Intergovernmental Oceanographic Commission
Reports of Governing and Major Subsidiary Bodies

IOC Committee on International Oceanographic Data and Information Exchange

Eighteenth Session
Kursaal, Ostend, Belgium, 26-30 April 2005

UNESCO

Abstract
The IOC Committee on International Oceanographic Data and Information Exchange held its Eighteenth Session (IODE-XVIII) at the Kursaal, Ostend, Belgium between 26 and 30 April 2005. The Session was attended by 59 delegates from 31 Member States, 15   representatives of organizations, programmes and projects, and 5 observers. The Session was preceded by the official inauguration on 25 April 2005, of the IOC Project for IODE, based in Ostend, Belgium which was attended by Mr. Jean Vandecasteele, Mayor of the City of Ostend, Mrs Fientje Moerman (Vice-Minister-President of the Flemish Government and Flemish Minister for Economy, Enterprise, Science, Innovation and Foreign Trade), Dr Patricio Bernal (on behalf of Mr Koichiro Matsuura, Director-General of UNESCO), Mr. Johan Vande Lanotte, Deputy Prime Minister, Minister for the Budget and Public Enterprise and Minister of the North Sea, Mr. Paul Breyne, Governor of West-Flanders and President of the Board of Directors of the Flanders Marine Institute (VLIZ), Dr Lesley Rickards, Chair of the IOC Committee on International Oceanographic Data and Information Exchange (IODE), and Mr. Yves Leterme, Minister-president of the Flemish Government and Flemish Minister for Institutional Reform, Agriculture, Sea Fisheries and Rural Policy. The IODE Committee, during its 5 day Session, reviewed the work of the past inter-sessional period. Considerable attention was given to the IODE Review that had taken place during the inter-sessional period. The Committee reviewed all recommendations by the Review Team and made several fundamental and structural change decisions in response to the Review. These included the re-composition of the IODE Officers, the abolishment of the RNODC and IODE Regional Co-ordinator systems, and further review of the IODE Groups of Experts during the next inter-sessional period. The Committee established an inter-sessional working group on ocean data quality control, thereby re-emphasizing the important role of IODE in this area. The Committee further welcomed the increased collaboration with other organizations, programmes and projects such as JCOMM, GOOS, ICES, SCAR, CDIAC, GCMD, CEP, OBIS, IAMSLIC, EURASLIC and others. The Committee noted the success of the ODINAFRICA and ODINCARSA projects, established the ODINCINDIO project and recommended the establishment of an ODIN for the WESTPAC region. The Committee further endorsed an outline and timeline for the development of the IOC Data Management Strategy. The Committee prepared 4 Resolutions and 8 Recommendations.

* An executive Summary of this report is available in English, French, Russian and Spanish.

PREFACE

On 25 April 2005, the IOC project Office for IODE was inaugurated officially. The audience was addressed by **Mr. Jean Vandecasteele**, Mayor of the City of Ostend, **Mrs Fientje Moerman** (Vice-Minister-President of the Flemish Government and Flemish Minister for Economy, Enterprise, Science, Innovation and Foreign Trade), **Dr Patricio Bernal** (on behalf of Mr Koichiro Matsuura, Director-General of UNESCO), **Mr. Johan Vande Lanotte**, Deputy Prime Minister, Minister for the Budget and Public Enterprise and Minister of the North Sea, **Mr. Paul Breyne**, Governor of West-Flanders and President of the Board of Directors of the Flanders Marine Institute (VLIZ), **Dr Lesley Rickards**, Chair of the IOC Committee on International Oceanographic Data and Information Exchange (IODE), and **Mr. Yves Leterme**, Minister-president of the Flemish Government and Flemish Minister for Institutional Reform, Agriculture, Sea Fisheries and Rural Policy. During the preceding Press Conference, Mrs Moerman and Dr Bernal unveiled a commemorative plaque, Dr Bernal received the keys to the Project Office from Mrs Moerman, and a management agreement was signed by Mrs Moerman, on behalf of the Flemish Government, and by representatives of the province of West-Flanders and VLIZ for the Office. The full speeches are included in this report as Annex IV. A detailed description of the Project Office is provided in Agenda item 3.2 of this Report.

The IOC Project Office for IODE

The Ministers visit the exhibition on ocean data and information management guided by Dr Bernal

Addressing the Press in the Main Conference Room

Minister Moerman and Dr Bernal unveil the commemorative plaque

Dr Bernal receives the keys of the Office from Minister Moerman

Mr. Pertry, Mrs Van der Stichele-De Jaegere, Mr. Vandecasteele, Minister Moerman, Dr Bernal, Minister Vande Lanotte, Minister-President Leterme, Mr Breyne

Minister Moerman signing the management agreement for the Office

Dr Jan Mees (Director VLIZ), Mrs Veerle Lories (Director-general, Science and Innovation Administration, Government of Flanders), Mr Yves Leterme, Minister-president of the Flemish Government

Dr Lesley Rickards, Chair IODE addressing the Academic Session

TABLE OF CONTENTS

ANNEXES

1. OPENING

1   Dr Lesley Rickards, Chair of the IOC Committee on International oceanographic Data and Information Exchange (IODE) welcomed the participants to the Eighteenth Session of the IODE at 09:20 on Tuesday 26 April 2005 in the Kursaal of Ostend, Belgium. She expressed her gratitude to Dr. Rudy Herman, Dr Jan Mees and the VLIZ staff for hosting and assisting with this meeting.

2   Dr Rickards stated that IODE is entering a new and exciting phase. Data and information management is increasingly being recognized as an important activity, and there are many opportunities which we need to grasp to ensure that the skills and expertise that we have are used to the best effect. She then highlighted some of the successes of IODE over the last two years and mentioned some of the critical issues that need to be addressed during the current Session. A detailed Chair's report is presented under Agenda Item 3.1.

3   Dr Rickards then recalled the sad passing away of Professor Alexander Suvorov. Known to many in the IODE community, Prof. Suvorov was born in 1947. He was deputy director of the Marine Hydrophysical Institute, Sevastopol, in the Ukraine. He acted as the IODE National Coordinator for Ukraine and was the IODE Regional Coordinator for the Black Sea. He passed away in December 2003. The Committee observed a minute silence in his memory.

4   The Meeting was then addressed by Dr Rudy Herman on behalf the Government of Flanders and more specifically on behalf of Ms Fientje Moerman, Vice- Minister President of Flanders and the Flemish Minister responsible for Science and Innovation. Dr Herman noted that the hosting of IODE-XVIII meets several of the Flemish Government's actual policy priorities: (i) the strengthening of its co-operation with multilateral organizations; (ii) the strong participation of Flanders in a selected number of activities of these organizations: Flanders has shown particular interest in IOC/UNESCO's capacity building efforts in Africa and has supported the Ocean Data and Information Network for Africa (ODINAFRICA); and (iii) the creation of a new framework compatible with the principles of sustainable development to stimulate the development of dynamic and competitive knowledge-based societies.

5   Dr Herman explained that the complexity of the marine system requires new forms of dialogue; dialogues to be developed on the basis of sound information. Although we increased the knowledge about the oceans over the last decades substantially, much has still to be understood. Sound decision making requires well-documented scientific and technological information. Decision-makers rely on scientists for collecting and interpreting relevant data. Therefore we have to assure – in addition to guaranteeing the quality of the information – that both scientists and decision-makers speak the same language based upon standardized protocols and exchange procedures. The information, data and derived research results must be easily and free accessible. This will certainly facilitate the ongoing establishment of new networks and the willingness to co-operate. But, the growing need for improvement of the operational modalities and the communication possibilities requires also a continuous development of new technologies, software and software applications. In this matter the new IODE Project Office offers an excellent opportunity to bring experts together in an environment that stimulates collaboration. Not only the cooperation between UNESCO/IOC programmes (IODE, GOOS, ICAM) is important, but also between UN agencies such as WMO, IMO and other bodies such as ICSU and others.

6   Dr Herman recalled that the IODE Project office was officially handed over by the Government of Flanders to IOC/IODE on 25 April 2005. In addition to the Flanders contribution to the Flanders-UNESCO Science Trust Fund (FUST), the Government of Flanders has decided to provide additional financial support of € 500,000 per year to support

capacity building activities of the IODE Project Office related to Africa, South-East Asia and the Caribbean. The IODE project office is well equipped to meet the requirements for the organization of workshops and meetings within the IOC/IODE context, and also to host such events organized by, or in collaboration with, other organizations.

7   On behalf of the Minister of Science and Innovation, Dr Herman stated that Flanders is prepared to continue its support to the development of new approaches and innovative technologies and to further endorse the IOC activities related to ocean data and information exchange.

2.   ADMINISTRATIVE ARRANGEMENTS

2.1.   ADOPTION OF AGENDA

8   **The Committee adopted** the Agenda (Annex I, hereto)

2.2.   DESIGNATION OF RAPPORTEUR

9   **The Committee accepted** the generous offer of Mr Mustafa Ozyalvac (Turkey) to act as Rapporteur for the Session.

2.3.   SESSION TIME TABLE AND DOCUMENTATION

10   **The Committee adopted** the Timetable (Doc. IOC/IODE-XVIII/1 Add.Prov.rev.).

11   The IODE Technical Secretary (Mr Peter Pissierssens) reviewed the arrangements for the Session and presented the Document IOC/IODE-XVIII/4 prov. '*List of Documents*'. It was recalled that all working documents have been made available through the IODE web site (http://www.iode.org) and more particularly through its IODE-XVIII section (http://ioc3.unesco.org/iode/categories.php?category_no=124) as soon as they were received or prepared by the Secretariat.

12   He informed the Committee about the working hours for the Session and other details relevant to the conduct of the Session.

13   **The Committee established** Sessional Working Group as relevant to the Agenda.

2.4.   LOCAL ARRANGEMENTS

14   Dr Jan Mees, representing the local host institution (Flanders Marine Institute – VLIZ), informed the Session on local arrangements. Information and guidelines for participants were provided in Document IOC/IODE-XVIII/Inf. 1.

3.   STATUS OF IODE

15   Under this Agenda Item reports were presented to give an overall picture of the IODE system, its activities and implementation of the programme at national, regional and global levels. Member States submitted their National Reports prior to the Session (Documents IOC/IODE-XVIII/10.1 to 10.83).

3.1.   CHAIRMAN'S REPORT

16   The Chair presented her report (Document IOC/IODE-XVIII/6) on inter-sessional activities since the Seventeenth Session of the Committee. Dr Rickards reported that, over the inter-sessional period, IODE has continued to grow and develop with a number of projects – both established and new - achieving significant success. The WDCs, RNODCs, NODCs and DNAs continue to work as the long-term depositories for oceanographic data and associated

metadata and also to serve the IODE and user community, producing a great variety of new data products. The number of data centres has also grown steadily over the past 40 years. A new RNODC has been established for the Persian Gulf. The number of national oceanographic data centres and declared national agencies is now 64 and the number of national coordinators stands at 82. Sixty national reports have been received for IODE-XVIII. An Ocean Data and Information Network has been proposed for the Indian Ocean area (ODINCINDIO), which should be the capacity building instrument for Indian Ocean GOOS. Altogether, this growth provides an increasingly larger community of marine data managers. It should be noted that there has been no IODE Officers Meeting since IODE-XVII.

17   The 22nd Session of the IOC Assembly in 2003 adopted the new IOC Oceanographic Data Exchange Policy, and it is part of IODE's role to ensure that it is implemented in IOC Member States.

18   Dr Rickards informed the Committee that a preliminary meeting was held to discuss the development of an IOC Data and Information Strategy, and some progress was made. This is now becoming a critical issue that needs to be addressed very quickly.

19   She further stated that Mr Peter Pissierssens is well established as Head, Ocean Services at the IOC Secretariat, that encompasses the responsibility for the IODE program. Mr Greg Reed returned to Australia during the inter-sessional period after secondment to IODE. Current staffing comprises Peter Pissierssens, supported in Paris by Benjamin Sims, Adrien Vannier and Françoise Ricotou. Over the last six months Mr Bob Gelfeld, from the USA, has been on secondment to IODE. In addition, Mr Mika Odido is the ODINAFRICA Project Coordinator and Mr Vladimir Vladymyrov has been appointed Head of the Project Office, here in Ostend. However, this staffing is considerably below what is needed to implement the IODE Programme satisfactorily, and the situation is not likely to improve in terms of the regular budget received.

20   The issue of declining resources for IODE has been raised on a number of occasions. IODE is acknowledged to be a key activity of the IOC and is one of its flagship programs. However, when the issue of resources is raised, the Member States have not supported any increase to counter the slowly declining level of support. The IODE Committee at this 18th Session, must look at ways of raising the profile of IODE, especially with their own national IOC representatives. It is important that we turn the compliments given to IODE by the delegates at the IOC Assembly into additional resources for the IODE programme.

21   The recent devastating tsunami in the Indian Ocean has clearly stressed that the absence of timely and scientifically underpinned data and information can and will cost many lives. The steps that are now being taken by the countries in the Indian Ocean to develop an Indian Ocean Tsunami Warning System are building upon the new IOC data policy in which IODE has been instrumental in its development. We may want to consider during the current Session how the IODE programme can contribute to the efforts in the Indian Ocean as well as in other part of the world as tsunami warning systems are now considered in various other regions.

22   The Chair then proceeded with reporting on IODE Programme successes. She noted that IODE's long term and new global data programmes are continuing to be successful. While there will be specific reports on these activities later in the agenda, it is important to recognize the success of some of the more significant efforts.

23   The Global Oceanographic Data Archaeology and Rescue (GODAR) project has continued to be a great success. To date, data from approximately 1.05 million Station Data casts, 1.15 million MBT casts, 610,000 XBT casts, 145,000 high resolution CTD casts, and 142,000 Plankton Tows have been recovered and distributed without restriction to the international scientific community. A further 200,000-250,000 historical ocean profiles and over 60,000 plankton tows are to be made available in the next release of the "World Ocean Database" series. In addition, substantial progress has been made in the collection of

historical measurements of sea level from tide gauges, as recommended by the International GODAR Review Meeting held in 1999. A total of 372 years of hourly data has been rescued so far for tide gauges at 34 locations in 15 countries.

24   The Global Ocean Surface Underway Data (GOSUD) Pilot Project has the objective of organizing surface underway data and working with the data collectors, to improve data collection to meet the benchmarks of spatial and temporal sampling and data accuracies set out by the Ocean Observation Panel for Climate (OOPC). Both real-time and delayed-mode data are included in the system. The GOSUD Global Data Assembly Centre (GDAC) has been established at Coriolis, France, from where data are available both through the web site and via ftp.

25   IODE is also a key player in the development of marine XML through participation in the ICES-IOC Study Group on the Development of Marine Data Exchange Systems using XML (SGXML), and the EU Marine XML project. Dr Rickards informed the Committee that both projects have completed their work and their final reports and recommendations would be discussed at the current IODE Session. She further stressed that IODE needed to build on the momentum generated and urgently needed to decide on the next steps and recommend the appropriate mechanism to continue this work. Marine XML will support tracking of data from collection through to generation of integrated global and regional datasets, and support metadata describing the data collection, quality control and subsequent processing. The generation of data tagged with marine XML at the instrument level can enable automating processes like generation of metadata descriptions.

