



IOC Committee on International Oceanographic Data and Information Exchange

Sixteenth Session

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Abstract

The Sixteenth Session of the IOC Committee on IODE was attended by nearly 100 participants from 37 countries and a number of partner organizations. The Committee recommended specific support to the IODE Regional Coordinators. In view of the success of the “Pilot Project on the Revision of MEDI” the Committee recommended to (i) make the MEDI a permanent IODE programme; (ii) establish a Steering Group for MEDI; and (iii) include the MEDI software tool in IODE training activities and capacity building products/projects. The Committee recognized the importance for IODE, through its data centres, to actively participate in the planning of marine scientific and monitoring programmes. The Committee thus recommended the establishment of a Steering Group on Establishment, Maintenance and Strengthening of Co-operation between IODE and Research and Monitoring Programmes. The Committee welcomed the establishment of JCOMM and decided that a constructive relationship should be established between JCOMM and IODE. The Committee recommended increased attention in the IODE system for remotely-sensed data, biological and chemical data, pollution data and coastal data. The Committee recommended the establishment of a Group of Experts on biological and chemical data management and exchange practises. Following the success of the GODAR project the Committee approved the development of the World Ocean Database Project and endorsed the further development of the IODE web site, the IODE Data and Information Portal and the related services and products. The Committee recommend for IOC to participate in the development of a marine XML and to promote the use of XML at the national level. The Committee recommended the establishment of a Steering Group for the IODE Resource Kit. Noting the success of regional data and/or information networks such as RECOSCIX, ODINAFRICA and MEDAR/MEDATLAS, the Committee recommended the development of additional regional networks.

¹ For reasons of budgetary constraints, Annexes III to X remain in English only.

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1. OPENING

- 1 Adjunct Prof. B. Searle, Chairman of the IOC Committee on International Oceanographic Data and Information Exchange, welcomed the participants to the Sixteenth Session of the IODE at 10:00 on 31 October 2000 in the Centro Cultural de Belém, Lisbon, Portugal.
- 2 Prof. L. Magalhaes, President of the Portuguese Foundation for Science and Technology, welcomed the participants. Prof. Magalhaes said that oceanographic data exchange has international relevance as oceans have no natural frontiers. He stated that management of marine resources requires a permanent international organization. Portugal is committed to international efforts of many aspects of ocean management. There are three particular reasons why Portugal is strongly committed: (i) Portugal is dominated by an extensive Atlantic coastline; (ii) the Portuguese presence in the Azores archipelago, which is a place of natural oceanographic phenomena; (iii) Portugal has historical roots in marine discoveries and one of the contributions of Portugal has been to unite the oceans through exploration and to view the oceans as a whole. The IODE focuses on these and other concerns. The full version of the speech is attached in [Annex V](#).
- 3 The Chairman of the IODE Committee welcomed Prof. M. Ruivo, representing his Excellency, the Minister for Science and Technology; Admiral M. Leal de Azevedo, Vice-Chairman IOC; Dr. P. Bernal, Executive Secretary IOC and Prof. L. Magalhaes, President of the Portuguese Foundation for Science and Technology and called the meeting to order.
- 4 The Chairman described the considerable length of time since the previous meeting of the IODE Committee in Athens in 1996. This was partially due to the very devastating and tragic earthquakes that occurred in Turkey in the beginning of August 1999, which forced Turkey to cancel its offer to host IODE-XVI. The Chairman offered the condolences of the IODE Committee to the Government and people of Turkey. He also thanked the Government of Portugal, the Portuguese Foundation for Science and Technology, and in particular, Prof. Ruivo for the efforts made to host the Sixteenth Session of the IODE Committee at such short notice and for the magnificent venue made available for the meeting.
- 5 The Chairman described some of the highlights of the IODE programme that had occurred during the intersessional period and indicated that there were many successes that would be discussed in detail during the meeting. Referring to the conduct of the IODE Committee meetings, the Chairman indicated that while it was important to describe past activities, it was necessary to shift the emphasis of the meeting to focus more on planning for the future. As part of that process, the Chairman indicated that he would seek the formation of a number of sessional working groups to look at future projects and activities.
- 6 The Chairman raised the issue of increasing requirements for data and information management resulting from marine science and monitoring programmes. He referred to developments in technology that could help address these needs, especially the development of the eXtensible Markup Language (XML). He also referred to the difficulties of implementing an international programme and stated that one of the ways to overcome these difficulties can be through centres that co-operate on international activities aligned with national objectives. This was demonstrated by the very successful GTSP activity where Canada and the USA data centres worked closely together and with science centres. The Chairman stressed that the conflict between national needs and the international perspective of IODE needed to be resolved if IODE was to continue effectively.
- 7 The Chairman stressed the need for continuing and strengthening the IODE capacity building programme and suggested that the formula of linking equipment, training and operational support, as demonstrated in the very successful ODINAFRICA project, should form a model for future capacity building activities. He also acknowledged the significant support of the Government of Flanders (Belgium) for the ODINAFRICA project.

- 8 The Chairman concluded by expressing concern with the decline in IOC staff resources available to implement the IODE programme and requested that this concern be brought to the attention of IOC Member States.
- 9 Dr. P. Bernal, Executive Secretary IOC, thanked the Portuguese Ministry for Science and Technology for offering to host this Session. He referred to the historical importance of Bel[im], as a departing place for many explorers making this a very particular and appropriate surrounding for an IODE Session. Dr. Bernal reiterated that IODE is the most successful global ocean data system that has underpinned many global ocean science programmes. He further referred to the GODAR project, which increased available data on the oceans by 60%. He expressed the hope that the project, after such a successful first phase, would soon be able to embark on a next phase. Dr. Bernal then pointed out that IODE now faces new challenges. The nature of the work of IODE has changed. Previously ocean data were needed for understanding the average picture of the ocean. Today we are more interested in the variance of the ocean as a system, which requires higher frequency data. Scientists highlight the risks related to human activities. This has created the '*Earth System Science*'. We need to observe and predict, so we need a global observing system monitoring land, ocean and atmosphere as a whole. This will generate new and huge data streams. The IODE will need to both archive and handle these through a dynamic data management system. The UNESCO and UN system are well placed to fulfil the role of '*standard setting*'. A system cannot succeed with a multitude of different formats and protocols. The development of the eXtensible Markup Language as an international standard and its application in oceanographic data and information exchange could be of tremendous benefit not only to the data and information management community, but also to the data users and scientific instrument developers.
- 10 Dr. Bernal conveyed the IOC Governing Bodies' strong support for the IODE. He also called on IODE to pay close attention to actions that may have a negative effect on the IOC's data policy of free and open exchange that has been in effect for the past four decades. He ended by wishing the meeting every success.
- 11 Admiral M. Leal de Azevedo, Second Vice-Chairman IOC addressed the Committee. He took this opportunity to acknowledge the outstanding contribution that Portugal has always made to oceanography and to the work of IOC.
- 12 An important outcome of this Session is bound to be a new paradigm for oceanographic data exchange, an alliance of interests from the private sector, governments, etc., towards a sound articulation of needs and mechanisms to improve our knowledge of the oceans. The full version of the speech is attached in [Annex V](#).
- 13 Prof. M. Ruivo, on behalf of His Excellency the Minister for Science and Technology addressed the Committee.
- 14 Prof. Ruivo stressed the great interest of his country in all issues relating to the ocean, not only because of its economic and environmental role but also for reasons of cultural heritage and history. This interest was clearly demonstrated during EXPO'98, aiming at creating public awareness for Ocean Affairs and, thus bringing marine culture to the public in general. He acknowledged that science and technology is now moving from a focus on descriptive oceanography towards operational oceanography, aiming at making predictions and meeting social requirements, for which real time data is essential. The future governance of the Ocean will require an integrated, cross-sectoral and interdisciplinary approach. Taking this into account, it is essential to, on one hand, reinforce the identity and capital of experience represented by IODE, in terms of international co-operation and, on the other, ensure that IODE's system is enhanced, rather than undermined, by parallel activities. Recalling the insufficient attention given to the oceans in the 1992 UNCED conference, Prof. Ruivo stressed that Portugal was of the opinion that they should be a major item on the Agenda of Rio+10, in 2002. The Informal Consultative Process, taking place within the United Nations, which should present its conclusions to the General Assembly in the autumn of 2002, can also contribute to enhance international co-operation and co-ordination in ocean affairs.

- 15 Recalling Portugal's position during its presidency of the European Union, Prof. Ruivo reiterated the need for IOC to be recognized as the appropriate body, within the UN system, dealing with the Ocean. He stressed the important role of IOC in the promotion and co-ordination of ocean related scientific research activities, ocean services and related regional bodies, as well as the development of national capacities, particularly in developing countries.
- 16 Prof. Ruivo closed by calling the attention to the lack of human and financial resources in IODE and ocean science and services in general. He called for strong action by Member States to correct this situation. The full version of the speech is attached in [Annex V](#).
- 17 Dr. E. Sarukhanian, Director of the WMO World Weather Watch-Applications Department, expressed the appreciation of the WMO Secretary-General, Prof. G.O.P. Obasi, who he had the honour to represent at this Session.
- 18 Dr. Sarukhanian referred to the long-standing collaboration between IOC and WMO, which had now resulted in the establishment of the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM). He recalled that, at its first transition planning meeting in St. Petersburg (July 1999), the Management Committee for JCOMM had stressed that one of the most important areas of future activities of the JCOMM should be the maintenance of the close relationship with IOC's IODE, especially with regard to the development of procedures and responsibilities for operational data management. At that time it was also recommended to use the IODE data network by JCOMM for the management and final archival of delayed mode ocean data.
- 19 Dr. Sarukhanian then proceeded on to the issue of IOC's policy on oceanographic data exchange. He noted that this is also an important matter for the WMO, and he referred to WMO's Resolutions 40 and 25, adopted by WMO's Twelfth and Thirteenth Meteorological Congresses respectively. He pointed out that these resolutions allow WMO to retain the fundamental principle of free and unrestricted exchange of meteorological data and products and in practice to expand the quantity of data and products exchanged.
- 20 He called on the IOC Governing Bodies to adopt an IOC policy that would be at least mutually compatible and reinforcing with that of the WMO. The full version of the speech is attached in [Annex V](#).

2. ADMINISTRATIVE ARRANGEMENTS

2.1. ADOPTION OF THE AGENDA

- 21 **The Committee adopted** the Agenda ([Annex I](#), hereto).

2.2. DESIGNATION OF A RAPPORTEUR

- 22 **The Committee accepted** the proposal by Mauritius, seconded by Australia, to designate Mr. S. Sato of Japan, as Rapporteur for the Session.

2.3. CONDUCT OF THE SESSION, TIMETABLE AND DOCUMENTATION

- 23 **The Committee decided** to establish *ad hoc* sessional working groups to deal with agenda items that required in-depth discussion. The following working groups were established:

- SWG on the Establishment and Maintenance of Co-operation between IODE and Research Programmes ;
- SWG on RNODCs;
- SWG on Regional Co-ordinators;
- SWG on IODE Data and Information Products ;
- SWG on the Workplan and Budget ;

- SWG on MEDI ;
- SWG on Training and Capacity Building.

24 **The Committee agreed** on their terms of reference and composition.

25 **The Committee adopted** the Timetable (Doc. IOC/IODE-XVI/1Add.Prov.Rev2).

26 The Technical Secretary, Mr. P. Pissierssens, presented the technical arrangements for the Session and informed the Committee of the various technical presentations and demonstrations that would be organized during the Session. The full list of presentations and demonstrations is added as Annex VII. He then introduced the Provisional List of Documents (Doc. IOC/IODE-XVI/4 prov. rev.), attached as Annex IV. The final List of Participants is given in [Annex III](#).

2.4. LOCAL ARRANGEMENTS

27 Mrs. A-P. Ormeche (Portuguese Committee for IOC), representing the local Organizing Committee, informed the Session on local arrangements and social events, offered by the Government of Portugal.

3. STATUS OF IODE

3.1. CHAIRMAN'S REPORT

28 The IODE Chairman opened this Agenda Item and referred to Document IOC/IODE-XVI/6 '*Report on Intersessional Activities of the Chairman of the IOC Committee on IODE*'. He described a number of changes that had occurred during the intersessional period and were impacting the IODE programme. These included changes in technology, the convergence of delayed mode and near real-time data streams and increase in the volume of data collected and exchanged, the introduction of new science programmes and increases in the need for marine data and information. The Chairman reiterated that IODE is the programme that has the mandate to support the management and exchange of marine data and information at the intergovernmental level and IODE is already providing a considerable level of support. Some of the high profile and very successful activities include GODAR, the MEDI Pilot Project, the IODE Resource Kit and GTSP. In addition to this, capacity building had been considerably strengthened, especially in Africa. With considerable support from the Government of Flanders, IODE had successfully begun the implementation of the ODINAFRICA Project.

29 The Chairman also expressed considerable concern at the reduced resources available at IOC to support the IODE programme, especially the declining number of IODE staff members at the IOC Secretariat. This decline will negatively impact the Secretariat's ability to implement the activities requested by the Member States. He called on the Committee to inform their respective national IOC representatives of this concern and bring this to the attention of the IOC Assembly in July 2001. This was especially important since 11 additional Member States had established NODCs during the intersessional period and the total number of IODE Member States is now 62.

30 The Chairman called attention to the increasing awareness of the need for marine data and information management and referred to the major conferences held over the past 3 years that had been devoted to these important issues. Two important themes related to the technology development emerged from these conferences: (i) the benefits of the Internet, and (ii) the increasing importance of metadata to data management and data exchange. The marine data and information community can benefit from many of these Internet developments and should adopt Internet-based technologies such as the eXtensible Markup Language (XML).

31 The Chairman then referred to on the deliberations of the Groups of Experts on Marine Information Management (GEMIN) and Technical Aspects of Data Exchange (GETADE) and the significant progress these groups had made. The reports of these groups were presented under the relevant agenda items.

32 An aspect of IODE activities that the Chairman considered as crucial was the establishment or strengthening of partnerships with other international and regional programmes. In this regard he pointed out that the IODE support for GOOS and relevant GOOS implementation and management mechanisms was given a high priority in the intersessional period. The Chairman described his participation in a number of GOOS-related meetings and in the meetings on the establishment of the new Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM). He stressed the need to follow up this activity with concrete proposals for co-operative projects; especially those developed within the end-to-end data management scheme. In relation to this, the Chairman briefly described the outcome of the IODE Strategy Group Meeting held in Paris (December 1998) attended by representatives of major global and significant national marine-related activities. The issue of standardization of data management was considered the highest priority, especially the development of a standard marine data dictionary.

33 The Chairman concluded by stressing the need for IODE to look to the future and adopt new technologies to improve the flow of data and their accessibility. He indicated the need to create a framework of convergence in data management practices, not one of divergence.

3.2. ACTIVITIES OF THE WORLD DATA CENTRES AND RNODCs

34 Dr. R. Wilson, representing the Chairman of the ICSU WDCs Panel, Dr. F. Webster, apologized that Dr. Webster was unable to attend because of the conflict with a major WDC meeting at the national Climate Data Centre in Asheville, NC, USA, being held from 6-8 November 2000.

35 The meeting in Asheville is addressing the future of the WDC system. The theme of the Asheville Conference is '*The World Data Centres in the Internet Era*'. The first day of the meeting will examine the WDC system as it currently exists. On the second day, working groups will plan how to create a globally networked system. It will address the needs for additional WDCs, and the recurring problems faced by all national centres that do international work with national funding. The meeting will also focus on the opportunities for using technology to increase the capabilities and capacities of the centres, for example, the concept of the virtual data centre. In other words, the WDCs face the same challenges as the IODE centres.

36 Dr. Wilson emphasized that ICSU welcomes the work that IODE is doing to identify the negative results that will occur if the free and open exchange of environmental data is restricted. The ICSU continues to support the IOC/IODE policy of free and open exchange of ocean data at no more than the cost of reproduction for scientific applications.

37 **The Committee noted** that there has been a long history of co-operation between IODE and the ICSU World Data Centres for Oceanography and Marine Geology and Geophysics. The NODCs of the IODE system provided data to the WDCs and the concept of IODE RNODCs was developed to support the WDCs with processing, quality control, etc., to broaden their capabilities for handling diverse datasets.

38 In terms of the RNODC system, the Committee was informed that ICSU appreciates the data and services provided by the existing centres and encourages the further development of the system as GOOS and the other observing systems develop.

39 **The Committee agreed** to develop a message, which would emphasize the need for strengthening co-operation and continuous collaboration between the Panel and IODE on the issues of common interest. The Committee invited a member of the US Delegation, Mr. R. Gelfeld, who will attend the Asheville meeting, to pass the message to the Panel.

40 **The Committee adopted [Resolution IODE-XVI.1](#)**

41 Mr. S. Levitus, Director of WDC-A, Oceanography reported that the WDC-A continues to be an archive for the cruise and data reports and other information and data. However, the WDC-A is becoming increasingly a centre for the development of intelligent, global, electronic ocean databases. The WDC-A has served an average of 150-200 requests per year for data and information. During the year 2000, the number of requests appears to be smaller although this may be due to data and information being made available via the Internet.

42 The WDC-A is providing data on CD-ROM and via the Internet. The next database to be released, '*World Ocean Database 2001*', will be made available on a DVD. During the IODE intersessional period, WDC-A supported, along with the IOC and BSH, the '*International Workshop on Ocean Chemical and Biological Data Management*' held in Germany. The WDC-A has also initiated an '*International Ocean Atlas Series*' of publications. Both hard copy and CD-ROM versions of these publications are produced.

43 The WDC-A continues to focus much of its resources on leading and supporting the IODE/GODAR project. The progress of this project is reported under Agenda Item 7.2.1.

44 Mr. N. Mikhailov, Director of the Russian NODC presented the WDC-B, Oceanography and WDC-B, Marine Geology/Geophysics reports on behalf of their Directors. He described the results of WDC-B's activities during the intersessional period (1996-2000).

45 The WDC-B, Oceanography received oceanographic data from 353 R/V cruises from 20 countries and 24 CD-ROMs containing GODAR, JGOFS, WOCE, MEDAR and other project data. The most significant products developed by the WDC-B include 6 issues of the WDC-B data catalogues. The analysis of data stream allows to conclude that data collected during cruises announced as NOPs arrive at the WDC-B with a delay of more than 2 years. Over 12 data formats were used in data submissions to the WDC-B. This makes the direct use of data very difficult.

46 The WDC-B, Marine Geology/Geophysics developed two CD-ROMs with marine geology, geophysics and non-living resources data for the Indian Ocean, Black and Mediterranean Seas. Inventories of marine geology/geophysics data, which have been accumulated by WDC-B, were loaded on the website of this centre. The WDC-B Geology/Geophysics, organized a training course (1997, Gelendzhik, Russia) on marine geology and geophysics data management.

47 The WDC-B, Oceanography actively participated in the GODAR project. In particular, it accumulated and submitted to the global ocean database more than 120,000 oceanographic stations, 390,000 BT and 6,000 CTD profiles. The WDC-B, Oceanography further developed a comprehensive ocean data inventory for the Mediterranean and Black Seas within the framework of the MEDAR/MEDATLAS II project. This inventory was loaded onto the website of WDC-B, Oceanography.

48 The WDC-B, Oceanography jointly with the Russian NODC organized two training courses on ocean data management for countries of the Baltic, Black and Caspian Seas region, involving 26 experts from 8 countries.

49 As other WDCs Directors were not able to come to the Session because of overlapping dates of the WDCs Panel meeting and IODE-XVI, **the Committee encouraged** its Chairman and the Technical Secretary to take steps in future to avoid the situation of overlapping schedules with the WDC Panel meeting, as it is most desirable to have all relevant WDCs Directors present and contribute to the sessional discussions.

50 The Chairman then referred the Committee to Documents IOC/IODE-XVI/7.64, 7.65 and 7.66, containing RNODCs reports and invited the representatives of the centres to provide additional information to the above-mentioned documents. The representatives of RNODCs for BATHY/TESAC data, WESTPAC, MARPOLMON, ADCP, drifting buoy data, formats, Indian Ocean and SOC described their intersessional activities, identified achievements and failures.

51 **The Committee noted** that through RNODCs, the IODE system has been able to provide considerable support to global programmes such as WOCE, GOOS and Argo, as well as assistance in capacity building of different regions.

52 **The Committee strongly endorsed** the need for the expansion of the RNODCs network to meet new demands and **supported the view** of the sessional working group on RNODCs on the need to strengthen the effectiveness of RNODCs. **The Committee recommended** the implementation of the following actions:

- X All RNODCs should examine their Terms of Reference and make proposal for modification, if appropriate.
- X RNODCs accept a leading role for the creation of metadata directories at the regional level.
- X RNODCs should keep close contacts with the scientists and scientific programmes in order to identify data and information requirements and to provide necessary services for the development of marine science in the region.
- X RNODCs should take a co-ordinating role in the discovery of data that are not yet available in the IODE system.
- X RNODCs should develop value-added data and information products to meet the requirements of regional scientific research projects.

53 The Delegate of the Islamic Republic of Iran, Prof. H. Zomorrodian, recommended the establishment of an RNODC for the Persian Gulf and proposed the Terms of Reference. The Iranian NODC has acquired good experience during the years of operation at the regional and national level, and has the required technical and scientific expertise. Furthermore, during the past few years, Iran has been able to develop constructive relationships with many countries in the region while implementing the Iranian President's 'Tension Relief Policies' and his further proposal of 'Dialogue Among Civilizations'. The Delegate of India, Mr. J.S. Sarupria expressed his support to the proposal and stressed that the centre, if established, will complement RNODC-INDO activities. **The Committee adopted** Resolution IODE-XVI.2 (reference is also made to Agenda Item 3.4).

54 The Delegate of France, Mrs. C. Maillard recommended that an RNODC for managing underway sea surface salinity (SSS) data be established. She further suggested that a Steering Group be created and that a pilot project for the management of such data be established. She stated that SSS data be considered as critical for the study of the decadal and longer time-scale variations associated with deep ocean overturning by the OOPC. The Delegate of France offered to host the RNODC at IFREMER/SISMER when established.

55 **The Committee adopted** Recommendation IODE-XVI.10 and **requested** the new Steering Group to implement the procedures for the establishment of an RNODC as described in the *IOC Manual and Guides N° 9*, Annex II and submit the application and Terms of Reference for the RNODC to the next session of the IODE Officers meeting.

3.3. NATIONAL DATA AND INFORMATION MANAGEMENT ACTIVITIES

- 56 The Technical Secretary introduced this item recalling that the letter of invitation to this Session (IOC Circular Letter No. 1651) had included a request to submit reports on national activities in marine data and information management to the IOC Secretariat in accordance with the guidelines provided in Document IOC/IODE-XVI/Inf.2, prepared by the IODE GEMIM. He welcomed that all Member States that had submitted a report had used this format. He informed the Committee that all reports thus received had been posted on the IODE-XVI website. He reported that, to date, a total of 33 national reports had been received (Doc. IOC/IODE-XVI/7.1 to 7.60). These are available on-line through the URL http://iode.org/iode16/documents/nodc_reports.htm
- 57 A few delegates then briefly highlighted some particular activities of interest.
- 58 The Delegate of Colombia, Mr. C.A. Parra, pointed out that his country has been undergoing a phase of recession, which has slowed down the activities of the NODC. Nevertheless, the data centre is re-establishing partnerships at the national level. Despite the difficulties, the Centre has developed a software package CIOH/Ocean Data software that was demonstrated during the Session.
- 59 The Delegate of Ecuador, Mr. M. Rodriguez Jara, informed the Committee that the Ecuadorian NODC has had some difficulties in improving its operational tasks due to a lack of training in oceanographic data and information management. He called for support from NODCs of developed countries to share their experiences and resources with countries in his region, possibly using the ODINAFRICA mode.
- 60 The Delegate of the Islamic Republic of Iran, Prof. H. Zomorrodian, informed the Committee that, due to the importance of the Caspian Sea for his country, the NODC of Iran has focused its activities in this geographical area. The NODC of Iran is now working on the establishment of a database for the Caspian Sea watershed (Iranian side) and has prepared a digital hydrographic map for the Caspian Sea (scale 1/750,000) that is now in print. A digital map of the Persian Gulf and Sea of Oman of the same scale has also been prepared.
- 61 The Delegate of the United Kingdom, Dr. L. Rickards, invited Member States to request copies of the many products, developed by BODC. She further referred to the progress of the '*International Inventory of Moored Current Meter Data*', maintained by the British Oceanographic Data Centre (BODC) on behalf of IODE. She informed the Committee that the Inventory is now available on the Internet as a searchable database. She reiterated the request by BODC during IODE-XV for information from the Member States on moored current meters.
- 62 The Delegate of Mauritius, Mr. S. Ragoonaden, informed the Committee about the establishment of the Mauritius NODC. He reported that a National Committee had been established composed of all ministries and national institutions, involved in the ocean. He further said that a metadata inventory had been developed but that it was still incomplete. A questionnaire has been sent out nationally in mid-October 2000 to complete the database. Mr. Ragoonaden thanked the Government of Flanders (Belgium) for the substantial support provided within the framework of the ODINEA project.
- 63 The Delegate of South Africa, Mr. M. Grundlingh, thanked Germany (surface observations), France (XBTs), the United States (GODAR data) and others for the valuable data SADC has been receiving, relevant to South Africa. He thanked the Government of Flanders (Belgium) for the support provided to South Africa through the participation of the Sea Fisheries Institute (now MCM) in the ODINEA project. He also informed the Committee of the plans of Namibia to establish a Data Centre. **The Committee requested** South Africa to keep the IOC Secretariat informed about the progress in this matter.

64 The Delegate of Madagascar, Dr. E.R. Mara, informed the Committee that his country had decided, subsequently to the formal establishment of the NODC, to build additional physical facilities to house the Centre.

65 **The Committee noted** the activities of the data centres within the framework of national or regional projects and acknowledged the unique experience gained. **The Committee stressed the need** to share this expertise in the widest possible way. In this regard, reference was made to the newly developed OceanPortal (See Agenda Item 8.2.1) as a mechanism to disseminate this knowledge.

66 The Delegate of Cuba, Ms. J. Gutierrez, thanked IOC for supporting her participation in this Session. She reported that Cuba had not yet established an NODC but was very interested in establishing such a facility in the near future. The Delegate informed the Committee that Cuba has national data and information management activities and has participated in a number of regional IODE workshops in the IOCARIBE region. The Delegate also reported that her institution would shortly start retroactive scanning of Spanish language IOC publications, following the provision of the necessary hardware and software by IOC.

67 Mr. S. Levitus, Director WDC-A, Oceanography, stated that his WDC was looking forward to closer collaboration with Cuba on oceanographic data and information exchange matters.

68 **The Committee welcomed** the participation of Cuba and **stressed** that IODE welcomes participants from any IOC Member State even those where currently no IODE NODC or DNA has been established. It was pointed out that participation in Session of the Committee would hopefully provide sufficient information and generate interest to subsequently make the necessary arrangements to establish a national IODE presence.

3.4. REGIONAL CO-ORDINATORS REPORTS

69 This Agenda Item was introduced by the IODE Vice-Chairman, Dr. E. Balopoulos. Dr. Balopoulos recalled that, in compliance with the general policy of IOC in implementing its programme activities through regional co-operation, the IOC Committee on IODE at its Fifteenth Session decided to appoint IODE Regional Co-ordinators within the Committee, who may help increase the effectiveness of the IODE support to regional needs. During the period 1996-1997, nine IODE regional co-ordinators, corresponding to the IOC regional interests were appointed, with the following Terms of Reference:

- keep IOC regional bodies and programmes informed on the IODE data policy and rules of procedure;
- be a link between the IOC regional bodies and the IODE Committee;
- publicize IODE activities;
- help the IODE Committee implement regional activities in data and information management by providing advice and establishing necessary contacts.

70 The regional co-ordinators appointed are:

- Mr. T. Nagai, IODE Regional Co-ordinator WESTPAC.
- Mr. J.S. Sarupria, IODE Regional Co-ordinator IOCINDIO.
- Dr. L. Awosika, IODE Regional Co-ordinator IOCEA.
- Mr. H. Ong'anda, IODE Regional Co-ordinator IOCINCWIO.
- Mr. A. Duncan, IODE Regional Co-ordinator IOCARIBE.
- Mr. A.J. Gil Villanueva [*retired*], IODE Regional Co-ordinator IOCSOC.
- Dr. E. Balopoulos, IODE Regional Co-ordinator Mediterranean region.
- Dr. A. Suvorov, IODE Regional Co-ordinator for the Black Sea region.
- Mr. R. Rojas, IODE Regional Co-ordinator for the Eastern Pacific (El Nino).

71 All regional co-ordinators, except Dr. L. Awosika, Regional Co-ordinator for the IOCEA region, submitted a report. Unfortunately, the Regional Co-ordinators for WESTPAC, IOCARIBE, and IOCSOC could not attend the Session.

3.4.1. IOC Sub-Commission for the Western Pacific (WESTPAC) Region

72 Mr. S. Sato (Japan) reported on behalf of Mr. Toshio Nagai for the WESTPAC region. Reference was made to the WESTPAC Regional Co-ordinator Report (Doc. IOC/IODE-XVI/8.1).

73 Mr. Sato informed the Committee of the International Conference on the International Oceanographic Data and Information in the Western Pacific 1999 (ICIWP99) held in Lankawi, Malaysia from 1-5 November 1999. The JODC planned the conference; IOC supported the organization of the conference in collaboration with JODC and the Oceanographic Research Co-ordination Committee of Malaysia. It was financially supported by the Nippon Foundation through the Marine Information Research Centre (MIRC) of Japan Hydrographic Association, the Japanese Science and Technology Agency (STA), through the Japan International Science and Technology Exchange Centre (JISTEC), and the Japan International Co-operation Agency (JICA).

74 The conference was attended by 113 data managers and scientists from 14 countries and was aimed at bringing together scientists and data managers to share knowledge about data management and marine science, to discuss the problems facing the IODE programme in the WESTPAC region and recommend ways to overcome these problems.

75 To meet this objective, the first 2 days of the conference were dedicated to presentations on oceanography and marine science activities in the region with the specific focus on data requirement needs and products. Fifty-six papers were presented under 5 themes: global climate, coastal environment, living marine resources, marine pollution and data management.

76 The Committee formulated the following recommendations:

- to establish a working group to develop a GODAR WESTPAC action plan;
- to nominate IODE National Co-ordinators in those WESTPAC Member States where there are none, as soon as possible. (In this regard the Conference noted with interest the decision of Thailand to establish a DNA and to nominate an IODE National Co-ordinator);
- the WESTPAC Member States to provide NOPs and CSR's to the RNODC-WESTPAC;
- the IODE to develop a distributed metadata system in the region using the MEDI software tool;
- the IODE to take the lead in the development of standards in marine data management, including Marine XML;
- the JODC to assist WESTPAC Member States with the establishment of a WESTPAC data management listserv and with the improvement of information exchange using the Internet. (In this regard the Committee was informed that the '*WESTPAC Discussion Group on Data Management*' westpac-ml@cue.jhd.go.jp has been established);
- a pilot project to be developed on the declassification of naval data.

