocean climate studies. The Workshop was expected to provide a forum to discuss scientific needs for data management support, to exchange ideas and technical information on ocean services and data management, and to make recommendations on ways and means for scientists and data managers, working together, to meet the requirements of large scale ocean programmes in 1990s and beyond.

An Organizing Committee was established to assist in the formulation and preparation of the Workshop. The Organizing Committee held its first meeting at the US NODC in Washington, DC. on January 10-12, 1990. Mr. G. Withee, Chairman of the Group of Experts on RNODCs and Climate Data Services stated that his appointment as Chairman of the Organizing Committee was an interim one to get things started and suggested that Mr. J. Churgin take over as Chairman. The Committee accepted his suggestion.

The Organizing Committee explored a number of options, formats, and techniques that would meet the underlying goal of bringing the scientific community and data management groups closer together.

CONCLUSIONS AND RECOMMENDATIONS

The Organizing Committee reached the following conclusions:

Workshop Objectives: The Objectives of the Workshop are to develop requirements for ways to improve the present IODE system and to establish guidelines for the future. It was decided that the best way to meet this objective was to go beyond a conference/seminar format and bring together scientists and data managers who could demonstrate and discuss specific cases. These Case Studies would not only develop a set of conclusions for a specific problem, but there would also be an attempt to find a common thread between the cases that might lead to improved IODE products and services.

Workshop Format: The Workshop would be based on a series of case studies on Climate and the Oceans. A suitable keynote speaker will be found to open the discussions. This would be followed by introductory remarks on Climate related ocean programmes such as WOCE, TOGA, and JGOFS, stressing critical areas of data management within these programmes. There will also be an introduction to current IODE products and services. The heart of the Workshop would be 3 or 4 Case Studies in which the emphasis will be on how data related items affected or would affect scientific objectives. Each Case Study would have invited 2-4 speakers, an opportunity for on-line demonstrations and ample time for discussions and recommendations. Sessions would be run consecutively so that all attenders would have an opportunity to enter into discussions. The Organizing Committee did not feel that it had sufficient information to make a final decision on Case Studies, but the following candidates were proposed:

- (i) JGOFS Object oriented data and analysis system.
- (ii) Currents/Circulation and Heat Transport
- (iii) Sea level
- (iv) Sea Surface Temperature (& possibly other surface variables).

Organizing Committee members have been assigned to explore these topics further with project scientists and report back in the next 2-3 months on recommended subjects and invited presenters.

The Workshop would be concluded bringing together all participants to discuss general themes that stress topics which the international data management system needs to address in order to serve the larger community of scientists engaged in climate and climate related studies. For example, these topics may include types of directories, inventories, and distribution systems that are needed; time/space coverage, data quality, and products.

Attendance: To preserve the workshop atmosphere and be able to demonstrate results on-line there may be a need to limit the number of attenders, but until a final decision is made on location and technical requirements the exact ceiling could not be set at this time. The number of speakers, case study co-ordinators, and presenters would probably be on the order of 20-25 over the suggested workshop time period of three and a half days.

Time: In order to properly plan and prepare for a Workshop of this nature it was agreed that the target date will be September/October 1991.

Place: The US agreed to act as host for the Workshop and make local arrangements. They will attempt to find a facility that has space and the technical equipment that will be required. Contributions for funding travel of key personnel for the conference will be sought by the IOC and the US and other national and international agencies will be queried as well.

Proceedings: Proceedings of the Workshop will be published and distributed internationally.

Milestones: The following milestones were set in order to reach the target date for the Workshop:

1. May 1, 1990 - decide on introductory topics and nominate candidate speakers; select case study topics and candidate discussion leaders.
2. August 1, 1990 - distribute to Organizing Committee programme outline, acceptances and status of programme preparation. Outline problem areas.
3. October 1, 1990 - Meet with Organizing Committee and key Workshop organizers to finalize programme and set Workshop date.
4. November 1, 1990 - Send invitations and requests for abstracts and papers to speakers. Nov. - July remain in contact with discussion leaders and contact all possible participants. Request technical support requirements.
5. July/August, 1991 - Send copies of programme, papers, logistical information etc. to participants.
6. September/October, 1991 - Hold Workshop.