26   Dr Rickards informed the Committee that various International and Regional Conferences, Symposia, Workshops, etc. related to different issues of ocean data and information management and associated information technology were held during the inter-sessional period. They allowed experts from developed and developing countries to share information and to present project results, thus serving as a valuable source of education to scientists and planners. Most of these activities have been in support of ongoing programmes and with close co-operation with the countries of the regions. These included:

- Scientific and Policy Challenges towards an effective management of the Marine Environment in support of Regional Sustainable Development. Varna, Bulgaria, October 2003;

- MAMA Workshop on Marine Data & Information Management. Malta, January 2004;

- IOC Executive Council, Paris, France. June 2004;

- GODAR WESTPAC Workshop. Tokyo, Japan, November 2004;

- Ocean Biodiversity Informatics (OBI) Conference, Hamburg. Germany, November 2004.

27   She also noted that at the end of May 2005 and the beginning of June 2005, two further conferences, to be hosted by IFREMER, France, were scheduled:
- International Marine Data and Information Systems (IMDIS) conference;

- Fourth EuroGOOS Conference.

28   Dr Rickards recalled that the IODE Community operates three Groups of Experts: the Group of Experts on Marine Information Management (GE-MIM), the Group of Experts on Biological and Chemical Data Management and Exchange Practices (GE-BICH) and the Joint JCOMM/IODE Expert Team on Data Management Practices (ETDMP). These continued to develop and improve IODE's data and information management capabilities through their various programs and activities. The ETDMP, with Mr Nick Mikhailov (Russian Federation) as Chair, held its first meeting in Ostend in 2003, where three pilot projects were established. GE-BICH, with Edward Vanden Berghe as Chair, has met once during the inter-sessional period at BODC, Liverpool, UK in March 2004. Two pilot projects have been identified. The 8th Session of GE-MIM was held at CSIRO Marine Research Laboratories, Hobart, Australia

in September 2004. At this meeting Ms Suzie Davies (Australia) took over from Dr Murari Tapaswi (India) as the Chair. She noted that the GE-MIM was developing a strategic plan to provide direction for the Group over a 4-year period. Details of the past efforts and proposed future programs of these groups are discussed under other agenda items (Agenda Item 6.1).

29   Dr Rickards recalled that capacity building has been an essential and critical part of all IODE activities. Its role has always been proactive and synergic in the IODE relationship with Member States. Solving society's needs required building the capacity to analyze the data, generate forecasts and other products and communicate the results to the public, managers and policy makers. To develop expertise required a series of successive and inter-linked approaches including training of experts, knowledge of the framework for integrated management, product development ability and an operating data management system that is fully integrated into a global network. She stated that capacity building uses a variety of mechanisms, which has included national and regional workshops and training courses, advisory missions and internships. However, increasingly the IODE strategy is to use ODIN regional data and information exchange networks and the use of training tools like OceanTeacher.

30   Dr Rickards then proceeded addressing the progress of various IODE core projects and activities"

31   "Notable IODE capacity building initiatives, such as, the Ocean Data and Information Networks for Africa (ODINAFRICA) and for Caribbean and South America regions (ODINCARSA) exhibited significant activity in developing regional infrastructures for data and information management in the aforementioned areas, and thus, greatly advancing international cooperation, necessary for the sustainable development in these regions.

32   The second phase of ODINAFRICA was completed in September 2003 and this was marked by a seminar where the ODINAFRICA NODCs exhibited posters and provided demonstrations of the accomplishments of the project including data atlases and metadata bases. ODINAFRICA activities have also included national ocean awareness activities, stakeholder meetings, and the establishment of national coordination teams. Impressive progress made by the region and ODINAFRICA continues to build on this with ODINAFRICA-III, which began in 2004. Training courses on data management including biodiversity data management have just taken place in the Project Office.

33   OceanTeacher is being upgraded. The new product, ODIMeX, currently under development will provide a single integrated e-learning and expert system, including expert and training resources for marine data information management needed by professional ocean data and information managers and scientists involved in data management and will provide ocean researchers and students with the necessary knowledge to interact effectively with their national oceanographic data centres

34   During the inter-sessional period IODE's emphasis on developing a prominent and interactive web presence has continued. The web site has been redesigned substantially since IODE-XVII. It now uses a re-engineered version of the BeeBox dynamic content management system. The latest re-development was carried out in December 2004/January 2005, when the graphic elements and layout of the site were redesigned and user-friendliness and navigation of the site was improved. The average number of visits to the site per month is now (April 2005) about 3500 visits/month.

35   The IODE programme provides support to a range of other international and regional activities. The most significant of these continue to be the Global Ocean Observing System (GOOS) and the Joint WMO/IOC Technical Committee for Oceanography and Marine Meteorology (JCOMM). In the inter-sessional period, IODE has participated in a range of GOOS and JCOMM meetings. However, the offer to support GOOS and JCOMM needs to be backed up with concrete actions developed here at IODE-XVIII. It should be

noted that some IODE data centres are already playing a role participating in projects such as Argo, GTSPP and GLOSS. Further cooperation will develop with the GOOS Regional Alliances and the Coastal Module of GOOS.

36   *IODE has been represented at the I-GOOS meetings in 2003 and 2005 and also at the GOOS Steering Committee in 2004. Similarly IODE has been represented at the JCOMM Management Committee in 2004 and 2005 and is part of the JCOMM Data Management Coordination Group. Cooperation is also effected through the JCOMM-IODE Expert Team on Data Management Practices (ETDMP).*

37   *The IODE Chair was a member of the Global Observing System Information Centre (GOSIC) Review Team in 2003. GOSIC is a data and information centre in support of the 3 Global Observing Systems: the Global Climate Observing System (GCOS), the Global Ocean Observing System (GOOS) and the Global Terrestrial Observing System (GTOS).*

38   *In December 2003, an IGBP-SCOR meeting on Data Management for Marine Research Projects, was held in Liverpool, UK, December 2003, with the objective of producing a common strategy for managing and sharing marine data within and among IGBP and SCOR projects, learning from the experiences in WOCE, JGOFS, and other projects.*

39   *Links have been continued with new and existing science programmes. The IODE Chair attended a CLIVAR Data Planning Meeting in March 2004 and presented IODE to the meeting.*

40   *The IODE Chair also chaired a review of the Joint Committee on Antarctic Data Management (JCADM) last month. This review also considered ways of developing collaboration and cooperation between NODCs and the JCADM National Antarctic Data Centres (NADCs).*

41   *Collaboration between ICES and IODE has occurred over many years. This is set to continue in the future.*

42   *IODE was invited to attend the third Ocean Biogeographic Information System (OBIS) Management Committee where ways of collaboration were discussed.*

43   *The new IODE Project Office was opened in Ostend, Belgium on 25 April 2005. The Office will establish a creative environment facilitating the further development and maintenance of IODE projects, services and products with emphasis on improving the efficiency and effectiveness of the data and product/service stream between the stage of sampling and the user. It will further assist in strengthening the capacity of Member States to manage oceanographic data and information and to provide ocean data and information products and services required by users. Dr Rickards stated that she was very pleased to have Vladimir Vladymyrov as the Head of the Project Office. Already there is a training course underway, with others planned during the year. Plans for developing the IT infrastructure are underway, and IODE's web site servers will be moved to the Project Office. Through the Project Office, IODE will participate in several EU funded projects.*

44   *To further guide IODE towards fully meeting the user needs, a full review of IODE was undertaken during the past year. Mr Dieter Kohnke has led the IODE Review Team and provided the report for IODE-XVIII. This will be discussed in detail during the Session. The Review Report will be submitted to the IOC Assembly in 2005. The review considered the operation and implementation of IODE, with particular attention to its mandate, mission, structure, data centre networks and their ways of operation, the activities of its subsidiary groups and projects, and the national development of IODE activities. It reviewed the extent to which IODE activities, including those specifically targeted at capacity building in support of IODE, benefit Member States. The Report needs careful consideration by the IODE Committee. The outcome of the review will also be used to aid the development of an IOC Data Management Strategy".*

45   Dr Rickards ended her presentation reflecting on future developments and directions. For over forty years the IODE programme has been serving the marine community not only through collecting, quality controlling, archiving and exchanging of data, but also in developing formats, standards, protocols, in addition to powerful data products. To serve these requirements IODE has used state of the art data systems, methods and techniques for data management, but the emphasis has focused on delayed mode data and, in most cases, on physical data.

46   Dr Rickards noted that advances in oceanography, marine science and technology, especially during the last decade, have led to a rapid expansion in the volume and the diversity of ocean data collected. During this period, the marine community paid increased attention to multidisciplinary research, especially that serving integrated coastal zone management. User requirements have also changed. Dr Rickards stated there was now an increased requirement for operational data and products. Data types, such as chemical, biological, biogeochemical, coastal and remotely sensed data were being increasingly collected and managed. These changing requirements have an impact on IODE, which IODE has recognized and is evolving in order to meet these needs.

47   The Chair recalled that IODE was closely collaborating with, and servicing the needs of, the other IOC and related programmes such as Ocean Sciences, GOOS and JCOMM. Another major and long-term commitment of the IODE Programme was the long-term accessibility and archival of oceanographic data, meta-data and information to safeguard present and future holdings against loss or degradation.

48   Dr Rickards cautioned that there was still much to be done. IODE still largely comprised a collection of separate NODCs, RNODCs and WDCs, using primarily a centralized data centre architecture, with a wide variety of remits, skills and data. Sometimes these centres have worked together in groups for individual projects. Much focus has been on quality control, data archival and dissemination.

49   Dr Rickards stated that IODE continued to go through a period of change and some critical decisions were needed, both as a result of the IODE Review, but also through further development of XML and such initiatives like the prototype End-to-end data management pilot project developed through the ETDMP. Significant progress needed to be made to ensure easy access to all types of marine data (and information) on an appropriate time scale, encompassing global, regional and local needs. She recognized that elements of this existed, but others still need to be adapted and developed. In addition, there was an urgent need to lead the development of the IOC Data Management Strategy.

50   Dr Rickards concluded with saying that IODE-XVIII provided an excellent opportunity to define the future role of IODE and to make real decisions, thus ensuring the future of this important programme.

51   The Report of the Chair was followed by discussions and comments on the IODE programme *in general.* The Committee was requested to consider the Chair's report, together with discussions on other Agenda items, in order to discuss and decide upon future directions of the IODE programme under Agenda Item 5 - Future of IODE.

3.2.   IOC PROJECT OFFICE FOR IODE

52   Mr Vladimir Vladymyrov, Head of the IOC Project Office for IODE, introduced this item referring to Document IOC/IODE-XVIII/12 '*IOC Project Office for IODE*'. He informed the Committee on the official inauguration of the Project Office held on April 25. He underlined the important role of the Flanders Marine Institute in technical and administrative support towards the creation of the Project Office, and the considerable opportunities for joint activities between the Office and VLIZ. He expressed gratitude to the Government of Flanders and to the City of Ostend for hosting the Project Office and future financial support of its work.

53   He informed the Committee that the main objectives of the Project Office are:

    (i)   to provide a creative environment facilitating the further development and maintenance of IODE projects, services and products with emphasis on improving the efficiency and effectiveness of the data and product/service stream between the stage of sampling and the user; and

    (ii)   to assist in strengthening the capacity of Member States to manage oceanographic data and information (with special attention to developing countries) and to provide ocean data and information products and services required by users.

54   He underlined that to achieve these objectives the IODE Project Office will:

    (i)   further develop, strengthen and maintain IOC/IODE ocean data and information management training programmes and training tools;

    (ii)   provide an environment ('think tank') where ocean data and information experts and students can work, meet and discuss;

    (iii)   develop, host and maintain IOC/IODE's ocean information systems and related public awareness tools;

    (iv)   promote collaboration between all expert levels active in ocean data (and data product) and information management, including scientists, data managers and other users;

    (v)   host specialized short-term training courses in ocean data and information management; and

    (vi)   provide a laboratory environment for the development and beta testing of ocean data and information management technology.

55   Mr Vladymyrov informed the Committee that the Project Office is housed in the former '*Oostende Vismijn*' located close to the City of Ostend, Belgium. VLIZ is housed in the same block of buildings back-to-back with the Project Office. VLIZ hosts the NODC for Flanders (VMDC), and participates in IODE activities through membership of GE-BICH and the ETDMP pilot projects. This proximity will enable close collaboration between the two organizations. VLIZ will provide internet connectivity for the Project Office and will also provide secretarial and technical support. The oceanographic research vessel, '*Zeeleeuw*' operated by VLIZ, can serve as a test-bed for on-board technologies developed by the Project Office.

56   Mr Vladymyrov informed the Committee that training and other activities had already begun at the Project Office. These included two training courses within the framework of the ODINAFRICA project, one on Oceanographic Data Management and one on Biodiversity Data Management. In addition there were two short term visits of experts from the USA and Russia to assist with the OceanTeacher and ETDMP E2EDM pilot projects.

57   He then briefly described facilities that are available within the Project Office and outlined the proposed work plan for the Project Office in 2005. He informed the Committee on the Project office actions related to obtaining additional funding and other resources to support Project Office activities. These resulted in the donation of free GIS software licenses from ESRI, to be used at the training courses. He also mentioned the Project Office's participation in EC projects.

58   He informed the Committee that in January 2005 the Government of Flanders had pledged an additional €500,000 per year for the support of training activities at the Project Office, related to oceanographic data and information exchange and for tsunami warning system related activities. These funds could be used for training and related capacity building, primarily for Africa, South-east Asia and the Caribbean. The funds would be available as from July 2005.

59   The JCOMM Co-Presidents welcomed the establishment of the IOC Project Office for IODE, considering it very timely, and expressed their appreciation for the support that will be provided by IODE and Flanders for the organization of the joint IODE/JCOMM training course on modeling that will be held at the Project Office in September 2005.

60   **The Committee** expressed its gratitude to the Government of Flanders and to the City of Oostende for hosting the Project Office and financial support of its work.

61   **The Committee welcomed** the establishment of the Project Office **and noted** its future role in fostering close cooperation between Member States on matters related to IODE as well as between IODE and other IOC programmes.

62   **The Committee recommended** maintaining a calendar of events at the Project Office and making this available through the planned Project Office web site.

63   **The Committee welcomed** the diversity of the training events planned by the Project Office and **noted with appreciation** the planned trainings for young scientists.

64   **The Committee** expressed its gratitude to the Flanders Marine Institute (VLIZ) for the excellent technical and administrative support provided to the Project Office.

65   **Noting** the importance of promoting the IOC Project Office for IODE, **the Committee encouraged** Member States to promote the Project office and to second relevant experts on short or long-term basis to the Project Office.

3.3.   ACTIVITIES OF WORLD DATA CENTRES

66   The Directors of the World Data Centres for Oceanography (Silver Spring, Obninsk and Tianjin), for Marine Geology and Geophysics, Moscow, and for Marine Environmental Sciences (MARE) informed the Committee of the activities of their respective centres.

3.3.1.   **World Data Center for Oceanography, Silver Spring, USA**

67   Mr Sydney Levitus informed the Committee that data is obtained by the World Data Centre for Oceanography, Silver Spring, from a variety of sources. Data can be sent directly to the World data Centre by an organization or institution or it can be digitized in electronic format from a printed document, such as a ship's report or other manuscript. Datasets are distributed by the US NODC on CD-ROM, DVD, or user selected files from the Internet (i.e. WOD*select*).

68   Mr Levitus informed the Committee that, during the last inter-sessional period, the number of organizations from which the World Data Center for Oceanography, Silver Spring, has received data include more than 60 international and domestic U.S. institutions. In addition, data publications have been received from U.S. institutes such as the Scripps Institute of Oceanography and foreign institutes such as the National Fisheries Research and Development Institute, Korea; Japan Meteorological Agency; Hokkaido Fisheries Experimental Station; Hokkaido University; University of Tokyo/Ocean Research Institute; and National Institute of Polar Research, Japan.