77 The Conference expressed its appreciation for JODC's efforts in providing human resource training in the WESTPAC region and recommended the development of training courses to support other IODE activities such as the Resource Kit, GODAR, MEDI, etc.; and the IODE Chairman, who had been able to attend the Conference called on the Member States to visit the Conference pages on the JODC web site with particular attention to the Workshop's recommendations.

78 **The Committee welcomed** the outcome of the Conference and referred discussions to the relevant agenda items of the Session.

3.4.2. IOC Regional Committee for the Central Indian Ocean (IOCINDIO)

79 The IOCINDIO Regional Co-ordinator, Mr. J.S. Sarupria (India) referred to Document IOC/IODE-XVI/8.2. He recalled that the main objective of the IOC Committee for the Central India Ocean (IOCINDIO) is '*To enhance the regional co-operation in marine science and to develop the scientific programme in the region*'. He reported that during the IODE intersessional period, two meetings of the Regional Committee were held: the first one in Goa, India, in November 1996, and the second in Tehran, Islamic Republic of Iran, in February 2000. The Regional Committee adopted a programme for systematic observations and marine research in the region. The programme included the following projects: (i) Storm Surges project; (ii) Regional GOOS development; (iii) Coral Reef Monitoring programme; (iv) Integrated Coastal Area Management and Marine Pollution; and (v) IODE programme on Sharing of Data and Information.

80 Mr. Sarupria reported that the IODE system is well developed in the region. There are now eight NODCs and one RNODC in the region (RNODC-INDO). He welcomed the newly established NODC in the IOCINDIO region, Sri Lanka (1996). He assured Sri Lanka of the RNODC-INDO's full support and co-operation.

81 Two training courses on oceanographic data management were held in the region: in Iran in 1997 and in India in 1998.

82 Three CD-ROMs for the Indian Ocean region were developed. These are the JGOFS (India) CD-ROM, the NIO-HYDRO CD-ROM and the CD-ROM on Marine Biology developed by WDC-B, Marine Geology and Geophysics. The JGOFS (India) CD-ROM and the CD-ROM on Marine Geology were distributed to national and international users.

83 More than 200 data requests were handled by the RNODC-INDO during the intersessional period.

84 Mr. Sarupria concluded by stating that our understanding of the oceanographic processes of the Indian Ocean is still inadequate and there exists huge gaps in data availability.

3.4.3. IOC Regional Committee for the Central Eastern Atlantic (IOCEA)

85 No report was received from the IOCEA Regional Co-ordinator. Unfortunately the IOCEA Regional Co-ordinator, Dr. L. Awosika (Nigeria) was not able to attend the Session.

3.4.4. IOC Regional Committee for the Co-operative Investigation in the North and Central Western Indian Ocean (IOCINCWIO)

86 Mr. H. Ong'anda (Kenya), IOCINCWIO Regional Co-ordinator, reported on the progress in his region. Reference was made to the IOCINCWIO Regional Co-ordinator report (Doc. IOC/IODE-XVI/8.4). Mr. Ong'anda informed the Committee that, during the intersessional period, 8 out of the 9 IOCINCWIO Member States had now established an NODC or DNA: (i) France- La Réunion (NODC, France, 1971); (ii) Kenya (NODC, 1996); (iii) Tanzania (DNA, 1996); (iv) Seychelles (DNA, 1997); (v) South Africa (secondary NODC, 1997); (vi) Mozambique (NODC, 1997); (vii) Mauritius (NODC, 1999); and (viii) Madagascar (NODC, 2000). It is expected that Comoros will shortly establish a DNA or NODC, as it has now joined the ODINAFRICA Partnership (May 2000).

87 He stressed the need for support from the IODE system to the newly established centres.

88 Mr. Ong'anda referred to the success of the RECOSCIX-WIO project, established with support from IOC in 1989 and subsequently funded by the Government of Belgium and the IOC until 1997. Mr. Ong'anda reported that several RECOSCIX-WIO products have been continued and further developed during the intersessional period: (i) WINDOW (the Regional Newsletter, available in printed and electronic form); (ii) WIOPUB/WIOLIB: databases of publications published/available in the region; (iii) WIODIR: directory of marine and freshwater professionals in the IOCINCWIO region (part of GLODIR); (iv): the Marine Species Database for Eastern Africa (MASDEA); and (v) WIOBASE (compilation of the above mentioned information products, as well as additional data and information related to the IOCINCWIO region). He informed the Committee that the RECOSCIX-WIO services and products are now part of the ODINAFRICA-II project. A full report on the RECOSCIX-WIO project is provided under Agenda Item 7.3.3.1.

89 Mr. Ong'anda briefly reported on the ODINAFRICA-I project (Ocean Data and Information Network for Africa) that was implemented between 1997 and 2000. A full report on this activity is provided under Agenda Item 7.3.3.2.

90 Mr. Ong'anda reported to the Committee that the Kenya Marine and Fisheries Research Institute (KMFRI), host institution of the KeNODC and RECOSCIX-WIO Regional Dispatch Centre, is now an ASFA input centre. He informed the Committee that the Centre had submitted over 800 records to the ASFA database between 1996 and 1999. A staff member of KMFRI was trained on ASFA input procedures in 1999 at FAO Rome, supported by IOC. IOC had also continued to support participants from the IOCINCWIO region to participate in the Annual IAMSLIC Conferences that took place between 1996 and 2000.

91 The Delegate of Portugal, Prof. M. Ruivo, informed the Committee that Mozambique and Portugal continued to have a close relationship and that Mozambican librarians had received some training at IPIMAR. He expressed the intention of his country to continue and possibly expand this type of bilateral co-operation with Portuguese-speaking countries in Africa. He also informed the Committee that Portugal hosts quite a number of datasets relevant to the IOCINCWIO region and he offered to ensure that these datasets would become available to the data centres in the region.

92 The Representative of the WDC-A, MGG, Dr. M. Loughridge, informed the Committee that his Centre hosts information on the GEBCO project (<http://www.ngdc.noaa.gov/mgg/gebco/gebco.html>) and its regional component IBCWIO (International Bathymetric Chart for the Western Indian Ocean) (<http://www.ngdc.noaa.gov/mgg/ibcwio/ibcwio.html>). He also reported that his centre has several mirror site agreements with France, Kenya and South Africa ensuring improved access to NGDC information.

93 The IAMSLIC President, Ms. L. Pikula, expressed her organization's appreciation for the regular participation of IOCINCWIO information managers in the Annual IAMSLIC Conference and informed the Committee that the Annual Conference increasingly includes specialized training workshops. She reiterated her organization's invitation to information managers from developing countries to participate in the Annual IAMSLIC Conference.

94 The Delegate of Mauritius, Mr. S. Ragoonaden, called on the IODE Member States to provide support to enable IOCINCWIO data managers to undertake internships in well established data centres.

3.4.5. IOC Sub-Commission for the Caribbean and Adjacent Regions (IOCARIBE)

95 The IOCARIBE Regional Co-ordinator was not able to attend the meeting. Reference was made to the IOCARIBE Regional Co-ordinator's report (Doc. IOC/IODE-XVI/8.5)

3.4.6. IOC Regional Committee for the Southern Ocean (IOCSOC)

96 The IOCSOC Regional Co-ordinator was not able to attend the meeting. Reference was made to the IOCSOC Regional Co-ordinator's report (Doc. IOC/IODE-XVI/8.6).

3.4.7. Mediterranean Region

97 Dr. E. Balopoulos, Regional Co-ordinator for the Mediterranean region presented his report. Reference was made to Document IOC/IODE-XVI/8.7.

98 Dr. Balopoulos informed the Committee that during the intersessional period an effort was made by the Regional Co-ordinator to publicize IODE activities in the Mediterranean region and also to assist in implementing regional activities in data and information management. This was mainly attempted through personal contacts and stimulating regional co-operation for the development of co-operative data management projects, organization of training courses, participation in Conferences/Symposia/Workshops, and the development of data products and services. The above efforts led to the establishment of a new NODC (Cyprus) and the development of close links of co-operation between various NODCs and specialized marine institutes of the region. Through this co-operation, less developed NODCs were assisted in the development of national infrastructures for oceanographic data and information management, including data archives, inventories, etc.

99 With regard to regional projects, Dr. Balopoulos reported that large-scale regional projects related to the oceanographic data management was implemented in the Mediterranean Sea during the intersessional period, enhancing regional co-operation through the participation in these projects of several NODCs and specialized marine institutes.

100 The MEDATLAS Project was carried out in 1994-1997 jointly by the NODCs of France (Co-ordinator), Greece and Spain and was financially supported by the European Union.

101 The NODCs of France (Co-ordinator), Greece and Italy in 1996-1999 joined efforts in order to provide data management support to the basin-scale research Project MATER, financially supported by the European Union.

102 The MEDAR/MEDATLAS-II Project is being implemented since 1998 with the participation of the NODCs and specialized marine institutes from 18 countries of the Mediterranean and Black Sea.

103 Several NODCs of the European Union Member States of the Mediterranean Sea participated in the European Project EURONODIM. The aim of the project is to strengthen the quality and service of ocean and marine data and information management in Europe.

104 Dr. Balopoulos reported that during the intersessional period, two training courses were organized on '*Data and Meta-data Quality Control of the Mediterranean Sea*'. Both were carried out within the framework of the MEDAR/MEDATLAS Project. The first training course (22 November - 03 December 1999) took place in the NODC of France, in Brest. Participants included (as trainees or trainers) 19 scientists from 8 countries (of which 7 were Mediterranean countries). The second training course (29 November - 10 December 1999) which was held in the NODC of Greece, in Athens, was attended by 31 scientists from 15 countries (of which 10 were Mediterranean countries).

105 Several data products and tools for data management were developed by Mediterranean NODCs and specialized marine institutes during the intersessional period, mainly within the framework of their participation in regional oceanographic data and information management projects. These include national and regional inventories of oceanographic cruises and datasets, databases, software for oceanographic data quality control, etc.

- 106 A major data product developed as a result of co-operation between France, Greece and Spain, is the MEDATLAS Hydrological Database of the Mediterranean Sea. This represents the most comprehensive dataset of historical temperature and salinity profiles collected since the beginning of the last century by many scientific laboratories and hydrographic services. It is available as a set of three CD-ROMs.
- 107 During the intersessional period data managers of the Mediterranean Sea were stimulated and encouraged by the Regional Co-ordinator to participate in various conferences, symposia, workshops, etc., in order to present results of their activities in the field of oceanographic data and information management. A list of papers presented by Mediterranean data managers in these scientific events is attached to the Regional Co-ordinator's Report. (Doc. IOC/IODE-XVI/8.7).
- 108 In February 1999, an '*Oceanographic Data and Information Management*' Session was organized within the framework of a major International Conference on '*Oceanography of the Eastern Mediterranean and Black Sea*'. In this Session a number of papers related to oceanographic data and information management were presented demonstrating that initiatives undertaken in both the Mediterranean and Black Seas, provided the scientific community with very important data products.
- 109 An initiative has been undertaken by the Regional Co-ordinator for the publication of a special issue of the International Journal '*Oceanographic and Atmospheric Data Management*' entitled '*Progress in Oceanographic Data Management of the Mediterranean and Black Sea*' (Guest Editors: E. Balopoulos and C. Maillard). This issue will include selected papers reflecting the progress made in oceanographic data management of the aforementioned basins.
- 110 The Regional Co-ordinator concluded by saying that future plans include further expansion and strengthening of the Mediterranean NODCs network and further development of regional co-operation, through the establishment of new data management programmes, the organization of training courses and the production of advanced data products. The co-operation developed between the Mediterranean and Black Seas NODCs will be further widened.
- 111 The Delegate of the United Kingdom, Dr. L. Rickards and the Delegate of Germany, Mr. F. Nast, informed the Committee on the EURONODIM project. The project involves 16 national oceanographic data centres and marine centres from 14 European countries that operates in a coherent and operational mode to strengthen the quality, service and overall performance of ocean and marine data and information management in Europe, both on a national and international level. The EURONODIM objectives are to develop, maintain and electronically publish jointly 4 meta-data products/directories on the Internet to keep track of ocean and marine data and information and to improve the overall awareness, overview and access to ocean and marine data and information in Europe. The products are:
- (i) European Directory of Marine Environmental Data (EDMED);
 - (ii) Cruise Summary Reports (ROSCOP);
 - (iii) Research Projects Database; and
 - (iv) Navigation Web-site 'Guide to Marine Data and Marine Data Management in Europe'.
- 112 The EURONODIM project aims to exchange experience and to co-operate in the development, promotion and implementation of data and information management practices and methods; to develop and organize an overall capability for handling, processing, quality-controlling and archiving a variety of oceanographic and marine data types, anticipating differences in capabilities of individual partners and the evolvement of new data types. The Committee was informed that the project was now in its third and final year and that a proposal would shortly be submitted to the European Union for continuation of the project. It was hoped that the Eastern European, as well as North-African countries bordering the Mediterranean could be included in the new project. Information on the project is also available through the website <http://www.sea.search.net>.

113 The Delegate of Portugal, Prof. M. Ruivo, stated that not all European countries had been able to benefit fully from the data and information management capacities available in well-developed NODCs of the EU countries. He called on further strong efforts to work in a concerted way to better share expertise.

3.4.8. Black Sea Region

114 Dr. A. Suvorov, Regional Co-ordinator for the Black Sea region introduced this item referring to Document IOC/IODE-XVI/8.8. Dr. Suvorov reported that as the IODE Regional Co-ordinator for the Black Sea region he maintained contacts and collaborated with the Chairman of the IOC Black Sea Regional Committee (BSRC) Prof. V. Eremeev from the Marine Hydrophysical Institute of the Ukrainian National Academy of Sciences. He recalled that one of the main tasks of the BSRC is to co-ordinate and conduct activities of the Pilot Project '*Black Sea GOOS*'. The '*Black Sea GOOS*' aims at developing an evolving system able to acquire, integrate and distribute oceanic observations and data, and to generate analyses, forecasts and other useful products to provide information for decision-makers at the governmental level. The programme also supports industry, science and general public concerns on marine-related issues, including the effects of the global climate change on the Black Sea region. While IODE was internationally focussed, its mechanisms could be used to support regional issues.

115 Within the framework of the MEDAR/MEDATLAS-II project, and in co-operation with colleagues from the All-Russia Research Institute of Hydrometeorological Information (WDC-B, Oceanography), specialists from the Black Sea countries the most complete version of the data inventory on measurements of the Black Sea marine environmental parameters is being created. During the MEDAR/MEDATLAS-II Regional Workshop on the Black Sea held in Obninsk (Russia, June 2000), preliminary conclusions relating to the creation of the inventory were made. Considerable work was carried out for the preparation of the first version of the Black Sea database focusing on 14 parameters.

116 At the international conference '*Oceanography of the Eastern Mediterranean and Black Sea*' in Athens in February 1999, more than half of the reports on data management were devoted to the Black Sea issues. Within the framework of the Technical University Black Sea NATO Project finished in 1997, the interdisciplinary database on the Black Sea environment was created (Team Leader: Dr. V. Vladimirov, Senior Scientist of the Department of Marine Information Systems and Technologies of the Marine Hydrophysical Institute). In 1997, a training course on Marine geological and Geophysical Data Collection in management was organized for the Black Sea countries in Gelendzhik, Russia.

3.4.9. Eastern Pacific (El Niño) Region

117 This item was introduced by Mr. Ricardo Rojas, Regional Co-ordinator for the Eastern Pacific region, referring to Document IOC/IODE-XVI/8.9.

118 After the IODE Training Course held in Brazil in 1999, in order to increase the communication between the participants of the region and following a resolution of the meeting, CENDOC offered its capacities to produce and host a web page related to this IODE activity (<http://www.shoa.cl/cendoc/taller/taller.html>.) Mr. Rojas regretted that little input had been received from the participants to update the 'future activities' section of the page.

119 The Regional Co-ordinator with the assistance of Dr. P. Geerders, shared Chilean experiences in data recovery and exchange within the GODAR activities in the Caribbean and Central American region.

120 Mr. Rojas expressed regret on the low level of activity in the region during the intersessional period and noted that this was caused, *inter alia*, by the lack of communication with the IODE National Co-ordinators in the El Niño region. Improved communication between the National Co-ordinators and the Regional Co-ordinator is essential to strengthen IODE activities in the region. Mr. Rojas called on the IOC to give higher priority to the needs of the El Niño region and South America in general.

- 121 The Delegate of the Russian Federation, Mr. N. Michailov, reported that 4 training courses had been organized by his country during the intersessional period. These covered data management issues relating to physical oceanography, marine geology and marine geophysics. In order to reinforce data management in Eastern Europe, he called for the organization of such courses in future on a more regular basis. He offered the support of his Centre in this regard.
- 122 The Committee noted the importance of the Regional Co-ordinators mechanism and recognized the need to strengthen it. It was stressed that co-operation with the IOC Regional Bodies should be improved and an opportunity given to the IODE Regional Co-ordinators to participate at their regular meetings.
- 123 **The Committee expressed its appreciation** for the support provided by the European Union to European and other data centres. **The Committee called** for further co-operation between IOC/IODE and the European Union in the field of oceanographic data and information management and **requested** its Chairman and the Technical Secretary to bring the Committee's view to the EU DG-XII Director.
- 124 The Delegate from the Islamic Republic of Iran, Prof. H. Zomorrodian, called the attention of the Committee to the fact that the Persian Gulf supplies about half of the globally exported oil; the oil is sent from the region to the world's industrialized zones. Prof. Zomorrodian called for the urgent nomination of an IODE Regional Co-ordinator for this region. The extensive pollution of the region increases the necessity for such a nomination.
- 125 The Committee was informed of the co-operation between IOC and ROPME, as well as the planned Memorandum of Understanding between these international organizations. The MOU, if signed, would create an appropriate framework for stronger collaboration between the data management activities of ROPME and IODE.
- 126 **The Committee stressed** the need for the Regional Co-ordinators to establish effective 'human networks' that would allow to clearly assess the available resources and needs of the regions, so as to enable the Committee to timely respond to these needs.
- 127 **The Committee called** upon the Regional Co-ordinators to co-ordinate the development of capacity building proposals. **The Committee requested** that, to facilitate the work of future Sessions of the Committee, to submit such proposals not less than two months prior to the Session.
- 128 **The Committee noted** that the financial resources of the IOC are able to provide only seed money, and that additional donors need to be identified to complement these resources. **The Committee requested** the Regional Co-ordinators to assist the Secretariat in identifying these donors.
- 129 Taking into consideration the reports of the Regional Co-ordinators, **the Committee considered** the need to revise the Terms of Reference for Regional Co-ordinators, as they had been defined through Resolution IODE-XV.4.
- 130 **The Committee adopted** [Recommendation IODE-XVI.2](#).

4. STATUS AND FUTURE OF DATA FLOW AND DATA MONITORING PROCEDURES

4.1. NOPS - STATUS AND FUTURE OF 'RESEARCH SHIP INFORMATION AND SCHEDULES'

- 131 The Technical Secretary introduced Document IOC/IODE-XVI/10 '*Report on NOPs Submission - Status and Future*'. He recalled that National Oceanographic Programmes (NOPs) serve the purpose of informing other IOC Member States of the intention to conduct research cruises or research programmes. In particular, NOPs are intended to provide an opportunity for the development of co-operative programmes, especially of use to developing countries.
- 132 The Technical Secretary recalled that the Thirteenth Session of the IODE Committee (1990) had recognized that the ships schedule database operated within OCEANIC, maintained by the University of Delaware (USA) provides a good basis for a more practical and usable approach to the distribution of NOPs. Whereas the Fourteenth Session of the IODE Committee (1992) welcomed a substantial increase of NOP submissions during the previous intersessional period and welcomed the continuing collaboration with OCEANIC, IODE-XV in 1996 noted a drastic drop in submissions. However, during that Session, the Committee agreed that NOP submission should be continued, Member States encouraged, and that closer relations be established with OCEANIC in the framework of IODE to increase effectiveness of both sources of information. It had also been recommended that NOPs should be loaded on a WWW server, while continuing the practice of distributing NOPs in hard copy to those countries that have no access to WWW facilities to explore ways of merging CSRs and NOPs.
- 133 In response to a recommendation of the IODE Officers during their 1998 Meeting (Goa, India), Circular Letter No. 1563 (2 March 1998) was sent informing the Member States of the availability of NOPs on the OCEANIC WWW server. It also informed Member States that the IOC would continue mailing NOPs, and requested the continued mailing of NOPs to the IOC Secretariat.
- 134 Despite these efforts, there was the continuing decrease in NOP submissions between 1996 and 2000.
- 135 Dr. R. Wilson, representing the Chairman of the ICSU WDC Panel, then provided some statistics about the content of the '*Research Ship Schedules and Information Pages*' database, maintained by OCEANIC. Dr. Wilson reported that for the year 2000, OCEANIC contains 848 records, originating from 6 countries. The United States, with NOPs for 34 ships, contributed 778 of these 848 records. Dr. Wilson further reported that the database had been redesigned recently, now enabling both on-line searching and on-line entry of NOPs. He concluded by confirming the commitment of the University of Delaware to continue the '*Research Ship Schedules and Information Pages*' database service.
- 136 After extensive discussions, **the Committee agreed** that NOPs have been, and continue to be, an important and useful tool for the monitoring of data flow. Taking into consideration that (i) mailing to the IOC Secretariat, reproduction at the IOC Secretariat and mailing from the IOC Secretariat results in unacceptable delays; and (ii) the on-line publication of the NOPs at OCEANIC provides a considerably more valuable and cost-effective service, **the Committee decided** to cease the mailing of NOPs by the IOC Secretariat while maintaining a closer monitoring of the process. **The Committee acknowledged** with thanks the efforts of JODC in mailing their own NOPs and **invited** other NODCs to follow this example.
- 137 **The Committee recommended** that the NOP information be available on-line and Member States were encouraged to provide NOPs directly to OCEANIC, as it was considered a waste of very limited resources to duplicate the OCEANIC database system. It was noted that a link to the OCEANIC Research Ship Schedules and Information System has been added to both the IODE website and Ocean Portal.

138 **The Committee acknowledged** the effort of ICES in combining CSRs and NOPs reports in the same database and the efforts to evolve from CSR to the metadata system were considered as a big step forward in meeting scientific needs.

139 Noting a relatively high level of NOPs submission to ICES, **the Committee further agreed** to consider ways of effective co-operation between ICES and OCEANIC. **The Committee recommended** that the next session of GETADE will include the revision of NOPs and CSRs in its agenda taking into account new scientific demands and modern technological tools of rapid communication and exchange. In their efforts, GETADE should closely co-operate with relevant ICES groups.

4.2. STATUS OF THE MEDI PILOT PROJECT AND FUTURE ACTIONS

140 The GETADE Chairman, Mr. G. Reed, introduced this item, referring to Document IOC/IODE-XVI.11 *'Report on the MEDI Pilot Project'*. In his presentation Mr. Reed restated that the Marine Environmental Data Information Referral Catalogue (MEDI) is a directory system for datasets, data catalogues and data inventories developed by IODE. Its development was recommended in 1971 by the Joint Task Team on Interdisciplinary and Inter-organizational Data and Information Management and Referral (IMAR). The MEDI Catalogue was published in 1979 (1st Edition, *IOC Manuals and Guides No. 10*), 1985 (2nd Edition, *IOC Manuals and Guides No. 16*) and 1993 (3rd Edition, *IOC Manuals and Guides No. 16*). He recalled that the IODE Committee, during its Fifteenth Session had recommended (Recommendation IODE-XV.1) that a Pilot Project be undertaken to: *'Test the ways and means of applying modern methodology to the further development of the MEDI system and, on the basis of these investigations, to draft a specification for a revised MEDI'*. The objectives of the Pilot Project were: (i) prepare a clear statement on the level and breadth of information to be included in the system; (ii) identify a core set of fields necessary to constitute a MEDI entry; (iii) identify the technical requirements of the database; (iv) develop transfer interfaces between existing databases and the agreed-upon system; (v) develop suitable end-user interfaces for the databases also bearing in mind the needs of users not connected to the Internet; (vi) define necessary structures for the maintenance and further development of the system; (vii) make the MEDI system compatible with initiatives developed by other programmes, e.g., GCOS, WCP, INFOTERRA.

141 Mr. Reed reported that AODC had proceeded to implement the MEDI Pilot Project soon after IODE-XV. He explained that a review of existing national and international data directory systems (including EDMED and Blue Pages) had been undertaken, revealing many similarities allowing direct mapping between most fields. The first version of the MEDI software was released in 1998 and was distributed to data centres in Australia, Thailand, Vietnam and countries participating in the ODINEA project (Kenya, Madagascar, Mauritius, Mozambique, Seychelles, South Africa and Tanzania). In 1999, the GEMIM, during its Sixth Session, was invited to comment on the first version. This resulted in various suggestions for improvement of the tool.

142 In March 2000, during the Eighth Session of GETADE, it was decided to integrate the GCMD DIF structure into MEDI so as to enable that MEDI can be used as an off-line input tool for the GCMD.

143 Mr Reed concluded by introducing the current version of MEDI, which is a Java application with a Java Database Connection (JDBC) allowing the user to connect to the database of their choice thereby ensuring that the MEDI software is hardware independent, as well as database independent. He explained that the current version includes a Java database engine. Currently the software is available for the Windows environment (Windows 98, Windows NT) and for UNIX (Sun Solaris). A Macintosh version will be available shortly. The software is furthermore available with interfaces in English, French and Japanese. On-line help files, with examples, are available to assist the user. Records can be exported in XML, HTML or text format. The XML format can be used to export records to the GCMD system. The MEDI software is available for downloading from <http://www.aodc.gov.au/IODE/MEDI/>.

144 **The Committee congratulated** the MEDI Pilot Project participants on the successful completion of the MEDI Pilot Project and with the excellent MEDI software tool now available. **The Committee expressed its special appreciation** to the Australian Oceanographic Data Centre for developing the MEDI software tool.

145 The representatives of GOSIC (<http://www.gos.udel.edu>) and NASA/GCMD (<http://gcmd.nasa.gov/>) expressed their intention to use the MEDI software tool for their offline input.

146 Several delegates expressed their concern, based on national experience, about the difficulties to get users to create metadata records. It was observed that the development and distribution of the software would not suffice to create a comprehensive global ocean metadata system.

147 Some delegates suggested the use of the MEDI software tool as an input tool for CSRs. This generated lengthy discussions leading to the conclusion that this matter needed further study. The Delegate of Germany, Mr. F. Nast, suggested a joint project between Germany and MEDI in view of the European Union's EURONODIM Sea-Search project that includes an activity to develop a web-based CSR(ROSCOP) entry system (see also [Agenda Item 3.4.7](#)). It was concluded that the MEDI software could possibly be used for various other information management purposes (data citation, NOPs, project management) but that these options would require extensive further investigation.

148 **The Committee urged** Member States to use and promote the MEDI software tool and **adopted** [Recommendation IODE-XVI.1](#).

4.3. IODE DATA FLOW AND DATA MONITORING MECHANISMS: FUTURE ACTIONS TO IMPROVE THEM

149 Dr. I. Oliounine, IOC/IODE Consultant, started his presentation of the item by referring to existing IODE mechanisms for ocean data flow monitoring which include the National Oceanographic Programme (NOP), the Cruise Summary Report and the MEDI project. He reminded the Committee that the status of NOP submission was considered under [Agenda Item 4.1](#) and the Progress Report on the MEDI Pilot Project was thoroughly discussed under [Agenda Item 4.2](#). He further noted that although the status of the CSRs submission was not included in the Agenda as a special item, the information contained in the catalogues of the WDCs, some RNODCs and provided by the ICES Representative led us to believe that we may still consider this monitoring mechanism as a successful effort of Member States. The Representative of ICES gave the number of 500-600 CSRs submitted to the ICES Centre annually, which is very close to the average decadal number. Some decrease noted in CSRs submission to the IODE centres is related, to a large degree, to the fact that a number of research vessels and consequently, research cruises have decreased.

150 Under this Agenda Item the focus of discussion was on the further development of the operational IODE monitoring mechanisms and on the consideration of new ones. As a result of the discussion that followed, the importance of the NOPs and CSRs submission was reiterated and **the Committee called** on Member States to spare no efforts in providing the necessary resources for the NOPs and CSRs preparation and making them available to the international community.

151 **The Committee then considered** some developments in the integration of existing data flow and data monitoring activities in the light of the increasing needs to track data within the end-to-end data management activities of GOOS/GCOS. The Committee recalled that one of the first efforts in this direction was the establishment of a mechanism for the monitoring of ocean temperatures and salinity data in support of WOCE, as part of the IODE/IGOSS GTSP. Efforts with GTSP in particular have demonstrated the successful integration of near real-time and delayed mode data stream monitoring.

152 **The Committee agreed** that end-to-end data management systems similar to GTSP would be useful to meet the needs of the GOOS and GCOS communities. The detailed discussion of the past and future of GTSP took place under [Agenda Item 7.1.3](#).

153 **The Committee noted** that the distributed nature of the G3OS data and information systems is best served by a single entry for users. This central source is known as the Global Observing System Information Centre (GOSIC), and Dr. R. Wilson informed the Committee of the progress in the GOSIC development.

154 He presented an overview of the GOSIC web site that is being developed as a single window entry to the data and information collected and managed by the three global observing systems GCOS, GOOS and GTOS. The site has been designed to provide information on the development and specifications of the observing systems, access to the real-time and historical datasets and products, including downloading or ordering, and to provide monitoring information on the status of the various data flows. The GOSIC can be accessed through the URL <http://www.gos.udel.edu>.

155 The GOSIC is being developed, as a distributed information system so some of these functions will be accessed through links to other sites. The data centres that hold the data and products at the various stages of processing and distribution are expected to provide a page on their web site that GOSIC can link to. The page will provide a G3OS view of the holdings and activities of the centre and provide on-line access to the data and products. The centres are also expected to carry out automated or semi-automated data flow monitoring to demonstrate that the system is working, or identify problems. These data flow analyses will also be maintained on-line for access and analysis by those responsible for evaluating the performance of the system.

156 **The Committee congratulated** the GOSIC developers on the progress achieved and expressed satisfaction with the interest and readiness of GOSIC to co-operate with IODE in meeting the GOOS objectives. **The Committee noted** that the GOSIC data flow diagrams include a number of the IODE centres and invited the NODCs, in consultation with GOSIC, to develop draft pages on the various activities to which GOSIC can link, following the model presented in Figure 1, above.