Other Considerations: There are several advanced technology projects being conducted by Member States. Some of these projects may fit within the context of a Case Study and Case Study Co-ordinators will be reminded of this. The Organizing Committee may also further consider demonstrations of these project at "Poster Sessions" during the Workshop. These matters may be further discussed at the second committee meeting.

ANNEX VII

ANNOTATED LIST OF DEMONSTRATIONS *

OCEANIC. James Crease, Ferris Webster (USA)

OCEANIC is an on-line information system operated by the University of Delaware in support of WOCE. It contains a variety of information relevant to the WOCE programme, including programme details, data directories and catalogues and research ship schedules. The system is menu driven and contains text and optional graphic displays.

ICES Harry Dooley (ICES)

ICES demonstrated a diskette based package supporting the IODE ROSCOP system, which catalogues data collected on research ship cruises. The package provides for search and display of ICES's database of existing ROSCOP forms and for interactive entry of new forms.

BODC Meirion Jones (UK)

BODC demonstrated the diskette based version of their Current Meter Inventory for ICES countries displaying the location and key parameters of moored current meter observations.

NODC Bob Gelfeld, Bruce Parker (USA)

NODC demonstrated the NOSIE on-line information system which provides information about NODC data holdings and the facility to order data from them. A second demonstration covered NODC's CD-ROM data products.

OMNET Susan Kubany, Bob Heinmiller (OMNET)

OMNET Inc. demonstrated their SCIENCENET electronic mail service, which provides communication facilities to oceanographers in about 30 countries.

CSA Jonathan Sears (CSA)

Cambridge Scientific Abstracts, publisher for the ASFA partnership of Aquatic Science and Fisheries Abstracts, demonstrated the Compact Cambridge ASFA CD-ROM, which allows searching and display of entries in the ASFA bibliographic database from 1982 to 1989.

INODC J.S. Sarupia (India)

INODC showed a short computer based presentation describing the work of their centre and demonstrated their data inventory.

REGIS Larry Biclawski (USA)

REGIS is an experimental information system for African aquaculture. It is a joint project of FAO and the National Agricultural Library and was developed under contract by the AI Laboratory, Goucher College, Baltimore, Maryland, USA. The system uses a combination of hypermedia and expert systems technologies to provide a useful and easy to access information retrieval system.

MARIS Dick Schaap (Netherlands)

MARIS demonstrated the MARIS Geographical Information Manager, a software package providing map based data display, database and print-out capability for marine data.

* In chronological order of first presentation.

ANNEX VIII

SUMMARY REPORT OF THE MEETING OF DIRECTORS, WDCs OCEANOGRAPHY
United Nations, New York, 16 January 1990

The Meeting agreed on Guidelines for Data Exchange between the World Data Centres, Oceanography, as presented in Appendix 1, and **noted** that these do not conflict with the general principles established in the present draft for the Revised IOC Manuals and Guides No. 9, the Manual on International Oceanographic Data Exchange.

The Meeting recognized that extensive discussion of technical and practical issues between the Directors of the WDCs Oceanography is required to implement these guidelines. Therefore, the **Meeting recommended** that a Consultation between the Directors of the World Data Centres, Oceanography, be held as soon as possible, and **accepted with thanks** the renewed offer of the Director of WDC-D Oceanography to host such a meeting at his centre in China. It was agreed that there should be a consultation meeting of the Directors of WDCs A, B, and D, to be held in China, and that this meeting should be attended by the Secretary IOC, the Chairman of the IOC Committee on IODE, and the Chairman of the ICSU Panel on World Data Centres. **The Meeting requested** the Secretary IOC to consider the possibility of providing travel support from IOC and to consult with ICSU on the possibility of providing support from ICSU for the attendance of the Directors of WDCs A and B Oceanography, in order to permit an early date for the meeting.