69   Two new products under the International Ocean Atlas and Information Series have been released during the inter-sessional period:

70   **Volume 8:   History of the Arctic Exploration 2003:   Cruise Reports, Data –** October 2003. This product was a collaborative effort with the Shirshov Institute of Oceanology and provides electronic access to physical, chemical, and biological oceanographic data for the Eastern Arctic seas (Barents, Kara, Laptev, East Siberian, Chukchi, and southern Bering) and parts of the Arctic Ocean for the period 1870-1941.

71   **Volume 9:   Climatic Atlas of the Arctic Seas, 2004: Part I.   Database of the Barents, Kara, Laptev, and White Seas – Oceanography and Marine Biology** – July 2004. This product was a collaborative effort with the Murmansk Marine Biological Institute.

This Atlas presents primary data on meteorology, oceanography, and hydrobiology from the Barents, Kara, Laptev, and White Seas, which were collected by scientists from different countries during the period 1810-2001.

72   In addition a new, high-resolution set of climatologies entitled "**Quarter-Degree Objective Analysis of Temperature and Salinity for the World Ocean**" is available online from NODC/WDC.

73   Mr Levitus informed the Committee that during the inter-sessional period the WDC received 33 visitors from 8 countries. Requests were regularly received by WDC for Oceanography for data, publications and information from foreign and domestic academic institutions, government agencies, commercial interests, international organizations, and individuals. These were in addition to routine distributions of publications and data products to addressees on WDC mailing lists.

74   The WDC received publications as items of exchange from various institutions. When available, duplicate copies were supplied to the WDCs in Obninsk and Tianjin. Publications that are distributed by WDC for Oceanography, Silver Spring, such as the World Ocean Database (WOD), World Ocean Atlas (WOA), and the *International Ocean Atlas and Information Series* were routinely supplied to the WDCs in Obninsk and Tianjin.

75   Mr Levitus reported that IOC Member States were submitting increasing amounts of oceanographic data to the WDC System which he welcomed as a very positive trend. He stated that the regional, global, and project databases compiled and distributed by member States and submitted to the WDC system were critical for producing important international assessments such as the IPCC which might serve as foundations for intergovernmental treaties on climate, pollution, and/or other important activities. The significant contribution of IOC Member States through the provision of data to the IOC/GODAR Project was just one example of how successful the IOC/IODE/WDC community has been during the past decade.

76   Mr Levitus noted that a major weakness of the WDC system was the lack of support to process and distribute the ever increasing amounts of oceanographic data sent to the WDCs. The WDCs were originally archives for data since much of these data were in manuscript form. Increasingly, WDCs served their data and products based on these data in electronic format. Mr Levitus re-iterated that increased support for WDCs to build electronically available, comprehensive, integrated, scientifically quality-controlled databases was required to allow the WDCs to meet present and future demands.

77   Mr Levitus recalled that the WDC for Oceanography, Silver Spring, received data from many Member States. However, many data sets that the WDC received had fundamental problems with the data and metadata. These included, but were not limited to, data with incorrect geographical coordinates, incorrect dates, impossible data values, and missing metadata. It would be valuable for IODE centers, and institutions within IOC Member States to perform more thorough quality control on data before they are submitted. It would also be valuable for IODE data centres to check their national ocean-profile holdings against those contained in the "World Ocean Database," which was being maintained by WDC for Oceanography, Silver Spring. This database was frequently used by the scientific community, and it would be in the interest of all Member States to ensure that this database was as accurate and complete as possible.

78   Mr Levitus informed the Committee that monthly updates of the data base since the release of WOD01 were posted on the WDC web site along with what changes were made and why.

79   He informed the Committee further that in 2005, enhanced versions of the *World Ocean Database* and *World Ocean Atlas* would be released. Both products and all data would be made available on DVD and online.

80   **The Committee requested** all IODE data centres, and other institutions in IOC

Member States that manage oceanographic data, to perform more thorough quality control on data before they are submitted.

81 Reference is made to Resolution IODE-XVIII.4, adopted under Agenda Item 5.1.

82 **The Committee requested** all IODE data centres, and other institutions in IOC Member States that manage oceanographic data, to check their national ocean-profile holdings against those contained in the "World Ocean Database," which is maintained by WDC for Oceanography, Silver Spring.

3.3.2. World Data Centre for Oceanography, Obninsk, Russian Federation

83 This Agenda Item was introduced by Dr Marsel Shaymardanov. He informed the Committee that all data and information submitted to WDC for Oceanography, Obninsk (Declared National Programme - DNP, CSR, oceanographic data on various media, publications within WDC domain) were registered, and subsequently descriptions of data and publications were placed in the metadata base managed by DBMS MS/Access. The metadata format being used was similar to that of MEDI and contained summarized characteristics of data, publications and other materials. The metadata were used to prepare printed and electronic *"WDC-B Catalogues"*. The latter were posted on the RIHMI-WDC Web page (WDC section) on a regular basis (every month) and were available at: http://www.meteo.ru/wdcb/ewdc_oce.htm

84 Dr Shaymardanov informed the Committee that all data (in manuscripts and on electronic media in their original formats) submitted to the WDC were processed for QC during the registration process. Oceanographic data submitted on electronic media (CDs, etc.) were reformatted to the Russian NODC formats for integrated use. After registration all data and information submitted to WDC were permanently archived at RIHMI-WDC on the data (information) originator media and formats in two holdings: Manuscript Holding (publications, DNP, SCR) and Digitized Data Holding (oceanographic data on technical media). Information on data and information submitted to WDC for Oceanography, Obninsk was published on a regular basis in the form of *"WDC-B Catalogues"*. They were issued 4 times a year and disseminated to 135 organizations of 55 countries. The electronic version of "WDC-B Catalogues" was posted on the RIHMI-WDC Web site in its WDC section and updated every month. Oceanographic data and metadata digitized and reformatted to the Russian NODC format were made available on-line at http://data.oceaninfo.ru/cruisecat/en/index.jsp.

85 Dr Shaymardanov noted that during the inter-sessional period (2003-2004), the WDC for Oceanography, Obninsk accumulated oceanographic data from over 500 R/V cruises for 1951-2004 from 8 countries – 50.000 oceanographic stations, 100.000 BT profiles. In this period 111 publications for 1993-2004 from 8 countries were received. Data arrived mainly on CDs. The total amount of data submitted to WDC for Oceanography, Obninsk decreased as compared with the previous inter-sessional period probably due to more intensive use of new information technologies. For the period 1964-2004 WDC for Oceanography, Obninsk accumulated oceanographic data from over 15,000 R/V cruises between 1890 and 2001 from 64 countries. These resulted in 2,000,000 oceanographic stations, 1,950,000 BT profiles, 95,000 CTD profiles, 800 current meter series, and 35,000 pollution records.

86 During the inter-sessional period the WDC received visitors from IFREMER (France), HNODC (Greece), IOS (Italy), BODC (UK), and MHI (Ukraine).

87 After dissemination of the World Atlases by the WDC for Oceanography, Silver Spring, the number of requests for oceanographic data and climate summaries had decreased significantly. At present users took more interest in operational data, prognostic and diagnostic information.

88 Dr Shaymardanov informed the Committee that the WDC for Oceanography,

Obninsk data are available from http://data.oceaninfo.ru/resource/connector/main1.jsp .

89   He further informed the Committee that the WDC for Oceanography, Obninsk has contacts with WESTPAC Data Centre (JODC). The JODC submits to WDC, Obninsk the regional oceanographic data . These data are loaded to metadata/data basis of the WDC, Obninsk and also used by FERHI (Vladivostok) to build daily surface water temperature fields for the North

90   Dr Shaymardanov noted that the guidelines and guides on activities of the ICSU WDCs were formulated long ago – the latest edition of the Guide on International Data Exchange was published in 1992 - and since that time approaches to data collection and management changed radically. He stated that today emphasis was on oceanographic data management under global programmes, Advanced information technologies were being developed rapidly, and user requirements have changed significantly, especially in the context of GOOS as well as new initiatives such as GMA and GEOSS. A key problem of the WDC system was its slow response to present-day user requirements. In addition the system needed to adapt to the rapid progress of advanced information and communication technologies.

91   Dr Shaimardanov stated that, to improve the WDC system it would be necessary to:
   (i)   more clearly define indicators of the WDC system operations (marine parameters, geographic areas, data/product types, etc.), within the IODE framework, for short-term and long-term periods and on the basis of GOOS/GCOS/COOP, as well as GEOSS and GMA requirements;
   (ii)   establish a mechanism to respond to present-day challenges in the field of metadata, data and product services to IODE and other users;
   (iii)   improve the IODE data management standards and technologies on the basis of modern web-oriented client-server technology to provide an "end to end" data management process.

92   Dr Shaymardanov reported that, in the next 2-3 years the WDC for Oceanography, Obninsk was expected to:
   (i)   migrate all digitized oceanographic data submitted to WDC for Oceanography, Obninsk to data storage library cartridges to ensure long-term and safe WDC data storage;
   (ii)   reduce the time for posting metadata on data submitted to WDC for Oceanography, Obninsk on the RIHMI-WDC Web site;
   (iii)   implement technology of quasi-operational reformatting of digitized data submitted to WDC for Oceanography, Obninsk to the unified data format and provide on-line user access to all WDC for Oceanography, Obninsk data;
   (iv)   allow the WDC for Oceanography, Obninsk users to perform data retrieval and statistical processing including the development of generalized parameter fields and product representation in the table-graphical form.

93   **The Committee noted** that the WDCs exchange data in a complementary fashion but, over the years, have developed a different range of products and services.

94   Considering that this varied offering of the WDCs may not be clear to end users, **the Committee recommended** the development of an information page on the IODE web site that will guide users to the relevant products and services available from the WDCs.

3.3.3.   World Data Center for Oceanography, Tianjin, China

95   Ms. Lin Shaohua informed the Committee that the data flow in WDC for Oceanography, Tianjin included the following steps: collection of marine data; analysis and sorting out; quality control; format transferring; establishment of marine metadata database and grouping of databases; archiving and maintenance; product development and provision of services.

96   Ms. Shaohua reported that marine data and information were obtained through national surveys and international exchange. National data were collected from a wide range of Chinese agencies such as State Ocean Administration; Chinese Academy of Sciences; Universities and Colleges; and the China Meteorological Administration. International exchange data were obtained from NODC of USA, NCDC of USA, NGDC of USA, UCAR of USA, JODC of Japan, Topex Satellite Data Centre of France, IFREMER of France, Global Sea Level Data Centre of USA, BODC of UK, Japan Meteorological Agency, MEDS of Canada, and PICES centre. The National Marine Data and Information Service (NMDIS) developed a quality control system. The system included three steps: data field verification; relative verification and meteorological verification.

97   The WDC through NMDIS also developed the "Application Format for Oceanographic Data Records". After quality control all data were stored in this format and archived in the database. The WDC through NMDIS developed in addition the following products: (i) Global Marine Climate Atlas; (ii) Marine Atlas of South China Sea; (iii) Marine Atlas of Bohai Sea, Yellow Sea and East China Sea; (iv) Atlas of Marine Environment and Economic Resources; and Dataset of Argo Data on CD-ROM.

98   The WDC through NMDIS actively provided marine data, information and products to users. Ms Shaohua informed the Committee that the data and information developed by NMDIS could be obtained through websites that include:
- China Oceanic Information Network (COINet)
  - o Chinese version: http://www.coi.gov.cn
  - o English version: http://www.coi.gov.cn/eindex.html
- Marine Information Sharing Website (The Department of National science & Technology): http://sdinfo.coi.gov.cn
- WDC for Oceanography, Tianjin for Oceanography ,Tianjin China Information Website: http://wdc-d.coi.gov.cn
- Asian Regional Forum Ocean Information Website: http://www.arfmarinfo.coi.gov.cn
- China Argo Data Website: http://www.argo-cn.org
- NEAR-GOOS Website: http://near-goos.coi.gov.cn

99   Ms Shaohua further reported that the WDC for Oceanographic, Tianjin, China received 14 delegations and 25 expert visits in 2003-2004.

100   Ms Shaohua highlighted a number of other international activities for data management and services related to international cooperation projects such as GLOSS, GOOS, JCOMM, Argo and ASFA that have taken place in the inter-sessional period:
- GLOSS (Global Sea-level Observing System): provides monthly mean of the sea level data of 7 Chinese gauge stations in a timely manner and 14 Chinese stations with hourly data to the Global Sea Level Center at the University of Hawaii, and tide forecast for the WDC Tianjin area;
- NEAR-GOOS: a delayed database has been established and made available online http://near-goos.coi.gov.cn. Every month all delayed data were processed, merged and loaded on the NEAR-GOOS database. The WDC provided Chinese temperature and salinity data, sea wave data, GTS data, buoy data, VOS data and other data to the NEAR GOOS website;
- JCOMM: the WDC for Oceanography, Tianjin participated actively in JCOMM: (i) a report on the comparative study of eleven metadata formats, such as MEDI, ODAS, ISO19115, etc., has been prepared; (ii) the ODAS Metadata Management Center is being established. The ODAS metadata website has been opened for testing purposes: http://jcomm.coi.gov.cn; (iii) the global surface current data was transferred from BODC to WDC for Oceanography, Tianjin. By June 2003, the data have been finished transferring. And WDC for Oceanography, Tianjin has analyzed 5,127,577 stations and stored these in 12 monthly files ranging between 1854 and 1998 and distributed on the website;

- Argo: the WDC for Oceanography, Tianjin established the China Argo Data Center operational system to receive and process near real-time data, delayed mode data, QC and distributed data both on DVD and through the website: http://www.argo-cndc.org. The WDC also established the Argo database, developed Argo data products and performed data assimilation processing;
- ASFA: NMDIS was also the marine library and a China's input centre for the Aquatic Science and Fisheries Abstract as well as a China's National Documents Depository Center of UNESCO/IOC, and has completed the marine literature database in both Chinese and English and its computer-aided marine literature retrieval system.

101   The WDC for Oceanography, Tianjin for Oceanography has established cooperation agreements with several other WDCs such as the WDC for Oceanography, Silver Spring, USA, and has also undertaken cooperation with other NODCs, such as long term cooperation with NODC of USA (the 8th meeting with the US NODC took place during the inter-sessional period), cooperation with IFREMER of France for Argo data collecting, processing and services, cooperation with MEDS of Canada for near-real time GTSPP data collecting, processing and services, exchange of marine data and information with JODC of Japan, and cooperation with KODC of Korea for yellow sea data exchange, management, and services.

102   Ms Shaohua summarized the problems of the present arrangements for the World Data Center System as follows: (i) the marine activities of every country in the world are different and the World Data Center System should fully consider the interests of every country, especially the interests of developing countries. (ii) there should be closer cooperation between WDCs, especially for marine data quality control technology and other activities.

3.3.4. World Data Center for Marine Geology and Geophysics, Moscow, Russian Federation

103   Dr. Valery Scherbakov informed the Committee that the World Data Center for Marine Geology and Geophysics (WDC-MGG) was established in 1986 as one of the WDCs of the Former Soviet Union. He explained that today, the WDC-MGG is hosted by the State Federal Institution "Russian Information Fund of Natural Resources and Environment Defense" of the Russian Federation Ministry of Natural Resources.

104   Dr Scherbakov explained that the Centre managed data and information for marine geology, geophysics, geochemistry and ecology. It also published the bulletin of available MGG data, and prepares data, information and products for users.