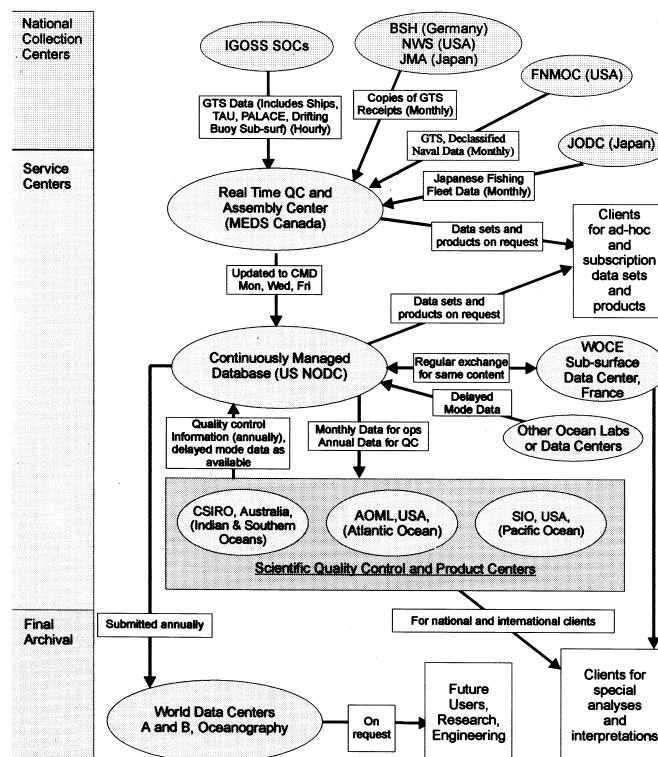


Figure 1: GOSIC data flow

- 157 **The Committee proposed** that the idea of web pages in the data centres be further tested on the data flows that are now operational as part of the GOOS Initial Observing system (IOS), through a GOSIC-IODE project which would have the additional benefit of promoting more GOOS-IODE co-operation.
- 158 **The Committee invited** GOSIC to co-operate with the IODE data and information centres that participate in the IOS in conducting these tests as much as possible.
- 159 The Representative of WMO, Dr. E. Sarukanian, informed the Committee that the GCOS Steering Committee (SG) at its Ninth Session (Beijing, China, September 2000) expressed its thanks to the leaders of the GOSIC for their efforts in support of the global observing systems and noted the progress made in its operation.
- 160 The GCOS Steering Committee (SG) had further endorsed the concept of a small advisory committee that would provide guidance and oversight for GOSIC. This Committee would consist of 6 members; 2 representatives each of the atmospheric, oceanic and terrestrial domains. One of each of the 2 domain advisors would represent the interests of the climate observing systems. They would be selected from, respectively, the AOPC, OOPC and TOPC. The other would represent the non-climatic observation interests in each domain. The establishment of the GOSIC Advisory Committee and development of its Terms of Reference would be led by GOOS.
- 161 **The Committee felt** that it would be most desirable to have an IODE representative in the Advisory Committee and invited the IODE Chairman to identify an expert and inform the Steering Committee for GOOS accordingly.
- 162 In conclusion of this Agenda Item, the Delegate from the Republic of Korea, Mr. Hae-seok Kang, informed the Committee of the progress achieved in the development of regional procedures for data flow monitoring. This mechanism is being developed for acquiring real-time or near real-time data will serve users in timely a manner as possible. The project is focussed on the NEAR-GOOS programme.
- 163 A kind of robot software named '*Smart Agent*' was developed which can connect to the designated web/ftp sites and download the specified file automatically. After downloading the specified file, it can automatically decide, unify the unit and re-format those data and also upload those to the database automatically with specified criteria. All these processes are done automatically and periodically and the processing results are logged in a log file.
- 164 **The Committee noted with satisfaction** that the data from China, Japan and the Republic of Korea are now gathered and served using this software. **The Committee recommended** continuing efforts in applying this software to improving NOPs, CSR and the MEDI data flow in the region, and invited NEAR-GOOS countries to assist the KODC in this activity.

4.4. ROLE OF IODE IN OCEAN SCIENCE AND MONITORING PROGRAMMES

- 165 In introducing this Agenda Item, Dr. I. Oliounine referred the Committee to the main aim of the IODE programme which was formulated at its establishment in 1961 and which is still valid: '*to provide services to different users and particularly to the science community*'. Scientists are and continue to be the main clients of IODE, and the IODE development is, to a large degree, motivated by scientific needs.

- 166 Dr. Oliounine referred the Committee to several projects that were initiated in support of global scientific and monitoring programmes. Among the latest are GTSP and GODAR. He then reminded the Committee of some mechanisms of co-operation with the scientific community that have been created within IODE to facilitate co-operation, such as the nomination of the IODE representatives to the data management groups of scientific and monitoring programmes, organization of joint meetings and inviting representatives of scientific programmes to participate in the work of the IODE Committee. Finally, Dr. Oliounine expressed concern that during the last few years, the effectiveness of these mechanisms has been decreasing and called on the Commission to recommend ways to improve the role of IODE in ocean science and monitoring programmes.
- 167 The Delegate of Canada, Dr. S. Narayanan, presented the Document entitled '*Task Team to Establish and Maintain Co-operation between IODE and Research Programmes*' which discusses the importance of IODE in global programmes and contains a proposal on the way forward for the IODE system to provide leadership in the establishment of end-to-end data management components in global programmes that are currently being planned. The IODE has many noteworthy successes, particularly in establishing and enhancing the marine databases, contributing to many global programmes. It is also increasing the awareness of the importance of data management and is enhancing the capacity for data management in many countries. However, the IODE has been falling behind in meeting the needs of a number of global programmes that are being planned under GOOS and other initiatives. The IODE will have to adapt to today's trend of integrated databases, distributed data centres and faster data flow. Dr. Narayanan proposed an intersessional group on 'The Establishment, Maintenance and Strengthening of Co-operation between IODE and Research and Monitoring Programmes', mandated with identifying opportunities for, and facilitating co-operation between, IODE and research and monitoring programmes, and particularly in meeting the end-to-end data management needs of the GOOS projects. Dr. Narayanan further proposed the inclusion into IODE, of relevant data management units within research institutes that are currently not designated as national data centres of the IODE system, since for many specialized datasets that are increasingly exchanged regularly, expertise resides often at such centres and not at the NODCs.
- 168 Dr. Narayanan emphasized that it is absolutely essential that IODE, through its data centres, actively participate in the planning of marine scientific and monitoring programmes. This may be achieved through the establishment of project teams. The IODE could form as many teams as it needs to address the requirements of the observational programmes being developed. There will be many commonalities between observational programmes, so that one group may be able to meet the requirements of many programmes. As groups achieve their goals, the resulting data management function passes from a development activity to an on-going IODE programme. The development group changes to a maintenance function and the group is dissolved. If new requirements come up that can be met by changes in an existing data management programme, developments are spun up with the current members and the requirements addressed. Members of a group may drop out and new members may be added.
- 169 Several Member States voiced their concern on the apparent divergence between IODE and research and monitoring programmes. **The Committee expressed** its intention to take steps to bridge the gap and **adopted** [Recommendation IODE-XVI.3](#).
- 170 The Committee then discussed the possible ways of co-operation with the Argo programme developed under GOOS. The Argo programme requires a comprehensive end-to-end data management system. Recognizing this, a data management-planning meeting was organized in October 2000 by the Argo Scientific Steering Committee. In addition to several researchers, data managers from Canada, France, Germany, United Kingdom and the USA attended this meeting and a draft plan for end-to-end data management was formulated. It was agreed that the quality-controlled data will be available from the French and US data centres in real-time and will be sent to the WDC-A for final archival. Information on the status of the floats on the programme and on its data will be made available by the Argo Co-ordinator located in Toulouse.

171 Recognizing the importance and volume of data collected by the Argo programme **the Committee recommended** the formation of an IODE/Argo Project Team which will include the IODE data centres currently participating in the programme and others as appropriate, such as the NODC of Chile, recently nominated for the Argo programme. The responsibility of this team will be to provide the data management support to Argo, as well as to facilitate the exchange of Argo data and information among the IODE Member States. Noting that MEDS (Canada) is a key player in the development of standards for data formats, quality control and data exchange, as well as the MEDS experience, **the Committee felt** that it would be desirable to have a representative of MEDS to Chair this project team and lead the formulation of the project from the IODE side. **The Committee requested** its Chairman to pass the Committee's view to relevant Argo bodies to start the development of the joint project.

172 **The Committee stressed** the need to establish close co-operation between the IODE centres involved in the management of data produced within the Argo project on one hand and the JCOMM Operating Centre responsible, *inter alia*, for monitoring of the operational implementation of the Argo project on the other.

5. CO-OPERATION AND ACTIVITIES RELATED TO GOOS

5.1. DATA REQUIREMENTS FOR GOOS MODULES

173 Dr. C. Summerhayes, GOOS Project Office Director, thanked the Committee for the opportunity to outline the activities of GOOS in the area of data and information management. He stated that in the past several months, there has been an increase in dialogue between GOOS and IODE on a range of data and information issues, and that IODE will play an important role in meeting the needs of GOOS.

174 Dr. Summerhayes noted that the climate module of GOOS is the most developed at present, mostly owing to the success of the First International Conference for the Ocean Observing System for Climate (OceanObs '99), St. Raphael, France, 18-22 October 1999. An important new paradigm is the widespread acceptance of the need for rapid release and exchange of data, with credit being given to data suppliers. He noted that the elements of the observing system for climate are listed in the annex of the OceanObs meeting report, including a table of variables to be measured and the space and time-scale resolution required for each type of measurement.

175 Dr. Summerhayes explained that the Coastal module of GOOS has been merged with the Living Marine Resources module and the Health of the Oceans module. This new module, called the Coastal Ocean Observations Panel (COOP) for GOOS, has developed a strategy and plan for data and information management based on an end-to-end management system. The plan outlines guidelines for the exchange of data, archiving procedures, quality control and quality assurance procedures, metadata needs, product development, data flow, and feedback. The plan also outlines the data management structure to be used, including information on data management infrastructure, levels of data management, data streams, and provision and evaluation of data services. The COOP has also performed a user requirements survey, documenting the most requested variables for measurement and monitoring in the coastal ocean. Dr. Summerhayes noted that the list of priorities for the first 18 of these variables was in agreement with the first 18 variables most requested as documented in the EuroGOOS data users requirement survey.

176 Dr. Summerhayes explained that there are many areas of potential interaction between GOOS and IODE, and that the key challenge is how IODE is going to respond to these activities, noting that the implementation structure is diverse and the requirements are for real-time data of a range of physical, biological, and chemical data.

177 Dr. R. Wilson, in his capacity as IOC Consultant and author of the GOOS Data and Information Management Strategy and Plan, introduced Document IODE-XVI/29 '*The GOOS Data and Information Management Strategy and Plan - Third Draft*'. The document has been developed under the direction of the GOOS Steering Committee and the Ocean Observation Panel for Climate.

178 This strategy is based on three levels of responsibilities including local centres, national centres, and regional or global centres. (See Figure 2). This structure has been designed to closely parallel the existing structures of the IODE system adapted as necessary to the special requirements for managing coastal data.

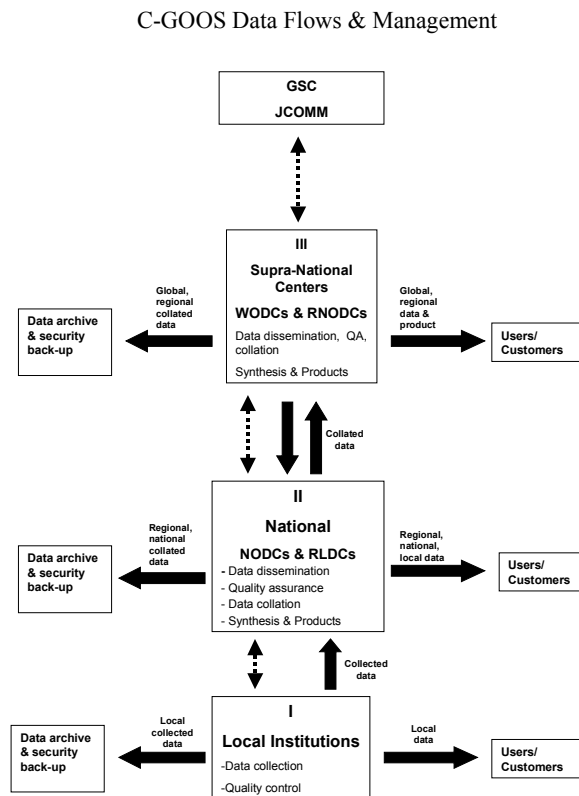


Figure 2 (Schematic of the communications network and data management subsystem of C-GOOS)

- The local centres at **level I** collect and quality control the required data for the application. They also provide network access to the data and metadata and timely delivery of datasets to level II, as will be set down in the specifications for the end-to-end data management systems that will manage the data. The local centres correspond to the national oceanographic institutions that provide data to the NODCs.
- At **level II**, there are NODCs or Responsible Local Data Centres (RLDCs). These centres have similar functions to the existing NODCs. The RLDC is a centre that is established when either an NODC does not exist, does not have the means or expertise to carry out the function, or the country operates its NODC in a distributed manner. At this level, additional quality control is carried out on merged datasets from the local centres, standards are applied to meet both national and international agreements, and the resulting datasets are delivered in a timely manner to the other levels.
- **Level III** is the supra national level and corresponds to the RNODCs and WDCs for Oceanography in the existing IODE data flows. At this level, data are collated from level II centres or as appropriate, from level I directly. Regional or global databases and products are produced here, and additional standards and quality control will be applied. Data flow monitoring will also be done to ensure the system is working as planned.

179 At levels II and III, the centres will often consist of some combination of scientific and data management centres co-operating to carry out the task or managing a particular coastal data flow.

180 **The Committee noted** that the Steering Group on End-to-End Data Management Systems is the IODE mechanism to develop the details of the co-operation and promote the participation of IODE in GOOS and in the Coastal GOOS projects. This includes increasing the participation of the existing IODE centres and recruiting new centres of the traditional type or identifying means by which other data centres or scientific centres can become associated with IODE in managing these data. (e.g., RLDCs).

181 **The Committee invited** the Delegate of Canada, Dr. S. Narayanan, to represent IODE at the coming meeting of COOP, which will take place in Costa Rica in November 2000.

182 The strategy also proposes the role for GOSIC as a one-window entry point for GOOS data and information (GOSIC has been discussed under Agenda Item 4.3). One task is to examine the various operational systems that make up the GOOS IOS to bring them up to the standards of the proposed end-to-end systems and to provide access to them through GOSIC. This will involve implementing the data centre web pages and data flow monitoring activities in the scientific and data management centres as described in [Agenda Item 4.3](#) referring to GOSIC. Another task is to assist the regional programmes in developing their data management systems as necessary, to link to them as appropriate through GOSIC. GOSIC will work with the GOOS pilot projects to develop their data management systems, provide access through GOSIC, and implement the necessary new end-to-end data management systems.

5.2. RESULTS OF THE GOOS/GCOS IMPLEMENTATION MEETING

183 Dr. Summerhayes explained that the implementation structure of GOOS and GCOS will be carried out by JCOMM, and that this item will be discussed in Agenda Item 5.5 by the Interim Co-President of JCOMM, Prof. D. Kohnke.

5.3. RESULTS OF THE IODE/GOOS MEETING

184 Dr. M. Hood, IOC consultant, presented to the Committee the results of the IODE-GOOS meeting held in conjunction with the GETADE meeting at NASA's Goddard Space Flight Centre in Greenbelt, Maryland, USA, 20 March 2000. The participants included representatives from IODE, GOOS, GOSIC, GCMD, and the MEDI pilot project. The purpose of the meeting was to discuss the metadata requirement of the GOOS programme and of the marine community, and to plan the necessary collaborations to meet the needs. Dr. Hood explained that the actual results of the meeting have already been demonstrated to the Committee through presentations of the MEDI pilot project, GOSIC, and GCMD, where the interactions between each group were presented.

185 Dr. Hood explained to the Committee that GOOS is a programme comprised of a number of operational programmes that already collect and manage their own data, and that one of the key challenges is to co-ordinate the data and information management activities of these various programmes in the framework of the GOOS end-to-end data management system. **The Committee noted** that one of the first and perhaps most important tasks are to unite these programmes under a common information system, where a user can find information about all the programmes from one source. For this, the GOOS programme will rely heavily on the collaborations between GCMD, GOSIC, and the MEDI system.

5.4. RESULTS OF THE GOOS STEERING COMMITTEE MEETING IN RELATION TO IODE

186 Dr. Summerhayes presented the results of the GOOS Steering Committee (GSC) meeting in relation to IODE. The GSC reviewed the progress of GOSIC, and was given a demonstration of the MEDI software tool. The GSC discussed how MEDI might be used in support of GOSIC and GOOS metadata management. The Committee further discussed how IODE would work with GOOS and GOSIC to provide a comprehensive and user-friendly metadata format for all GOOS data.

187 Dr. Summerhayes presented the components and programmes that constitute the GOOS IOS and also outlined the regional structure of GOOS, briefly describing the development stages, progress and/or activities of each.

188 **The Committee remarked** that the GOOS programme presents a number of challenges to IODE. The GOOS has expressed needs in the areas of data management and exchange, and the IODE community must respond to these needs.

189 **The Committee further remarked** that there exist several data centres that have the ability to support the GOOS programme now.

190 The Delegate of Canada, Dr. S. Narayanan, noted that the co-operation and support of IODE is being sought by GOOS for many tasks. One mechanism for developing this co-operation is through the work of the IODE Steering Group on the Establishment, Maintenance, and Strengthening of Co-operation between IODE and Research and Monitoring Programmes, established as discussed under [Agenda Item 4.4](#).

191 **The Committee emphasized** that one particular area of potential involvement is data standards and exchange protocols, which is an area where IODE has considerable expertise. Another area of involvement is capacity building. The GOOS capacity building efforts must evolve from the IODE activities, since IODE helps centres to develop the ability to participate in research and monitoring programmes. Some members of the Committee remarked, however, that we are moving into a new era of real-time data exchange and product development and that IODE centres are not sufficiently funded to be able to meet all the challenges of these new programmes.

192 Some Member States expressed concern that while the IODE system was mentioned several times in the data and information management plan for GOOS, IODE representatives were not sufficiently involved in the planning stages, and suggested that IODE representatives should be included in the planning process rather than coming into the project after the planning decisions had already been taken. The Committee was informed that there was and is considerable involvement of IODE representatives in the formulation of GOOS data and information management plans, noting that the Chair of IODE was invited to be a member of the Working Group for the implementation of GOOS/GCOS. For the COOP data and information management plan, Dr. R. Wilson was invited to participate in the planning stages because of his experience with IODE and the GTSP programme, and because COOP wanted to develop a plan that is consistent with the way in which IODE works. This arrangement also exists for the GOOS data and information management plan, where Dr. Wilson was hired as a consultant to write the plan.

193 **The Committee recommended** that the IODE involvement should be strengthened.

5.5. IODE/JCOMM INTERACTION

194 The Interim Co-President of JCOMM, Prof. D. Kohnke, informed the Committee of the merging of the WMO Commission for Marine Meteorology (CMM) and the Joint IOC-WMO Committee for the Integrated Global Ocean Services System (IGOSS) into the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM). As agreed by WMO and IOC governing bodies, JCOMM is to provide the institutional co-ordinating/integrating mechanism for all existing and future operational marine-related activities of IOC and WMO. He elaborated on the potential future working relations between IODE and JCOMM. He noted that to initiate the transition from CMM/IGOSS to JCOMM and to develop a coherent work plan in the time remaining until the first session of the new body (Iceland, June 2001), two Transition Planning meetings took place, the first in St. Petersburg, Russia in July 1999, and the second in Paris, France in June 2000. The work plan was to encompass the on-going work of CMM and IGOS, with a particular focus on GOOS and GCOS implementation. Prof. Kohnke noted that the challenge in the transition process is to find the appropriate way of getting from the present status of more or less independent bodies to a fully integrated process.

195 Prof. Kohnke outlined some of the principle aspects of the JCOMM structure, as described in Document IOC/IODE-16/13 '*The Establishment of J-COMM and Consequences for IODE*'.

196 As part of the integration process, the St. Petersburg meeting supported the concept of integrating as much as possible, all ship-based observation programmes, specifically the traditional Voluntary Observing Ship (VOS) scheme and Automatic Shipboard Aerological Programme (ASAP) of WMO, and the Ship-of-Opportunity Programme (SOOP) of IOC and WMO. The new concept would involve a full integration on matters of common concern in ship operations (ship recruitment and servicing, communications, metadata, etc.), with specialized technical sub-groups to deal with measurement-specific questions.

197 At the Paris meeting, the key item for discussion was the review of a draft detailed JCOMM structure and work plan. The meeting considered a proposal from the DBCP/SOOP Co-ordinator, for the establishment of a '*JCOMM Operations Centre*', to be based essentially on the existing DBCP/SOOP co-ordination and information centre, expanded as proposed to include also the Argo Information Centre. This centre would provide essential data and tools, as well as a centralized information and technical support facility, required for co-ordinating and integrating many of the existing operational ocean observing networks under JCOMM.

198 Capacity building was clearly recognized by the meeting as being another major issue, with the widespread availability of expertise and facilities in all JCOMM Member States being crucial to its future success.

199 Prof. Kohnke next discussed the relationship between JCOMM and IODE. He noted that the question of the consequences for IODE of the establishment of JCOMM should be considered from two standpoints: (i) JCOMM replaces *inter alia* IGOSS, which could be considered as the closest IODE partner; (ii) JCOMM appears in a world where Global Observing Systems are coming into being and rapidly developing.

200 Prof. Kohnke outlined 3 major areas of interaction:

- (i) **Co-sponsorship of GTSPP:** The GTSPP was initiated jointly by IODE and IGOSS in 1989 as a pilot project and transformed in 1996 into a permanent operational programme under the co-sponsorship of IODE and IGOSS. It is clear in this case that JCOMM will take the GTSPP co-sponsorship over from IGOSS. The JCOMM will follow the model established by GTSPP for the end-to-end management of marine data, incorporating both real-time (operational) systems and the delayed mode systems including IODE (see also Agenda Item 7.1.3).
- (ii) **Management and Archival of Relevant Delayed-Mode Data:** Another recommendation at the St. Petersburg meeting was "*that JCOMM use the IODE data networks for the management and final archival of relevant delayed mode ocean data*". That has been the constant IGOSS policy in the past and there is little possibility for any significant change in that policy caused by the establishment of JCOMM. Nevertheless, a new dimension is now added to what IGOSS was, that is the meteorological data, including marine climatology.
- (iii) **Metadata Management:** It was recommended "*that JCOMM use the developing IODE MEDI metadata directory system for the tracking and location of marine data*".

201 In addition to the presentation, Prof. Kohnke informed the Committee on the fate of the Joint GOOS-GCOS-GTOS Data and Information Management Panel (J-DIMP).

- J-DIMP has fulfilled its initial role and it is difficult to see a specific role for it at this time.
- G3OS DIM issues are sufficiently diverse that a single committee cannot provide each of the G3OS units with the specific advice needed.
- GOOS, GCOS and GTOS each need to address their own specific data issues, especially as we work

more closely with the space agencies that have their own panel (WGISS - the CEOS Working Group on Information Systems and Services).

202 As far as the relationship between JCOMM and IODE is concerned, there is no longer any kind of "supervisor", working at the level of the G3OS, and entitled to "*formulate and develop the G3OS Data and Information Management Plan(s), monitor the overall implementation of the data-related elements of the plans and make reports and present recommendations, as required, to the steering committees of GCOS, GTOS and GOOS on information management issues*" [from the J-DIMP Terms of Reference]. The JCOMM and IODE will work together in the field of data and information management, under the general principles established at the G3OS level, in close collaboration with the GSC and the relevant WMO bodies, namely CBS and CCI.

203 The IODE Chairman reminded the Committee, that it should determine the appropriate level of interaction with JCOMM. **The Committee noted** that in the past, the Chair of IODE attended IGOSS meetings and vice versa, and **expressed the wish** to have this practice continued.

204 The Delegate of Portugal, Prof. M. Ruivo, expressed his view that the IODE Committee should have increased links with other organizations such as WMO and UNEP, and especially with the GOOS programme.

205 The Representative of JCOMM, Prof. D. Kohnke, stated that it was both desirable and necessary to have interactions between IODE and JCOMM.

206 **The Committee decided** that a constructive relationship should be established between IODE and JCOMM.

6. STANDARD AND NOT YET ROUTINELY EXCHANGED DATA TYPES

6.1. REMOTELY-SENSED DATA

207 The Chairman introduced this item and referred to the contacts the IODE Committee previously had with the satellite community, largely through the efforts of the IOC Consultant, Mr. J. Withrow. He informed the Committee that Mr. Withrow had left the IOC almost 2 years ago and there had been little contact with the satellite community since this time. The Chairman indicated that he had attended a meeting of the Committee on Earth Observing Systems Working Group on Information Systems and Services (WGISS), representing GOOS. WGISS was looking at the delivery of data across the Internet and other projects that were relevant to IODE.

208 The Chairman suggested that it would be useful to re-establish a link with WGISS. The representative of NASA, Ms. L. Olsen informed the Committee that a meeting of WGISS was scheduled to be held in Sioux Falls, USA (planned for May 2001) and that it would be appropriate for IODE to have a representative present at this meeting. The Delegation from the USA indicated that they would be participating in this meeting and, with the approval of the IODE Committee, would be happy to represent the interests of IODE at the WGISS Meeting. The Committee supported this proposal.

209 A number of delegates expressed concern at the lack of access to satellite imagery especially for developing countries. In relation to this, Portugal suggested the formation of a Task Team to further examine the issues of IODE's relations with the satellite community and to improving access to satellite data that was particularly valuable in the coastal zone for resource management and environmental protection purposes. **The Committee referred** this matter to the next meeting of the IODE Officers.

210 The Delegate of the Islamic Republic of Iran, Prof. H. Zomorrodian called the attention of the Committee to the fact that his country has a NOAA HRPT receiving station. Regrettably, due to changes in the software and political circumstances, the station could no longer receive satellite images. He therefore called on the Committee to ensure that agreements are made with the remote-sensing community and agencies to ensure that IODE NODCs can receive support for acquiring the necessary hardware and software. **The Committee referred** this matter to the next meeting of the IODE Officers.

6.2. BIOLOGICAL AND CHEMICAL DATA

211 This Agenda Item was introduced by Mr. S. Levitus, Director WDC-A Oceanography. Mr. Levitus noted that his centre was now ready to receive plankton data on a routine basis. WDC-A has developed a plankton database that is integrated with physical and chemical oceanographic data. The WDC-A database takes into account the recommendations of the IOC-EU-BSH-NOAA (WDC-A) International Workshop on Oceanographic Biological and Chemical Data Management (Hamburg, Germany, 20-23 May 1996 sponsored workshop and uses some protocols used by the Japan Oceanographic Data Centre. The WDC-A has developed a spreadsheet for use in digitizing plankton as well as other oceanographic variables. Use of this spreadsheet will mean faster processing of plankton and other data by WDC-A. The BSH (Germany) has also developed a spreadsheet with similar purposes.

212 The Delegate of Germany, Mr. F. Nast, noted that they had had good response from data originators to their plankton spreadsheets, and offered to make these spreadsheets available. He also noted that there will be a workshop to review these formats.

213 The Delegate of Canada, Dr. S. Narayanan, noted that JGOFS had made some progress in the development of standards, and that now some other group must move this activity forward. She suggested the formation of a Group of Experts to develop standards for biological and chemical oceanographic data.

214 The Delegate of South Africa, Mr. M. Grundlingh, noted that there were gaps in the plankton database, particularly in the South Atlantic Ocean, and that this pilot project must also focus on mechanisms for actively encouraging data holders to contribute their data.

215 **The Committee adopted [Recommendation IODE-XVI.4](#).**

6.3. POLLUTION DATA

216 This Agenda Item was introduced by Dr. R. Wilson who informed the Committee of the recent review of the activities of the Global Investigations of Pollution in the Marine Environment (GIPME). The GIPME programme has been in existence for 24 years. Over that time there have been major changes in policy perspectives regarding protection of the marine environment. The Chairman of GIPME, Dr. J.M. Bowers, in consultation with several experts, has prepared a document on new directions for GIPME.

217 In the future, the focus for GIPME will be on anthropogenic activities. The programme will be developed within two core activities. The first core activity is transport, cycling, fate and effects of contaminants. This will include consequences of increased nutrient influxes; sources and consequences of changed sediment influxes; and sources, transport, and fate of synthetic organic pesticide compounds.

218 The second core activity is the development of indicators of marine environmental condition and effects. This activity will include development of human health indicators; training, development and proving of techniques for rapid assessment of marine pollution (RAMP); and the study of benthic indicators of condition. The GIPME has not yet addressed the data requirements for this new focus.

219 **The Committee stated** that it was premature for IODE to propose strategies for managing pollution data in support of GIPME. However, IODE does have some centres that have expertise with managing these data and could assist GIPME once some requirements are identified. GOOS may also identify requirements for some of its pilot projects that need assistance. In the meantime, IODE should construct an inventory of the NODCs and other national data management facilities that have expertise in marine pollution data and document the capabilities and 'best practices' that are available for dealing with this type of data. This task can be carried out within a broader project that has been assigned to the Group of Experts on MIM to document and publicize IODE capabilities in general.

220 The Delegate of Canada, Dr. S. Narayanan, described a project in Canada to implement systems for the management of chemical contaminant data, led by the Marine Environmental data System (MEDS). The MEDS had not yet dealt with contaminants data. The data model and the system requirements were developed by a joint team of a few data managers and scientists. The scientists were those already collecting, processing and managing the data using spreadsheets and notebooks. The databases are distributed with all the data being hosted in the regional science centres and the administrative and protocol information centralized in MEDS. For this project, more than 75% of the funding went to locating, preparing and loading the data, and the remaining 25% to developing and operating the computer systems. Using this model, other NODCs, not familiar with chemical or biological data should be able to address requirements in their country or internationally if there is sufficient co-operation with the scientists involved now with collecting and managing the data.

221 **The Committee tasked** the GEMIM with the documenting of experience within the IODE community in managing and archiving pollution data and in increasing the visibility in the community of this expertise. The collected information should be posted on the IODE web site.

6.4. COASTAL DATA

222 This Agenda Item was introduced by Dr. P. Geerders. He reminded the Committee that the coastal zone is actually the meeting point between the land, the ocean, the atmosphere and society. The conflicts of interests in this area - resulting from human activity - have led to an increased interest in integrated management of the coastal zone with a view on sustainability of its resources. Such management needs data: historical and future. A national strategy complemented by focused research and active participation of all stakeholders is essential in this process. Only on this basis, an information base can be put into operation, which can generate dedicated products and services, such as simulations, scenarios and alternatives for decision-making.