The Meeting recommended that IOC Manuals and Guides No. 9, the Manual on International Oceanographic Data Exchange, should be revised to take account of the establishment of WDC-D, Oceanography, and the Guidelines agreed above. Recognizing that this would require major revisions to the text, **the Meeting recommended** that the necessary amendments be made at the proposed consultation. **The Meeting further recommended** that, in order to facilitate this, suggested revisions from each WDC (Oceanography) should be prepared and circulated to their counterparts well in advance of the Consultation. The Meeting was of the opinion that, despite the delay this would cause in the publication of the Manual, the Manual should not be published until these changes had been made.

The Meeting noted the need for adequate consultation between the IOC, SCOR, and the ICSU Panel on the World Data Centres on issues concerning the World Data Centers, Oceanography. **The Meeting believed** that it would be beneficial to set up a formal procedure for the establishment of new World Data Centres which would provide for a careful examination of the necessity for, and role of the proposed centre, in consultation with bodies substantially affected. **The Meeting took the view** that agreement between ICSU and IOC on the text concerning the WDCs for Oceanography and for Marine Geology and Geophysics in Manuals and Guides N° 9, and joint publication of this manual is the best means to formalize the role of the ICSU World Data Centers within the IODE System.

The Meeting prepared a draft Recommendation for possible adoption by IODE-XIII. This was subsequently adopted by IODE-XIII as Recommendation IODE-XIII.2

ANNEX VIII
Appendix 1

GUIDELINES FOR DATA EXCHANGE BETWEEN WDCs OCEANOGRAPHY

1. Copies of mutually agreed-upon routinely exchanged data types received by a WDC, Oceanography in internationally-approved data exchange formats will be exchanged with the counterpart WDCs.
2. Non-routinely exchanged data types will not normally be exchanged unless they are identified by the IOC Committee on IODE as being of general interest to the scientific community. For some types of data, not amenable to standard processing techniques, a copy of the originator's tape may be provided.
3. Magnetic tape copies of RNODE data sets, data sets from Specialized Project data centres, and data sets from international co-operative programmes will be routinely exchanged between the WDCs, Oceanography.
4. Copies of all ROSCOP forms (and other internationally-approved inventory forms) received by one WDC, Oceanography will be exchanged with the counterpart WDC. ROSCOP forms will be transcribed in the most expeditious manner possible, e.g., photocopies, copies of computer diskettes, etc.
5. When spare copies of marine scientific publications are received by one WDC, one copy of each will be routinely provided to the counterpart WDCs. There is no requirement for the WDC to seek additional copies of publications from the originator; likewise, there is no requirement to reproduce copies of publications held in the archives of a WDC. However, for publications relating to important international co-operative programmes, an extra effort should be made to acquire additional copies for provision to the counterpart WDCs.
6. Three copies of all catalogues of data, catalogues of publications, and reports prepared by each WDC, Oceanography will be routinely provided to the counterpart WDCs.