105   He informed the Committee that sixteen countries have supplied data and information on 1,200 cruises to the WDC-MGG archives.

106   The research program of WDC-MGG consisted of four divisions:
- development of data collecting, processing and usage methods and technology;
- creation of standards for collecting new kinds of data and information;
- production of new global and regional informational products;
- capacity building including training.

107   WDC-MGG was responsible for the Indian Ocean "Geotraverse" Project and for the Indian-Russian bilateral scientific collaboration.

108   The WDC-MGG data and information were used by international, national and private bodies. These can be divided into the following groups:
- governmental organizations interested in information and data of mineral resources, ecology, geology, and geophysics. These accounted for 10 percent of the 1,200 requests during the past three years;

- industrial companies interested in geological and geophysical data, mineral resources, pipelines, nuclear stations, port and channel constructions, and fishery problems. These accounted for 42 percents of requests;
- scientific organizations interested in a wide variety of issues. These accounted for 37 percents of requests;
- educational bodies interested in a wide area of themes. These accounted for 11 percents of requests.

3.3.5. World Data Center for Marine Environmental Sciences (WDC-MARE)

109   Dr. Nicolas Dittert recalled the main milestones of the World Data Center for Marine Environmental Sciences (WDC-MARE): (i) 1987 AWI repository database; (ii) 1996 PANGAEA; (iii) 1998 www.pangaea.de; and (iv) 2001 WDC-MARE. The Alfred Wegener Institute (AWI) provides the hardware and software backbone, as well as parameter supervision; MARUM provides the data model, middle ware, and clients development. WDC-MARE, equally hosted by AWI and MARUM, provides long-term data archiving and data publishing. WDC-MARE houses >200,000 data sets, >1,500,000 data series, and > 350,000,000 data points using >40,000 different parameters within 142 projects worldwide. All data sets are available in XML-format and are ready for meta-data harvesting through data portals ("Gateways"; "1-stop-shops"). In addition: (i) all data sets have a persistent identifier (DOI); (ii) all data sets are available online through PangaVista search engine; (iii) 69,000 JGOFS data sets available in consistent data format; (iv) 38,000 CTD profiles of the Southern Ocean (Hydrographic Atlas); and (v) a mirror process for WOCE data sets has started. WDC-MARE Reports is the new journal for publishing of project related data collections. It is available as a written report comprising data CDs/DVDs. Since April 2005 WDC-MARE is a member of the International DOI Foundation

110   Dr Dittert summarized the benefits of WDC-MARE as follows: (i) easy data exchange; (ii) open access (no charges, according to OAI); and (iii) serves the whole scientific community. He noted that since 2005 three major EU funded projects are data-managed through WDC-MARE: CARBOOCEAN IP; EUR-OCEANS NoE; and HERMES IP. Other are under negotiation with the European Commission.

111   Dr Dittert further informed the Committee that WDC-MARE plans to intensify data exchange with other WDCs in the future.

112   **The Committee recommended** that all data centres consider making their metadata-databases OAI compliant

3.4. ACTIVITIES OF RNODCS

113   This Agenda Item was introduced by the Vice-Chair, Mr Ricardo Rojas. He recalled that the RNODCs were established to take on the responsibility of assisting the World Data Centres in support of their mission.

114   Through IOC Circular Letter IOC-2121 of 25 August 2004 the Directors of RNODCs were requested to inform to IODE XVIII on their inter-sessional activities by filling the standard form supplied by the IODE Secretariat.

115   Mr Rojas reported that the following RNODCs are active:

1. IGOSS (BATHY and TESAC) *operated by Japan, USA and Russian Federation.*
2. MARPOLMON *operated by Japan, USA and Russian Federation.*
3. WESTPAC *operated by Japan*
4. ADCP *operated by Japan*
5. Drifting Buoy Data *operated by Canada*
6. INDO *operated by India*
7. JASIN *operated by United Kingdom*
8. Persian Gulf *operated by Iran*

116   From the above, five reports were received and were made available as Documents IOC-IODE-XVIII/9.1 to 9.5. Mr Rojas summarized the reports as follows:

3.4.1. RNODC for Drifting Buoy Data

117   This centre, hosted by MEDS (Canada), covers a specific topic: the global drifting and moored buoy data collected on the GTS. It also collaborates with the Global Drifter Centre (as part of CLIVAR). Any buoy data reported in BUOY code on the GTS is collected by this centre. The management of the data includes the metadata archive, the quality control of the drift track, velocities and other parameters on a monthly basis in accordance with CLIVAR principles. The data is archived in an index sequential file using an in-house software for input and output processing. During 2003, 4.1 million observations were received (an increase of 25% from 2002). At present 30 million observations are held in this centre dating back to 1978. Data products such as inventories, maps, statistics and format descriptions are available on-line and GTS data are available upon request. During 2004, 65 users requested data (a 38% increase from the previous year). Accumulated data is sent to the WDC for Oceanography, Silver Spring on an annual basis. No physical visits or contacts with others RNODC were reported.

118   Future plans of the RNODC called for adopting the BUFR code as the primary format for decoding/encoding drifting buoy data, as well as to improve the quality control process and to update and to provide users access on line of the Surface Velocity Program data (SVP) from the Global Drifter Program.

119   Further discussions on this Agenda Item are reported under Agenda Item 5.1.

3.4.2. RNODC for the Indian Ocean

120   This RNODC, hosted by NIO (India) covers the IOCINDIO region. The terms of reference include: actively acquiring, quality control and archiving of oceanographic data and information, to provide data and information services to users of the region, to provide training to personnel of the region and to maintain close cooperation with other NODCs, RNODCs and WDCs. The management of the data includes metadata archival and to maintain databases and inventories for the region. At present the centre holds oceanographic data sets for about 70,000 stations collected in the Indian Ocean since 1900. Data products such as CDs and databases have been made available to users. During 2004, 53 users requested and obtained data (on floppies, CD or by email).

121   The following activities were reported for the inter-sessional period:
- ocean observations (drifting, ARGO and moored buoys, XBT and others);
- participation in two main projects: (i) the Marine Integrated Information System on the Indian Ocean, in collaboration with the Russian Institute of Hydrometeorological information, WDC for Oceanography, Obninsk); and (ii) the Indian National Center for Ocean Information Services (INCOIS), Hyderabad, India;
- organization of, or participation in 11 national workshops/symposia, 15 International meetings and 3 training activities.

122   Future plans called for the continuation of products development (metadata directory, atlases, coastal databases) as well as to help to establish new NODCs or DNAs in the region.

123   Further discussions on this Agenda Item are reported under Agenda Item 5.1.

3.4.3. RNODCs in Japan (which covers WESTPAC, MARPOLMON, IGOSS, ADCP)

124   The JODC (Japan) takes responsibility for four RNODCs which all have global coverage except for WESTPAC which just covers the Western Pacific Region. The WESTPAC RNODC covers many data types; the IGOSS RNODC covers BATHY and

TESAC data; the MARPOLMON RNODC covers marine pollution data; and the ADCP RNODC covers only ADCP data.

125   The management of the WESTPAC data includes the metadata archival and the quality control of data using standard procedures. During 2002 and 2003 about 3.000 XBT, CTD and ADCP were collected. At present a total of 3 millions of observations are held in this RNODC dating back to 1973

126   In terms of data dissemination, the JODC has operated an online data retrieval system since 1995, J-DOSS (JODC Data Online Service System), which provides ocean station data, ocean current data, tidal data, bathymetric data, and marine plankton data, through the Internet. In 2004, a total of 38,246 files were downloaded from J-DOSS and more than 100 organizations sent oceanographic data to JODC. In terms of data products, JODC publishes and distributes two newsletters: JODC News (in Japanese) and the RNODC Activity Report (in English. JODC published the following four datasets: Japanese Experiment on Asian Monsoon (JEXAM), Ecological Study Dataset of Microbial Web in Tokyo Bay (ECOMIC), Statistics of Wave Data in the adjacent Seas of Japan and JGOFS North Pacific Process Study Dataset.

127   The JODC reported a total of 24 visits during the last inter-sessional period.

128   Future plans call for coordinating and hosting the 8th IOC/WESTPAC Training Course on NEAR-GOOS Data Management in November, 2005 and the 3rd International Workshop for GODAR-WESTPAC (Global Oceanographic Data Archaeology and Rescue project in the Western Pacific) in 2006.

129   Further discussions on this Agenda Item are reported under Agenda Item 5.1.

3.4.4. RNODC for JASIN

130   This centre, hosted by BODC (United Kingdom), covers a specific project: the Joint Air Sea Interaction Project (JASIN) set up for the Eastern North Atlantic. It comprises 43 different data sets including upper air and near surface meteorology and physical oceanography.

131   The management of the data includes the metadata archival in the European Directory of Marine Environmental Data (EDMED), the standard quality control which is performed by the BODC as well as the data archival. This is a completed project, so no new data will be received. Data are currently available from BODC upon request.

132   This RNODC did not report any physical visits or contacts to others RNODC during the last inter-sessional period.

133   Future plans call for the finalization of the data set, to distribute it on CD-ROM and to close this RNODC.

134   Further discussions on this Agenda Item are reported under Agenda Item 5.1.

3.4.5. RNODC for the Persian Gulf

135   The proposal for the establishment of an RNODC for the Persian Gulf Area (RNODC-PG) was submitted by Dr. N. Hadjizadeh Zaker, Director of the Iranian National Centre for Oceanography (INCO) to the IODE-XVI Session. IODE-XVI had adopted Resolution IODE-XVI.2 (Establishment of an RNODC for the Persian Gulf Area) in which the IODE Committee had advised the delegate of the Islamic Republic of Iran to implement all the procedures applicable to the process of the establishment of an RNODC and as detailed in IOC Manuals and Guides No. 9, Annex I. This task was completed, and the RNODC was formally established accordingly, in June 2004.

136   The Centre aims at acquiring, quality control and storage of oceanographic data collected from the Persian Gulf. The Member States covered by the RNODC include the 8

littoral countries of the Persian Gulf namely; Bahrain, Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia, and United Arab Emirates. The current coordinator of the RNODC is Mr Majid Naderi of INCO.

137   Even though this was a newly created RNODC some actions have been taken during the inter-sessional period to improve the data flow in the region, especially related to metadata management (using MEDI) and data tracking. More details on the activities can be found directly in the web site http://www.inco.ac.ir/RNODC-PG/index.htm.

138   Future plans call for assistance to establish the NODCs for the littoral countries of the Persian Gulf and close collaboration with other regional and international programs such as ODINCINDIO, ROPME, RNODC-INDO, etc.

139   Further discussions on this Agenda Item are reported under Agenda Item 5.1.

3.5.   REGIONAL CO-ORDINATORS REPORTS

140   This Agenda Item was introduced by the Vice-Chair, Mr Ricardo Rojas. Through IOC Circular Letter IOC–2121 dated August 24, 2005 the Regional IODE coordinators were requested to summit their progress reports to IODE XVIII. The following were the IODE Regional Coordinators during the inter-sessional period:

- Mr. Nobuyuki Shibayama,   IODE Regional Coordinator WESTPAC
- Mr. J.S. Sarupria,   IODE Regional Coordinator IOCINDIO
- Dr Larry Awosika,   IODE Regional Coordinator IOCEA
- Mr Harrison Ong'anda,   IODE Regional Coordinator IOCINCWIO
- Ms Lorna Inniss,   IODE Regional Coordinator IOCARIBE
- Mr. Ariel Troisi,   IODE Regional Coordinator IOCSOC
- Dr. E. Balopoulos,   IODE Regional Coordinator Mediterranean
- Mr. Marfiu Rodriguez,   IODE Regional Coordinator for the Eastern Pacific (El Nino)
- There is currently no IODE Regional Coordinator for the Black Sea

141   From the above, 5 reports were received and made available through the web site as Documents 11.1 to 11.5. Mr Rojas then provided the summary below.

3.5.1.   IODE Regional Coordinator WESTPAC

142   The countries covered are: Australia, China, Fiji, France, Indonesia, Japan, D.P.R. Korea, Republic of Korea, Malaysia, New Zealand, Philippines, Russian Federation, Samoa, Singapore, Solomon Islands, Thailand, Tonga, United Kingdom, United States of America, and Vietnam.

143   Mr. Nobuyuki Shibayama, from the Japan Oceanographic Data Center (JODC) reported the following activities in the region:

- the WESTPAC discussion group on the data management (a group that was created after the International Conference on the International Oceanographic Data and Information Exchange in the Western Pacific, held in Malaysia in late 1999) discussed the many new challenges facing IODE in the region and identified measures for increasing the effectiveness of the system. As of February 2005, 127 scientists and data managers from 19 countries participate in this discussion group;
- the NEAR-GOOS Regional Delayed Mode Data Base (RDMDB) operated by JODC received oceanographic/marine meteorological data and products from various research institutes in the region. The total volume of data available on the RDMDB is about 17GB as of the end of 2004. Users can download any data from RDMDB without registration;
- the IOC/WESTPAC Training Course on NEAR-GOOS Data Management was held at the JODC in November 2003, with 7 participants from 7 WESTPAC member states. In addition to the regular trainings and lectures concerning data management

and quality control, the course contained new training on biological and chemical data management and on the use of the training resource, "IODE Resource Kit";
- the 2nd International Workshop for GODAR-WESTPAC was held in Tokyo, Japan in November 2004. Eleven WESTPAC member states attended the workshop.

144   Mr Shibayama, in his report, had announced that the 3rd International Workshop for GODAR-WESTPAC is scheduled to take place in Tokyo in 2006.

145   The Committee was informed that Mr Shibayama had retired from his position at JODC and JODC submitted the name of Mr Teruo Kanazawa as the new IODE Regional Coordinator for the WESTPAC region.

146   **The Committee thanked** Japan for its offer.

147   Further discussions on this Agenda Item are reported under Agenda Item 5.1. and 6.3.1.4.

3.5.2. IODE Regional Coordinator IOCINDIO

148   The countries covered are: Australia, Bahrain, Bangladesh, France, India, Indonesia, Islamic Republic of Iran, Iraq, Kuwait, Malaysia, Maldives, Myanmar, Oman, Pakistan, Qatar, Saudi Arabia, Sri Lanka, Thailand, United Arab Emirates and United Kingdom.

149   In his report Mr. J.S. Sarupria, from the Indian Oceanographic Data Center (IODC) reported on the following activities in the region:
- the IOC/ROPME workshop on the establishment of the Ocean Data and Information Network for the Central Indian Ocean region (ODINCINDIO) was held at INCO, Tehran, Iran in October 2004;
- the 2nd meeting on the development of the Marine Integrated Information System on the Indian Ocean (MIIS) was held at RIHMI in March 2004;

150   During the inter-sessional period Mr. Sarupria participated in 6 workshops and 8 training courses. New activities scheduled for the coming period include:
- an e-group on ocean data and information management in the region will be formed to discuss issues related to data format, data quality control(QC), and data exchange policy;
- a group of experts to identify capacity building requirement in the region for data and information management will be formed;
- the formation of new NODCs in the region in order to care for the data and information services in the region.

151   Further discussions on this Agenda Item are reported under Agenda Item 5.1.

3.5.3. IODE Regional Coordinator IOCSOC

152   The countries covered are: Australia, Belgium, Brazil, Canada, Chile, China, Denmark, Ecuador, Finland, France, Germany, India, Italy, Japan, Korea, Netherlands, Norway, Peru, Poland, Russia, South Africa, Spain, Sweden, United Kingdom, United States of America, Uruguay, and Ukraine.