223 Integrated coastal zone management forms a unique opportunity for IODE to demonstrate the value of its tools and experience. Based upon its long-standing experience, IODE can assure that information is integrated in a proper way to benefit integrated management of the coastal environment and its resources.

224 The IODE has much to offer: guidelines, procedures and mechanisms, tools but above all experience. All these should be much more explicitly brought to the attention of the (potential) user communities. An active approach is needed based upon a profound knowledge of the user needs and requirements. Furthermore, capacity building and awareness creation should form a major part of IODE's activities in this area.

225 The Delegate of Portugal, Prof. M. Ruivo, expressed concern over the concept of separating coastal data from open ocean data, noting that such distinctions complicate data management activities of IODE.

226 **The Committee recommended** the strengthening of linkages to other coastal programmes such as COOP of GOOS and LOICZ.

7. PROGRAMME MATTERS

7.1. GROUPS OF EXPERTS

7.1.1. Group of Experts on Technical Aspects of Data Exchange (GETADE)

227 Mr. G. Reed, Chair of the IODE Group of Experts on Technical Aspects of Data Exchange (GETADE) introduced this item. He recalled that during the intersessional period, two sessions of GETADE had taken place: the Seventh Session was held in Dublin, Ireland between 20 and 22 October 1997 under the Chairmanship of Mr. R. Keeley. In 1998, Mr. Keeley resigned as Chairman and was replaced by Mr. Nick Mikhailov. The Eight Session of GETADE was held in Greenbelt, Maryland, USA hosted by the NASA Goddard Space Flight Center, between 12 and 17 March 2000.

228 The Group had identified the following medium-term objectives:

- develop an End-to-end Data Management Framework strategy and appropriate projects, products and services, based on user requirements;
- develop an IODE Global metadata management system;
- develop a marine XML as a mechanism to facilitate format and platform independent information, metadata and data exchange;
- develop the IODE Resource Kit as a marine data and information management reference tool for scientists and data/information managers;
- organize integrated national and regional level capacity building projects and programmes, linking equipment, training and operational support;
- develop a high-quality IODE web presence and IODE Data/Information Management Portal, as a mechanism to promote IODE, to reinforce the 'IODÉ family' principle, and to guide users to marine information, metadata and data sources.

229 The Chair of GETADE reported that the Group had recommended a detailed Work Plan for the period 2000-2001 with some 29 action items, and planned to meet again in 2001. Mr. Reed concluded by informing the Committee that all of the objectives were either completed or in progress: the MEDI software tool (see [Agenda Item 4.2](#)), the IODE Resource Kit (see [Agenda Item 7.3.1](#)), and the IODE web presence have been completed (see Agenda Item 8.2). The marine XML, End-to-end Data Management Framework and national/regional capacity building projects are in progress.

230 **The Committee congratulated** the Group with its important achievements during the past intersessional period and **thanked** the Members of the Group for their hard work.

231 **The Committee adopted** the Summary Report of the Eighth Session of the Group (Doc. IOC/TADE-VIII/3) and all recommendations contained therein.

7.1.2. Group of Experts on Marine Information Management (GEMIM)

232 Mrs. P. Simpson (UK), previous Chair of the GEMIM introduced this item referring to Document IOC/IODE-XVI/15 '*Report of the Chair of the IODE Group of Experts on Marine Information Management (GE-MIM)*'. Mrs. P. Simpson conveyed the apologies of the current Chair, Mr. M. Tapaswi, who was unfortunately not able to attend. After an intersessional period (GEMIM-V to GEMIM-VI) of three years, some major accomplishments had been achieved: (i) the excellent IOC/IODE web site and its IOC e-Library; (ii) the attainment of over 12,000 records in the Global Directory of Marine (and Freshwater) Professionals; (iii) the continued success of the Regional Co-operation in Scientific Information Exchange in the Western Indian Ocean project (RECOSCIX-WIO); (iv) the provision of ARIEL software to enable fast provision of information using electronic document delivery; (v) the support for librarians from developing countries to participate in training courses and professional conferences; and (vi) the growing interaction between the data and information communities under the aegis of IODE, particularly on MEDI.

233 Mrs. Simpson informed the Committee that the Sixth Session of the GEMIM had been held in Silver Spring, Maryland, USA between 31 May and 3 June 1999. During the Session, Mr. M. Tapaswi had been elected Chair of the Group. She called the attention of the Committee to that fact that, despite the Group's small size of only 5 members, a considerable portion of the GEMIM-V and GEMIM-VI work plans had been implemented.

234 The Group had developed the following work plan for the next intersessional period:

CAPACITY BUILDING:

- Development of information centres and/or regional information networks building on the RECOSCIX model (Support for RECOSCIX-WIO, RECOSCIX-CEA and others as requested by the IOC Member States).
- Development of training tools and products (MIM Toolkit (CD-ROM and WWW); Manuals and Guides (including MIM Publication Series)).
- Support for skills training and education (Training Courses and Workshops; Pool of Experts; Mentoring; Individual training or study grants).

PRODUCTS AND SERVICES:

- Development of information products and services (GLODIR, IDALIC and other Directories, IOC Publications catalogue, IOC e-Library (including full-text), Ocean Acronyms, etc.).
- Co-operative projects for the development of integrated data and information products.

235 The President of IAMSLIC, Mrs. L. Pikula, thanked the Committee for inviting IAMSLIC to this Session and confirmed IAMSLIC's strong interest in continued close collaboration between IODE and IAMSLIC.

236 The Delegate of Portugal, Prof. M. Ruivo, welcomed the success of the RECOSCIX-WIO project in Africa and expressed Portugal's intention to study the possibility to provide capacity building assistance to Portuguese-speaking countries in Africa.

237 **The Committee called** on the Member States to increase the participation of national information management experts in the IODE/MIM programme, regretting the poor response of the Member States to the invitation to nominate candidate experts for the GEMIM, and to include in the list, when appropriate, members from data centres with an information component.

238 **The Committee congratulated** the Group with its important achievements during the past intersessional period and **thanked** the Members of the Group for their hard work, carried out on a voluntary basis.

239 **The Committee adopted** the Summary Report of the Sixth Session of the Group (Doc. IOC/IODE-MIM-VI/3) and all recommendations contained therein.

7.1.3. Steering Group on IGOSS/IODE End-to-End Data Management Systems

240 The Chairman of the Steering Group on IGOSS/IODE End-to-End Data Management Systems, Dr. R. Wilson, presented the results of the last meeting of the Joint IGOSS/IODE Steering Committee on the GTSP held in Washington, DC, USA in April 1997. That meeting dealt with technical matters, related to the temperature and salinity data flow, quality control matters, etc. The meeting also discussed the continuing co-operation with the WOCE science centres of the Upper Ocean Thermal Programme. In fact, even though the observational phase of WOCE is over, these science centres are still providing their services to the ocean community and GTSP.

241 The GTSPP data flow continues to operate successfully. In fact, when the Argo float data first appeared on the GTS, it flowed automatically into the GTSP systems without any modifications to those systems, thus reaching IOC and WMO clients without delay. Since that time it has been proposed that the GTSP serve the needs of Argo for real-time data management. The Argo data will therefore be assembled and provided to the Argo programme in real-time by the GTSP Real-Time Assembly and Quality Control Centre in MEDS.

242 The GTSP has also prepared the datasets and associated information files for publication on the Upper Ocean Thermal CD-ROM that has been included in the second release of the WOCE datasets. More detailed information on the GTSP progress made is presented in Document IOC/IODE-XVI/16 '*The GTSP Project: Overview and Options for the Future*'

243 A major recommendation of the last meeting was that the GTSP, as a pilot project, has been successfully completed and there was no longer a need for the Steering Committee, and that it should become the IGOSS/IODE Steering Group on End-to-End Data Management Systems to address other data types. The GTSP would become the operational Global Temperature-Salinity Programme and would be an agenda item for meetings of the new Group. The future of GTSP was formulated and published as *IOC Technical Series N° 49* (1998) under the title '*Global Temperature-Salinity Profile Programme (GTSP) - Overview and Future*'.

244 Since 1997, there were no formal meetings in regard to GTSP. There have been complaints from participants that the programme has been leaderless lately. However, Mr. R. Keeley of MEDS has taken the opportunity of other meetings to have *ad hoc* meetings to address the more urgent operational needs of the programme.

245 **The Committee expressed** its thanks to Mr. Keeley for his initiative and dedication in taking on these responsibilities. However, **the Committee noted** that it is now becoming urgent that the new IGOSS/IODE Steering Group be activated and get on with its work.

246 The Committee considered some questions as on how to proceed. The existing Terms of Reference for the new Steering Group is 2 years old. With progress in GOOS they may not meet present needs. Although it is assumed that this new group will be a joint IODE-JCOMM Subsidiary Body, it is not clear how to implement this co-operation and develop an effective work plan quickly. **The Committee therefore recommended** that as a first step in activating the new Steering Group, a small meeting of experts, representing IODE, JCOMM and GOOS, be held, to prepare carefully considered recommendations on joint sponsorship and a work plan that can go forward to the JCOMM meeting in June 2001 and to the next IODE Officers meeting also planned for 2001 as an electronic meeting.

247 **The Committee requested** the Chairman of the Steering Group, in consultation with the IODE Technical Secretary and the WMO Secretariat to identify experts who will develop the agenda for the meeting of experts, taking into account the recommendations of IODE-XVI and relevant JCOMM and GOOS decisions. This process should be completed and an agenda developed by the end of 2000.

7.2. IODE PRODUCTS AND SERVICES

7.2.1. Global Oceanographic Data Archaeology and Rescue Project (GODAR)

248 The GODAR Project Leader, Mr. S. Levitus, reviewed the results of the project since its inception in 1993 and introduced Document IOC/IODE-XVI/17 *The GODAR Project: Moving Forward*. He informed the Committee that Member States have contributed data from approximately 800,000 bottle casts, 92,000 high resolution CTD casts, 946,000 MBT casts, 734,000 XBT casts, including data declassified by several navies, and data available from the IODE GTSP project. Approximately 600,000 plankton observations have become available as a result of the GODAR project.

- 249 All data submitted to the GODAR project by Member States have been made available internationally without restriction via CD-ROM and the Internet. The most recent database release being the *World Ocean Database 1998*. The next database release is planned for 2001 and will include at least an additional 450,000 temperature profiles including 130,000 profiles available as a result of the GTSP project, as well as many other data types.
- 250 Products based on the *World Ocean Database 1998* include the *World Ocean Atlas 1998* series of atlases and CD-ROMs which contain objectively analyzed fields of several oceanographic variables and more than 41,000 colour figures. These have also been made available internationally without restriction via the Internet.
- 251 The year 1998 marked the completion of the first phase of the GODAR project, culminated by the International GODAR Review Conference (IGRC) that took place in Silver Spring, MD, USA from 12-15 July 1999. The Conference summed up the results of the first phase and provided guidance for future GODAR activities. Substantial amounts of additional historical data that still reside only in manuscript form have been identified by Member States as a result of the 6 regional GODAR meetings that have been held to date. The GODAR project will continue to support rescue of these data through existing GODAR sub-projects.
- 252 Mr. Levitus then presented the World Ocean Database Project proposal contained in Document IOC/IODE-XVI/18 '*The World Ocean Database: Project Proposal*'. The main purpose of the project proposal is to stimulate international exchange of as much modern oceanographic data (collected during the last 20 years) as possible, in as timely a manner as possible, for the purpose of constructing the most complete, integrated, global oceanographic databases possible. Such databases must be as inclusive as possible of the data and metadata of commonly measured oceanographic variables and simultaneously measured meteorological variables.
- 253 **The Committee congratulated** the GODAR Project Leader and all those who have contributed to the success of the first phase of GODAR with the remarkable achievement in data exchange and providing services to a wide audience of users.
- 254 **The Committee expressed satisfaction** with the willingness of scientists and institutions of Member States to contribute data to the development of integrated, global oceanographic databases through the IODE system and the ISCU WDC system.
- 255 **The Committee emphasized** the importance of conclusions and recommendations formulated by the IGRC and **requested** the Secretariat to identify the necessary funding for the urgent publication of the report of the Conference in the IOC Workshop Series.
- 256 Dr. L. Rickards, representing the Group of Experts on the Global Sea-Level Observing System (GE-GLOSS), reported that the GE-GLOSS had discussed the need for data archaeology of historic sea-level records to extend existing time-series and to gain access to observations which are not in digital form. Subsequently, a representative of the GE-GLOSS proposed to the IGRC that sea-level data be included in the second phase of the GODAR project.
- 257 The rationale of the GODAR sea-level proposal is based on the fact that in many countries there are considerable amounts of historical sea-level data in paper form, such as charts or tabulations. These need to be computerized (i) to provide electronic access (ii) as a backup for data security and (iii) so that they can be subject to modern quality control and data analysis. The data can then be used for the various GLOSS-related activities described in the GLOSS Implementation Plan - 1997 (*IOC Technical Series N° 50*). The original records (e.g., charts, manuscript tabulations, etc.) would not be destroyed, as they may contain further information which is not captured by the computerized version (for example, charts digitized to hourly values might miss seiche or tsunami information) and also, in some cases, they are historic documents.

- 258 **The Committee supported** the proposal and **recommended** that the proposed sea-level data archaeology project should be co-ordinated by the GE-GLOSS, with the GODAR Project Leader acting as advisor to the project.
- 259 **The Committee encouraged** all countries to assess their holdings of historical tide gauge data which can potentially be rescued and convey that information to the Permanent Service for Mean Sea Level (PSMSL), which will act as the contact point. Following this, the GE-GLOSS would undertake action to put countries in communication with each other and with sea-level organizations with regard to collaborative data rescue. The GLOSS and other important sites (e.g., those with long records) should be regarded as priority sites. The Committee noted that sea-level data archaeology has begun in several regions already (e.g., Europe, USA and Canada).
- 260 The Delegate of Malaysia, First Admiral M. Rasip Hassan, submitted a work plan for the GODAR-type project in the WESTPAC region for 2001-2005. The aim of the project is to locate, rescue and make available marine data from the WESTPAC region (with the specific focus on the Southeast Asian region) that is in danger of being lost. Work will be undertaken to digitize the data or re-write it onto modern media in an effort to safeguard it for future use. The data gathered by the project will be made available to users in accordance with the IODE data policy of free exchange and open access.
- 261 **The Committee supported** the concept of the project and invited developed countries in the region to provide technical assistance for the project implementation. It was advised that assistance be based on existing co-operation schemes and include training courses and technology transfer.
- 262 Dr. P. Geerders then presented the IOCARIBE-GODAR project, which was initiated at the Sixth Session of the IOC Regional Sub-Committee for IOCARIBE in San Jose, Costa Rica in April 1999 (Recommendation SC-IOCARIBE-VI.2).
- 263 A group of experts from the region met under the Chairmanship of Dr. Geerders who acts as Regional Project Co-ordinator (RPC); in February 2000 at the IOCARIBE Secretariat in Cartagena, Colombia to define the Terms of Reference and implementation plan of the project, as well as identify possible funding sources.
- 264 The group revised the situation in the region and developed an approach to implement the project. This approach includes basically 2 phases: an inventory base and a phase for recuperation and digitizing. The group of experts came to the conclusion that a strong, motivated network of national contacts will be needed to further the project. The IOC Executive Secretary has invited the Member States to nominate national contacts. However, this process is proceeding very slowly.
- 265 **The Committee welcomed** the initiative of the IOC Regional Sub-Committee on IOCARIBE and **invited** the NODCs of the the lack of national project contacts in some countries and **urged** the IOC/IOCARIBE Regional Office region to support the project. **The Committee shared** the concern of the Regional Project Co-ordinator regarding and the IODE Regional Co-ordinator to help the RPC in this matter.
- 266 The Committee acknowledged Regional GODAR-type initiatives in the WESTPAC, IOCARIBE and Mediterranean regions (discussed in detail under [Agenda Item 7.3.3.3](#)).
- 267 **The Committee adopted** [Recommendation IOC/IODE-XVI.6](#) on the future ways of development of the GODAR programme.

7.2.2. Marine Information Management (MIM) Products and Services

268 This Agenda Item was introduced by Mrs. P. Simpson. Referring to Document IOC/IODE-XVI/19 '*MIM Information Services and Products: An Overview*', she gave a brief overview of the numerous information products and services developed under the guidance of the GEMIM including: (i) the establishment of the GEMIM, IODE, GETADE, RECOSCIX-WIO, ODINEA and ODINAFRICA-2 listservs; (ii) the development of a catalogue of IOC publications (the IOC e-Library); (iii) the development of the IODE web site template for Member States; (iv) the development of the Global Directory of Marine and Freshwater Professionals (GLODIR); (v) the identification of a low-cost Integrated Library Management System software (ABEKT).

269 With regard to the catalogue of IOC publications (IOC e-Library), Mrs. Simpson pointed out that the database currently contains over 500 IOC documents covering the period 1984 to 2000. Over 100 of these are now available on-line and can be downloaded as MS-Word or Acrobat PDF files. All new IOC publications are now immediately entered into the database and made available electronically. Mrs. Simpson added that these records are also submitted to ASFA. The IOC e-Library service, despite being opened only in April 2000, already receives over 2,500 requests per month.

270 Mrs. Simpson then proceeded to the Global Directory of Marine and Freshwater Professionals (GLODIR). Referring to GLODIR's predecessor, the UNESCO International Directory of Marine Scientists (UNESCO, 1983), she pointed out that UNESCO had continued to receive requests for this outdated publication until the IODE GEMIM, during its Third Session in 1992, decided to revive the directory. Taking into consideration the existence of regional directories and also the success of the RECOSCIX-WIO's WIODIR (Western Indian Ocean Directory of Marine Scientists), and noting the rapid growth of the WWW, the Group's subsequent Fourth and Fifth Sessions discussed this matter in-depth, recommended the format, keywords and other technical details and, under the MIM programme, requested the IOC Secretariat to develop an electronic, web-based directory. The first version of GLODIR was launched in February 1997.

271 Today, GLODIR contains over 12,000 records. The directory is not restrictive and allows entries from marine, brackish water and freshwater professionals. The site receives over 3,000 search requests per month and approximately 100 new records per month through on-line entry. A substantial number of additional records were received through national or regional sub-contracting arrangements. The system also requests the experts to enter information on their most relevant technical/scientific papers. Over 15,000 citations have been received so far. Between 1997 and 2000, several technical improvements have been made to the system and its interface, in response to user feedback. The GLODIR has been registered with the major search engines and ranks first in most. The system is referred to by nearly 200 web sites.

272 **The Committee congratulated** the IOC Secretariat in general, and Mr. P. Pissierssens in particular, for the success achieved with the range of products available on the IODE web site.

7.2.3. Future IODE Products and Services

273 The Chairman introduced this item and referred to many of the new products and services that had already been discussed under previous agenda items. In particular, he thanked the Chairs of GEMIM and GETADE for the significant work their groups have undertaken in the development of new capabilities. This includes GODAR, GLODIR, MEDI and the Resource Kit in particular. These products have a high profile in the marine community and are assisting IODE to further develop its data management programme.

274 Brief mention was made of the potential for new products to be developed as a result of a number of proposals made during the IODE-XVI Session. These included the additional data archaeology and rescue activities proposed and the various end-to-end data management activities under discussion in the sessional working group on that topic. **The Committee expressed its high appreciation** for the work undertaken to develop these products.

275 The Committee was then informed of the deliberations and outcomes of the discussions of the Sessional Working Group on New Products. The Sessional Working Group proposed that IODE develop an inventory of data products and tools that already exist in IODE centres. Such an inventory would be a very valuable tool in promoting the IODE programme and would also improve access to these products for the user community. **The Committee strongly supported** this proposal.

276 The Delegate of France, Dr. C. Maillard proposed the creation of a Sea Surface Salinity Project as a mechanism to develop a new product for salinity measurements. This proposal was strongly supported by Canada, who has experience with this type of data (Reference is also made to [Agenda Item 3.2](#) in this regard).

277 **The Committee considered** that a wide variety of data and information products, as well as data and information management tools have been developed by the IODE data centres. However, little information on these products and tools is made available to the IODE community. **The Committee stressed** the need to create awareness within, as well as outside the IODE community for these products and tools. This awareness would appropriately demonstrate the wide variety of high level expertise available within the IODE data and information centre community.

278 Accordingly, **the Committee tasked** the IODE Group of Experts on Technical Aspects of Data Exchange and the IODE Group of Experts on Marine Information Management to develop a comprehensive inventory of (i) data and information products; and (ii) data and information management software and related tools. **The Committee further decided** that these inventories should be disseminated through the IODE web site and should be included in the IODE Resource Kit.

7.3. CAPACITY BUILDING

7.3.1. Training Tools: IODE Resource Kit and Others

279 Mr. G. Reed presented Document IOC/IODE-XVI/20 '*The IODE Resource Kit Pilot Project*' and introduced the IODE Resource Kit Pilot Project. He recalled the IODE Officers' Meeting in February 1998 (Goa, India) that recommended the development of a Pilot Project proposal for an '*IODÉ Resource Kit CD-ROM*' for submission to IODE-XVI.

280 The stated objectives of the IODE Resource Kit were:

- to constitute a computer-based tool as a follow-up and complement to IODE Data and Information Management activities;
- to contain a number of modules which address marine data and information management requirements in the marine research process, going from programme design to program report;
- to support the development of marine data and information management capabilities.

281 In addition, the Officers Meeting (Goa, India, 1998) agreed that the project shall:

- review and revise the ODINEA Course-in-a-box CD-ROM's core document entitled 'A Toolkit of Data and Information Management Modules for ICAM and Coastal Oceanography Programmes';
- identify suitable data, metadata and information (including IOC documents) to include in the IODE course-in-a-box CD-ROM;
- identify suitable data formats and format translation utilities to include in the IODE course-in-a-box CD-ROM;
- produce a beta version of the IODE Resource Kit CD-ROM for submission to IODE-XVI.

282 The purpose of the IODE Resource Kit is to provide an ‘NODC- In-A-Box’ capacity building tool for oceanographic data centres containing data and information management reference material and software tools useful for data centres.

283 The Kit builds upon material presented at IODE capacity building workshops for the ODINEA project held in Mombassa (ODINEA 1997) and Cape Town (ODINEA 1998, ODINEA 1999). The media is CD-ROM and the Kit is browser-driven. The Resource Kit is written in HTML, with some documents provided in PDF, Word and Excel spreadsheet formats. Software applications are also installed and/or launched from the browser. The Kit has been developed by a small team composed of Dr. Murray Brown, Mr. Greg Reed and Mr. Peter Pissierssens.

284 The Resource Kit is modular in design and contains three basic modules, namely:

- IODE Data Centre System,
- Data Management Systems,
- Data Analysis and Products.

285 A fourth module, Regional Data and Information Custom Pack can be produced for specific regions and is currently available for the IOCINCWIO region.

286 The kit is also made available on the IODE WWW site (<http://iode.org/resourcekit> or <http://ioc.unesco.org/iode/resourcekit>), as well as on the AODC web site <http://www.aodc.gov.au/IODE/RK>.

287 The Delegate of Russia, Mr. N. Michailov, stated that the IODE Resource Kit is a very important initiative and offered to translate the Kit into Russian.

288 The Delegate of Ecuador, Mr. M. Rodroquez Jara, requested that the Kit should also be translated into Spanish. Dr. Brown pointed out that the Resource Kit currently contains over 1,000 html pages. Additionally, it contains several hundreds of multiple page documents. Translation into other languages would therefore be a time consuming and expensive undertaking that could only be achieved through direct support from Member States.

289 Mrs. P. Simpson pointed out that the Kit’s coverage is currently mainly data management. However, the GEMIM had recently drafted an outline for the MIM sections and it was now planned to request MIM experts, especially in UN agencies, to identify existing training modules or work with GEMIM to provide content.

290 The Delegate of Portugal, Prof. M. Ruivo, urged the development team to develop regional modules for all major regions of the IOC. He suggested that funding for such an undertaking could possibly be obtained from donors such as UNDP (GEF).

291 **The Committee congratulated** the authors with the completion of the IODE Resource Kit, and identified the product as an impressive and important achievement for IODE. In order to enable the further development of the Kit, **the Committee called** on the IOC Member States to assist the project financially, or in-kind.

292 **The Committee adopted** [Recommendation IODE-XVI/7](#).

7.3.2. Training Activities in Marine Data and Information

- 293 This Agenda Item was introduced by the Vice-Chairman, Dr. E. Balopoulos, referring to Document IOC/IODE-XVI/21 '*IODE's Training Programme: An Overview*'. Dr. Balopoulos reiterated that capacity building is an essential and critical part of all IODE activities. A strong IODE-TEMA policy ensures that the capacity building process is linked to existing and planned national and regional scientific programmes, thereby enhancing the success rate of capacity building activities.
- 294 The Vice-Chairman reported that during the intersessional period almost 20 short-term training courses had been organized in Japan, Thailand, Russia, India, Kenya, South Africa, France, Greece and Brazil. During these courses over 100 participants had been trained in different aspects of data and information management. The training courses were also used to promote the IOC.
- 295 An effort was made to explore the possibilities for some data centres to host long-term fellowships, with a duration of a few months to 2-3 years. The USA and Greece responded positively to this request and several short-term fellowships and study grants were provided.
- 296 Several international and regional conferences and symposia were organized during the intersessional period with a strong capacity-building component. These included, *inter alia*, the Ocean Data Symposium (Ireland, 1997), the International Conference on Oceanography of the Eastern Mediterranean and Black Sea (Greece, 1999), the IHO Marine Information Objects Conference (Singapore, 1998), the International Conference on Information Technology in Oceanography (India, 1998), and the International Conference on IODE in the Western Pacific (Malaysia, 1999).
- 297 Dr. Balopoulos also called the attention of the Committee to the new technology training tools that had been developed during the intersessional period including the ODINEA CD-ROM and subsequently the IODE Resource Kit. He described them as important training assistance and resource tools for newly established oceanographic data centres, as well as for experienced data managers and scientists, to acquire or update essential data and information skills.
- 298 Several expert missions were undertaken to more than 10 Member States in the Persian Gulf area, South America, Europe and WESTPAC region, to make feasibility studies on ocean data collection and processing issues. Advice and recommendations on the development or improvement of national or regional data collection and management infrastructures was provided.
- 299 In accordance with the IODE-XV recommendations, an effort was made to conduct an evaluation of the IODE-TEMA activities. A questionnaire was sent out to all IODE National Coordinators and Directors of NODCs, RNOCDs and WDCs. Regrettably, only 5 countries responded.
- 300 Dr. Balopoulos concluded by stating that the IODE/TEMA efforts should be strongly endorsed and strengthened. There is a need for a balance between short and long-term training. An IODE capacity building strategy should be developed based on the IODE Resource Kit. Regional Centres of Excellence should be identified in all regions. Travel and study grants should be provided on a competitive basis to young applicants working in areas relevant to oceanographic data and information management needs of their country. Priority should be given to applicants from developing countries.
- 301 **The Committee extended its high appreciation** to Japan for its continuing support to the WESTPAC region through the organization of oceanographic data management training courses in that region **and expressed its hope** that this effort would be continued.
- 302 **The Committee recommended** continuing organizing training courses on data and information management in the regions during the next intersessional period.
- 303 The Delegate of Iran, Prof. H. Zomorrodian, called for the provision of long-term training opportunities with regard to new technologies, stressing the need of developing countries to acquire this expertise.

304 The Delegate of India, Mr. J.S. Sarupria, called for the organization of a training course on oceanographic data management and remote sensing for the IOCINDIO region.

305 The Delegate of Kenya, Mr. H. Ong'anda called the attention of the Committee to the BILKO software, developed through UNESCO. This distance learning software would be most useful for developing countries interested in remote sensing of the coastal zone. The software is free of charge and should be used in IODE training courses. Mr. On'ganda called for the organization of a training course in remote sensing for the IOCINCWIO region.

306 In order to equip newly established data centres in developing countries, **the Committee invited** those data centres that have surplus equipment to provide these to new IODE data centres. **The Committee further invited** the data centres to provide a list of required or available equipment.

7.3.3. Regional Data and Information Networks/Programmes

7.3.3.1. RECOSCIX-WIO AND RECOSCIX-CEA

307 Mr. M. Odido, Regional Co-ordinator for ODINAFRICA-II/IOCINCWIO, reported on the development of the networks for Regional Co-operation in Scientific Information Exchange for the IOCINCWIO (RECOSCIX-WIO), and IOCEA (RECOSCIX-CEA), as well as the Ocean Data and Information Network for Eastern Africa (ODINEA), which had received support from IOC and the Government of Flanders within the framework of the ODINAFRICA-I project during the period 1998-2000.

308 The RECOSCIX-WIO project has promoted the development of marine sciences in the IOCINCWIO region through: (i) provision of bibliographic search and document delivery services; (ii) provision of training, equipment and software to marine science libraries in the region; (iii) development of the regional directory of marine scientists (WIODIR); (iv) development of a regional library holdings database (WIOLIB); (v) publication of the newsletter *WINDOW*; (vi) development of Marine Species Database for Eastern Africa (MASDEA); (vii) co-operation in ASFA as a regional input centre; and (viii) publication of WIOBASE (integrated Western Indian ocean data and information sources CD-ROM). The Workshop '*RECOSCIX-WIO in the Year 2000 and Beyond*' which was held in Mombassa, Kenya between 14-17 April 1999 (*IOC Workshop Report N° 156*) provided an opportunity to evaluate the project's structure and activities.

309 Noting the achievements made by the RECOSCIX-WIO Project in the region since its inception in 1989, the **Committee expressed its high appreciation** to IOC, the Government of Belgium through the Limburg University Centrum (LUC), and the Kenya Marine and Fisheries Research Institute (KMFRI) for the support that they have provided to the project.

310 **The Committee recognized** that the next phase of the project should strongly address sustainability. The network should be strengthened by provision of e-mail/Internet access, and by upgrading of equipment and software so that the entire project services and products can be availed electronically. The need was stressed for more in-depth training for librarians, especially using local training opportunities and distance learning tools so as not to disrupt the operations of the centers through extended absence of the librarians.

311 **The Committee**, however, **noted with regret** that the development of the RECOSCIX-CEA network, which was launched in 1998, had been rather slow due to administrative problems. **The Committee expressed its hope** that the appointment of a Regional Coordinator for ODINAFRICA-II/IOCEA will result in a strengthening of the network.