ANNEX IX

LIST OF ACRONYMS

ADCP	Acoustic Doppler Current Profiling
ASFA	Aquatic Sciences and Fisheries Abstracts (FAO)
ASFIS	Aquatic Sciences and Fisheries Information System (FAO)
BATHY	Bathythermograph Report
BIOMASS	Biological Investigation Of Marine Antarctic Systems and Stocks
BODC	British Oceanographic Data Centre
BUFR	Binary Universal Form for Representation (of meteorological data)
CARIPOL	Pollution Monitoring Programme (IOCARIBE)
CD-ROM	Compact Disk - Read Only Memory
CGOM	IOC Consultative Group on Ocean Mapping
CLICOM	CLimate COMputer
CMM	WMO Commission for Marine Meteorology
CNODC	China National Oceanographic Data Centre
CODAR	Coastal Ocean Dynamics Application Radar
CORINE	Co-ordination of Information on the Environment
COSINE	Co-operation for Open System Interconnection Networking in Europe
CTD	Conductivity, Temperature, Depth
DMG	Data Management Group (IGBP)
DNA	Declared National Agency
DRIBU	DRifting BUoys
EC	European Community
EGA	Extended Graphics Architecture
EODAN	European Ocean Data Applications Network
ESA	European Space Agency
EZZ	Exclusive Economic Zone
FAO	Food and Agriculture Organization of the United Nations
FGGE	First GARP Global Experiment (WMO-ICSU)
GEBCO	General Bathymetric Chart of the Oceans (IOC-IHO)
GE-OTA	IGOSS Group of Experts on Operation and Technical Application
GETADE	Group of Experts on Technical Aspects of Data Exchange
GEWEX	Global Energy and Water-cycle Experiment
GIPME	Global Investigation of Pollution in Marine Environment (IOC)
GLOSS	Global Sea Level Observing System
GTSP	Global Temperature-Salinity Pilot Project
HELCOM	HELSinki COMmission
IAEA	International Atomic Energy Agency

ICES	International Council for the Exploration of the Seas
ICSEM	International Council for the Scientific Exploration of the Mediterranean Sea
ICSU	International Council of Scientific Unions
IGBP	International Geosphere-Biosphere Programme
IGY	International Geophysical Year
IHB	International Hydrographic Bureau
IHO	International Hydrographic Organization
IMSTI	Institute of Marine Scientific and Technological Information (China)
INFOCLIMA	World Climate Data Referral System (WCP)
INFOTERRA	International Referral System (UNEP)
INODC	Indian National Oceanographic Data Centre
IOC	Intergovernmental Oceanographic Commission
IOCINCWIO	IOC Regional Committee for the Co-operative Investigations in the North and Central Western Indian Ocean
IODE	International Oceanographic Data and Information Exchange
JGOFS	Joint Global Ocean Flux Study
JODC	Japan Oceanographic Data Centre
KER	Kuroshio Exploitation and Utilization Research
LEGISLAT	National Marine LEGISLATION Data Base
LOSI	Law of the Sea Information System (UN(OALOS))
MARIS	MARine Information Service (Netherlands)
MAST	MARine Science and Technology
MEDALPEX	MEDiterranean ALPine EXperiment (IOC)
MEDI	Marine Environmental Data Information Referral System
MEDS	Marine Environmental Data Service (Canada)
MGG	Marine Geology and Geophysics
MIM	Marine Information Management
MONEX	MONsoon EXperiment
NODC	National Oceanographic Data Centre
NOP	National Oceanographic Programme
OSLR	Ocean Science in Relation to Living Resources
OSNLR	Ocean Science in Relation to Non Living Resources
PSMSL	Permanent Service for Mean Sea Level (UK)
RECOSCIX-WIO	Regional Co-operation in Scientific Information Exchange - Western Indian Ocean
RNODC	Responsible National Oceanographic Data Centre
ROSCOP	Report on Observations/Samples Collected by Oceanographic Programmes
SCAR	Scientific Committee on Antarctic Research
SCDB	Sub Committee on Digital Bathymetry
SOC	Southern Oceans
SOPAC	South Pacific Applied Geoscience Commission
SST	Sea Surface Temperature
TESAC	TEmperature, SALinity, Currents
TOGA	Tropical Oceans and the Global Atmosphere

TRACKOB	TRACK OBservation
UN	United Nations
UNEP	United Nations Environment programme
UN(OALOS)	United Nations Office for Ocean Affairs and Law of the Sea
VCP	Voluntary Co-operation Programme
WCRP	World Climate Research Programme
WDC	World Data Centre
WDCP	World Data Climate Programme
WESTPAC	IOC Sub-Commission for the WESTern PACific Region
WMO	World Meteorological Organization
WOCE	World Ocean Circulation Experiment