153   In his report Mr.Ariel Hernan Troisi from the Argentinian NODC reported the following activities in the region:
- a poll of countries of the region was held during 2003 through a Southern Oceans Questionnaire. The aim was to properly assess and document the current situation, activities, resources and problems in data management and exchange in the Southern Oceans region.
- a southern Oceans Data request was submitted to contact persons in 28 countries. This request also served as a communications strengthening mechanism.

- an interaction with other relevant regional and global science and services programmes such as the CLIVAR Project Office for Central and South America .

154   The report calls for a possible joint participation in the 9th JCADM meeting and 2nd Latin American Workshop for National Antarctic Data Centres to be held in Buenos Aires, Argentina in September 2005.

155   Further discussions on this Agenda Item are reported under Agenda Item 5.1.

3.5.4.   IODE Regional Coordinator for the Mediterranean region

156   The countries covered are: Croatia, Cyprus, Egypt, France, Greece, Israel, Italy, Spain, Tunisia , Turkey, Lebanon. Malta, has nominated an IODE co-ordinator, without establishing an NODC or DNA.

157   In his report, Dr Efstathios Balopoulos, from the   Hellenic Oceanographic Data Center (HODC) reported the following activities in the region :

- implementation of large-scale international projects related to the oceanographic data management, such as EU/EDIOS, EU/SEASEARCH, EU/MAMA, etc, in the Mediterranean Sea, during the inter-sessional period.
- no traditional IOC/IODE training courses were organized in the Mediterranean Sea, during this inter-sessional period due to lack of resources.
- several data products and tools for data management were developed, by various Mediterranean NODCs and specialized marine institutes. These included national and regional inventories of oceanographic cruises and data sets, and databases and software for oceanographic data quality control. Mediterranean NODCs also had an important contribution to the development of other global data products, such as, the EU/EDIOS meta-data directory and various inventories developed within the EU/SEASEARCH Project.
- various international meetings related to data management were organized by Mediterranean NODCs, during the inter-sessional period. The data managers of the Mediterranean Sea participated in International Conferences, Symposia, Workshops, etc. in order to present results of their NODCs activities. Special mention is made of the International Conference entitled: "Scientific and Policy challenges towards an effective management of the Marine Environment– Emphasis to the Black Sea and the Mediterranean Regions", held in 2003, Varna, Bulgaria.
- future plans include further expansion and strengthening of the Mediterranean NODCs network and 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

158   Dr. Balopoulos reported that the participation of the Mediterranean NODCs in numerous projects of EU gave them opportunity to collaborate and actively network, but a lot of work remains. The main problem is the lack of financial resources. Future efforts should be used to enhance governmental awareness about importance data management.

159   Further discussions on this Agenda Item are reported under Agenda Item 5.1.

3.5.5.   IODE Regional Coordinator for the Eastern Pacific (El Niño)

160   The countries covered are: Colombia, Ecuador, Peru and Chile. In his report, Mr. Marfiu Rodríguez, from the   Equadorian NODC, reported the following activities in the region:

- there was an effort to promote the development and updating of data products in the region and increasing services through the internet.
- main efforts were made to have data catalogues in the region.

- Chile, Ecuador and Colombia data Centres have updated their data catalogues and this information is available in their web sites.
- there was a close interaction with the Project coordinator of ODINCARSA proposing some joint actions into the CPPS framework, mainly focused to Data management and the establishment of a Regional data base on line through the ODINCARSA web site.
- the issue of data management and quality control procedures as well as the use of MEDI was discussed as one of the components of the GOOS Regional alliance for South Eastern Pacific which will have a meeting on mid 2005.
- in the particular case of the ENSO region, the four countries have maintained an active communication with ODINCARSA and this has allowed to put the IODE regional agenda in the context of global initiatives. He endorse the support the consolidation of ODINCARSA as a suitable and efficient mechanism to promote IODE activities at regional level.

161   Further discussions on this Agenda Item are reported under Agenda Item 5.1.

3.5.6. Black Sea region

162   Mr. Mikhailov noted that his centre has taken care of Black sea data for 35 years. There have been excellent relations with Turkey, Georgia, and Bulgaria. He requested the Committee to consider the offer of Russian NODC to be the Regional Coordinator for the Black Sea region.

163   **The Committee thanked** Russia for its offer.

164   Further discussions on this Agenda Item are reported under Agenda Item 5.1.

3.6.   REPORTS OF NODCS AND DNAS

165   This Agenda Item was introduced by the Chair. She noted that the Letter of Invitation for IODE-XVIII (Circular Letter 2121) contained a request to submit reports on national activities in marine data and information management to the IOC Secretariat in accordance with the guidelines (**Doc. IOC/IODE-XVIII/Inf.2**).

166   Reference was also made to IOC Circular letter 2125 of 21 August 2005 which invited Member States to nominate IODE National Coordinator for Marine Information Management. This was done as a follow-up to Recommendation MIM-VII.1 (Nomination of IODE National Co-ordinators) which *"recommends the nomination of IODE National Co-ordinators for Information Management and IODE National Co-ordinators for Data Management, replacing the existing IODE National Co-ordinators"*. It was noted that 29 Member States have nominated IODE National Coordinator for Marine Information Management.

167   **The Committee welcomed** the nomination of 29 IODE National Coordinators for marine information management and called on Member States that have not yet nominated such an expert, to do so as soon as possible. In this regard the **Committee requested** the Secretariat to issue a Circular Letter to all IOC Member States.

168   **The Committee noted** that 10 Marine Information Management expert participated in the IODE-XVIII Session which was a considerable improvement to previous Sessions.

169   Dr. Rickards informed the Committee about the new reporting format for national reports. Changes included background information, description of national data flow, structure of marine data management, strengths and weaknesses, suggested improvements, future national activities, and national, regional or international projects. She was pleased to report that for IODE-XVIII 60 reports were received. This is approximately 72% of the total National Reports. When including all of the NODCs/DNAs more than 80% turned in reports.

170   A brief summary of the reports indicated many NODC/DNA are migrating to distributed model. Each report provides an overview of the handled data types (and changes in data types as seen in data centres). There are statistics for data flow and how they are monitored. Each NODC/DNA expressed their capacity building requirements and regional networking.

171   The Chair expressed her concern that summarizing national reports is not simple. There is a huge amount of information in reports and some were very late in arriving. There are a very diverse range of data centres with varying capacity and remit.

172   The IODE Review questionnaire also provided useful information indicating the range of data types handled by both IODE and non-IODE data centres. This showed that 92% of the existing data centres deal with physical oceanographic data, 78% also with chemical data, 72% with biological data, 55% with marine meteorology and atmospheric data, and 52% with geological and geophysical data. 65% of the data centres process delayed-mode data and 30% real-time data. About 50% consider they deal with data relevant to GOOS. Most data centres receive data from government and academic agencies and a smaller proportion (approximately one-third) also receive data from privately funded research institutions and/or from industry. In terms of services provided, most provide quality controlled delayed-mode data. In addition, 54% offer data on-line.

173   The Chair provided examples of data management structures from Cameroon, Chile, France, and Japan. She noted that many organizations in most countries are involved in collecting and managing data; however there are certainly data, which are not, managed in data centres.

174   Reports also included some requests for capacity building including for ODINCARSA, for web, XML, and Open Source tools etc.

175   **The Committee complemented** the Chair with her report and **noted** that this was the first time such a concise and analytic report had been provided based upon the national reports.

176   **The Committee noted with appreciation** the increased coverage of real-time data by the NODCs but also **stressed the need** to assist all NODCs to acquire this capability.

177   **The Committee requested** Member States to provide separate reports for data management and information management as from the next Session of the Committee.

178   **The Committee noted** that the IODE capacity building strategy implemented through the ODINAFRICA and ODINCARSA projects had substantially increased the capacity of the participating country as reflected in the national reports. **The Committee noted further** that, especially in developing countries, the NODCs provided a bridge between the IOC programmes and national institutions.

179   **The Committee noted with appreciation** that the rapid technological evolution, as expected by GETADE and its successor ETDMP a few years ago, has taken place and distributed data management systems, and web services are now commonly used.

180   **The Committee instructed** the Chair and Secretariat to prepare various levels of summary versions of the national reports for presentation during the IOC Assembly, to demonstrate the considerable advances made by, and changes occurring in the NODCs.

3.7.   IODE DATA FLOW

181   The Chair introduced this agenda item noting that the National Reports contained information relating to discovery metadata, information systems for tracking data collected on cruises and inventories for observing systems.

182   With regard to NOPs (National Oceanographic Programmes) the Committee will

recall that it decided, at its 16th Session, to cease the mailing of NOPs by the Secretariat, requested NODCs to mail NOPs directly, and recommended that NOP information be made available on-line through OCEANIC. At its Ninth Session, the IODE Group of Experts on the Technical Aspects of Data Exchange (GETADE) agreed to request that OCEANIC create a link from the Oceanic research schedule page http://ships.cms.udel.edu/ship_gen.asp to the ICES page http://www.ices.dk/ocean/roscop and vice versa.

183   With regard to IODE's metadata management activities, the Committee will recall that, based upon the "Pilot Project on the Revision of MEDI" (implemented during the IODE-XV inter-sessional period by the Australian Oceanographic Data Centre), it established the MEDI Programme (Recommendation IOC/IODE-XVI.1) as well as the MEDI Steering Group. Progress will be reported under Agenda Item 6.2.6.

184   Concerning discovery metadata, a number of systems are in place in various countries, these include in-house systems, those based on or compatible with GCMD, national systems, such as the Australian Spatial Data Directory (ASDD), regional systems like the European Directory of Marine Environmental Data (EDMED) within the SeaSearch initiative or the IODE's MEDI system which is used within ODINAFRICA.

185   For cruise related data several countries use their own in-house systems, although some have no mechanism in place. ICES, the Sea-Search project, and several other countries use the IOC's Cruise Summary Report, and their combined databases contain a wealth of information. The recent CLIVAR Data Planning meeting noted the need for a mechanism for tracking data collected on cruises and were informed about the Cruise Summary Report.

186   For observing systems, there is no international system at the inventory level in place although the Global Observing System Information Center (GOSIC) includes a wide variety of information on GOOS observations. In addition a number of national inventories have been developed and at the European level, at the initiative of EuroGOOS, the European Directory of the Ocean-observing System (EDIOS) has been developed. EDIOS works together with initiatives in the Mediterranean (MAMA) and the Baltic (PAPA). This database is available to other countries and regions.

187   **The Committee noted with appreciation** the US-NODC/NOAA Library Joint project that combined the expertise of the NOAA Library in metadata management and the US-NODC data management, a system that connects the library and archive metadata records, so that either catalogues discover holdings from both catalogues.

188   **The Committee stressed** the need to develop controlled vocabularies but **noted the need** to take into consideration the efforts made, and expertise available from marine information management experts.

3.8.   IOC OCEANOGRAPHIC DATA EXCHANGE POLICY: IMPLEMENTATION BY MEMBER STATES

189   This Agenda Item was introduced by the Technical Secretary, Mr Peter Pissierssens. He recalled that the IOC Assembly, during its Twenty-second Session (24 June – 4 July 2003), adopted Resolution IOC-XXII-6 (IOC Oceanographic Data Exchange Policy). As a follow-up, the IOC Secretariat sent out IOC Circular Letter 2123 on 23 August 2004 to IOC Action Addresses and IODE National Coordinators, inviting Member States to provide a copy of the national oceanographic data exchange policy or other policy that covers the exchange of oceanographic data. The Committee was informed that only nine responses were received.

190   The Representative from WMO, Mr G. Kortchev, recalled that WMO had adopted Resolution 40 (WMO policy and practice for the exchange of meteorological and related data and products including guidelines on relationships in commercial meteorological activities) at its 12th Congress. Annex 1 to Resolution 40 (Cg-XII) refers to data and products to be exchanged without charge and with no condition on use; Annex 2 to Resolution 40 refers to guidelines for relations among National Meteorological and Hydrological Services (NMHSs)

regarding commercial activities; Annex 3 to Resolution 40 refers to guidelines for relations between National Meteorological and Hydrological Services (NMHSs) and the commercial sector; and Annex 4 to Resolution 40 provides definitions of terms in the practice and guidelines.

191   He further informed the Committee that the twelfth WMO Congress (Geneva, 1995) urged WMO Members to strengthen their commitment to the free and unrestricted exchange of meteorological and related data and products. The Congress had also requested the WMO Executive Council to invite the president of Commission for Basic Systems (CBS), in collaboration with the other technical commissions as appropriate, to provide advice and assistance on the technical aspects of implementation of the practice and had decided to review the implementation of this resolution at Thirteenth Congress.

192   The thirteenth WMO Congress (Geneva, 1999) had adopted Resolution 25 (Cg-XIII) (WMO policy for the exchange of hydrological data and products), a stand of committing to broadening and enhancing, whenever possible, the free and unrestricted international exchange of hydrological data and products, in consonance with the requirements for WMO's scientific and technical programmes and had urged WMO Members, in respect of the operational and scientific use of hydrological data and products, to make their best efforts to implement the practice on the international exchange of hydrological data and products.

193   The WMO Congress had requested the WMO Executive Council to invite the Commission for Hydrology (CHy) to provide advice and assistance on technical aspects of the implementation of the practice on the international and decided to review the implementation of this resolution at Fourteenth Congress.

194   The Fourteenth WMO Congress decided to keep in force Resolution 40 (Cg-XII) and Resolution 25 (Cg-XIII).

195   **The Committee noted** that a substantial number of IOC Member States had not adopted a national policy.

196   **The Committee welcomed** the adoption of the IOC Oceanographic Data Exchange Policy by the IOC Assembly and **called** on Member States to use the policy as a basis for national policies on oceanographic data exchange.

4.   COOPERATION WITH OTHER PROGRAMMES

4.1.   COOPERATION WITH JCOMM

197   This item was introduced by Dr Savi Narayanan (Co-president of JCOMM). Reference was made to Document IOC/IODE-XVIII/15 *"IODE Cooperation with JCOMM"*. In her presentation Dr Narayanan recalled that JCOMM has 2 co-presidents, 4 programme areas (observations, services, capacity building and data management) each with their own coordinators, and a management committee which includes the programme area coordinators and several other experts, as well as representatives of other global programmes and organizations. The IODE Chair is a member of the management committee. Each programme area has several expert teams or task teams. Examples are the GLOSS and Ships-of-Opportunity Program (SOOP) that are groups under the observation programme area, and the IODE/JCOMM ETDMP which is an expert team under the Data Management Programme Area (DMPA).

198   Dr Narayanan explained that in the last year JCOMM has formulated a strategy in a draft document that outlines the JCOMM vision, its long-term objectives, and the JCOMM structure (and how it may create or dissolve expert teams as required). The strategy stresses the importance of communications and outreach, as well as the need to periodically review its performance. Interaction with other entities is key to the success of JCOMM and for its evolution. Of particular importance is the interaction with other programmes in IOC and

WMO.

199   JCOMM has also planned the development of a data management strategy that is consistent with that of the IOC. However it was felt that the results of the IODE review will be useful in developing such a strategy for both IOC and JCOMM. Therefore this task was postponed to the next JCOMM inter-sessional period.

200   Dr Narayanan then provided information on the Maury Conference where JCOMM celebrated the 150th anniversary of the landmark conference convened in Brussels in 1853. The anniversary conference was a big success thanks to the High Patronage of His Majesty King Albert II of Belgium and the sponsorship by many countries and organizations.