312 Discussions on this item are reported under [Agenda Item 7.3.3.2.](#)

7.3.3.2. ODINEA and ODINAFRICA-II

- 313 Mr. Odido then reported on a review of the ODINEA project, made during the last ODINEA workshop was held at IPIMAR, Lisbon, Portugal from 25-27 October 2000 (*IOC Workshop Report N° 172*). The participants of that Workshop agreed that the project had achieved its objectives. Training, equipment and software have been provided to new data centres that were established in Kenya, Madagascar, Mauritius, Mozambique, Seychelles, South Africa and Tanzania. The ODINEA-IODE Resource Kit, and its data CD module proved to be a very useful reference and training tool. The data centres have developed metadata bases, as well as websites for publicizing their activities, and have provided data services and products. However, additional capacity development, including equipment, software and specialized training is required to enable the new centres to prepare a wider range of products and serve their clients better.
- 314 The designation of KMFRI/RECOSCIX-WIO as an ASFA input centre has provided greater exposure to publications of scientists from the region through their inclusion in the ASFA database.
- 315 Mr. Odido pointed out that it may be necessary to have French and Portuguese speaking countries with well established data centres to provide internships in the next phase of the project to further strengthen and expand capacity in the region.
- 316 The Regional Co-ordinator for ODINAFRICA-II/IOCEA and Northern Africa, Dr. S. Cisse then provided a report on the discussions and decisions of the First ODINAFRICA-II planning workshop held in Dakar, Senegal from 2-4 May 2000 (*IOC Workshop Report N° 167*). The ODINAFRICA-II project aims at enabling Member States from Africa to establish NODCs or DNAs, get access to data available in other data centres, develop skills for manipulation of data, prepare data and information products, and develop infrastructure for archival, analysis and dissemination of the data and information. The ODINAFRICA-II project will build on the experiences of the RECOSCIX and ODINEA networks.
- 317 During the planning workshop, the 20 Member States participating in the project were gathered into two groups, each with a Regional Co-ordinator, for effective co-ordination. These are IOCINCWIO countries (Comoros, Kenya, Madagascar, Mauritius, Mozambique, Seychelles, Tanzania and South Africa); and IOCEA and Northern Africa countries (Benin, Cameroon, Côte d'Ivoire, Gabon, Ghana, Guinea, Mauritania, Morocco, Nigeria, Senegal, Togo and Tunisia). The initial budget had envisaged the participation of only 18 Member States but it was decided to welcome the two additional countries (Comoros and Togo) through slight reductions in individual national allocations that would not affect the effectiveness of the project. The participants stressed the need for linkages with other international programmes with similar objectives or activities (e.g., GOOS-Africa; Gulf of Guinea LME, etc.).
- 318 Noting the achievements of the RECOSCIX and ODINEA networks, **the Committee congratulated** the Secretariat and cooperating Member States for the initiative and hard work that has made these projects a success. **The Committee recommended** that the ODINAFRICA project could serve as a model for development of networks in other regions.
- 319 On behalf of the Member States that participated in the RECOSCIX and ODINEA projects, the Delegate of Tanzania, Dr. D. Masalu, expressed thanks to the Government of Flanders for funding the implementation of the projects.
- 320 **The Committee welcomed** the offer of the Australian Oceanographic Data Centre to host interns from the ODINAFRICA-II data centres, **and thanked** both the AODC and US-NODC who have hosted interns during the first phase of the project.

321 **The Committee also welcomed** the offer of Portugal to assist in the provision of documents and data to institutions participating in the project.

322 The Delegate of Ukraine, Dr. A. Suvorov, drew attention to the co-operation between institutions in the former Soviet Union and in the Gulf of Guinea and offered to assist in the implementation of databases and the retrieval of data collected from the region so that it can be made available to the national data centres in the region within the framework of ODINAFRICA-II.

323 The Delegate of India, Mr. J.S. Sarupria, expressed his centre's interest in co-operating with ODINAFRICA-II and proposed to consider a similar initiative for IOCINDIO.

324 **The Committee thanked** the Government of Flanders for the generous support it has provided for implementation of this project, **and urged** other Member States to assist in capacity building for data centres from developing countries.

7.3.3.3. MEDAR/MEDATLAS

325 The MEDAR/MEDATLAS Project Coordinator, Dr. C. Maillard informed the Committee of the progress made in the project implementation. She reminded the Committee that MEDAR/MEDATLAS follows the EU MAST/MEDATLAS (MAS2-CT93-0074) pilot project that released in 1997, the best presently available datasets of temperature and salinity profiles in the Mediterranean and Black Sea. The new project was initiated by a group of 20 participants, including (i) national data centres or designated national agencies for oceanographic data exchange of 15 Mediterranean and Black Sea bordering countries: Algeria, Bulgaria, Cyprus, Egypt, France, Greece, Israel, Italy, Lebanon, Malta, Morocco, Spain, Russia, Turkey, Ukraine, (ii) 3 modeling centres, and (iii) 2 international organizations - IOC and ICES. Links and co-operation have also been established with the global GODAR project at WDC-A, USA and with centres in some other countries bordering the Mediterranean and Black Sea region: Croatia, Tunisia, Georgia, Romania.

326 The project started in December 1998 for a 3-year period, in the framework of an EU concerted action (MAS3-CT98-0174-0174/IC20-CT98-0103) with the objective of preparing an up-to-date comprehensive and good quality database of temperature, salinity and biochemical profiles, useful to various kinds of users. The current tasks are the inventory development and rescue of national datasets, reformatting, quality control, integration, gridding, mapping, documenting and publishing of data on CD-ROM including appropriate software tools for data retrieval. Emphasis has been put on developing a common quality control protocol for data management including the MEDATLAS format and quality control procedures based on the GTSP experience and regional expertise. Two training workshops on data quality control have been carried out in Brest and Athens in December 1999. Another workshop on '*Objective Analysis and Mapping*' is to be held in Liege, Belgium at the end of the project. Networking and communication have been enhanced between the participants by using all available Internet facilities.

327 The project will also contribute to improving the overall level of data quality and quantity, decreasing the time lag between data collection and data release, and to facilitating the further use of data among scientific and non-scientific communities. A distributed data management structure will be developed. The MEDAR Group will contribute to the capacity building for real-time and delayed mode data management of scientific and operational programmes carried out in the Mediterranean and Black Sea.

328 **The Committee congratulated** the MEDAR/MEDATLAS Data Centres and especially the Project Leader for these achievements and **considered** the project a good example of co-operation between two international organizations - IOC and the EU - that should be expanded and strengthened. **The Committee invited** the IOC Executive Secretary to bring this view to the attention of the relevant EU structure.

7.3.3.4. Other Regions

329 Dr. P. Geerders informed the Committee about an initiative in Latin America, known as the ‘*Regional Centre for Marine Instrumentation, Uruguay*’. He referred to the current feasibility study of the need for a regional facility for calibration, intercalibration, quality assessment and control of marine instrumentation. Within the context of this feasibility study contacts will be established with the regional user community, centres providing similar services and relevant providers of marine instruments. It is expected that the future centre will substantially improve the quality of marine and coastal data in the region.

Under this Agenda Item, the Delegate of Chile, Mr. R.L. Rojas, on behalf of a group of Latin American countries, submitted a proposal for the development of an ODINLAC project similar to the ODINAFRICA project. To support the planning process, **the Committee adopted [Recommendation IODE-XVI.9](#)**.

330 The Representative of the UNDP/GEF Caspian Environment Programme (CEP), Dr. V.L. Vladymyrov, informed the Committee on the efforts of the CEP to support and facilitate the international environmental data and information exchange in the Caspian Sea region and to create information systems, data inventories and databases for the region. **The IODE Committee expressed its support** for this work **and expressed readiness** to provide its knowledge and expertise to the programme. **The Committee invited** the Caspian Sea countries to support and enlarge data and information exchange in the region.

331 **The Committee strongly recommended** that proposals for regional projects, introduced under this Agenda Item, be brought to the attention of the IOC Regional Bodies concerned, and that consultations with Member States be organized and their support sought.

8. USE OF NEW MANAGEMENT, EXCHANGE AND DELIVERY TECHNOLOGIES IN THE IODE SYSTEM

8.1. END-TO-END DATA MANAGEMENT FRAMEWORK AND ITS IMPORTANCE FOR THE FUTURE OF IODE

332 The Chairman introduced this item and provided a brief presentation, prepared together with Mr. N. Michailov (Russian NODC), on the issues of an end-to-end data management framework. He indicated that there were many reasons why an integrated data framework was needed. He described the present situation with a large number of data formats in existence, covering many different data types. In addition to this, many countries and centres have different computer systems. Also, different analysis and visualization applications are needed because each centre uses a different data format.

333 The problems caused by this situation result in a high level of duplication of effort. Data is quality controlled many times, translated from one format to another, with little or no value adding occurring during this process. There is duplication in database development and in many other aspects of information system development as well. The Chairman indicated that this is a substantial waste of effort. He indicated that the IODE community has proven the concept of end-to-end data management through the very successful GTSPP activity. He now considered it timely to introduce a technological solution to support the further development of this data management process. This could be provided through a data framework in much the same way as framework technologies underpinned the Internet.

334 The proposed marine data framework should comprise standards for data, data model and user interfaces. It should also bring in existing information technologies such as Internet based technologies, GIS and Object Oriented Technologies. He further stressed the need for such a framework to underpin the full cycle of marine data from collection through to product development and dissemination. The process of developing such a framework would include the creation of an overarching plan and the creation of a series of modules or 'building' blocks. The existence of existing data structures and computing systems needed to be taken into account when creating these modules. The Chairman pointed out that there were both technical and policy issues to be resolved and a clear focus needed to be maintained on the user needs. He further suggested that the issues that revolved around the general acceptance of such an approach be supported by the national centres.

335 The Chairman remarked that the Russian NODC had developed a prototype of the E2EDM framework using web technology including XML. This prototype was demonstrated during the Session.

336 Finally, he proposed that this framework be developed using the Internet technology and its eXtensible Markup Language (XML) as its basis. This process required the support of the broad user community and industry in order to be successful.

337 **The Committee tasked GETADE** to work on these technical issues.

8.2. IODE AND THE WWW

8.2.1. IODE Programme and Data Centre Presence on the WWW

338 This Agenda Item was introduced by the Technical Secretary, Mr. P. Pissierssens. He referred to Document IOC/IODE-XVI/24 '*IODE's Web Presence*'. In his presentation Mr. Pissierssens identified the target audiences of the IODE web site as (i) the IODE data centres; and (ii) the IODE product and services users.

339 He defined the core objectives of the IODE web site as:

- X for the IODE data centres:
 - provide updated information on the IODE Partners,
 - provide comprehensive information on the IODE programme implementation;
- X for the IODE Product and Service users:
 - provide description of the IODE system, programme, activities, and available expertise,
 - provide access to IODE products and services,
 - provide links to web resources of the IODE Partners,
 - promote IODE and its data exchange policy.

340 Mr. Pissierssens recalled the GETADE-VIII Recommendation to "*Develop a high-quality IODE web presence and IODE Data/Information Management Portal, as a mechanism to better support the IODE user community with improved abilities to locate marine information, metadata and data sources as well as promoting IODE and to reinforce the 'IODE family' principle.*"

341 Mr. Pissierssens noted with regret that out of the 26 NODCs that reported their URL to the IOC Secretariat, only 10 linked to the IODE web site (<http://iode.org> or <http://ioc.unesco.org/iode>) in their NODC site. Only 17 out of the 26 NODCs mentioned IODE in their web pages. In order to improve the visibility of the IODE Programme, the GEMIM had recommended the development of a draft IOC/IODE template. This template was announced in September 2000 to the IODE Data Centres (IOC Circular Letter N^o. 1668) and could be downloaded from the IODE web site. (http://iode.org/nodc_iodepage/iode.htm).

342 Mr. Pissierssens then proceeded with providing an overview of the various versions of the IODE web site since 1997. The latest revision dates from July 2000. In this version the 'weight' of the IODE products and services has been increased, compared to the more traditional IODE structure information, prominent in previous versions. He called on the IODE Data Centres to enter information on IODE-related events (workshops, training courses, conferences, etc.) into the 'activities' database available on-line (<http://ioc.unesco.org/activities>). New sections include (i) 'IOD internal', providing information of special relevance to the Data Centres (e.g., List of Circular Letters with download capability); (ii) Expertise section with links to the GETADE and GEMIM sections, as well as to the GLODIR database; (iii) Projects/Products: providing full information on the many IODE projects and products, such as ASFA, GODAR, GLODIR, MEDI, ODINAFRICA, IODE Resource Kit, Marine XML, OceanPortal etc.; (iv) Data/Info Sources: the OceanPortal; (v) Scientist Room: this section is intended to demonstrate to scientists how IODE can be of use to them. It should also include or refer to FAQs related to 'data and information management for research'; (vi) DataLab/InfoLab: this will also link to the Resource Kit; (vii) Capacity Building: information on group training courses, individual internships and grants, provision of equipment, etc. and how to apply for these; (viii) Publications/Document: link to the e-library.

343 In order to facilitate access to the IODE web site, the domain name <http://iode.org> has been registered.

344 The IODE website visits have increased rapidly since the most recent version of the site: from less than 20,000 requests in July 2000 to 55,000 requests in October 2000. The IODE web site has been registered with the main search engines resulting in top ranking in most major search engines when searching for the word 'IODÉ'.

345 **The Committee congratulated** the IOC/IODE Secretariat in general, and Mr. Peter Pissierssens in particular, on the new web site.

346 **The Committee regretted** the low profile of the IODE programme in many NODC web sites and **urged** the Data Centres to either include the IODE template in their web site or to ensure the IODE web site is clearly and visibly referred to in their web site(s).

347 **The Committee further urged** the Data Centres to urgently inform the IODE Secretariat of their URL and to ensure the Secretariat is informed about any changes to the URL.

348 **The Committee called** on the IODE data and information centres to advertise GLODIR within their centres **and invited** data and information experts to enter their information into GLODIR, stressing that the expertise available within the IODE community is substantial and should be publicized through GLODIR (<http://ioc.unesco.org/gloDir>).

8.2.2. IODE Data and Information Portal

349 This Agenda Item was introduced by the Technical Secretary, referring to Document IOC-IODE-XVI/24 'IODÉ's Web Presence'. Mr. Pissierssens referred to the recommendation of the Eight Session of GETADE that stated "*The profile of the IODE programme and its activities is not as high as it should be. It is essential that IODE establishes itself as the primary point of contact for scientists, scientific programmes and other users of marine data and information. To do this, IODE must have a greater visible presence and provide a more coordinated way of accessing the data and data and information products it has available at the Secretariat and at the many national oceanographic data centres. One mechanism to achieve this is through the use of the Internet and a specific capability of the Internet that is now being widely adopted by a number of industry and other groups. This approach is called a portal and provides access to services and products spread over a number of web sites.*". He reported that, in response to this recommendation, the IOC Secretariat had developed a Pilot IODE Portal, called the 'OceanPortal'.

350 The Technical Secretary defined the objectives of the OceanPortal as follows:

- the OceanPortal will provide a starting point for users searching for ocean data and information on the WWW;
- the OceanPortal will provide a top-level directory of ocean data and ocean information related web sites;
- the OceanPortal will promote the IODE Data Centres by guiding users to the Data Centre Data and Information Products/Services web pages;
- the OceanPortal will include (reference to) the GCMD/MEDI node for metadata creation;
- the OceanPortal WILL NOT BE a metadata system providing descriptions of INDIVIDUAL ocean datasets.

351 Mr. Pissierssens reported that the OceanPortal had been launched on 1 September 2000. He further explained that, in order to promote product recognition, the OceanPortal had registered the domain <http://oceanportal.org>.

352 At present the Pilot OceanPortal contains the following sections:

- DATA: metadata , data centres , projects , specialized sets , website catalogues.
 - INFO: e-journals , abstract DBs, bibliographic DBs, libraries , expertise sources.
 - INTERACTIVE : Contact Us , Discussion Forum.
- TIPS and TRICKS: Search tools.

353 On 19 October 2000, the Portal contained links to over 1,100 web sites. Nearly 10,000 requests were registered during the month of September 2000.

354 Mr. Pissierssens suggested two ways to proceed, if the Committee decided to continue the development of the OceanPortal: (i) continue the portal as static html files (as is used for the current version), or (ii) migrate to a database-based application, enabling on-line submission of URLs, powerful searching and other advanced capabilities. He noted that option (i) would be low-cost and easy to set up (existing already) but with limited capabilities. Option (ii) would be more expensive but would provide substantially more flexibility and capabilities.

355 Mr. G. Searle of WorldTree then gave a detailed presentation on the history of portals and on the benefits of vertical portals, also known as Vortals. He recalled the development of the Yahoo portal in 1995 and gave detailed information on the dmoz.org portal project, based on a large group (> 30,000) of voluntary editors that take responsibility for specific topics in the portal database. He noted that this decentralized approach had resulted in an extremely rapid growth and in a very rich database.

356 Mr. Searle then proceeded with an introduction on OneFish, the SIFAR portal for the fisheries community. The OneFish portal is based on 'knowledge objects' that are organized in hierarchical fashion, whereby each object can be part of multiple 'trees'. This enables users to follow multiple paths.

357 **The Committee decided** to proceed with further development of the OceanPortal.

358 **The Committee further decided** to continue with the current portal system (static html pages) and enrich the Portal as much as possible, while **tasking** the GETADE and GEMIM with (i) defining the content and technical specifications of the OceanPortal; (ii) identifying possible technical solutions to implement such a portal.

359 Several delegates suggested that, in order to make better use of the necessary technology, it may be appropriate to consider an IOC portal. However, **the Committee considered** that this might expand the scope of the portal too much.

360 It was noted that the IOC is a Partner in the UN-Atlas project, co-ordinated by the FAO. **The Committee noted** that the OceanPortal's objectives did not overlap with those of the UN-Atlas, a portal that had different objectives and a different target audience.

361 **The Committee recommended** that the other United Nations agencies should be informed about the IOC/IODE OceanPortal development through the appropriate co-ordination mechanisms.

8.3. DEVELOPMENT OF A MARINE XML

362 This Agenda was introduced by the IODE Chairman, Mr. B. Searle. He referred to Document IOC/IODE-XVI/25 '*Development of a Marine XML*'.

363 The Chairman gave a brief history of XML. He informed the Committee that XML is a markup language based on Standard Generalized Markup Language, with similarities to HTML. Whereas HTML describes style, XML describes content. It furthermore allows different methods of 'presentation' through the use of stylesheets and allows data exchange across the Internet. The most important property of XML is that it enables the creation of format independent structures for data exchange and processing.

364 The benefits of a Marine XML will be (i) improved data discovery and data access; (ii) automatic database population; (iii) automatic aspects of data quality control and dataset integration; (iv) simplified data exchange; (v) simplified data retrieval; (vi) simplified processing of data; (vii) provision of a common platform to support marine data management system developers; (viii) supporting the automatic entry of data into analysis and visualization applications; and (ix) support of different 'versions of data'.

365 The Chairman further reported that a Marine XML Consortium was being created to support the development of a single marine XML framework. It would provide a management and technical structure to the XML development process. So far, over 30 organizations and private companies had expressed interest in joining the Consortium. Seven agencies have now agreed to join. A Consortium office will be established to co-ordinate the activities.

366 Mr. Searle informed the Committee that the Russian Oceanographic Data Centre had developed a prototype of the E2EDM framework using web technology including XML. This prototype demonstrated during the Session. The Delegate of Russia, Mr. N. Mikhailov informed the Committee that his centre had been able to study and apply XML technology during the past two years and offered this expertise to IODE.

367 The Australian Oceanographic Data Centre had developed an XML based data quality control system.

368 The Consortium will need to resolve several technical (syntax to use, marine sector keywords parameter list, extent of XML framework) and policy issues (membership, ownership, semantics, influence).

369 **The Committee acknowledged** the importance of XML and **recognized** the need for IODE to be closely involved in the development of a Marine XML. **The Committee stated** that additional to assuring free and open access to data at the policy level, it would also help to ensure access at the technical level and XML will facilitate this process substantially. **The Committee stressed** that XML technology and expertise should be available to all IOC/IODE Member States.

370 **The Committee encouraged** the IOC to establish special arrangements aimed at facilitating access by developing countries to XML technology.

371 **The Committee recommended** that the IODE Groups of Experts (GETADE and GEMIM) be involved in the XML Consortium.

372 **The Committee adopted** [Recommendation IOC/IODE-XVI.8.](#)

8.4. REPORTS ON NEW TECHNOLOGIES WITH RELEVANCE TO IODE

373 This Agenda Item was introduced by Mr. G. Reed from Australia. He recalled the clear presentation on the concept of a marine XML under [Agenda Item 8.3](#) and the advantages of using XML for the exchange of ocean data. Mr. Reed also recalled that XML provides many advantages in relation to the exchange of oceanographic data. It can provide a platform for data centres to share data in a common syntax. Data can be stored in the originator's format and yet still be available for exchange over the Internet by using pre-defined tags to describe the data. The XML model requires its own query language and XQL, or XML Query Language, is being proposed to the World Wide Web consortium for recommendation as an industry standard.

374 Mr. Reed informed the Committee of the emergence of the Marine Geographic Information Systems (GIS). The Marine GIS has successfully adapted to a technology, designed primarily for land-based applications and structured in a 2-dimensional framework, that does not match the ocean environment. By explicitly recognizing and attempting to overcome the limitations of GIS, marine geographers and oceanographers have succeeded in improving its fundamental toolbox, while extending the methodological framework for its applications. A useful reference that discusses adapting GIS to the marine environment is the *Marine and Coastal Geographical Information Systems* edited by D.J. Wright and D.J. Bartlett published in 1999.

375 Mr. Reed then introduced the concept of Web mapping as another technology that can be of benefit to data centres. Web mapping will make it possible to overlay and combine complex and essentially different kinds of geographic information automatically over the Web, despite differences in the vendors' geographic data storage, analysis, and display systems. Web mapping will greatly accelerate the ability to access and understand geo-spatial information from multiple sources and this will include oceanographic data. The Web Mapping Testbed is an Open GIS Consortium Interoperability Initiatives, which involves sponsors and participants.

376 He further reported that the AODC is involved in a clearinghouse pilot project to serve maps of oceanographic parameters over the Internet as part of a governmental project to integrate data, both marine and terrestrial, from different agencies using the Internet as the platform.

377 Relating to the potential use of new and developing technologies, **the Committee requested** GE-TADE to maintain a close watch on the appropriate technologies, **and recommended** that GIS-related technology be given closer attention at the next meeting of the IODE Committee.

378 **The Committee also advised** that the IODE pilot projects (already underway and those proposed at the Sixteenth Session) incorporate these new technologies, especially the marine data framework concept and XML, as was considered appropriate. In this way, these technologies could be tested.

9. IOC OCEANOGRAPHIC DATA EXCHANGE POLICY

379 Dr. M. Hood, IOC Consultant, discussed the review process of IOC's data exchange policy, providing the Committee with background information of what has taken place, what conclusions have been reached at each step of the process and what is planned for the future.

380 Dr. Hood recalled Resolution 11 from the Twentieth Session of the IOC Assembly, which calls for an *ad hoc* Working Group to examine the data policy with a view to proposing to the next session of the Assembly a restatement of the general IOC principles and policy with regard to oceanographic data exchange, and a statement of recommended practices and the required institutional arrangements for the operational exchange of oceanographic data. She then presented the conclusions from that *ad hoc* Working Group, which met at UNESCO Headquarters in Paris, France, 15-17 May 2000, as detailed in the summary report of the meeting (IOC/INF-1144 rev). The *ad hoc* Working Group concluded that the issue of data commercialization may have far-reaching implications and consequences for the programmes of the IOC, and thus need to be discussed among Member States. While the *ad hoc* Working Group was unable to reach a consensus on a new IOC data exchange policy, it brought together a substantial amount of information to aid the decision-making process of the IOC Governing Bodies.

381 The *ad hoc* Working Group developed a draft policy statement with commercialization issues clearly marked for further discussion.

382 The thirty-third Session of the IOC Executive Council expressed the concerns of some Member States that a change in policy would adversely affect oceanographic programmes and development. Some Member States outlined the economic realities that are forcing data collectors and compilers to consider partial recovery of public investments through commercialization of data, protecting databases through copyright, or by imposing restrictions on free access to data. The Executive Council requested that IOC Subsidiary, Technical and Regional Bodies and programmes on which the IOC data policy might have an impact to review and assess the implications of the possible modifications of the policy and be invited to participate in the process of policy formulation.

383 The Executive Council decided to establish an intersessional Intergovernmental Working Group on IOC Oceanographic Data Exchange Policy, open to all Member States of the IOC Executive Council, with the purpose of proposing to the IOC Assembly (i) a statement of the general IOC principles and policy with regard to oceanographic data exchange; (ii) a statement of recommended practices and associated institutional arrangements for the exchange of oceanographic data; (iii) a draft resolution for consideration by the Assembly (IOC Resolution EC-XXXIII.4).

384 The Representative of the WDC-Marine Geology and Geophysics, Dr. M. Loughridge noted that a change in IOC's data policy that would place restrictions on data exchange would result in a withdrawal of WDC interaction and support.

385 Dr. P. Geerders briefly informed the group of the European EOPOLE project on remote sensing data and exchange policies, and referred to the information document he prepared entitled '*Earth Observation Data Policy and Europe (EOPOLE) - Summary of Results - Relevance to IODE*'. He noted that the findings of this group may have relevance for *in situ* marine data as well.

386 The Committee agreed that restrictions for commercial purposes may have substantial consequences to oceanographic programmes and data centres if IOC's policy were to change. These include:

- a decrease in the ability of the IODE system to provide integrated regional and global oceanographic databases for regional and global assessments such as IPCC, which serve as the basis of international treaties;
- creation of barriers for developing countries in using databases for local and regional use;
- Creation of barriers for use of data for educational and training purposes;
- divergence of data policy between IOC and the ICSU World Data Centres. A more restrictive IOC policy will likely result in the submission of fewer data to the IODE system and may result in the departure of the ICSU WDCs for Oceanography from the IODE system;
- creation of bureaucratic responsibilities to monitor the flow of restricted data that cannot be supported with the limited resources of IODE data centres;
- creation of legal requirements that will discourage the exchange of data between IOC Member States.

387 **The Committee adopted [Recommendation XVI.5](#).**

10. **REVIEW OF THE IODE SYSTEM**

388 This Agenda Item was introduced by the Chairman, Mr. B. Searle, referring to Document IOC/IODE-XVI.27 '*Review of the IODE System*'. He recalled the progress made during this Session, which would guide the Committee into new directions. He noted that the sessional working groups that had discussed various important issues such as co-operation between IODE and research programmes, the review of RNODCs and their Terms of Reference, the role of Regional Co-ordinators, future IODE data and information products, IODE's data policy, and the future of MEDI, gave a clear indication of the ambitions of the IODE system in the years to come.

389 Mr. Searle then called the attention of the Committee to the numerous products that IODE was now decided to develop or improve upon including MEDI, the IODE Resource Kit, Ocean Portal, IODE web site, inventory of NODC data products, software tools and services, promotional materials, etc.

390 With regard to capacity building, he referred to the discussions deciding on the need to undertake IODE capacity building activities within a framework of linking training with equipment and operational support, highlighting the success of the RECOSCIX-WIO and ODINEA projects that had already applied this framework strategy. He restated that training courses and workshops should be organized within such a framework and that these activities should be organized in response to clear requests by the concerned Member States. It was essential that requests were submitted as detailed proposals, indicating the needs, as well as available and required resources.

391 **The Committee recommended** that a review and evaluation of the IODE be initiated for submission to the IODE Officers and to the forthcoming IOC Assembly in July 2001. This should cover the mandate of the Committee and of its Subsidiary Bodies and should consider the respective compositions, *modus operandi*, interactions and other relevant aspects. The review will be made by the IODE Officers and a group of invited consultants, if necessary.

392 This evaluation should also review how the IODE Programme serves science and monitoring programmes of the IOC, and in particular, the complementarity and interaction with GOOS. The evaluation should include the description of links with those programmes and include the role and responsibilities of Member States, IODE Officers and the Secretariat. Evaluation should contain recommendations on the ways of increasing effectiveness of the system and of the Committee as the subsidiary IOC Body responsible for the IODE Programme, as well as of its interaction with the IOC Regional Subsidiary Bodies and other co-operating organizations and bodies.

11. **REQUIRED RESOURCES AND PLAN OF ACTION FOR 2000-2003**

393 **The Committee noted** with concern the limited financial resources available from the UNESCO Regular Programme for the IODE Programme. Taking into consideration the substantial extra-budgetary support obtained from Member States and different international partners for IODE activities, **the Committee requested** that the regular programme component should appropriately reflect these successful efforts made by IODE to obtain extra-budgetary resources, seen as counterpart contributions by many donors.

394 The Delegate of Belgium, Ms. S. Jans, informed the Committee that her Government would be able to provide some financial support to the IODE.

395 The Delegate of Sweden, Mr. J. Szaron and the Delegate of Mozambique, Mr. A.O. Sitoe, informed the Committee that their governments were investigating the possibility to provide financial support to the IODE.

396 **The Committee requested** the IODE National Co-ordinators to provide the Secretariat with an estimate of the in-kind resources made available by their governments for the IODE programme. It was felt that this support is a substantive contribution to extra-budgetary resources available to the IODE Programme and should therefore be identified as well.

397 **The Committee noted with concern** that the IODE programme, that develops and manages the world ocean profile database, as a co-operative project of IODE centres and is estimated to have a 'replacement value' of over US\$ 4 billion, is allocated not more than US\$ 100,000 per year from the UNESCO/IOC budget.

398 **The Committee noted with serious concern** that the IODE programme is currently supported by only one permanent Professional staff member. **The Committee invited the IOC Executive Secretary and IOC Governing Bodies** to strengthen the IOC's Ocean Services Section, responsible for IODE in the IOC Secretariat, by two additional permanent Professional staff members and to hire consultants as required.

399 **The Committee called** on Member States to support the Programme through the secondment of experts or by allowing national experts to work on IODE Programme activities, on a full or part-time basis, from their home institution, under the guidance of the IODE Chairman and IODE Technical Secretary.

400 **The Committee discussed and adopted** the Programme and Budget for the period 2001-2003 as presented in [Recommendation IOC/IODE-XVI/11](#).

12. PROMOTION OF IODE ACTIVITIES

401 The Chairman referred to the various IODE promotional activities and products, implemented and produced during the intersessional period. In this regard he referred to the IODE's participation in EXPO'98, the production of the IGOSS/IODE Brochure, the preparation of the WWW IODE template, the revision of the IODE web site, the development of the OceanPortal, the development of the IODE logo and related 'corporate branding', the production of the IODE folder and inserts, and the exhibition on IODE during this Session and Sessions of the IOC Governing Bodies.

402 **The Committee noted with appreciation** the wide variety of promotional activities and products implemented by the Secretariat. **The Committee expressed its gratitude** to the Australian Oceanographic Data Centre for their assistance in producing the IODE folder, logo and 'corporate branding'.

403 **The Committee recommended** the development of IODE folder inserts for both expert audiences and the general public. **The Committee recommended further** that these inserts should be developed for both the global level and the regional level (matrix model).

404 **The Committee tasked** the Regional Co-ordinators with the development of regionally focused sheets.

405 **The Committee requested** the Member States to assist with the translation of all inserts into the different working languages.

406 The Delegate of Chile, Mr. R.L. Rojas, offered to translate the inserts into Spanish. **The Committee thanked** the Delegate of Chile for his kind offer.

407 The Delegate of the Netherlands, Mr. N.M. Kaaijk, proposed to prepare a PowerPoint presentation on IOC and IODE that could then be used by IODE Data and Information Managers to introduce the IOC and its IODE at various occasions. This presentation should be modular in design with a general section and specific pages based on the folder inserts. **The Committee thanked** the Delegate of the Netherlands for his kind offer.

13. ELECTION OF THE OFFICERS OF THE COMMITTEE

408 The Technical Secretary reviewed the rules and practical arrangements for the election of the officers of the IOC Subsidiary Bodies as they are presented in the IOC Manual 1989 and in the Revised Rules of Procedure as of June 1994 (Document IOC/EC-XXVII/Inf. 1).

409 **The Committee noted** that there were no candidates submitted to replace the current Chairmen.

410 Accordingly, **the Committee re-elected** Mr. B. Searle as IODE Chairman, and Dr. E. Balopoulos as Vice-Chairman of IODE.

411 A number of delegates commended the Chairman and Vice-Chairman on their hard work and dynamic approach, especially with regard to bringing IODE into a new and successful era.

14. DATE AND PLACE OF THE NEXT SESSION

412 To keep momentum and to keep abreast with the developments in ocean data and information management in a more effective way, **the Committee decided** to organize its Seventeenth Session during the second half of 2003.

413 **The Committee requested** the Chairman to identify the dates and place of the Session in consultation with the IOC Secretariat and advise Member States accordingly.

414 The Delegate of Greece, Dr. E. Balopoulos offered to investigate ways to host the Seventeenth Session of the IODE, in case no other venue for IODE-XVII can be identified.

15. ADOPTION OF THE SUMMARY REPORT

415 **The Committee adopted** the draft Summary Report of the Session, the Resolutions and Recommendations as they are presented in Annex II. **The Committee requested** the IOC Secretariat and its Chairman to make editorial corrections as necessary, taking into account the discussions held during the Session.

416 **The Committee requested** the Chairman to present the Report, Resolutions and Recommendations to the Twenty-first Session of the IOC Assembly, planned to take place in the second half of 2001, in Paris, UNESCO Headquarters.

16. CLOSURE OF THE SESSION

417 The Chairman introduced a special item, not officially on the agenda; in order to be able to officially bid farewell to Dr. I. Oliounine from his position within the IOC.

418 The Chairman mentioned that Dr. Oliounine had been the major driving force behind the IODE programme for over 20 years and had been instrumental in ensuring the considerable success of IODE in the intergovernmental community.

419 Dr. Oliounine's hard work and long hours are well known. When he accepted the responsibility to co-ordinate the International Year of the Ocean in 1998, little did he know the interest that would be generated. It is understood that he made a commitment to personally respond to all e-mails and letters about the International Year of the Ocean. This commitment resulted in his replying to many thousands of inquires from the public all over the world. He did this with great enthusiasm, while still making arrangements for other IYO activities and also supporting the IODE programme from his position of Deputy Executive Secretary of the IOC. A position that entailed a huge additional workload.

420 As a result of his tireless work and dedication, Dr. Oliounine had created a feeling of 'family' within the IODE community. IODE has become a friendly and co-operative programme with considerable support from its participants. The Chairman stated that Dr. Oliounine's retirement was a sad occasion and expressed a hope that he will be able to continue, in an advisory capacity, for many years to come.

421 **The Committee thanked** Dr. Oliounine for his strong commitment and wished him all the best in his future endeavours.

422 **The Committee expressed** its high appreciation for the generous hospitality extended to all participants of the Session by the local organizers and Portuguese host organizations, **noted with satisfaction** the excellent arrangements of the Session and **paid special tribute** to Prof. Mario Ruivo, for his personal efforts and initiative in hosting this Session at very short notice.

423 **The Committee noted with satisfaction** the balanced representation, during this Session, of participants from different regions. This allowed the Committee to address the needs and receive the views of the IOC Member States community at large.

424 The Session was closed at 16h30 on 8 November 2000.

ANNEX I

AGENDA

- 1. OPENING**
- 2. ADMINISTRATIVE ARRANGEMENTS**
 - 2.1. ADOPTION OF THE AGENDA
 - 2.2. DESIGNATION OF A RAPPORTEUR
 - 2.3. CONDUCT OF THE SESSION, TIMETABLE AND DOCUMENTATION
 - 2.4. LOCAL ARRANGEMENTS
- 3. STATUS OF IODE**
 - 3.1. CHAIRMAN'S REPORT
 - 3.2. ACTIVITIES OF THE WORLD DATA CENTRES AND RNODCS
 - 3.3. NATIONAL DATA AND INFORMATION MANAGEMENT ACTIVITIES
 - 3.4. REGIONAL CO-ORDINATORS REPORTS
 - 3.4.1. IOC Sub Commission for the Western Pacific (WESTPAC) Region
 - 3.4.2. IOC Regional Committee for the Central Indian Ocean (IOCINDIO)
 - 3.4.3. IOC Regional Committee for the Central Eastern Atlantic (IOCEA)
 - 3.4.4. IOC Regional Committee for the Co-operative Investigation in the North and Central Western Indian Ocean (IOCINCWIO)
 - 3.4.5. IOC Sub-Commission for the Caribbean and Adjacent Regions (IOCARIBE)
 - 3.4.6. IOC Regional Committee for the Southern Ocean (IOCSOC)
 - 3.4.7. Mediterranean Region
 - 3.4.8. Black Sea Region
 - 3.4.9. Eastern Pacific (El Niño) Region
- 4. STATUS AND FUTURE OF DATA FLOW AND DATA MONITORING PROCEDURES**
 - 4.1. NOPS - STATUS AND FUTURE OF 'RESEARCH SHIP INFORMATION AND SCHEDULES'
 - 4.2. STATUS OF THE MEDI PILOT PROJECT AND FUTURE ACTIONS
 - 4.3. IODE DATA FLOW AND DATA MONITORING MECHANISMS: FUTURE ACTIONS TO IMPROVE THEM
 - 4.4. ROLE OF IODE IN OCEAN SCIENCE AND MONITORING PROGRAMMES
- 5. CO-OPERATION AND ACTIVITIES RELATED TO GOOS**
 - 5.1. DATA REQUIREMENTS FOR GOOS MODULES
 - 5.2. RESULTS OF THE GOOS/GCOS IMPLEMENTATION MEETING
 - 5.3. RESULTS OF THE IODE/GOOS MEETING
 - 5.4. RESULTS OF THE GOOS STEERING COMMITTEE MEETING IN RELATION TO IODE
 - 5.5. IODE/JCOMM INTERACTION
- 6. STANDARD AND NOT YET ROUTINELY EXCHANGED DATA TYPES**
 - 6.1. REMOTELY-SENSED DATA
 - 6.2. BIOLOGICAL AND CHEMICAL DATA
 - 6.3. POLLUTION DATA
 - 6.4. COASTAL DATA

7. PROGRAMME MATTERS

7.1. GROUPS OF EXPERTS

7.1.1. Group of Experts on Technical Aspects of Data Exchange (GETADE)

7.1.2. Group of Experts on Marine Information Management (GEMIM)

7.1.3. Steering Group on IGOSS/IODE End-to-End Data Management Systems

7.2. IODE PRODUCTS AND SERVICES

7.2.1. Global Oceanographic Data Archaeology and Rescue Project (GODAR)

7.2.2. Marine Information Management (MIM) Products and Services

7.2.3. Future IODE Products and Services

7.3. CAPACITY BUILDING

7.3.1. Training Tools: IODE Resource Kit and Others

7.3.2. Training Activities in Marine Data and Information

7.3.3. Regional Data and Information Networks/Programmes

7.3.3.1. RECOSCIX-WIO and RECOSCIX-CEA

7.3.3.2. ODINEA and ODINAFRICA-II

7.3.3.3. MEDAR/MEDATLAS

7.3.3.4. Other Regions

8. USE OF NEW MANAGEMENT, EXCHANGE AND DELIVERY TECHNOLOGIES IN THE IODE SYSTEM

8.1. END-TO-END DATA MANAGEMENT FRAMEWORK AND ITS IMPORTANCE FOR THE FUTURE OF IODE

8.2. IODE AND THE WWW

8.2.1. IODE Programme and Data Centre Presence on the WWW

8.2.2. IODE Data and Information Portal

8.3. DEVELOPMENT OF A MARINE XML

8.4. REPORTS ON NEW TECHNOLOGIES WITH RELEVANCE TO IODE

9. IOC OCEANOGRAPHIC DATA EXCHANGE POLICY

10. REVIEW OF THE IODE SYSTEM

11. REQUIRED RESOURCES AND PLAN OF ACTION FOR 2000-2003

12. PROMOTION OF IODE ACTIVITIES

13. ELECTION OF THE OFFICERS OF THE COMMITTEE

14. DATE AND PLACE OF THE NEXT SESSION

15. ADOPTION OF THE SUMMARY REPORT

16. CLOSURE OF THE SESSION

ANNEX II

RESOLUTIONS AND RECOMMENDATIONS

CODE	RESOLUTION TITLE
Resolution IODE-XVI.1	IODE STATEMENT TO THE ICSU PANEL ON WDCs
Resolution IODE-XVI.2	ESTABLISHMENT OF AN RNODC FOR THE PERSIAN GULF AREA (RNODC-P.GULF)
CODE	RECOMMENDATION TITLE
Recommendation IODE-XVI.1	ESTABLISHMENT OF THE MEDI PROGRAMME
Recommendation IODE-XVI.2	STRENGTHENING OF THE REGIONAL CO-ORDINATORS MECHANISM
Recommendation IODE-XVI.3	ESTABLISHMENT, MAINTENANCE, AND STRENGTHENING OF CO-OPERATION BETWEEN IODE AND RESEARCH AND MONITORING PROGRAMMES
Recommendation IODE-XVI.4	ESTABLISHMENT OF A GROUP OF EXPERTS ON BIOLOGICAL AND CHEMICAL DATA MANAGEMENT AND EXCHANGE PRACTISES
Recommendation IODE-XVI.5	IOC OCEANOGRAPHIC DATA EXCHANGE POLICY
Recommendation IODE-XVI.6	DATA ARCHAEOLOGY AND RESCUE PROJECT (GODAR)
Recommendation IODE-XVI.7	ESTABLISHMENT OF THE IODE RESOURCE KIT PROJECT
Recommendation IODE-XVI.8	IODE PARTICIPATION IN AN XML CONSORTIUM
Recommendation IODE-XVI.9	IMPLEMENTATION OF A REGIONAL DATA AND INFORMATION MANAGEMENT NETWORK FOR THE LATIN AMERICAN AND CARIBBEAN (LAC) REGIONS
Recommendation IODE-XVI.10	UNDERWAY SEA SURFACE SALINITY DATA ARCHIVING PILOT PROJECT
Recommendation IODE-XVI.11	PROGRAMME AND BUDGET FOR 2000 - 2003

RESOLUTIONS

Resolution IODE-XVI.1

IODE STATEMENT TO THE ICSU PANEL ON WDCs

The IOC Committee on International Oceanographic Data and Information Exchange,

Considering the long-term relationship between IODE and the ICSU Panel on World Data Centres, and the desirability to further develop this co-operation and partnership,

Recommends that the:

- (i) Chairmen of IOC Committee on IODE and the ICSU Panel on World Data Centres meet intersessionally to impose planning and co-ordination of the activities of the two systems;
- (ii) IOC and ICSU share experiences with the World Wide Web of the Internet and other new technologies;
- (iii) IOC Committee on IODE be formally represented and participate in the ICSU Panel on WDCs meetings to present pertinent items directly applicable to the ICSU Panel on WDCs and in turn the Representative of the ICSU Panel on WDCs be represented and participate in the IODE meetings to do the same;
- (iv) IOC Committee on IODE and the ICSU Panel on WDCs form a joint working group on data management for consideration of issues of mutual interest with the aim of developing a pilot project that will work towards creating a linked data network;
- (v) practice of inviting the Directors of the WDCs-Oceanography and Marine Geology and Geophysics to the regular IODE Officers meetings on the basis of cost sharing with ICSU of their participation be continued.

Resolution IODE-XVI.2

ESTABLISHMENT OF AN RNODC FOR THE PERSIAN GULF AREA (RNODC-P.GULF)

The IOC Committee on International Oceanographic Data and Information Exchange,

Noting that there is a crucial need for facilitating the collection of data in the Persian Gulf area that continues to be data sparse and that is strongly affected by oil and other types of pollution,

Recognizing that the ocean data and information management infrastructure in the region is still under-developed and that there is a need to assist the Persian Gulf bordering countries in this matter,

Recollecting the discussions of the IOCINDIO-III meeting on the need for a regional data management infrastructure, to help the RNODC-Indian Ocean in the Persian Gulf, in implementing more effectively its responsibilities in the sub-region,

Acknowledges the readiness of the Islamic Republic of Iran to take the responsibilities of an RNODC for the Persian Gulf and the Sea of Oman (RNODC-P. Gulf) with the Terms of Reference attached to this Resolution;

Invites the Delegate of the Islamic Republic of Iran to implement all the procedures applied to the process of an RNODC nomination as described in the IODE Guide on the Establishment of RNODCs (*IOC Manuals and Guides No. 9, Annex I*);

Requests the Islamic Republic of Iran to submit all the required materials to the next meeting of the IODE Officers for further cooperation;

Urges the Committee's Chairman and the Vice-Chairman, jointly with the Technical Secretary, to carry out consultations on this matter with the IOC Member States concerned and the Secretariat of ROPME prior to the next IODE Officers meeting.

Annex to Resolution IODE-XVI.2

Terms of Reference of an RNODC for the Persian Gulf Area

- (i) Acquire, quality control and store in standard format, the oceanographic data, especially the data concerning the petroleum-caused pollution obtained from the countries of the region through National Oceanographic Programmes (NOPs), research programmes and other activities in the area of the Persian Gulf and the Sea of Oman;
- (ii) Distribute on request, data and information and provide services to the users;
- (iii) Co-operate closely with the RNODC-INDO and WDCs in developing datasets of oceanographic and coastal zone parameters in accordance with the IODE procedures;
- (iv) Develop and maintain databases and inventories;
- (v) Exchange documentation and software on quality control and processing procedures with other RNODCs, WDCs, NODCs, and relevant national institutions;
- (vi) Co-operate closely with the IOC regional bodies, IOCINDIO and IOCINCWIO, in the execution of regional programmes and provide necessary services;
- (vii) Report regularly on the progress of the RNODC to the IODE Officers and to the IOC Committee on IODE;
- (viii) Provide support to and advise the IOC Member States of the Persian Gulf area on the establishment of national research and coastal data management infrastructure by organizing missions, arranging training courses and through the transferring of technology.

RECOMMENDATIONS

Recommendation IODE-XVI.1

ESTABLISHMENT OF THE MEDI PROGRAMME

The IOC Committee on International Oceanographic Data and Information Exchange,

Recognizing the value of a directory system for databases, data catalogues and data inventories to a broad user community, including IOC programmes such as GOOS and related activities within other global and regional programmes,

Recalling Recommendation IODE-XV.1 that established the '*Pilot Project on the Revision of MEDI*',

Noting with satisfaction the full achievement of the objectives of the Pilot Project during the intersessional period,

Further noting with satisfaction the advanced technological capabilities of the MEDI software tool as an off-line metadata creation tool,

Recommends that the:

- (i) '*Pilot Project on the Revision of MEDI*' becomes a permanent programme of IODE;
- (ii) Steering Group will be responsible for the further development and enhancement of the MEDI software tool, in response to user feedback and additional requirements;
- (iii) MEDI Programme be supported by a Steering Group, established as a subsidiary body of IODE, initially composed of AODC (Australia), NASA-GCMD (USA), KODC (Republic of Korea), BODC (UK), Russian NODC (Russian Federation) and US NODC (USA). The activities of the Steering Group shall be co-ordinated by Mr. G. Reed, AODC;
- (iv) distribution of tasks within the Steering Group be based on available capacity of the group members;
- (v) Steering Group will be guided by and interact with GETADE and GEMIM;

Further recommends the incorporation of a MEDI software tool as a training module in IODE training activities and capacity building products;

Urges Member States to use the MEDI software tool to the maximum extent possible and promote its use to the widest possible audience.

Recommendation IODE-XVI.2

STRENGTHENING OF THE REGIONAL CO-ORDINATORS MECHANISM

The IOC Committee on International Oceanographic Data and Information Exchange,

Recalling Resolution IODE-XV.4 on the nomination of the IODE Regional Co-ordinators for each of the IOC Regional Programmes,

Bearing in mind the Terms of Reference of the IODE Regional Co-ordinators as approved by the IOC Officers Meeting held in Goa, India in February 1998,

Acknowledging information and recommendations contained in the reports of the Regional Co-ordinators submitted to IODE-XVI on the status and progress achieved, also containing descriptions of the failures incurred and the problems met,

Taking into account the experiences gained during the past years and the technological developments, especially in the area of the usage of e-mail for communications, as well as the changed focuses of IODE and its NODCs and the new regional and global programmes and projects,

Strongly supports the continuation and strengthening of the IODE Regional Co-ordinators mechanism,

Proposes the amendment of the Terms of Reference for Regional Co-ordinators as follows:

- (i) carry out actions targeted to strengthening co-operation in the area of marine and coastal data and information management in the regions with a view to meeting the user needs effectively. This includes advising the existing NODCs within the region on new developments within the IODE system and helping in establishing national data and information management systems including NODCs in the countries where the infrastructure has not yet been developed;
- (ii) promote the communication and collaboration between the data and information centres in the region and exchange experiences with other regional co-ordinators;
- (iii) establish links with the IOC's and other relevant regional and global science and services programmes in order to be informed about on-going activities and keeping them informed of the IODE development;
- (iv) liaise, at the regional level, with the relevant subsidiary bodies of IOC in order to promote the IODE system, services and products to the widest possible audience;
- (v) support the efforts of the IODE Officers and the IOC Secretariat in implementing the fund raising process in the regions;

Invites the IOC Executive Secretary to provide the necessary support to the Regional Co-ordinators for effective implementation of assigned responsibilities;

Recommends that the Regional Co-ordinators be members of the IOC Regional Bodies and participate in their regular meetings and that the Regional Co-ordinators be invited, with the financial support from IOC, to the regular IODE Officers meetings to report on the progress made and contribute to discussions.

Recommendation IODE-XVI.3

ESTABLISHMENT, MAINTENANCE, AND STRENGTHENING OF CO-OPERATION BETWEEN IODE AND RESEARCH AND MONITORING PROGRAMMES

The IOC Committee on International Oceanographic Data and Information Exchange,

Recognizing the increase in recent years of the number and complexity of international marine research and monitoring programmes,

Recognizing further that researchers and operational agencies are contributors to, and users of oceanographic data centres as well as participants in the development of data management systems, and are therefore becoming increasingly dependent on and essential to the data centres,

Noting the recent trend of many research and monitoring programmes to develop independent data and information management services,

Recommends the formation of a Steering Group to establish, maintain, and strengthen IODE's participation in co-operative marine research and monitoring programmes,

Further recommends that the tasks of the Steering Group should include:

- (i) documenting the best practices of existing co-operative arrangements between IODE Data Centres and international co-operative research and monitoring programmes;
- (ii) identifying and compiling information on all relevant pilot projects and programmes in co-operation with GOSIC for areas of common interest, as well as on planning meetings of relevant research and monitoring programmes in which IODE data centres and IODE representatives could participate;
- (iii) developing a plan for co-ordination of and participation in relevant projects, in consultation with other IODE subsidiary bodies;
- (iv) guiding and assisting the Chairman of IODE in facilitating the involvement of IODE Centres in global programme activities such as GOOS and particularly Coastal GOOS;
- (v) reporting the progress of the Steering Group to meetings of the IODE Officers and IODE Committee Sessions;

Invites the IOC Governing Bodies to support this Steering Group;

Invites further the IOC Member States to encourage the nomination of IODE experts to represent the IODE programme at relevant meetings of research and monitoring programmes.

Recommendation IODE-XVI.4

ESTABLISHMENT OF A GROUP OF EXPERTS ON BIOLOGICAL AND CHEMICAL DATA MANAGEMENT AND EXCHANGE PRACTISES

The IOC Committee on International Oceanographic Data and Information Exchange,

Recognizing the increasing importance of managing and archiving biological and chemical data,

Noting the recent development of global research and monitoring programmes that focuses on issues such as climate change and ecosystem dynamics, and relies heavily on biological and chemical data,

Recommends the formation of a Group of Experts on Biological and Chemical Data Management and Exchange Practices;

Further recommends that the tasks of the Group of Experts should include:

- (i) documenting the systems and taxonomic databases currently in use in various data centres;
- (ii) documenting the advantages and disadvantages of different methods and practices of compiling, managing and archiving biological and chemical data;
- (iii) developing standards and recommended practices for the management and exchange of biological and chemical data, including practices for operational biological data;
- (iv) encouraging data centres to compile inventories of past and present biological and chemical data holdings;

- (v) encouraging data holders to contribute data to data centres for the creation of a global integrated oceanographic profile and plankton databases;

Invites the IOC Governing Bodies to support this Group of Experts;

Encourages IOC Member States to nominate experts having expertise in biological and chemical data management and exchange practices to the Group of Experts;

Requests that the Group of Experts maintains close relations with GIPME, OSLR and other relevant programmes;

Further requests that a progress report be submitted regularly to the IODE Officers and the IODE Committee.

Recommendation IODE-XVI.5

IOC OCEANOGRAPHIC DATA EXCHANGE POLICY

The IOC Committee on International Oceanographic Data and Information Exchange,

Recalling the strong support from many delegates of the IOC Executive Council for the existing IOC/IODE Policy Statement on Ocean Data Management for Global Science Programmes, the basis of which is free exchange of and open access to data,

Further considering the potential negative impacts that a change in the existing policy may have on the exchange of oceanographic data and information, in particular:

- (i) a decrease in the ability of the IODE system to provide the most comprehensive integrated regional and global oceanographic databases for regional and global assessments such as the reports of the Intergovernmental Panel on Climate Change, which serve as the basis of international treaties,
- (ii) a divergence of data policy between IOC and the ICSU World Data Centres and the related possible departure of ICSU World Data Centres for Oceanography from the IODE system,
- (iii) the creation of barriers to all countries, particularly developing countries, in acquiring the most comprehensive databases for local and regional use,
- (iv) a limitation of access to data for research, educational, and training purposes,
- (v) the imposition of additional responsibilities to monitor the flow of restricted data that cannot be supported with the limited resources of IODE data centres,
- (vi) the creation of legal requirements that will discourage the exchange of data between IOC Member States.

Stresses its strong concern that a change to the existing IOC data exchange policy would severely limit exchange and access to data and place additional management and legal burdens and responsibilities on the IODE system and its data centres;

Reiterates its strong support for the existing data exchange policy based on free and open data exchange that has been used with considerable success since the establishment of the IOC in 1960;

Recommends that data having restrictions on their distribution continue to be sent to IODE data centres,

but that these data will not be freely circulated until originators of these data give unambiguous permission for the unrestricted release of such data;

Urges the Intergovernmental Working Group on IOC Oceanographic Data Exchange Policy, in the formulation of its policy statement to be presented to the next session of the IOC Assembly, to take into account the position of the IOC Committee on IODE on the continued free and open exchange of ocean data and of the many serious impacts associated with potential changes to the existing policy.

Recommendation IODE-XVI.6

DATA ARCHAEOLOGY AND RESCUE PROJECT (GODAR)

The IOC Committee on International Oceanographic Data and Information Exchange,

Appreciating the success of the first phase of GODAR,

Acknowledging that substantial amount of historical ocean data observations are still at risk of being lost due to media decay or neglect,

Noting that global, integrated, comprehensive, scientifically quality-controlled oceanographic databases are of great importance to understand the role of the ocean in climate change such as articulated by the WCRP CLIVAR project, GOOS and GCOS,

Emphasizing that in order to make sound policy decisions, scientific advisory groups require assessments based on such databases,

Acknowledging the demonstrated willingness of IOC Member States to contribute to the second phase of GODAR through the implementation of regional and other projects,

Welcoming the new GODAR initiatives operated or proposed in a few regions such as WESTPAC, IOCARIBE and the Mediterranean and Black Sea,

Recommends that:

A

- (i) IOC establish a World Ocean Database Project as presented in Annex IX to the Summary Report;
- (ii) special attention be paid to the speed of transfer of modern data in real-time into integrated, comprehensive oceanographic databases for research, monitoring or establishment of quality control for oceanographic data on local, regional and global scales to support research and real-time analysis of data;
- (iii) a Project Leader be designated by the IOC Executive Secretary in consultation with the Chairman of the IOC Committee on IODE to supervise the project implementation;
- (iv) Member States of the IOC and international organizations support and participate in the project, including the possibility of providing financial support through the IOC Trust Fund arrangements;

B

- (i) Member States of the Black Sea and Mediterranean regions strongly support and contribute to the implementation of the MEDAR/MEDATLAS project funded by the European Union;

- (ii) the WESTPAC GODAR project be approved, and the necessary resources be provided for its implementation;
- (iii) in co-operation with the GLOSS Group of Experts, a GODAR sub-project for sea-level data be established;
- (iv) IODE Centres will co-operate with the IOCARIBE GODAR initiative by providing advice and sharing experience, and Member States provide information on their data holdings and data for the creation of a comprehensive regional ocean data inventory and database;
- (v) sub-project leaders be considered and designated by the IOC Executive Secretary in consultation with the Chairman of the IOC Committee on IODE and the Chairmen of relevant regional bodies as appropriate, for those projects that are still at the planning stage.

Recommendation IODE-XVI.7

ESTABLISHMENT OF THE IODE RESOURCE KIT PROJECT

The IOC Committee on International Oceanographic Data and Information Exchange,

Recognizing the value of a computer-based application tool as a follow-up to OceanPC and to complement IODE data and information management capacity building activities,

Recalling the decision of the IODE Officers meeting in February 1998 to set up a Pilot Project for an '*IODE Resource Kit CD-ROM*', and its Terms of Reference,

Noting with satisfaction the full achievement of the objectives of the Pilot Project during the intersessional period,

Further noting with satisfaction the advanced capabilities of the Resource Kit as a tool for IODE capacity building,

Recommends that:

- (i) a Resource Kit Project be established, with the objective of further developing and enhancing of the content of the Kit;
- (ii) the Resource Kit Project be supported by a Steering Group, established as a subsidiary body of IODE, initially composed of a Project Leader and the Chairs of GETADE and GEMIM, and guided by GETADE and GEMIM, and will have the following Terms of Reference:
 - a. the Steering Group will be responsible for the further development and enhancement of the Resource Kit, in response to user feedback and additional requirements;
 - b. the Steering Group will nominate two editors, one for the data management aspects and one for the information management aspects, who will be responsible for the content of the Resource Kit;
 - c. the Steering Group will co-ordinate the preparation of regional data and information sets in response to IODE capacity building programmes;

Further recommends the use of the IODE Resource Kit as a training tool in all IODE capacity building activities;

Requests to investigate the possibilities to translate the Resource Kit to other languages, as required by IODE capacity building programmes;

Urges Member States to contribute suitable material for inclusion in the Resource Kit.

Recommendation IODE-XVI.8

IODE PARTICIPATION IN AN XML CONSORTIUM

The IOC Committee on International Oceanographic Data and Information Exchange,

Recognizing the advantage of using the eXtensible Markup Language (XML) for the exchange of oceanographic data within the IODE system and the importance of XML as a standard for data interchange on the Internet,

Noting the proposed development of a Marine XML Specification through the creation of an international consortium,

Considering, the desirability of the development of a single marine XML framework,

Recommends the participation of IOC, through its Committee on International Oceanographic Data and Information Exchange, in the development of a Marine XML as part of a consortium of interested groups;

Instructs its Chairman to monitor the development of a marine XML and keep the Committee informed of the progress;

Recommends Member States to promote the use of XML, at the national level, as a mechanism for the efficient exchange of oceanographic data;

Invites Member States to consider individual membership of the marine XML Consortium.

Recommendation IODE-XVI.9

IMPLEMENTATION OF A REGIONAL DATA AND INFORMATION MANAGEMENT NETWORK FOR THE LATIN AMERICAN AND CARIBBEAN (LAC) REGIONS

The IOC Committee on International Oceanographic Data and Information Exchange,

Noting the urgent need for marine and coastal data and information in the LAC region (Latin America-Caribbean) for research, monitoring and integrated management of the coastal zone and the Exclusive Economic Zone (EEZ),

Noting further that such data and information are also essential for forecasting extreme events like El Niño and typhoon paths, as well as for developing preparedness for natural and man-made disasters such as floods, earthquakes, toxic algae blooms, oil spills, tsunamis and hurricanes,

Acknowledging the experience gained by the IODE Centres in the region and by such international groups as the ICES Working Group on Marine Data Management (MDM) in the field of regional marine and coastal data management,

Welcomes the proposal: *A Strategy Towards an Ocean Data and Information Network for Latin America and the Caribbean (ODINLAC)*, which calls for closer regional collaboration in data and information collection and management and identifies ways for capacity building;

Invites IOC to undertake the necessary steps to implement the ODINLAC project in the LAC region, similar to ODINAFRICA;

Requests the IOC Executive Secretary to implement, as a priority, the following actions:

- (i) nominate a Project Leader to facilitate the development of an ODINLAC project proposal;
- (ii) make an assessment of the needs and requirements in marine data and information management of different sub-regions of the ODINLAC area, in order to identify, taking into account the facilities of each sub-region, the sub-region in which an initial phase of the project could be started;
- (iii) organize a planning meeting in co-operation with the IOC Regional Bodies concerned to discuss the results of the assessment study and propose a detailed plan for the implementation of the ODINLAC project;
- (iv) identify the necessary funding to support the implementation of the meeting and other recommended actions.

Recommendation IODE-XVI.10

UNDERWAY SEA SURFACE SALINITY DATA ARCHIVING PILOT PROJECT

The IOC Committee on International Oceanographic Data and Information Exchange,

Noting that the Ocean Observations Panel for Climate (OOPC) considers sea surface salinity data as critical for the study of the decadal and longer time-scale variations associated with deep ocean overturning,

Further noting that the number of countries collecting underway sea surface salinity data and the volume of data collected within coastal and open ocean monitoring programmes are rapidly growing,

Recognizing that presently there is little international co-operation in the exchange and management of these data,

Acknowledging the need to build effective international management of these data in co-operation with data providers and users to meet the requirements for temporal and spatial sampling resolution and measurement accuracy set forth by the OOPC,

Recommends the establishment of a Pilot Project for the management of these data with the Terms of Reference as attached in the Annex to this recommendation;

Invites the IOC Executive Secretary, in consultation with the Chairmen of IODE and OOPC, to establish a Steering Group to implement and monitor progress of the Pilot Project;

Invites the IODE Member States and other interested countries collecting underway sea surface salinity data to participate in the activities of the Steering Group.