201   Other important events related to JCOMM included CLIMAR-II, the GLOSS Group of Experts Meeting and Workshop on New Technical Developments in Sea and Land Level Observing Systems (Paris, October 2003), and Ocean OPS 2004, organized by JCOMM with sponsorship from several countries and organizations. She also referred to the second GODAE Symposium that was held in November 2004, St Petersburg, Florida, USA.

202   Dr Narayanan noted that the results and recommendations of Ocean OPS 2004 and the GODAE Symposium provided jointly a clear vision of the direction to be taken by JCOMM in facilitating and coordinating the implementation of operational oceanographic products and services, as well as the issues to be addressed in achieving this goal. She explained that these were now being incorporated into the work plan of JCOMM.

203   Another recommendation originating from these events and directly related to IODE was to establish an *ad hoc* Task team under the JCOMM Data Management Coordination Group (DMCG) and IODE, and comprising representatives of JCOMM data management, IODE and GODAE, to develop a detailed proposal for the required standardized data and metadata formats, and be reviewed by GODAE, IODE and JCOMM.

204   Dr Narayanan informed the Committee that the implementation plan for the Global Observing System for Climate (GCOS) has been published. It contains 131 actions with 21 actions specifically involving JCOMM. GCOS is seeking the active engagement of JCOMM as an "agent for implementation: on these actions, including system improvement in developing countries, such as sea level stations in the GCOS baseline network. The JCOMM observation programme area will use the recommendations as a basis for developing its work plans for the next inter-sessional period.

205   With regard to the OOPC, Dr Narayanan reported that JCOMM, based upon the requirements established by the OOPC, has looked at the performance of the observational networks. She noted two significant milestones: (i) the full complement of 1,250 global drifting buoys will be achieved by the DBCP in 2005; and (ii) Argo reached its halfway mark in 2004 with 1,500 floats being deployed. She noted that a major challenge for the observations programme area of JCOMM is to develop system-wide monitoring and performance reporting that can help in evaluating the effectiveness of the observing system and help in efforts to convince governments to provide the funding needed to meet global implementation targets. In this regard a number of achievements were reported including the development of standard base maps (see http://www.oco.noaa.gov/page_status_reports_global.jsp), quarterly performance reports are now available (see: http://www.jcommops.org/network_status), and a web site is under development to provide a single entrance portal to link to all web sites being maintained by countries contributing to the development of the global ocean observing system for climate and marine services.

206   Dr Narayanan ended her presentation by referring to the discussions held at the JCOMM Management Committee's fourth session (Paris, France, 9-12 February 2005), and she in particular quoted from the Statement on Data Management: *"The JCOMM Management Committee recognized that considerable overlap and potential duplication still exist between the activities of the JCOMM Data Management Program Area and the IODE,*

in spite of the merging of JCOMM ETDMP and IOC GETADE, the co-sponsoring of the data management pilot projects, and the transferring of the responsibility for the secretariat support for JCOMM data management to the IODE secretariat. Furthermore, it is no longer sufficient to provide access to data in real-time, near-real-time and/or delayed mode, but at many access times with version controls and often integrated with other data types (atmospheric and oceanic). Thus the original distinction of JCOMM providing real-time data and integrated products and services in marine meteorology and oceanography, while IODE deals with delayed-mode data, is no longer appropriate.

207   *The JCOMM Management Committee at its fourth meeting in Paris, February 2005 recommended closer collaboration between JCOMM and IODE data management activities and eventual merger of IODE and the JCOMM DMPA activities. It would immediately enhance the JCOMM operational oceanographic data management capability to match its operational observations and services capabilities. It would ensure that the data management facilities developed as parts of the IODE will evolve so as to serve also new operational ocean data requirements developed in the future as part of JCOMM. It would preclude possible duplication of efforts regarding data and metadata models, transport protocols, discovery methods, etc. It would likely reduce the use of resources (financial and human) relative to the present situation, both in JCOMM and IODE.*

208   *IOC at 35th session of its Executive Council through its resolution EC-XXXV.2 IOC at its XX session through its resolution xxx mandated the development of an IOC data management strategy, building on the results of the current IODE review. The JCOMM Management Committee recommends that IOC give serious consideration to the merger of IODE with the JCOMM DMPA, and to the development of the necessary steps to be taken to facilitate a smooth transition.*

209   *The Committee recognized that any such merger must be considered with great care. Due diligence must be exercised to ensure that the ocean data capabilities needed by those outside the current JCOMM community and currently served by the IODE are maintained and continue to evolve."*

210   Dr Narayanan urged IODE experts to participate in the upcoming JCOMM-II Session that will be held in Halifax, Canada between 19 and 27 September 2005.

211   The Committee was informed by the Chair of the JCOMM/IODE ETDMP that the mixed membership of the ETDMP has been quite enriching and productive.

212   **The Committee recognized** that any merger between IODE and JCOMM DMPA activities must be considered with great care.

213   **The Committee stated** that this is a matter that needs careful study and consideration and **recommended** that this be included in the preparations of the IOC Data Management Strategy.

214   The Chair then invited Mr Vladymyrov to provide some information on the first JCOMM/IODE joint capacity building event: the joint GOOS/JCOMM Panel for Capacity Building, working jointly with IODE, plans to organize the "Digital Modeling Training Course 2005", to be held in September 2005 at the IOC Project Office for IODE, in Ostend, Belgium, with some preparations taking place in Bergen, Norway. The event is expected to attract participants from countries in the Indian Ocean, Africa, and Central America regions.

215   The main purposes of the training course are;
   • to enable attendants to implement national services for warnings of wind waves, storm surges, and potential application services such as oil spill simulations or/and search/rescue operations.
   • to develop the interaction/mutual understanding between ocean numerical modellers and ocean data managers;

216   Mr Vladymyrov informed the Committee that a short meeting to discuss the

preparations for the training course was held on April 26 during IODE-XVIII. The meeting was attended by representatives of IODE, WMO, and JCOMM with the participation of the ODINAFRICA and ODINCARSA project coordinators. The meeting decided that it would be convenient to organize the course in two phases. Phase 1 will be held in September 2005 and will include the training course on digital modeling for 12 trainees from the regions mentioned above (with a background in modeling and/or operational meteorology). It will be attended as well by three data management specialists (one from each region) and by two data management trainers. Jointly with the modeling group the data managers and their trainers will analyze the data requirements to run/validate the models and will prepare the programme for Phase 2. Phase 2 will consist of two courses running in parallel that will be attended by two participants from each country, one of which is a modeler, and the other one is the data manager. If the two courses are successful then the material of the courses will be included in OceanTeacher and will be used in future training curricula. Dr Vladymyrov underlined that the trainees for such courses should be well qualified and need to have a good knowledge on the subject of the courses.

217   **The Committee welcomed** the organization of this first joint IODE/JCOMM training event and **recommended** its support by IODE, JCOMM and IOC Member States.

4.2.   COOPERATION WITH GOOS

218   This item was introduced by Mr Keith Alverson, director of the GOOS Project office at IOC. Mr Alverson gave a brief overview of GOOS. He explained that GOOS is a cooperation and coordination mechanism building sustained, internationally coordinated observations of the oceans, a platform for the generation of oceanographic products and services and a forum for interaction between research, operational, and user communities. GOOS is designed to Monitor and better understand climate, improve weather and climate prediction, provide ocean forecasts, improve management of marine and coastal ecosystems and resources, mitigate damage from natural hazards and pollution, protect life and property on coasts and at sea, and support scientific research.

219   Mr Alverson informed the Committee that GOOS is evolving from a strategy and implementation design phase to an implementation phase and its data and information exchange needs are evolving rapidly with it. Research oceanography requires: safe, long term data storage (IODE), incentives for researchers to submit data, close 2 way communication between data centres and researchers. Operational Oceanography additionally requires: data standards, real time, automated data transfer (IODE), and close 2 way communications between data centres and users. The open ocean climate component of GOOS is building towards global coverage using a wide array of platforms and would like to work with IODE to ensure there are the integrated global data products. In addition, the talk highlighted a number of data and information exchange challenges associated with developing operational hazard warnings that are outside the traditional envelope of GOOS and IODE activities, but will rapidly need to become a major element of all of our efforts.

220   Mr Alverson noted that the IODE chair's report to this meeting states that "*the offer to support GOOS and JCOMM needs to be backed up with concrete actions developed here at IODE-XVIII*". Mr Alverson stated that GOOS is in complete agreement and notes that there is a need to continue as necessary, but move far beyond, joint representation on planning, governance and management committees to concentrate our energies on joint implementation of a Global Ocean Observing System.

221   He said that some small but concrete first steps include that GOOS will try to help provide resources for, and derive benefits from, the new IODE Project office, as appropriate, to help ensure that it becomes the beehive of activity that is hoped. Furthermore, GOOS will work with IODE to solve the tangle of real time data exchange needs associated with hazard warnings involving a wide range of platforms and users. Mr Alverson noted that starting in 2006, GOOS, JCOMM and IODE secretariats at IOC are being brought together in the same

UNESCO main line of action, which will both ensure and require much closer cooperation than in the past.

222   **The Committee noted with appreciation** that at the regional level, in particular through the ODINAFRICA, ODINCARSA and the starting ODINCINDIO projects, cooperation between regional GOOS alliances and IODE ODIN projects have been initiated and well received, and **called** for the further strengthening of such cooperation.

4.3.   COOPERATION WITH SCIENCE AND MONITORING PROGRAMMES

223   This item was introduced by Chair of the IOC Committee on IODE. The Chair gave a brief presentation on IODE cooperation with a few programmes including CLIVAR, Argo , IGBP-SCOR data management meeting, POGO, and OBIS. In relation to CLIVAR she mentioned the Data Planning Meeting held in March 2004, and the use of the DAC structure set up for WOCE, links with Argo and with GOSUD. In this regard she noted that several countries had established DACs (Data Assembly Centres) and that this involved NODC cooperation. She further reported that an IGBP-SCOR data management meeting had been held that brought together data management requirements for a number of projects such as GEOHAB, GLOBEC, IMAGES, IMBER, JGOFS, LOICZ, and SOLAS. There were also contributions from two NODCs (India, UK), WDCs, IODE, WOCE, CLIVAR. The meeting produced a number of recommendations. Information on the meeting can be found at http://www.jhu.edu/scor/DataMgmt.htm.

224   She further informed the Committee on the IODE relations with POGO. The IODE Chair had been requested by POGO to provide a set of basic data management principles. This was provided with assistance from the JCOMM Co-president. It is sub-divided in sections on: Policy and Strategy, Practical Measures in Individual Institutes, and Education. It includes recommendations such as:
- POGO Institutes should develop and implement a policy governing data management and data exchange;
- institutional data management policy and that covering cooperation among POGO institutes should recognize and exploit the adopted international IOC Data Exchange Policy and promote its implementation;
- monitor the effective implementation of data policy;
- data management and resourcing of that management should be an explicit consideration in institutional strategic planning, including participation in research experiments;
- scientists are rewarded for their research and publications – recognition for data needed;
- use existing data centres (e.g. NODCs or specialized data centres;
- do not "re-invent the wheel";
- document procedures for data collection and handling;
- the generation, management and preservation of metadata should be given high priority;
- use published guidelines/standards to process and quality control data;
- ensure data are backed-up;
- ensure effective data stewardship/archive and data access facilities;
- educate (new) staff/students.

225   **The Committee welcomed** the initiatives of the IODE Chair that fostered closer cooperation between IODE and scientific programmes.

226   The Chair then invited Mr Bob Branton, OBIS Chair, to provide a presentation on OBIS and on possible relations between OBIS and IODE. Mr Branton thanked the chair and members of IODE for this opportunity whereby CoML (Census of Marine Life) and OBIS could become formally affiliated with IODE. He mentioned that the IODE chair had just

spent two full days with the OBISMC (OBIS Management Committee) exploring ways and means of the two communities to work together. He then gave a brief description of CoML and OBIS.

227   Mr Branton explained that the CoML pursues the mission of assessing and explaining the diversity, distribution and abundance of marine life from microbes to mammals, from pole to pole, and from the oceans' near shore to its darkest depths. CoML's large tasks are answering what did, does and will live in the oceans. OBIS constitutes the CoML strategy for melding the data from its investigations and from other marine data bases from around the world into an integrated global system. Furthermore OBIS pursues the goal of a dynamic global digital atlas for explorations of relations in the oceans with species, locations, and abundance all integrated with environmental data, maps and model outputs on the Internet. Traditional discipline centered research methodologies are yielding a wealth of snapshots of this complex and ever changing marine world. The challenges for CoML and OBIS are to fill the gaps in these insights, to synthesize coherent patterns of marine life in space and time and to develop testable hypotheses and predictive models of the origin and maintenance of these patterns. OBIS is founded on a modern information management technology practices and is the leading source of marine biodiversity data into the GBIF system. OBIS expects to maintain this position as well as to be a living legacy for CoML when CoML ends in 2010. As well as maintaining a global database, OBIS also currently provide a global basis for integration and analysis of biological with other oceanographic data. This can be seen on the OBIS global portal at http://www.iobis.org.

228   Mr Branton recalled that it was determined at the OBISMC that IODE, like OBIS has a strong geographic (regional) base to its organization and structure. Where IODE has NODCs and ODINs, OBIS has Regional OBIS Nodes (RONs). These RONs working together as members of the OBISMC complement the established thematic nodes (e.g. Cephbase, SeamountsOnline, and SEAMAP) by providing a regional focus for data collection, quality control and analysis product development. In this capacity, RON managers are expected to be the first line of defense against the wholesale introduction of duplicated data and to assist in the formulation of information and data based solutions to real world regional issues. Individual NODCs and RONs must work together to find and quality control data from the many fields of marine biology and to establish operational links between the biological, physical and chemical disciplines. To this end, Mr Branton expected that the IODE Chair will be starting this cooperative effort by requesting that NODCs identify their biological data holdings and where possible that they start to associate with their nearest OBIS RON. At the level of global marine information management practices, IODE and OBIS share a common appreciation of issues associated with the formulation and management of discovery metadata such as maintained by GCMD. He noted that IODE-XVIII references to controlled vocabularies are an indication of this.

229   In addition to discovery, OBIS is also working with GBIF to establish Global Unique IDs as a means to improving global security and quality control. At the OBISMC it was also determined that regional collaboration was indeed already a reality, particularly in the framework of ODINAFRICA. Mr Branton informed the Committee that ODINAFRICA will assist the biodiversity data managers in Africa to contribute to the OBIS network, by providing assistance in building capacity, and by making facilities available. The Internet connectivity, servers and experience with generic data management created in the previous phases of ODINAFRICA will be made available also to the biodiversity data management community, thus creating a synergy between the OBIS and IODE networks. A first training session on biodiversity data management was held the previous week in the IODE Project Office. Topics covered included general biodiversity issues, biodiversity data management, and the specific tools used by the OBIS community such as DiGIR. Training material will be incorporated into OceanTeacher. Mr Branton informed the Committee that there will be close collaboration between the national OBIS providers in Africa and the NODCs involved in ODINAFRICA.

230   In conclusion Mr Branton mentioned that there are many opportunities for IODE and OBIS to work together at both regional and global levels.

231   **The Committee noted with appreciation** that excellent opportunities now exist to connect the OBIS system with the prototype of the E2EDM system combining the data providers.

232   **The Committee welcomed** the extended contacts of the IODE with the science and monitoring programmes and **noted with appreciation** the good contacts established recently with OBIS.

233   **The Committee instructed** the IODE Chair to discuss closer collaboration with the OBIS Chair.

4.4.   OTHERS

234   The Chair introduced this agenda item, noting that there were a variety of other activities which IODE links to. Examples of these include the Global Change Master Directory (GCMD, http://gcmd.gsfc.nasa.gov/) and the Marine Metadata Interoperability (MMI, http://www.marinemetadata.org) project led by the Monterey Bay Aquarium Research Institute (MBARI) in the USA. This latter project is a collaborative effort to support the use of metadata in marine science. Its goal is to provide useful resources (e.g. information, standards, cookbooks, working examples, etc.) to the marine data management community. This initiative is led by the USA, and forms part of the IOOS Data Management and Communication (DMAC). Dr. Roy Lowry (BODC) represents IODE in this project. See the web site for further information. The MMI community is being widened to include other European countries, Canada, and Australia.

235   The Chair then invited representatives from ICES, SCAR, CDIAC and CEP to briefly address the Session.
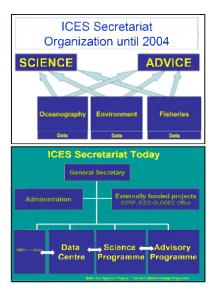
4.4.1. ICES

236   Ms Julie Gillin provided information on the data management activities of the International Council for Exploration of the Sea (ICES) (http://www.ices.dk). ICES is moving towards an interdisciplinary approach. ICES has a network of over 2000 professionals in over 200 institutions in 19 member and 6 affiliate countries. ICES has about 100 working groups and 13 committees. She recalled the history of the establishment of the ICES and its objectives. The Secretariat is located in Copenhagen and employs 38 staff members.

237   Ms Gillin then informed the Committee that in 2004, the ICES Secretariat was reorganized to strengthen its coordinating and support services, and better facilitate the multi-disciplinary, ecosystem approach.

238   As displayed in the figure (right) in each of the units (before 2004) there was separate data unit. The data managers did not communicate so the result was divergent databases.

239   ICES was reorganized and there are now science programme, advisory programme and a data centre. (figure right)

240   Ms Gillin recalled that one of the Data Centre's primary goals is to unite data systems and services. She noted that previously distinct, divergent databases are now being integrated. As an example she mentioned the Database on Oceanography and Marine Ecosystems DOME.

241   She emphasized that ICES and IODE have independently identified main focus areas for future developments including data quality, distributed databases, and multi-disciplinary, integrated databases, DOME.

242   Ms Gillin then informed the Committee that ICES and IODE pursue common goals through cross-organizational participation on various expert groups:
- ICES/IOC Study Group on XML
- IODE GE-BICH
- ICES Study Group on the Management of Integrated Data
- ICES Working Group on Marine Data Management.

243   She noted that ICES and the IOC entered into a Memorandum of Understanding which specifically emphasizes "co-operation in the field of data and information management, including development of marine information technologies"

244   **The Committee noted with satisfaction** the growing collaboration between the IODE and ICES.

4.4.2. SCAR

245   In his presentation, Mr Taco de Bruin explained that scientific research in Antarctica and the Southern Ocean is conducted within the framework of the Antarctic Treaty. Antarctic science is interdisciplinary in character, multinational in execution, and globally relevant. The scientific issues being addressed are increasingly large and complex, including environmental protection and monitoring under the Protocol on Environmental Protection to the Antarctic Treaty ("Madrid Protocol"). These issues require a high degree of cooperation between scientists and the ability to access and work with data from a wide range of scientific disciplines. The Antarctic Treaty therefore calls on parties to "exchange and make freely available scientific observations and results from Antarctica" (Antarctic Treaty , section III.1.c).. Data and information are the primary assets derived from Antarctic research, and so must be carefully managed. In order to coordinate Antarctic data management, the Scientific Committee on Antarctic Research (SCAR) and the Council of Managers of National Antarctic Programmes (COMNAP) established the Joint Committee on Antarctic Data Management (JCADM) in 1997.

246   Members of JCADM are the managers of the National Antarctic Data Centers, or a relevant national contact if an NADC has not yet been nominated. Currently 26 nations are involved in JCADM: Argentina, Australia, Belgium, Canada, Chile, Estonia, Finland, France, Germany, India, Italy, Japan, Korea, Netherlands, New Zealand, Norway, Peru, Poland, Russia, Spain, Sweden, Switzerland, Ukraine, United Kingdom, and United States. Several other nations will join JCADM in the course of 2005.

247   JCADM is responsible for the network of National Antarctic Data Centres and the Antarctic Master Directory (AMD). The Antarctic Master Directory (AMD) is the online, searchable and freely accessible data base of Antarctic data set descriptions. Data sets range from a few observations at a particular time and place to millions of observations over many years and large areas. Mr Taco de Bruin then briefly informed the Committee on the AMD.

248   National Antarctic Data Centres are 'region-based' whereas oceanographic, atmospheric, geological, etc. data centres are 'discipline-based'. JCADM is aware that these discipline based data centres may hold many Antarctic or Southern Ocean data sets, not known to JCADM, nor described in the AMD. JCADM is therefore actively seeking collaboration with these discipline based data centres and with its peer organizations like IODE.

249   Mr de Bruin then informed the Committee that considering the collaboration with IODE and the oceanographic data management community, two steps in that direction were taken. At a national level, NADCs have started to contact their oceanographic counterparts to establish a complete national inventory of Southern Ocean data sets. At the meeting in

Bremen, July 2004, the JCADM Executive agreed with Dr. Lesley Rickards, Chair IODE, and Dr Colin Summerhayes, Executive Director SCAR, to expand the AMD and include relevant entries from the MEDI and EDMED data bases into the AMD in close collaboration with the GCMD.

250   The Committee was informed that during the inter-sessional period, cooperation has been established with the Joint SCAR-COMNAP Committee on Antarctic Data Management (JCADM).

251   **The Committee welcomed** the collaborative efforts towards the establishment of the united metadata and data exchange systems.

252   **The Committee instructed** the Chair to continue to seek close collaboration with JCADM and to find ways, together with the Chief Officers of JCADM, to expand the existing collaboration.

4.4.3.   CDIAC

253   Mr Alexander Kozyr provided information about the Carbon Dioxide Information Analysis Center (CDIAC). He explained that in the 1990s CDIAC provided data management support for the Joint Global Ocean Flux Study CO_2-related measurements taken aboard research vessels during the World Ocean Circulation Experiment (WOCE) Hydrographic Program (WHP) cruises. He mentioned that WOCE was a major component of the World Climate Research and briefly described the programme. He informed the Committee that the JGOFS/WOCE data set is completed and available through the CDIAC web page http://cdiac.ornl.gov/oceans/home.html

254   Mr Kozyr informed the Committee that CDIAC completed the Global Ocean Data Analysis Project (GLODAP) data set. GLODAP is a cooperative effort of investigators funded for synthesis and modeling projects through the National Oceanic and Atmospheric Administration (NOAA), United States Department of Energy (US DOE), and the National Science Foundation (NSF). The GLODAP Data set is available through the CDIAC web page http://cdiac.ornl.gov/oceans/glodap/Glodap_home.htm

255   Mr. Kozyr reported that the CDIAC is currently providing the data management support for the Climate Variability (CLIVAR) Carbon Repeat Sections Project and Volunteer Observing Ship (VOS) Project Data.

256   Mr Kozyr said that the CDIAC plays a major role in the CO_2 data management for the North Pacific Marine Science Organization (PICES) Working Group 17 (WG-17). The main goal of the WG-17 is to work with the International Data Centers (Japan Oceanographic Data Center (JODC), National Oceanographic Data Center (NODC), CDIAC, Marine Environmental Data Service (MEDS), et al.) to complete an International North Pacific data set for CO_2 and CO_2-related parameters and to encourage PICES countries (Japan, Republic of Korea, China, Canada, Russia, and United States) and non-PICES countries to contribute data and information on data to the PICES data inventory.

257   Mr Kozyr called on IODE to establish ways and means to arrange the efficient collaboration between such special data centers as CDIAC and organizations as PICES.

258   **The Committee welcomed** the participation of CDIAC in IODE-XVIII and **instructed** the Chair and IODE Secretariat to seek closer collaboration with this centre.

4.4.4.   Caspian Environment Programme (CEP)

259   Mr Vladimir Miroshnichenko, the representative of the Caspian Environment Program (CEP), briefly informed the Committee on CEP. CEP is a regional Programme representing a partnership of 5 Caspian littoral states aiming towards the sustainable development of the Caspian Sea Environment. In addition to 5 littoral states it includes a number of international partners: UNDP, UNEP, World Bank, EU/TACIS.

260   He noted that marine data exchange is an important part of the CEP activities. Further he informed the Committee that during the CEP activities since 1998 the regional mechanism and guidelines for data exchange were developed, numerous metadata were collected and databases created.

261   Mr Vladimir Miroshnichenko noted that the level of data exchange in the region is low due to low monitoring activity and due to lack of corresponding legal protocols for data exchange in the region. He then informed the Committee that the littoral states are in the process of ratifying the Framework Convention for the Marine Environment in the Caspian Sea. He noted that this convention opens more possibilities for intensifying of marine environment data exchange in the region.

262   Mr Miroshnichenko emphasized that the cooperation with IODE can help to improve and to strengthen mechanisms of data and information exchange in the region and will allow to use latest achievements, international standards and technologies.

263   Mr Miroshnichenko welcomed the establishment of the IOC Project Office for IODE and mentioned that it brings new possibilities for cooperation in the training area and the contributing to the capacity building. Further he mentioned the importance of the establishment of the cooperation between CEP and IODE.

264   **The Committee expressed** the strong support to the Caspian Environment Programme data and information management activity and **welcomed** the cooperation between CEP and IODE.

265   **The Committee noted with appreciation** the increasing number of programmes and projects collaborating with IODE and **called** to extend their number.

5.   FUTURE OF IODE

5.1. IODE REVIEW (PROGRESS REPORT)

266   This item was introduced by the Chairman of the IODE Review Team, Mr Dieter Kohnke. Reference was made to Document IOC/IODE-XVIII/18 *"IODE Review"* and Document IOC/IODE-XVIII/23 *"Results of the IODE Priority Survey"*.

267   The Chair of the IODE Review Team reminded the Committee that IODE-XVI had tasked the IODE Officers (and, as required, some consultants) to undertake a comprehensive review of the IODE system, and to report to the 21st Session of the IOC Assembly. However, due to the many actions that were undertaken by IODE since IODE-XVI, many of which impacted strongly on the 'nature' of IODE, it was felt that a review during this critical phase of changes (2001-2002) would result in an incomplete and possibly even incorrect representation of "the state and future of IODE".

268   In addition (see also Agenda Item 7.3) the IOC Executive Council, during its 35th Session (4-14 June 2002) adopted Resolution EC-XXXV.2 entitled "IOC Strategic Plan for Oceanographic Data and Information Management". The Resolution called for the development of *"an IOC Strategic Plan with clearly defined roles for each of its observational and data management elements, for oceanographic data and information management, embracing the requirements, capabilities and infrastructures of its Member States, as well as the needs of their user communities"*.

269   The IODE Review Panel was composed on 23 October 2004 and included six members (See: http://ioc3.unesco.org/iode/contents.php?id=210) . The composition was selected carefully, taking into consideration geographic balance. The Terms of Reference for the Review were defined as:

- ▪ review the operation and implementation of the IODE, with particular attention to its mandates, mission, structure, data centre networks and mode of operation,

the activities of its subsidiary groups and projects, and the national development of IODE activities;

- review the extent to which IODE activities, including those specifically targeted at capacity-building in support of IODE, benefit Member States; and

- present the final review report to the Assembly at its 23rd Session in 2005.

270   A paper and two web surveys were organized to obtain input from a wide variety of stakeholders in marine data and information management. The results of the paper survey are included in Document IOC/IODE-XVIII/18; the results of the IODE Priority survey are included in Document IOC/IODE-XVIII/23; and the results of the Survey of the marine science community on IODE are available through the IODE web site on http://ioc3.unesco.org/iode/contents.php?id=325.

271   Mr Kohnke was then invited to present a detailed report on the survey results and on the IODE review report. He explained that for the review process the Group had available three primary sources of feedback from the ocean science community: (a) a questionnaire which was developed by the Review Group; (b) a priority survey of ocean data and information managers; and (c) a survey of the oceanographic research community.

272   The Review Team had noted that the feedback gave a positive impression about IODE's activities and its data centre system. A great majority of the respondents believed that the objectives of the IODE Programme were still appropriate. IODE was considered beneficial to the marine scientific community as its constituent members compiled a vast amount of data, quality control the data, transferred it into a few common standard formats, and gave access to the data. On the other hand, there was an almost total consensus that the IODE Programme needed a major overhaul to better fulfill the changing data and user requirements. Although the basic data centre system was appreciated it needed to be further developed with the latest information technology.

273   The Review Team stated that during the past few years, IODE has advanced more rapidly in making information available rather than in further improving the compilation of ocean data and fostering the preparation of science based products. It appeared to the Team as if IODE has become more oriented towards technology rather than ocean sciences. The Review Team was fully aware that new and promising techniques must be applied for better communication. However, IODE had not performed well in tackling the more scientific problems, such as establishing the tools for a global compilation of data from other non physical disciplines; large amounts of even physical data have not been compiled by NODCs and channeled into the IODE data centre system; and the data quality assurance was under-developed.

274   Mr Kohnke stated that IODE has not yet succeeded in creating global data sets of even quality. The stressed that his was an essential requirement of the global science programmes which monitored the slow global changes in the marine environment and tried to forecast its development.

275   Mr Kohnke then presented the more essential of the 17 recommendations which are contained in the the Review report.

276   **The Committee expressed** its high appreciation for the work of the review team and accepted its report.

277   **The Committee expressed** its special gratitude to the Chair of the Team, Mr Dieter Kohnke.

278   **The Committee noted** that the review included a considerable amount of valuable information and suggestions for improvement of the IODE system. **The Committee noted further** that the results of the 3 surveys need further detailed analysis as the collected information provided valuable information on the appreciation and criticism of the various

communities that interact, or should interact, with IODE at the national, regional and international level.

279   **The Committee instructed** the Chair and IODE Secretariat to compile the surveys results into an information document for distribution to the IODE National Coordinators (for data management and for information management).

280   The Committee then discussed the recommendations of the Review Report one by one and made decisions as listed below.

1. Objectives of IODE

281   **The Committee noted** the changes proposed by the Review and **established** a sessional working group to draft revised objectives of the IODE programme.

282   **The Committee adopted** Recommendation IODE-XVIII.1

2. Number of IODE Officers

283   **The Committee agreed** with the recommendation of the review team and **decided** that the IODE Officers should include:
    (i)   the IODE Chair;
    (ii)   the IODE Vice-Chair;
    (iii)   Chairs of groups established jointly with other organizations;
    (iv)   Chairs of Group of Experts.

284   **The Committee agreed** that in addition, the WDC Directors and selected regional, scientific or technical experts may be invited to Officers' Meetings, if the agenda calls for them.

285   Taking into account that the IODE Committee meets approximately every two years, **the Committee decided** that one Officers Meeting should follow immediately future Committee Sessions to finalize the inter-sessional Work Plan, and a second meeting should be held during the inter-sessional period to review progress and prepare for the coming Committee Session.

3. IODE Groups of Experts

286   **The Committee noted** the concerns expressed by the Review Team related to the IODE Groups of Experts. **The Committee felt** that the achievements of the IODE Group of Experts on Marine Information Management (GE-MIM) were not sufficiently recognized in the report of the review team.