Annex to Recommendation IODE-XVI.10

Terms of Reference of the Underway Sea Surface Salinity Data Archiving Pilot Project

Objectives of the Pilot Project:

- (i) to acquire, quality control, store in standard format, and disseminate the collected underway sea surface salinity data
- (ii) to establish close co-operation with relevant data centres to build a database and develop data management procedures and standards
- (iii) to build a comprehensive archive for USSSAL data including appropriate metadata
- (iv) to develop and implement procedures for quality assessment of real time and delayed mode data based on the GTSP experience
- (v) to provide data and information on line to users in a timely fashion
- (vi) to ensure safeguarding of high resolution delayed mode data
- (vii) to co-operate with data collectors to improve the data acquisition systems and to provide information on the data they provide
- (viii) to maintain close links with other data collection and management programmes such as JCOMM and SOOP
- (ix) to prepare proposals for the archiving of all potentially available underway data types

The Participants in the Pilot Project:

The Pilot Project will be carried out by a Steering Group composed of, *inter alia*, IFREMER/SISMER (France), MEDS (Canada), BSH (Germany), BODC (UK), ICES (Denmark), NCMR/HNODC (Greece), WDC for Oceanography - Silver Spring (USA).

Work Plan and Timing:

The Steering Group will work by correspondence (e-mail). The Group will report to the IODE Officers and to the IODE Committee.

Recommendation IODE-XVI.11

PROGRAMME AND BUDGET FOR 2000-2003

The IOC Committee on International Oceanographic Data and Information Exchange,

Having reviewed its on-going and planned programme implementation requirements for the period 2001 through 2003,

Having been informed about the resources allocated to the IODE Programme from the UNESCO Regular Programme for the 2000-2001 biennium,

Being aware of the severe financial constraints under which UNESCO and its IOC are operating,

Emphasizing the importance of ensuring high-quality oceanographic data and information, products and

services for scientific and observational programmes of the Commission, for Member States and numerous users,

Appreciating the considerable support for the IODE Programme, received from Member States through the IODE Data Centres, the provision of experts, financial support to the IOC Trust Fund or through other international organizations, projects and programmes co-operating with IODE,

Calls on Member States to continue and strengthen their support to the IODE Programme through their NODCs and other national data and information management facilities;

Urges Member States to provide funding, specifically for IODE projects, through the IOC Trust Fund arrangement, and to consider secondment of national experts to the IOC Secretariat or other appropriate mechanisms for improving the staff situation in the IOC Secretariat in support of implementing the IODE Workplan;

Invites the IOC Executive Secretary to strengthen the IODE Programme Secretariat with two additional permanent staff members;

Requests the IODE Officers to explore ways to establish co-operation with other international programmes and agencies with the view to increase the effectiveness and visibility of IODE;

Invites international organizations to support the development and implementation of joint activities, related to oceanographic data and information management;

Requests the IODE Chairman to bring to the attention of the next Session of the IOC Assembly, the IODE programme of work and budget for the period 2001-2003, as found in the Annex to this Recommendation.

Annex I to Recommendation IODE-XVI.11

	2001			2002			2003			
	Regular Program	EB expected	IODE received	EBRegular Program	EB expected	IODE received	EBRegular Program	EB expected	IODE received	EB
Subsidiary Body Meetings										
GEMIM	-	\$20,000	-	-	-	-	-	\$20,000	-	
GETADE	-	\$30,000	-	-	-	-	-	\$30,000	-	
GE-Bio & Chem. data	-	\$30,000	-	-	-	-	-	\$30,000	-	
SG E2EDM	-	\$20,000	-	-	-	-	-	\$20,000	-	
SG MEDI	-	\$15,000	-	-	-	-	-	\$15,000	-	
SG Resource Kit	-	\$15,000	-	-	-	-	-	\$15,000	-	
SG Coop. IODE-Sci. & Monit. progs.	-	-	-	-	-	-	-	-	-	
SG SSSL Pilot Project	-	-	-	\$5,000	-	-	-	-	-	
Officers Meeting	-	-	-	\$45,000	-	-	-	-	-	
Workshops/Training Courses										
ODINAFRICA-II	-	\$30,000	\$600,000	-	\$20,000	\$700,000	-	\$20,000	\$730,000	
Regional Training IOCINDIO	-	-	-	\$5,000	\$20,000	-	-	-	-	
Regional Training Caspian & Black Sea	\$5,000	\$20,000	-	-	-	-	-	-	-	
Regional Training IOCINCWIO	-	-	-	\$5,000	\$20,000	-	-	-	-	
MEDAR/MEDATLAS (partial)			\$35,000	-	-	-	-	-	-	
Regional Training Mediterranean Sea	-	-	-	\$5,000	\$20,000	-	-	-	-	
Regional Training Caribbean	-	-	-	-	-	-	\$5,000	\$20,000	-	
Regional Training South America	-	-	-		\$20,000	-	-	-	-	
Regional Training ROPME	\$5,000	\$20,000	-	-	-	-	\$5,000	\$20,000	-	
Internships (all regions)	-	-	-	-	-	-	-	-	-	
Products & Services										
Resource Kit - other regions	-	\$10,000		\$10,000			-	\$10,000		
Marine XML (partial)	\$10,000			\$10,000			\$10,000			
MEDI development	\$5,000			\$5,000			\$5,000			
Ocean Portal & Inventory	\$10,000			\$10,000			\$10,000			
ABEKT translation (E,F,S)	-	\$5,000		\$5,000			-			
Operational Projects										
GODAR - World Ocean	\$3,000			\$3,000			\$3,000			
GODAR World Conference report		\$1000								
GODAR - WESTPAC /Malaysia	-			\$5,000			-			
GODAR Caribbean	-	\$5,000		-			-			
GODAR - Sea level (GLOSS)	-			-			-			
GODAR Africa (part of-				-			-			
Pilot Projects										
ODINLAC Pilot Project	-	\$20,000		-			\$20,000			
Sea Surface Salinity Pilot Project	\$1,000			\$1,000			\$1,000			
Travel, coordination and policy										
Travel and coordination	\$24,000			\$20,000			\$20,000			
IODE Review	\$ 10,000									
Regional Coordinators										
9 Regional coordinators support	-	\$27,000		-	\$27,000		\$27,000			
Public Relations										
Folders, web site	\$3,000			\$3,000			\$3,000			
TOTAL	\$76,000	\$268,000	\$635,000	\$137,000	\$127,000	\$700,000	\$109,000	\$200,000	\$730,000	
TOTAL year	\$958,000			\$964,000			\$1,039,000			
% of total	6.89	26.83	66.28	14.30	13.26	73.07	11.38	20.88	76.20	

EB: extra-budgetary support - Indicates provisional to submission detailed programme, description of expected outcome and requests by concerned Member States.

ANNEX III

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ANNEX IV

LIST OF DOCUMENTS

WORKING DOCUMENTS	Title
IOC/IODE-XVI/1	Agenda
IOC/IODE-XVI/1	Timetable
IOC/IODE-XVI/2	Provisional Agenda
IOC/IODE-XVI/3	Summary Report
IOC/IODE-XVI/4	List of Documents
IOC/IODE-XVI/5	List of Participants
IOC/IODE-XVI/6	Report on Interessional Activities of the Chairman of the IOC Committee on IODE
IOC/IODE-XVI/7	Reports on Activities of NODCs, RNODCs & WDCs
IOC/IODE-XVI/8	Reports of the IODE Regional Co-ordinators
IOC/IODE-XVI/9	WDC-IODE Co-operation and the Role of WDCs in Meeting New Needs and Requirements for Ocean Data
IOC/IODE-XVI/10	Report on NOPs Submission - Status and Future
IOC/IODE-XVI/11	Report on the MEDI Pilot Project
IOC/IODE-XVI/12	Data formats and data unification
IOC/IODE-XVI/13	The establishment of J-COMM and consequences for IODE
IOC/IODE-XVI/14	Results of the Coastal Databases Survey
IOC/IODE-XVI/15	RECOSCIX-WIO in the Year 2000 and Beyond: Proposal for the Next Phase
IOC/IODE-XVI/16	The GTSPP Project: vision for the future
IOC/IODE-XVI/17	The GODAR Project: Moving forward
IOC/IODE-XVI/18	The World Ocean Database: Project Proposal
IOC/IODE-XVI/19	MIM Information Services and Products: An Overview
IOC/IODE-XVI/20	The IODE Resource Kit: An 'NODC-in-a-Box' Training Tool
IOC/IODE-XVI/21	IODE's Training Programme: An Overview
IOC/IODE-XVI/22	IODE/TEMA Evaluation: Effectiveness of our Training and Support; Shortcoming and Success Stories
IOC/IODE-XVI/23	End to End Data Management Framework and its importance for the future of IOC
IOC/IODE-XVI/24	IODE's Web Presence
IOC/IODE-XVI/25	Development of a Marine XML
IOC/IODE-XVI/26	IOC Oceanographic Data Exchange Policy (draft report)
IOC/IODE-XVI/27	Review of the IODE System

ANNEX V

SPEECHES

BY MR. B. SEARLE, CHAIRMAN IODE

Prof. M. Ruivo, representing his Excellency the Minister for Science and Technology,
Admiral Marcos Leal de Azevedo, Vice-Chairman IOC,
Dr. Patricio Bernal, IOC Executive Secretary,
Prof. Luis Magalhaes,
Distinguished Delegates,
Representatives of Governmental Organizations, Non-governmental Bodies and Organizations,
Ladies and Gentlemen,

I would like to call the Sixteenth Session of the Intergovernmental Oceanographic Commission's Committee on International Oceanographic Data and Information Exchange to order.

I would now like to ask the President of the Portuguese Foundation for Science and Technology, Prof. Luis Magalhaes to provide some opening remarks.

IODE Chairman's Address

You will all appreciate that there has been a considerable length of time since the previous meeting of the IODE Committee that was held in Athens in early 1996. Part of the reason for this delay was due to a series of very devastating and tragic earthquakes that occurred in Turkey beginning in August 1999. This was tragedy of major proportions and we fully appreciate the difficulties faced by the Turkish Government during and after this disaster. Because of the earthquake, the Turkish Government was unable to host the Sixteenth Session of the IODE Committee. Our condolences go out to the people of Turkey and it is very pleasing to see that Turkey has been able to send a delegation to this meeting.

As a result of the earthquake in Turkey, IODE needed to find another venue to host this meeting. We have been very fortunate that the Government of Portugal has been able to make arrangements to host this important meeting at very short notice. I would like to pass on my sincere thanks to the Government of Portugal for this wonderful assistance. In particular, I would like to applaud the efforts of Professor Mario Ruivo who was instrumental in gaining financial support from the Portuguese Foundation for Science & Technology in order to hold our meeting. As many of you will know, Prof. Ruivo is a previous Executive Secretary of the IOC and I am sure that due to his understanding of the importance of the IODE programme, he has worked especially hard to ensure we have this magnificent venue in which to meet. I am sure that I can speak on behalf of all the delegates here today when I congratulate Prof. Ruivo for his continuing support of IODE.

This is truly a magnificent venue, one that I understand was built to support Portugal hosting of the European Union Presidency. Lisbon is also a very relevant location for this IODE meeting. In the 15th Century many famous explorers set sail from Lisbon on a mission of discovery. The IODE Committee will also be setting out on discovering a new path for the future and we are fortunate that we have this wonderful facility in which to chart the future course for the IODE programme.

IODE has made significant progress in many areas since the previous meeting some 5 years ago. We have successfully implemented, developed or completed a number of projects and activities. Some of the highlights include:

- The efforts of GODAR in identifying and making available tens of thousands of previously lost ocean profile observations, the release of the World Ocean Atlas and World Ocean Databases as a

product of GODAR and the related activities of the Ocean Climate Laboratory,

- The continuation of the very successful GTSP activity and its transition from a pilot to an operational programme,
- The progress made on the development of the MEDI Pilot project, a metadata or data directory capability for IODE and its recent integration with the related efforts of NASA with their Global Change Master Directory,
- The progress made on the development of the IODE web capabilities such as the development of the Global Directory of Marine Scientists, and the Ocean Portal, and
- The significant capacity building activities, especially the ODINAFRICA project.

There have been many achievements and successes for the IODE programme and we will hear about these in much more detail over the next few days. I will not dwell any more on these successes at this stage of the meeting other than to say that a few very dedicated people have provided a considerable input into the development of the IODE system and we all appreciate their efforts. I am sure that we will be able to more effectively thank these people when their activities are discussed under the specific agenda items.

I would briefly like to look how previous IODE meetings have been conducted and how I would like to see a slight change in the emphasis of this and future meetings. Previously, the IODE Committee has spent a considerable amount of time reporting on past events. While this is important and necessary for the Committee, I feel that we have been placing too much emphasis on the past events. In order to become more responsive and more effective, our focus needs to change to looking more at the future.

During this meeting I will be trying to ensure that we place a stronger emphasis on the future. As part of this effort, I am hoping that we can form a number of Sessional Working Groups to look at certain aspects of the IODE programme and to develop future plans. Given that the agenda item on the Review of the IODE programme is towards the end of the meeting, I feel that it is important to begin this work earlier in the meeting so that the full Committee can hear and discuss the ideas on the way ahead for IODE. I will be seeking volunteers to assist in this process and hope that we can get a high level of support for this effort.

In relation to this, we will also be hearing about new data requirements for marine science and monitoring programmes and about new developments in technologies that support or simplify the collection, management and exchange of marine data and information.

The IODE Committee will be required to determine the future direction of the programme within the constraints of limited budgets and increasing demands. We will need to make some important and sometimes difficult decisions about our future activities and future direction. We will need to determine if our present activities are providing the support needed by our broad user community and we must address the difficulties of operating an international programme within the constraints of supporting national objectives.

I will be asking all of you to help examine our activities and the structure of the IODE Committee to determine if we can improve our work and be more responsive to the user communities that we serve. I will be asking for ideas and support to make IODE more responsive and more suited to the needs of today's marine community.

I am sure that each Chairman of IODE before me has said at every meeting of the IODE Committee, that this is a particularly important meeting. I will not disappoint you, since I believe that the meeting we will have over the next few days will be crucial to the future of the IODE programme.

Why is it that this meeting is more significant than previous ones? Firstly, there has been an extra long time period since the previous meeting of IODE and secondly, the world has changed in many ways. Changes have occurred in the field of marine research and marine programmes, and changes have occurred in the technical fields that provides much of the framework in which we collect, manage and exchange our ocean data and information. Additionally, political changes are influencing our community in areas such as introducing 'cost for services' and the commercialization of aspects of the data management process, specifically charging for data. We are all suffering from reduced budgets and at a time when more data is being collected and demand for data, data services and information are also increasing. All this turmoil and change has further complicated our task, an activity that is already complex, difficult and often poorly understood.

Because of these changes, I believe that this is a very significant and possibly a defining meeting for the IODE Committee. Much has changed since the last time we met and many more things will change and change rapidly over the next intersessional period. However, one thing that has remained constant is the growing need for the IODE community to lead the way in coordinating access to marine data and information to support the broad needs of the scientists, policy makers, marine resource managers, commercial sector and the general public.

IODE plays a unique role in the international community, but as a result we have some unique problems. We are a Committee operating at the international level, but we are comprised of agencies that are operating within a national agenda. These national needs do not always coincide with the international objectives. This is clearly demonstrated by the lack of support and effort put into some of the IODE programmes by the national data centres.

The question asked by Directors of NODC's is "*what benefit will my centre gain from participation in an IODE programme?*" Sometimes the direct benefits are not clearly visible and our lack of resources means that we often cannot afford to be generous and contribute. Many data centres have contributed significantly when their national needs do coincide with IODE projects. An obvious example of this are the major contributions made by the Marine Environmental Data Service of Canada and the United States NODC in the Global Temperature and Salinity Profile Programme (GTSP).

However, unless there is a clear benefit to the national data centre, it is difficult to become involved in an international IODE activity. This conflict between national needs and the international perspective of IODE is an area that we must resolve if IODE is to continue effectively.

I do not believe that anybody would disagree that there is considerable mutual benefit in collaborating and sharing the common workload. If this was not the case, I doubt if we would have as many delegates at this meeting. In general terms, all our data centres do similar things and we often duplicate our efforts, especially in the area of computer system development. However, there are many barriers in front of us that restrict our abilities to merge national and international needs and increase our co-operation.

I believe that one of the most significant barriers restricting our ability to work more closely together relates to the lack of standards within the marine data community. I feel that this is the one single area that we can investigate to improve our present situation. The concept of developing compatible systems that work equally as well on our own data structures as well as the different data structures from other centres will reduce costs, save time and reduce the duplication of effort.

A number of agenda items will be highlighting a range of technologies and frameworks that may have the potential to increase our ability to co-operate and provide the necessary mechanisms to improve access to marine data and information for the broad community.

Two key framework technologies that will be presented during this meeting are the concept of an 'end-to-end' data framework and the tremendous potential that is available from the development of

the eXtensible Markup Language or XML for the exchange of data between computing systems.

With regard to capacity building, especially in developing countries we have made significant progress since IODE-XV. I believe we have found the recipe for success by linking equipment, training and operational support and this is demonstrated by the ODINAFRICA Project. This project was made possible through the substantial support provided by the Government of Flanders. We now need to identify other donors to apply this new development model to other regions.

I will conclude this opening address by saying that we have a number of major challenges to address during this meeting. I believe that the most significant of these is the process under which the IODE Committee operates and our level of resources. Should we continue to operate as we have done in the past or do we need to change to be more responsive to our user community and how do we address the issue of declining resources with which to implement our important programmes.

An important question to ask ourselves during the course of this meeting is : Have we developed a mutually beneficial and effective relationship with the marine scientific communities and do we have their confidence?

I look forward with interest to a strong and interesting debate over the future of IODE and also to the reports on the progress made with our existing activities.

I would now like to call on Dr. Patricio Bernal, the Executive Secretary of the IOC to provide his thoughts to the meeting.

BY ADMIRAL MARCOS LEAL, IOC VICE-CHAIRMAN

On behalf of the Intergovernmental Oceanographic Commission (IOC) I have the honour to address the opening of this Sixteenth Session of IODE.

First of all, I would like to take this opportunity to acknowledge the outstanding contribution that Portugal has always made to oceanography and the work of IOC. I would also like to express my contentment for being here, having mentioned the historical bonds, cultural and scientific co-operation that prevails between Portugal and my own country, Brazil.

Our planet goes with the flow of a growing globalization, not only in terms of economy and markets but also in terms of science, rapid exchange of information and some global programmes, such as the Global Ocean Observing System (GOOS) that are co-ordinated by intergovernmental and international institutions.

The IODE is the best example of such global co-ordination, since its very beginning of operations. Technology though has changed dramatically and it is now time to reconsider the role of our national, regional and world centres under this new paradigm of converting oceanographic information into research, and also products to meet societies, economies and general coastal demands.

The IOC has been, over the many years of its existence, committed to facilitate the setting up of Member State's databases and data centres for which results there is a balance between the conscience of the role of the oceans for their economies, generally speaking. It is now time to convert those into useful products and prove the value of keeping the ocean's history for their economies.

This is why we are here to prove to governments that our institutions and IOC/UNESCO are aware of the role we have to play, in what refers to collecting as much data and information of the oceans as possible and according to Member Nation's interests.

An important outcome of this Workshop is bound to be a new paradigm for oceanographic data

exchange, an alliance of interests from commercial sectors, private companies, governments, etc., towards a sound articulation of needs and mechanisms to improve our knowledge of the oceans.

I wish you great success and a very fruitful meeting with the assurance that IOC/UNESCO will follow very closely those recommendations and developments coming out of this Sixteenth Session of IODE to the extent possible and together with national commitments to our main goal.

Thank you.

**BY DR E. SARUKHANIAN, DIRECTOR OF WORLD WEATHER WATCH-APPLICATIONS
DEPARTMENT WMO SECRETARIAT**

Dr .Patricio Bernal, Assistant Director-General UNESCO, Executive Secretary IOC,
Dr .Ben Searle, Chairman IOC Committee on IODE,
Prof. Mario Ruivo, Chairman of Portuguese Committee on IOC,
Distinguished Delegates,
Ladies and Gentlemen,

It is a great honour and pleasure for me to welcome all of you on behalf of the WMO Secretary-General, Professor G.O.P. Obasi at the sixteenth session of IOC Committee on International Oceanographic Data and Information Exchange. I would also like to thank IOC for the invitation of WMO to be represented here and Portuguese Committee on IOC, as local organizer of IODE-XVI for the excellent opportunities provided for the session.

Mr. Chairman, Ladies and Gentlemen,

As you are aware, the partnership between WMO and IOC has a long and remarkable history. Starting from sixties WMO and IOC closely collaborated in many areas of oceanography and marine meteorology. The best example of this collaboration is the establishment of the Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM) by parallel decisions of the WMO Congress and IOC Assembly last year. With establishment of this Commission we are entering in new era of greatly enhanced co-operation and joint programme activities. WMO views the new Commission with enthusiasm and hope for the future of operational marine observing systems and services.

At its first transition planning meeting in St Petersburg, July 1999, the Management Committee for JCOMM stressed that one of the important areas of future activities of the JCOMM should be maintenance of the close relationship with IOCE Committee on IODE, in particular in the respect of development of procedures and responsibilities for operational data management. Another proposed recommendation was regarding the use of the IODE data networks by the JCOMM for the management and final archival of relevant delayed mode ocean data. That will be a key issue for the co-operation between JCOMM and IODE in the foreseeable future, and I am sure that this session will consider this matter among others issues.

I would also like to touch briefly on one other issue of considerable importance and mutual interest. As I could see from agenda of the session, you are going to discuss IOC policy and practice for the international exchange of oceanographic data and products. This issue is also of major importance to WMO. As most of you may be aware, the Twelfth Meteorological Congress in 1995 adopted Resolution 40 which deals with WMO's policy and practice for the international exchange of meteorological data and products. A parallel resolution (Resolution 25), covering hydrological data and products, was adopted last year by the thirteenth World Meteorological Congress. These resolutions have allowed WMO to retain the fundamental principle of free and unrestricted exchange of meteorological data and products and in practice to expand the quantity of data and products exchanged.

It is clearly the responsibility of the IOC bodies alone to develop and adopt their own policy and

practice with regard the exchange of oceanographic data. However, WMO believes that it is very important that the policies and practices for the exchange of environmental data and products adopted and applied by our two Organizations should be at least mutually compatible and reinforcing.

Mr. Chairman, Ladies and Gentlemen,

I would like to thank you once again for your kind invitation to be with you at this session. I wish you every success in your deliberations and pleasant time in Lisbon, one of the wonderful places of the world.

BY PROF. MARIO RUIVO

It is a great pleasure for me to be present here at this session, let us say, playing a double role. On one hand, I feel very honoured to be representing His Excellency the Portuguese Minister of Science and Technology, Prof. M. Gago, who could not be present here today and, on his behalf, welcome you to Lisbon. On the other hand, having been associated with the Intergovernmental Oceanographic Commission since the early days, and having participated in all the meetings held by this intergovernmental body, it is a great pleasure for me to be able to participate in this session.

To be the last speaker of an opening session has its advantages, especially for someone with a scientific mind. Although playing such different roles from one another, one can clearly note the convergence of the opinions expressed by the various speakers at this table. We also had the pleasure of listening to the distinguished representative of the WMO, whose words could have been those of either UN, FAO, IMO, UNEP, who look at IOC as a joint specialised mechanism. In other words, an intergovernmental body with functional autonomy within the UNESCO and which is at the service of the United Nations system as a whole. Echoing the words of the previous speakers, this IODE meeting is being held during a significant phase of IOC. Portugal, in hosting this session, intends, once more, to show the importance our Government gives to the Intergovernmental Oceanographic Commission, and to the key role it plays, as the appropriate organization within the United Nations, in the promotion and co-ordination of scientific research activities, ocean services and related regional bodies, as well as the development of national capacities, particularly in the developing countries.

Holding the meeting here in Lisbon has a very special meaning for Portugal, as was mentioned by the distinguished IOC Vice-Chairman and Brazilian brother. My country attaches great importance to all issues concerning the Ocean, not only because of its economic and environmental role but also due to our cultural heritage and history. For all these reasons Portugal had its first Council of Ministers exclusively dedicated to marine issues, during the International Year of the Oceans and Expo98. As you know, this world exhibition aimed at creating public awareness towards Ocean affairs and, thus, bringing marine culture to the public in general, so as to contribute to a better understanding of the problems affecting the oceans in our modern times. This awareness facilitates governmental actions and opens the way for desired partnerships. Nevertheless we are conscious that the progress of science and technology and its applications to oceanography, we have entered in a new phase, the so-called operational oceanography, aimed at making predictions and meeting social requirements, for which real time data is essential. This trend was underlined by the Executive Secretary of the IOC.

In this new context, the need for institutional adjustments has become recognised. The future governance of the ocean requires, within the objectives of sustainable development and in view of its nature, an integrated, cross-sector and interdisciplinary approach. Taking this into account, it is particularly important that when we discuss IODE and its future, we keep in mind the parallel development and requirements for data and information of the Global Ocean Observing System, for which the IOC is responsible in terms of joint co-ordination with other organizations. Further more, it is our opinion that we should, on the one hand, reinforce the identity and the capital of experience, which IODE represents in terms of international co-operation and, on the other hand, ensure that IODE's system is, rather than undermined, enhanced by parallel activities in Ocean data management. The major

interested parties in IODE and GOOS should encourage joint efforts between these two ventures, for the benefit of Member States and other users, and establish appropriate forms of co-operation and management.

In 2002 there will be a UN Conference to assess the progress made during the 10 years since the Rio de Janeiro Conference, in which the oceans, as you know, were not given sufficient attention. Portugal's opinion is that this should be corrected, and the Ocean should be one of the major items on the Agenda for this meeting. We hope that the Informal Consultative Process under way within the United Nations, which should present its conclusions at the General Assembly in the autumn of 2002, can also contribute to enhance international co-operation and co-ordination in Ocean affairs.

During the Portuguese Presidency of the European Union, Portugal along with the other EU Member States and other interested countries succeeded in their efforts to ensure that the next session of the ICP, in 2001, will focus on ocean sciences and technologies. In view of this I wish to appeal to the Member States of IOC to back up the Resolution adopted by the Assembly of the Commission to use this opportunity in order to strengthen its role in the UN system.

I would like to end by referring that during this transitional phase from traditional oceanography to operational oceanography, as previously mentioned, IODE must be provided with adequate means, namely in terms of secretariat and budget. The Portuguese Government's position is that Member States should collectively endeavour to ensure that the IOC is able to respond to IODE's needs, as well as all its other activities. Member States should take full advantage of the opportunity offered by the DOSS Working Group in order to formulate proposals aiming at a better sharing of responsibilities and commitments, thus complementing, in an effective way, the tremendous efforts carried out by UNESCO.

As mentioned by the Chairman of the Foundation for Science and Technology, Portugal is in a stage of developing and reinforcing national capacities in Ocean Science and Technology and, therefore, hopes to gain much from hosting meetings like this one. Portugal attaches the greatest importance to the role of multilateral institutions and, in this particular case, to the Intergovernmental Oceanographic Commission.

I wish you all the success in your work. Thank you very much.

ANNEX VI

IODE-XV (1996-2000) ACTION SHEET IMPLEMENTATION
(as of 14 September 2000)

IODE-XV Agenda Item	Subject	Responsibility	Planned timeframe	Implementation status
3.2 Monitoring Global Ocean Data Flow	Establish closer & formal relations with Oceanic	Chairman IODE, IOC/PP	1 st half '96	U DONE Letter sent
	Load NOPs on WWW server	GETADE, GEMIM, IOC/PP		U DONE NOPs forwarded to GOSIC
	Continue NOPs distribution in hard copy	IOC/PP, Member States		Ongoing See annual statistics
	Explore ways of merging CSRs & NOPs	GETADE, IOC/PP	GETADE-VII	Referred to IODE-XVI
	Procedures for monitoring drifting buoys data	GTSP RNODC Drifting Buoys		U DONE Under development
	Monitoring real-time data flow	Chairman IODE Member States, IOC		U DONE Under GTSP
Rec. XV.1 MEDI	Implement pilot project (MEDI Pilot Project)	GEMIM, GETADE, IOC/PP	mid-96 onwards	U DONE See agenda item 4.2
	Arrange Technical Workshop	GEMIM, GETADE, IOC/PP	1998	V REPLACED replaced by Pilot Project
3.3 Activities WDCs	Development of common data exchange format(s)	GETADE, IOC/JW	GETADE-VII	Referred to IODE-XVI
	Identify reasons of low number of CSRs received by WDC-B	GETADE, WDCs A&B, IOC/PP		U DONE Problem resolved, digitized, copy sent to WDC-B
	Digitize CSRs for Western Pacific area	Australia RNODC-WESTPAC, IOC/PP		U DONE Available on JODC Homepage
	Develop guidelines on how to operate the ICES CSR software	Australia RNODC-WESTPAC, IOC/PP		U DONE
3.4 National D&I Mgmt activities	Request Member States to submit current meter data to BODC	IOC/YO	1 st quarter '96	Referred to IODE-XVI
	Request Member States to provide data from Indian Ocean to RNODC-INDO by end of year	IOC/YO	1 st quarter '96	U DONE Letter about RNODC-INDO
	Publish national reports as IOC/INF document (make it available on-line, paper & CD-ROM)	IOC/SRU		U DONE IODE website
	Develop guidelines for preparation of national reports	GEMIM, IOC/PP	3 rd quarter '98	U DONE Template on IODE website, CL 1668 (9/00)
3.5 Rec. XV.2 IODE and GOOS	Prepare draft of IGOSS/IODE data management: initial draft final draft	Chairman IODE OceanPC Project Leader	1996	U DONE
	Prepare skills & capability report	N. Flemming (past chairman IODE) & his drafting group	1996	U DONE
	Nominate IODE Contact Point for GCOS	Chairman IODE	1 st half =96. B. Searle	U DONE B. Searle

IODE-XV Agenda Item	Subject	Responsibility	Planned timeframe	Implementation status
4.1.1 Rec. XV.3 GE RNODCs and Global Progs.	Make amendments to IOC Manual 9, Annex 2 on procedures for establishment of RNODCs	IOC/YO, Chairman IODE	1 st half '96	Referred to IODE-XVI
	Establish <i>ad hoc</i> Strategy Sub-Committee	Chairman & past Chairman IODE, IOC/YO		U DONE
	Arrange meeting of Sub-Committee	Chairman IODE, IOC/YO		U DONE Report: IOC/INF-1145
	Organize high-level expert consultation	Chairman Sub-Committee Chairman IODE, IOC/YO		V NOT DONE
	Make updates & editorial changes to TR of RNODCs & publish changes in next issue of IODE Handbook	IODE Officers, IOC/PP		V NOT DONE
	Recommend ways of maintaining IODE services in collecting & exchanging global wave datasets	Chairman IODE IODE Officers, IOC/YO		V NOT DONE
Res. XV.1 Est. RNODC- INDO	Inform Member States on establishment of RNODC-INDO	IOC/YO		U DONE
4.1.2 GETADE	Forward GETADE TR for approval of IOC EC	Chairman IODE, GETADE		U DONE
	Implement decisions of GETADE-VI	GETADE Members		U DONE in accordance with GETADE-VI Action Plan
	Arrange GETADE-VII meeting	GETADE Chairman, IOC/YO		U DONE Oct.97, Dublin Note: also GETADE-VIII, 2000, USA
	Project on encoding & decoding data into BUFR	GETADE Members, ICES, US NODC, MEDS	Continuously rep. progress to GETADE-VII	V CANCELED
4.1.3 GEMIM	Arrange interagency meeting on MIM	Chair IODE, Chair GEMIM, IOC/PP	Postponed until >98	V CANCELED
	Circular Letter to IODE contact points related to MIM	IOC Secretary, IOC/PP		U DONE CL1529, 29/5/97
	IOC ASFA input	IOC/PP	Continuously	U DONE
4.2.1 GTSP	Arrange GTSP-VI meeting	Chairman GTSP IOC/YO & WMO	4/96	U DONE Wash. DC, Apr.=96
	Continue close interaction with WOCE	GTSP Members	Continuously	U DONE
	Implement decisions of GTSP-VI & report progress to IODE-XVI	Chairman & members GTSP IOC/YO & WMO	Interseasonal period (1996-1999)	Referred to IODE-XVI
4.2.2 GODAR	Production of second set of CD-ROMs known as "Global Ocean Database 1998"	GODAR Project Leader US NODC, IOC, ICSU/WDC	1 st half >98	U DONE
	Arrange GODAR-V for Central & South America	GODAR Project Leader, Nat. Co-ord. Colombia, IOC/YO	1996	U DONE Oct. 96, Cartagena (IOC WR127)
	Arrange GODAR-VI for Western Africa	GODAR Project Leader, Nat. Co-ord. Nigeria, IOC/YO	1997	U DONE Apr. 97, Ghana (IOC WR136)
	Arrange an International Conference on GODAR, Washington, DC, USA	GODAR Project Leader US Nat. Co-ord., IOC/YO	1997	U DONE Oct. '98
	Implement recommendations of regional workshops & International Conference	GODAR Project Leader IODE Member States, IOC/YO	Continuously	U DONE AND CONTINUING

IODE-XV Agenda Item	Subject	Responsibility	Planned timeframe	Implementation status
	Send letter of thanks to Heads of ICSU, ICES & EU MAST Programme for their contribution to programme	IOC/YO	mid-96	U DONE
	Explore possibilities & arrange training in GODAR	GODAR Project Leader IOC/YO/TEMA	1998	Referred to IODE-XVI
	Address concerns expressed by ICES & take them into account while developing "Global Ocean Database 1998"	GODAR Project Leader, ICES	Done	U DONE
	Extend co-operation between GODAR & EU MAST programme. Report findings to IODE Officers Meeting	GODAR Project Leader, IOC/YO	Continuously	U DONE
	Bring proposal of WDC-B, MGG on new data types to attention of International Conference on GODAR	IOC Director WDC-B, MGG IOC/YO	end '98	U DONE
	Send Circular Letter on declassification of naval data	IOC	mid-96	U DONE
4.2.3 Res. XV.2 Update M&G 5 (Est. NODC)	Update of M&G No 5 (est. NODC) Identify Project Co-ord.	IODE Chair, IOC/PP		U DONE
	Establishment of working group for updating M&G N ^o . 5			U DONE
	Update & publish M&G N ^o . 5		1996	U DONE 11/97(IOCMG5)
	<u>MIM Pub. Series</u> Survey Member States on use of MIM Pub. Series	Chair GEMIM IOC Secretary, IOC/PP		V CANCELLED (overtaken by technology)
	<u>Global Directory</u> Merging national & regional directories	Chair GEMIM, IOC/PP	1996-	U DONE
	<u>Electronic Document Delivery</u> Pilot Project ARIEL	Chair GEMIM IAMSILIC President, IOC/PP	End >97	U DONE
	<u>IOC WWW</u> - Loading list of acronyms on IOC WWW; - Loading meeting list IOC & others on IOC WWW; - Circulate letter to Member States on national activities	IOC/PP IOC/PP IOC/PP; IOC/YO		U DONE U DONE U DONE
Rec. XV.5 IOC WWW server	Develop WWW servers & inform IOC on URL	Member States, IOC/PP	Continuous, by end >96. 1250 URLs >96 in database	U DONE
	Develop standard structure national IOC Homepage	IOC/PP		U DONE
	Setting up national IOC Homepage	Member States	Jun.'96	V NOT DONE
	Hosting of Member States Homepage	IOC/PP	Continuous	U DONE
	Assist Member States in establishing WWW server	IOC/PP	Continuous	V NOT DONE (no requests received)
	Printing of IOC WWW pages	IOC/PP	Upon request	V NOT DONE (no requests received)
4.2.4 QC Ocean. data	Collect quality control standards from range of programmes & propose list of new texts which should be included in second edition of quality control manual	N. Flemming, IOC/YO	Apr.'96	Referred to IODE-XVI
	Publish second edition of quality control manual both in hard copy & electronic form	Secretariat/YO	1997	Referred to IODE-XVI
	Explore with officials of EU MAST Programme possibility of cost sharing in	Secretariat/YO	1996	Referred to IODE-XVI

IODE-XV Agenda Item	Subject	Responsibility	Planned timeframe	Implementation status
	publication of quality control manual			
4.3.1 OceanPC and Software Dev.	Continue to promote & develop the present version of OceanPC, Windows version	Secretariat, H. Dooley M. Brown, IOC/JW	On-going	V CANCELLED
	Seek funds for re-engineering of system providing fully-integrated system based on modular framework using modern graphical user interface	Member States, Chairman, IOC/JW	Continuous Windows version	U DONE note: OceanPC complemented by IODE Resource Kit
	Issue Circular Letter exploring Member States interest for an IODE project to develop an enhanced OceanPC including draft proposal & questionnaire requesting user needs	IOC/JW, Chairman IODE	Done	Referred to IODE Resource Kit
	Pass responses to JCL & details regarding potential funding sources to IOC Secretariat	Member States, IOC/JW	Jan.'97	V CANCELLED
	Keep Member States informed of progress & development of OceanPC Project	IOC/JW	On-going	Referred to IODE Resource Kit
	Meeting of experts on OceanPC	IOC/JW, Project Leader	2 nd half >98	Referred to IODE Resource Kit
4.3.2 Training Marine D&I M	Send letter of thanks to Japan for JODC contribution to IODE/TEMA activities	IOC/YO	1996	U DONE
	Establish closer links of co-operation with UNESCO Regional Offices & IOC regional programmes (keep informed on plans & activities; implement joint ventures)	IODE Chairman, IOC/YO	Continuously	U DONE as appropriate
	Explore possibilities & if possible provide study grants & fellowships to meet IODE needs	IOC/YO/TEMA Vice-Chairman IODE	1996 & then continuously	U DONE
	Implement training activities as specified in Rec.XV.11	Chairman/Vice-Chairman IODE IOC/SRU/TEMA Respon. Nat. Co-ords.	Intersessional period	U DONE
	Include directory of IODE training opportunities on IOC WWW server	GEMIM Chairperson, IOC/PP		Referred to IODE-XVI and GEMIM-VII
	Evaluate IODE/TEMA activities & report findings to IODE Officers Meeting & IODE-XVI	Vice-Chairman IODE, IOC/YO	beginning '99, end '99	U DONE (documents 21.22)
	Recommend training tool to substitute training modules	IODE Officers, IOC/PP	mid-97	Referred to IODE Resource Kit
4.3.3 Voluntary Cooperation Programme	Send Circular Letter inviting Member States to provide surplus equipment	IOC/YO	1996	V CANCELLED
	Make surplus equipment available to developing countries	IOC Member States, IOC/YO	Continuously	V CANCELLED
5.1.1 Remotely Sensed Data	Watch for situations that may result in loss of satellite imagery or other remotely-sensed data & encourage partner programmes to continuously consider final archives for their data to prevent their loss	Member States		U DONE Oct.=97 CL sent COPY CL?
	Pass new terms of reference to next session of OSRS	Secretariat		U DONE
	Appoint 2 experts from IODE to OSRS group	Chairman, IOC/JW	1997	Referred to IODE-XVI
	Identify expert to represent IODE	Chairman, IOC/JW	mid-97	U DONE??

IODE-XV Agenda Item	Subject	Responsibility	Planned timeframe	Implementation status
	interests & work closely with CEOS to provide market arrangements for remotely-sensed data			
	Identify 2 potential pilot projects & prepare appropriate documentation for presentation to next session of the Committee	Chairman, IOC/JW	IODE-XVI	Referred to IODE-XVI
	Encourage active participation of Member States in these projects in their respective regions. Report to IODE-XVI	Chairman, IOC/JW	IODE-XVI	Referred to IODE-XVI
	Insure that importance of remote-sensed data for scientific & monitoring studies is adequately covered in the IGOSS/IODE data management strategy, as well as in GOOS data management plan	Chairman		U DONE
5.1.2 CO₂, Bio & Pollution Data	Implement workshop on biological & chemical data management	US NODC, Nat. Co-ord. Germany, IOC/YO		U DONE (May 96, Hamburg) (IOC WR 122)
	Study problems of managing pollution data by group of rapporteurs	Chairman IODE Chairman of group of rapporteurs, IOC/YO	1996	Referred to IODE-XVI
	Prepare joint action with EU MAST Programme related to management of marine pollution data & implement it during intersessional period (report to GIPME & IODE)	Chairman of group of rapporteurs, IOC/YO	1997-1999	Referred to IODE-XVI
	Support to GOOS project of monitoring petroleum hydrocarbons in seawater: who & how?	Chairman IODE & group of rapporteurs Directors of RNODCs- MARPOLMON, IOC/YO	Intersessional period	Referred to IODE-XVI
	Review of TR of RNODCs for MARPOLMON	IODE Officers Directors of RNODCs- MARPOLMON, IOC/YO	1996	Referred to IODE-XVI
5.1.3 Marine Data from Coastal Areas	Send Circular Letter to IODE data centres requesting information on coastal zone data management activities in which they are involved	Secretary IOC/JW	CL May =97	U DONE (IOC CL 1531)
	Appoint Rapporteur to: (i) compile material from IODE centres into an information paper; (ii) contact international & regional bodies already engaged in coastal zone activities to solicit information on their objectives & data management plans to be included in the above-mentioned information paper.	Chairman, IOC/JW	mid-96	Referred to IODE-XVI
	Include relevant coastal zone issues in IGOSS/IODE data management strategy	Chairman		U DONE
	Establish close contacts & offer assistance to LOICZ in preparation of the management plan & policy document for coastal data management	Strategy Sub-Committee, IOC/JW		U DONE (ongoing)
	Create inventory of marine data already available in coastal zone	Member States, IOC/JW	1997	Referred to IODE-XVI
	Establish & facilitate list of co-operation with JGOFS, AMAP & other programmes dealing with CO ₂ pollution & biological data. Report to IODE Officers meeting	Chairman IODE, IOC/YO	1996-1997	Referred to IODE-XVI
5.2.1 Extent of	Submission URLs to IOC Secretariat	see 4.2.3		U DONE (ongoing)

IODE-XV Agenda Item	Subject	Responsibility	Planned timeframe	Implementation status
Network Access				
	Experiences related to Internet compilation	Member States, R. Keeley, IOC/PP	01 Apr.'96	V CANCELLED (overtaken by technology)
	Circular Letter on need to provide Internet access to national marine science institutes	IOC Secretary, IOC/PP	May '96	V CANCELLED (overtaken by technology)
	IOC Secretary to contact ORSTOM to request assistance access Internet for IOCEA Member States	IOC Secretary, IOC/PP	1 st half >98	V CANCELLED (overtaken by ODINAFRICA)
	Bookmark list on relevant URLs for inclusion in CD-ROM	IOC/PP	Done	U DONE (as part of OceanPortal)
5.2.2 New Technology	Publication electronic version of IODE report	IOC/PP	Done	U DONE
5.2.3 Improve Regional Data & Info. Exchange	Implement regional activities as presented in Rec.XV.11	Chairman/Vice-Chairman IODE IODE Nat. Co-ords. of France, Bulgaria, Kenya, Iran ROPME/PERSGA reps. IOC/SRU	Intersessional period	U DONE
	Designate IODE Regional Co-ordinators with TR as presented in Res.XV.4	Chairman/Vice-Chairman IODE, IOC Regional Programmes, IOC/SRU		U DONE IOC CL, 18 Aug.=97
	Arrange meeting of IODE Regional Co-ordinators co-jointly with IODE Officers meeting	Vice-Chairman IODE, IOC/YO	End >97, Done, 10-13 Feb.=98, Goa	U DONE
5.3 Partnerships	Review IODE/IGOSS co-operation to improve its effectiveness	Chairman IODE, IOC/YO	1998	U DONE
	Consider possibility of developing Global Ocean Velocity Project	Chairman of IODE Strategy Sub-Committee, IOC/JW	1997	Referred to IODE-XVI
5.4 RESOURCES	Develop a partnership with aid agencies to address agreed-upon problems & report progress to IODE Officers meeting & IODE-XVI	Chairman/Vice-Chairman IODE IODE past Chairman, IOC/SRU	Intersessional period	U DONE
	Consider secondment of national experts to IOC Secretariat to deal with IODE programmes	All IODE Nat. Co-ords. IODE Chairman, IOC/YO	Intersessional period	V NOT DONE (no offers)
	Explore mechanisms for providing temporary assistance through financial contributions for hiring local people or sending people for short-term periods	All IODE Nat. Co-ords. IODE Chairman, IOC/YO	Intersessional period	V NOT DONE (no offers)
5.5 AWARENESS	Development of joint IGOS/IODE brochure	Contractor, IOC/YO		U DONE
	Development of IODE input to IOC Exhibition for International Year of the Ocean (posters, logo)	IODE Nat. Co-ords. Chairman/Vice-Chairman IODE, IOC/SRU		U DONE
	Discuss ways of co-operation with EU MAST Programme in demonstration of IODE exhibit	IOC/YO	1 st half '96	U DONE
	Publication of IODE Handbook	IOC/PP	1 st half >98	U DONE (web)
6. ACTION PLAN 1996-1999	Preparation of IODE-XV Executive Summary	Present & past IODE Chairman	Done	U DONE
8. DATE AND PLACE NEXT SESSION	Fix dates & place for IODE-XVI	Chairman IODE, IOC/YO		U DONE (CHANGED FROM ISTANBUL TO LISBON 2000)
	Arrange software demonstration, publications, exhibition, poster session	Chairman/Vice-Chairman IODE	end '99 - beginning 2000	U DONE

IODE-XV Agenda Item	Subject	Responsibility	Planned timeframe	Implementation status
	& scientific presentations in conjunction with IODE-XVI	IODE Nat. Co-ords., IOC/SRU		
9. ADOPTION SUMMARY REPORT	Finalize IODE-XV SR, Resolutions & Recommendations & give for publication	Present, past Chairman IODE, Vice-Chairman IODE, IOC/SRU		U DONE
	Prepare Action Sheet	Present, past Chairman IODE, Vice-Chairman IODE, IOC/SRU		U DONE
	Present Executive Summary, Resolutions & Recommendations of IODE-XV to 29 th Session of IOC EC for approval	Chairman IODE, IOC/SRU		U DONE

ANNEX VII

LIST OF PRESENTATIONS AND DEMONSTRATIONS DURING THE SESSION

PLENARY PRESENTATIONS

- The Virtual Ocean Data System (K. Schnebele, USA)
- The Global Change Master Directory (L. Olsen/ M. Holland, NASA)
- Quality-control software designed by MIRC and determination of range parameters to be used (Dr. Yutaka Nagata, MIRC, Japan)
- Oceanographic data management in South Africa: what, where and how (M. Grundlingh)
- ABEKT Library software (P. Constanta, Greece)
- BODC's experiences of end-to-end data management (L. Rickards, BODC, UK)
- WorldTree easyVortal software (G. Searle, WorldTree)
- Oceanographic Data Management at Portuguese Hydrographic Institute (S. Almeida/M. Pacheco, Instituto Hidrográfico, Portugal)
- Demonstration of activities (Prof. I. Âmbar, Instituto de Oceanografia, Portugal)
- Coastal GOOS (C. Summerhayes)

DEMONSTRATIONS

- Indian Ocean Data CDs (S. Sarupria)
- Multi-disciplinary database management system for marine environmental data (V. Vladymyrov)
- MEDI Pilot Project (G. Reed)
- GOSIC (R. Wilson)
- IODE Resource Kit (G. Reed)
- SEASEARCH & EDMED (L. Rickards & F. Nast)
- EU-SEASED Internet database of metadata on seafloor sediment samples (J. Monteiro)
- End-to-End Data Management (N. Mikhailov & A. Besprozvannykh)
- Tools for Taxonomic Coding (N.M. Kaaiijk)
- CIOH OceanData software package (C. Parra)

POSTERS

- Elsevier
- IOC / IODE
- ABEKT
- WorldTree
- NASA/GCMD
- NODC/WDCA GODAR and World Ocean Database
- Unified System of Information on the World Ocean conditions (ESIMO)

ANNEX VIII

**SESSIONAL WORKING GROUP ON THE ESTABLISHMENT AND MAINTENANCE OF
CO-OPERATION BETWEEN IODE AND RESEARCH PROGRAMMES - INVENTORY OF
RESEARCH PROGRAMMES**

A. Inventory of Data Centre Participation in Research and Monitoring Programmes

Data Centre

DOD - Germany
Representative: F. Nast

Programmes

HELCOM
OSPARCOM
EuroGOOS
Chemical and Biological Data
Management

SISMER - France
Representative: C. Maillard

TOGA
WOCE
CLIVAR
GTSP
CORIOLIS / ARGO
DORSALES / RIDGE
EURONODIM
MEDAR / MEDATLAS
MFSPP
MTP II / MATER
OCTOPUS
ROBLINKS
ICES MDM
GODAR

BODC - United Kingdom
Representative: L. Rickards/D. Hartley

SOOP
ARGO
GOOS
EU-OMEX II
EU-PROVCESS
EU-INDIA
EU-EURONODIM
WOCE
CLIVAR
JGOFS
GLOSS

Southern African Data Centre for Oceanography
Representative: M. Grundlingh

WOCE
JGOFS

NODC - United States of America
Representative: K. Schnebele

GTSP
WOCE
ARGO
JGOFS
Coral Reef Monitoring
Harmful Algal Blooms

Swedish Oceanographic Data Centre
Representative: J. Szaron

EURODONIM
EuroGOOS / BOOS
SEANET
OAERRE
BRIDGE

BALTEX
HELCOM
OSPARCOM
ICES

MEDS - Canada
Representative: S. Narayanan

GOOS
SOOP
DBCP
GLOSS
GTSPP
ARGO
GOSIC
Chemical and Biological Data
Management

ICES - Denmark
Representative : H. Dooley

EU-VEINS
EU-ESOP
EU-MEDAR

B. List of Programmes for IODE Participation

GOOS - global, regional, modules
HELCOM
OSPAR
IBTS / ICES
VEINS
Biological and Chemical Data Management
Pollution Data
Sea Surface Salinity
Real-time Data Management
North Sea Monitoring System
SOOP
DBCP
GLOSS
GTSPP
Argo
CPR
Time Series Stations and Repeat Hydrographic Sections
GOSIC
GODAE

ANNEX IX

WORLD OCEAN DATABASE PROJECT

by Sydney Levitus, Director, World Data Center for Oceanography, Silver Spring

Introduction

All countries have a concern about climate change because of the global impact of climate variability whether this variability is of natural or anthropogenic origin. In 1996, the United Nations *Intergovernmental Programme on Climate Change* (IPCC, 1996) concluded that “*The balance of evidence suggests a discernible human influence of climate*”.

If international agreements are to be implemented due to concern about climate change, the science on which these agreements are based must be international in scope. All data on which such research studies are based must therefore be available to the international scientific community without restriction and in an electronically, easily accessible, form with all necessary metadata .

The international oceanographic community has had a long and successful history of exchanging oceanographic data that begins with the founding of the International Council for Exploration of the Sea (ICES) (in 1902) and publication of oceanographic profile data in the ICES *Bulletin Hydrographique* and publication of plankton data in its *Bulletin Planktonique* beginning around 1907-1908.

The success of the *Global Oceanographic Data Archaeology and Rescue project* (GODAR) sponsored by the Intergovernmental Oceanographic Commission (IOC) indicates the willingness of scientists and institutions of Member States of the IOC to contribute data to the development of integrated, global oceanographic databases through the IODE system and the ICSU WDC system.

Rationale

There is a pressing need for the international oceanographic and climate communities to have access to the most complete oceanographic databases possible for scientific studies in support of international agreements and treaties such as:

- 1- United Nations Framework Convention on Climate Change of 1992 (FCCC);
- 2- Convention of 1992 on Biological Diversity (Biodiversity Convention);
- 3- Convention of 1972 on the Prevention of Marine Pollution by Dumping Wastes and Other Matters (London Convention);

Both the most recent scientific assessment of climate change by the Intergovernmental Programme on Climate Change (IPCC, 1996) and the CLIVAR (1995) Science Implementation Plan strongly emphasize the need to understand the role of the ocean in climate change.

The GODAR project has focused on locating and rescuing historical oceanographic profile and plankton data that are at risk of being lost due to media decay.

During the last twenty years the international oceanographic community has begun distributing temperature and more recently salinity data via the Global Telecommunications System (GTS) as illustrated by the IGOSS and GTSP projects . However, many data types such as CTD, undulating CTD, and Bottle Data are not sent in real-time. Such data need to become part of a global ocean database in as timely a manner as possible.

Purpose

To stimulate international exchange of as much modern oceanographic data as possible in as timely a manner as possible for the purpose of constructing the most complete, integrated, global oceanographic databases possible.

Such databases must be as inclusive as possible of the data and metadata of commonly measured oceanographic variables and simultaneously measured meteorological variables.

Such databases will be made available internationally without restriction in accordance with ICSU WDC data management principles (ICSU, 1996) as exemplified by distribution of the *World Ocean Atlas 1994* and *World Ocean Database 1998* databases.

Main Emphasis

Specifically the project will emphasize improving the exchange of modern data between IODE data centres in terms of timeliness and quality and to avoid duplication of effort.

Proposed Activities

1. IOC Executive Secretary in conjunction with the Chairman of the Committee on IODE appoint a Project Leader - no funds required.
2. The project leader with the assistance, if necessary, of selected experts will prepare an implementation plan and identify priorities - no funds required.
3. A workshop on quality control of oceanographic data and ways to improve the efficiency of data exchange will be convened. Possible funding sources include NOAA, IOC, the European Community, and international science projects such as the WCRP Arctic Climate System Study (ACSYS).
4. Development of regional databases, atlases, and quality control techniques similar to that of the MEDAR/MEDATLAS project will be supported.

Data Types of Interest

1. Hydrographic casts including biological (plankton), chemical, and physical data;
2. Salinity/Conductivity-Temperature-Depth casts;
3. Expendable Bathythermograph casts;
4. Mechanical Bathythermograph casts.

REFERENCES

- ICSU (International Council of Scientific Unions), 1996: *World Data Center System Guide: General Principles, World Data Centers, Data Services*, Paris, 109 pp.
- IPCC (Intergovernmental Program on Climate Change), 1996: *Climate Change 1995: The Science of Climate Change- Contribution of Working Group I to the Second Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, 567 pp.

ANNEX X

LIST OF ACRONYMS

ABEKT	Integrated Library Management System (Greece)
ADCP	Acoustic Doppler Current profiler
AODC	Australian Oceanographic Data Centre
AOPC	Atmospheric Observation Panel for Climate
ASFA	Aquatic Sciences & Fisheries Abstracts
BATHY	BathyThermograph Reports
BODC	British Oceanographic Data Centre
BSH	Bundesamt für Seeschifffahrt und Hydrographie (Germany)
BSRC	Black Sea Regional Committee
BT	BathyThermograph
CENDOC	Centro Nacional de Datos Oceanograficos de Chile
CEOS	Committee on Earth Observation Satellites
CEP	Caspian Environment Programme
CIOH	Centro de Investigaciones Oceanograficas e Hidrograficas (Colombia)
CMM	Commission for Marine Meteorology (WMO)
CSR	Cruise Summary Report
CTD	Conductivity-Temperature-Depth
DBCP	Data Buoy Co-operation Panel
DIF	Directory Interchange Format
DIMP	Data and Information Management Panel
DNA	Designated National Agency
DVD	Digital Video Disc
EDMED	European Directory of Marine Environmental Data
EOPOLE	Earth Observation Data Policy and Europe
EU	European Union
EURONODIM	European Network for Oceanographic and Marine Data & Information Management
FAO	Food & Agriculture Organization of the United Nations
GCMD	Global Change Master Directory (NASA, USA)
GCOS	Global Climate Observing System
GEBCO	General Bathymetric Chart of the Oceans
GEF	Global Environment Facility
GEMIM	Group of Experts on Marine Information Management
GETADE	Group of Experts on Technical Aspects of Data Exchange
GIPME	Global Investigations of Pollution in the Marine Environment
GIS	Geographic Information System
GLODIR	Global Directory of Marine and Freshwater Professionals
GODAR	Global Oceanographic Data Archaeology & Rescue Project
GOOS	Global Ocean Observing System
GOSIC	Global Observing System Information Centre
GSC	GOOS Steering Committee
GTOS	Global Terrestrial Observing System
GTS	Global Telecommunication System
GTSP	Global Temperature-Salinity Pilot Project
G3OS	Sponsors Group for the Global Observing Systems
HRPT	High Resolution Picture Transmission
IAMSLIC	International Association of Aquatic Marine Science Libraries & Information Service
IBCWIO	International Bathymetric Chart of the Western Indian Ocean
ICIWP	International Oceanographic Data and Information in the Western Pacific
ICSU	International Council of Scientific Unions
IDALIC	IAMSLIC Directory of Aquatic Science Libraries and Information Centres

IFREMER	Institut Francais de Recherche pour l'Exploitation de la Mer (France)
IGOSS	Integrated Global Ocean Services System
IGRC	International GODAR Review Conference
IHO	International Hydrographic Organization
IMAR	Information Management and Referral
INFOTERRA	International Environmental Information System
IOC	Intergovernmental Oceanographic Commission (UNESCO)
IOCARIBE	IOC Sub-Commission for the Caribbean & Adjacent Regions
IOCEA	IOC Regional Committee for the Central Eastern Atlantic
IOCINCWIO	IOC Regional Committee for the Co-operative Investigation in the North & Central Western Indian Ocean
IOCINDIO	IOC Regional Committee for the Central Indian Ocean
IOCSOC	IOC Regional Committee for the Southern Ocean
IODE	International Oceanographic Data & Information Exchange
IOS	Institute of Oceanographic Sciences (UK)
IPCC	Intergovernmental Panel on Climate Change
IPIMAR	Instituto de Investigação das Pescas e do Mar (Portugal)
IYO	International Year of the Ocean (1998)
JCOMM	Joint WMO-IOC Technical Commission on Oceanography & Marine Meteorology
JDBC	Java Data Base Connection
JGOFS	Joint Global Ocean Flux Study
JICA	Japan International Co-operation Agency
JISTEC	Japan International Science and Technology Exchange Centre
JODC	Japan Oceanographic Data Centre
KeNODC	Kenyan Oceanographic Data Centre
KMFRI	Kenya Marine and Fisheries Research Institute
KODC	Korean Oceanographic Data Centre
LME	Large Marine Ecosystems
LOICZ	Land-Ocean Interaction in the Coastal Zone
LUC	Limburg University Centre (Belgium)
MARPOLMON	Marine Pollution Monitoring System
MASDEA	Marine Species Database for Eastern Africa
MBT	Mechanical Bathythermograph
MCM	(Ex-Sea Fisheries Institute, South Africa)
MEDAR	Mediterranean Data Archeology
MEDATLAS	Mediterranean Atlas
MEDI	Marine Environmental Data Information & Referral System
MEDS	Marine Information Data Service (Canada)
MGG	Marine Geology & Geophysics
MIRC	Marine Information Research Centre (Japan)
MOU	Memorandum Of Understanding
NIO	National Institute of Oceanography (India)
NODC	National Oceanographic Data Centre
NOP	National Oceanographic Programme
ODINAFRICA	Ocean Data & Information Network for Africa
ODINEA	Ocean Data & Information Network for Eastern Africa
ODINLAC	Ocean Data & Information Network for Latin American Countries
OOPC	Ocean Observations Panel for Climate
PSMSL	Permanent Service for Mean Sea-Level (UK)
RECOSCIX-CEA	Regional Co-operation in Scientific Information Exchange in the Central Eastern Atlantic Region
RECOSCIX-WIO	Regional Co-operation in Scientific Information Exchange in the Western Indian Ocean
RLDC	Responsible Local Data Centres
RNODC	Responsible National Oceanographic Data Centres

RNODC-INDO	Responsible National Oceanographic Data Centre for the Indian Ocean Region
ROPME	Regional Organization for the Preservation of the Marine Environment
ROSCOP	Report on Observation Samples Collected by Oceanographic Programmes
RPC	Regional Project Co-ordinator
SADCO	South African Data Centre for Oceanography
SG	Steering Group
SISMER	Systeme d'Information Scientifiques pour la Mer (France)
SOC	Specialized Oceanographic Centre
SOOP	Ship-of-Opportunity Programme
SSS	Sea Surface Salinity
STA	Science & Technology Agency
SWG	Sessional Working Group
TEMA	Training, Education & Mutual Assistance in Marine Sciences (IOC)
TESAC	Temperature, Salinity, Currents
TOPC	Terrestrial Observation Panel for Climate
TU	Technical University
UNCED	United Nations Conference on Environment & Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Education, Science & Cultural Organization
URL	Uniform Resource Locator
VOS	Volunteer Observation Ship
WCP	World Climate Programme
WDC	World Data Centre
WESTPAC	IOC Sub-Commission for the Western Pacific Region
WGISS	Working Group on Information Systems & Services
WIOBASE	Western Indian Ocean Database
WIODIR	Western Indian Ocean Directory
WIOLIB	Western Indian Ocean Library
WIOPUB	Western Indian Ocean Publications
WMO	World Meteorological Organization
WOCE	World Ocean Circulation Experiment
WWW	World Wide Web
XBT	Expendable BathyThermograph
XML	eXtensible Markup Language