287   Ms Suzie Davies, Chair GE-MIM, highlighted that many of the IODE capacity building activities related to marine information management (eg ODINAFRICA, ODINCARSA, ...) had been developed and/or promoted by the GE-MIM. In addition she noted that the nomination of 29 IODE national coordinators for Marine Information Management within the last few months showed a strong commitment by the Member States to marine information management. This new "pool" of experts was expected to provide strong guidance to IODE in marine information management matters. The GE-MIM Chair noted further that the GE-MIM had created a close working relationship with IAMSLIC (and its regional groups) through a Memorandum of Understanding. It was stated that this relation provided a link between the marine information management community and would be a "conduit" from the wider marine information management community for expertise and for the identification of new requirements to the GE-MIM and its parent IODE. Finally, Ms Davies pointed out that the GE-MIM was currently preparing a strategic plan for marine information management, clearly demonstrating a long-term vision for IOC's marine information management activities.

288   **The Committee noted** that there had not been sufficient guidance to the Groups of

Experts in terms of issues to deal with and in terms of follow-up, and **tasked** the IODE Officers to closely monitor and guide the Groups.

289　　　　**The Committee stated** that the current rules that define the establishment, membership and *modus operandi* of the Groups of Experts needed revision and **established** a sessional working group to address this matter.

290　　　　**The Committee adopted** Resolution IODE-XVIII.3

4. Distributed national data management systems

291　　　　**The Committee stressed** that the architecture of national data and information management systems should be decided upon by the concerned Member State.

292　　　　**The Committee welcomed** the initiatives of several Member States to develop distributed systems and **invited** these countries to share relevant expertise with other Member States who wish to develop similar systems.

293　　　　**The Committee re-iterated** the need for national central focal points for data and information functions traditionally assumed by NODCs and marine libraries and **called** on Member States not to lose sight of this requirement.

5. Responsible National Oceanographic Data Centres (RNODCs)

294　　　　**The Committee decided** to abolish the system of RNODCs. However, to ensure that the resources and expertise acquired in the regional RNODCs will not be lost, **the Committee instructed** the ODIN projects to incorporate the resources of existing regional RNODCs. Similarly, **the Committee instructed** the Chair to discuss with host centres of other RNODCs how their operations, if considered essential for the international (science) community, could be maintained and properly acknowledged.

295　　　　**The Committee adopted** Resolution IODE-XVIII.2

6. Multi-national oceanographic data centres

296　　　　**The Committee welcomed** the proposal to establish multi-national oceanographic data centres in those cases where insufficient national resources or data exist to justify a fully-fledged national data facility.

297　　　　**The Committee noted** however that the establishment of such centres might not be easy, taking into consideration such issues as data ownership and national sovereignty.

7. Quality Control

298　　　　**The Committee re-iterated** the high importance of quality control as one of the core priority issues for the IODE programmes.

299　　　　**The Committee noted** that a Pilot Project on Quality Control was included in the work plan of the JCOMM/IODE ETDMP but that no action had been taken so far in this regard.

300　　　　**The Committee adopted** Resolution IODE-XVIII.4

8. Cooperation with scientific programmes, institutions and agencies

301　　　　This matter is covered under Agenda Item 4.3.

9. The development of a global data set for long-term archival

302　　　　This matter is covered under Agenda Item 3.3 as the WDC Oceanography, Silver Spring maintains the WOD.

10. MEDI

303   This matter is covered under Agenda Item 6.2.6 on MEDI.

11. IODE Regional Coordinators

304   **The Committee noted** that the function of IODE regional coordinator has been assumed successfully by project coordinators of ODIN projects (examples ODINAFRICA, ODINCARSA).

305   **The Committee decided** to abolish the system of IODE Regional Coordinators.

306   **The Committee instructed** the coordinators of ODIN projects to assume the responsibilities formerly assumed by the IODE Regional Coordinators.

307   **The Committee adopted** Resolution IODE-XVIII.1

308   Taking into consideration the excellent performance of the IODE Regional Coordinator of the WESTPAC region, **the Committee instructed** the Officers to identify a mechanism to maintain the functionality of the IODE Regional Coordinator for the WESTPAC region.

12. IODE National Coordinators

309   **The Committee urged** IOC Member States, who not have done so, to urgently identify IODE National Coordinators for Oceanographic Data Management and IODE National Coordinators for Marine Information Management.

13. IOC Oceanographic Data Exchange Policy

310   **The Committee welcomed** the adoption of the IOC Oceanographic Data Exchange Policy by the IOC Assembly during its twenty-third Session and **urged** Member States to apply the policy nationally.

14. The IODE unit at the IOC Secretariat

311   **The Committee urged** the Executive Secretary to ensure that the IODE programme's visibility and position in the IOC and UNESCO programme and secretariat structure is maintained in order to affirm the importance of oceanographic data and information dissemination and exchange.

15. IODE operational activity maintenance

312   The Committee was informed that OceanTeacher is now a project funded by extra-budgetary resources and no Secretariat resources are used to further build OceanTeacher.

313   **The Committee re-iterated** that IOC funds are being used for pilot projects only and that projects should, subsequent to the pilot phase be supported by extra-budgetary support or adopted by Member States.

16. IOC web sites

314   **The Committee urged** the IOC Secretariat to harmonize the IOC web sites.

315   Reference is made also to Agenda Item 7.1.

17. Role of IODE in ETDMP

316   Referring to the review team recommendation 3, **the Committee noted** that the IODE/JCOMM ETDMP will require close monitoring and guidance.

5.2.   FUTURE ROLE OF THE WDCS, RNODCS AND NODCS

317   This Agenda Item was introduced by the Chair. Dr Rickards recalled that IODE-XVII, in 2003, discussed at length the IODE structure of NODCs, RNODCs and WDCs in view of the changes in technology, user requirements, data types, and other factors that affect the network of data centres. IODE-XVII noted that the rapid changes in technology, changed user needs and capacity of many science programmes and even users hosting their own data on the Internet, posed challenges for the WDCs, as well as for all other IODE and ICSU data centres. The Committee had reiterated the importance of the WDCs as long-term archives of quality controlled oceanographic data, but stressed the need to develop appropriate tools for easy user access to the data. A particular concern was providing timely access to integrated data for operational oceanography while ensuring the long-term archival of known quality and known version.

318   To address these issues, an inter-sessional working group had been established (Resolution IODE-XVII.1), to discuss future roles for the WDCs, as well as RNODCs and NODCs taking into consideration the needs of JCOMM and GOOS in terms of operational data. The Group was composed of the IODE Officers and the Chair of the ICSU Panel on World Data Centres, and was to work by correspondence. Despite several attempts to initiate a discussion by e-mail, the response was very poor. However, much information was provided as input to the IODE Review through questionnaires and surveys. The national reports also provide relevant information.

319   As the role of WDCs, RNODCs and NODCs had already been discussed extensively during the current Session, **the Committee decided** to dissolve the inter-sessional working group.

320   **The Committee instructed** the IODE Officers to discuss how IODE will deliver its services to users, in particular through the WDCs. **The Committee further instructed** the Officers to investigate how the institutions that currently host RNODCs that are operational, can continue to provide services, taking into consideration the decision by the Committee to abolish the RNODC system.

5.3.   EVOLUTION OF IODE AT THE NATIONAL LEVEL

321   The Chair introduced this agenda item which focused on changes at the national level in terms of the distributed model vs. the centralized model. The Chair noted that the ICES Study Group on Management of Integrated Data had compiled a useful table of issues and attributes of centralized and distributed database systems, which could be made available.

322   Several Member States provided their experiences in development of the distributed systems in national and international programmes. They noted that the distributed system required a strong back-up which provides a stable environment and ensures that standards are maintained.

323   **The Committee urged** NODCs to take into consideration the global move towards distributed systems which would also be reflected in GEOSS. However **the Committee cautioned** countries that distributed systems would still require a focal point for national data acquisition and liaison with international programmes.

324   The representative of France, Dr Catherine Maillard, briefly described the proposal to the EU for a Pan-European marine data management infrastructure, SeaDataNet. This proposal links together 36 oceanographic data centres together with international organizations, including IOC/IODE.

325   She informed the Committee that SeaDataNet will be capable of managing the wide variety and large volumes of data collected by the various observing systems – both *in situ* and remotely sensed – and of serving the many user needs. SeaDataNet aims to develop this infrastructure as a virtual data centre that will incorporate and enhance the existing

infrastructures of the participating countries. It will be coordinated by IFREMER (France) with the technical coordination ensured by MARIS (Netherlands) in the context of past actions undertaken to produce databases and products and new possibilities offered by the communication technology. In the short term, it will serve the common users requirements and prepare regional and global data products supporting a large array of uses. Over the long-term it will provide at relatively low cost, an efficient Pan-European data management infrastructure for ocean monitoring and forecasting systems such as the GMES Integrated Projects. SeaDataNet builds on the achievements of a previous EU project MEDAR/MEDATLAS, and follows on from the current EU Sea-Search project.

5.4. IOC STRATEGIC PLAN FOR OCEANOGRAPHIC DATA AND INFORMATION MANAGEMENT

326   This item was introduced by Dr S. Narayanan, JCOMM Co-President. She recalled that the JCOMM Management Committee, during its First Session (Geneva, Switzerland, 6-9 February 2002) had recommended that a draft resolution be prepared for the 35th Session of the IOC Executive Council calling for the development of an IOC integrated data management strategy, encompassing all programmes. In order to assist with this task, the Management Committee had further requested IODE to carry out an assessment of data and data product requirements of existing oceanography and marine meteorology programmes/projects, and evaluate whether these were currently met by the various groups of data centres.

327   It had been recommended also to use the experience gathered in the preparation of the GOOS Data Management Plan (1998-1999) and possibly the GCOS Data Management Plan as examples. A draft resolution had subsequently been prepared and was submitted and adopted by the 35th Session of the IOC Executive Council (Resolution EC-XXXV.2 (IOC Strategic Plan for Oceanographic Data and Information Management). The Resolution also established a Task Team on the Development of an IOC Strategic Plan for Oceanographic Data and Information Management and defined its Terms of Reference.

328   Due to the heavy schedule in 2002 it had not been possible to organize the First Session of the Task Team. In addition it was felt that progress should first be made with the IODE Review (See also Agenda item 5.1) as this document would contribute to the work of the Task Team. The First Session of the Task Team had taken place at UNESCO Headquarters in Paris, France on 23 June 2003. The report of that meeting is available as IOC/INF-1191 (http://ioc3.unesco.org/iode/files.php?action=viewfile&fid=321&fcat_id=71). This meeting had formulated a draft statement on the vision, rationale, principles/objectives and elements of Governance for the IOC Data Management Strategy.

329   Dr Narayanan recalled that the Committee had set up a sessional working group during the current Session to follow-up on the work of the Task Team, taking into consideration the work of the IODE review team. The terms of reference of the sessional working group were: (i) to comment on vision, rationale and principles outlined in the report of the Task Team; (ii) elaborate on the key elements of the strategy; and (iii) suggest a way forward to develop the strategy.

330   The group had agreed that the vision, rationale and principles as stated in the report do represent the key elements of an IOC Strategy, however, some rewording would be necessary to make them more precise and clear.

Elements of the strategy

331   The sessional working group discussed a possible outline for the document and some of the key points that might be included. The suggested outline is as follows:
    1. **Executive Summary**
    2. **Introduction**

3. **The IOC Data Management Vision**
4. **The Long-Term Objectives:** Define what IOC data management wants to be;
5. **Basic Principles:** data policy, data provision to all member countries, etc.; products and services; technological aspects, capacity building; involvement of NODCs, specialized data centres, project data management elements; collaboration with other relevant groups; etc.;
6. **Current Structure of data management:** Description of IOC programs that have implications to and responsibility for data management; Description of programs (research and conventions) that have data of interest to IOC community; example – those under the regional seas conventions, regional alliances); how these are run (ex. At IOC how the secretariat deals with the responsibility, same for other programs; Coordination: Chair, Management Committee, Capacity Building aspects; etc.;
7. **Key Gaps**
8. **Proposed structure:** organizational structure, operational structure (how things should work together; data flow, QC, etc.); technological tools and standards; define components: how data can be acquired, processed, managed; data flow; data centres, special data centres; type of data acquisition.
9. **How to apply the principles in new data management:** this could include incorporation of new elements, pilot projects, science and technology workshops and conferences, and role of regional bodies;
10. **Mechanism to collaborate with other Entities:** this may involve subsidiary bodies of UN system, other governmental and non-governmental global organizations, links to science programmes, and the private sector. Every IOC programme should have a data management element;
11. **Performance Evaluation:** Review of work plans of subsidiary structure, reporting to the parent bodies, external review. Regular review and assessment should be part of the IOC data management strategy.
12. **Communications and Outreach:** we need to use a variety of tools. IODE has already developed a range of these (including web site, posters, OceanTeacher, etc).

Way forward to develop this strategy

332   **Approach:** There was consensus among the group members that the best approach to take is to select and task a dedicated, knowledgeable individual to develop the strategy. As was done during the IODE review and the GOOS review, the information should be compiled using: Questionnaire; Face-to-face interview; Review of available documents such as the GOOS data management strategy, strategy in the COOP Implementation and design plans, FWIS, DMAC, etc.

333   **Time line:** Selection of the Consultant by end of August 2005; progress report for the next IOC Executive Council (2006), Draft Report to be submitted to IODE-XIX and/or the IOC Assembly in 2007 which ever comes first.

334   The representative of ICES informed the Committee that though ICES has an overall strategy, it does not have a specific data strategy. ICES has set up a working group on strategy which will submit its report by mid-May 2005. Referring to the IOC/ICES MOU, she expressed the hope that IODE and ICES will ensure that the strategies are complimentary.

335   **The Committee noted** that the proposed strategy did not refer to technological issues and does not have a plan for the implementation of the strategy.

336   **The Committee thanked** the sessional working group and the Task Team for its work.

337   **The Committee requested** the IODE Chair to report the findings of the First Session of the Task Team and the meeting of the sessional working group to the 23rd Session of the IOC Assembly in June 2005.

338   **The Committee requested** the Executive Secretary IOC to identify the necessary funding for the proposed Consultant in 2005 and early 2006, to ensure timely delivery of the strategy document.

339   **The Committee endorsed** the outline and time lines proposed by the sessional group, and **requested** the IODE Secretariat to avail the document well ahead of the next IODE-XIX and the 24th Session of the IOC Assembly.

6.   PROGRAMME PROGRESS REPORTS

6.1.   GROUPS OF EXPERTS

6.1.1.   Group of Experts on Biological and Chemical Data Management and Exchange Practices (GE-BICH)

340   This item was introduced by Dr Edward Vanden Berghe (Chair, GE-BICH). He referred to Document IOC/IODE-XVIII/30 *"Group of Experts on Biological and Chemical Data Management and Exchange Practices (GE-BICH)"*. He recalled that this Group of Experts had been established by Recommendation IODE-XVI.4 (Establishment of a Group of Experts on Biological and Chemical Data Management and Exchange Practices).

341   He mentioned that close collaboration between IODE and the Ocean Biogeographic Information System and with the WG MDM of ICES had been established by the GE-BICH.

342   Dr Vanden Berghe informed the Committee that the Second Session of GE-BICH was held during the inter-sessional period, hosted by BODC, Liverpool, and he mentioned that the meeting had been attended by representatives from FAO, GBIF, ICES, ITIS and IODE. The Report of the Second Session is available from http://ioc3.unesco.org/iode/files.php?action=viewfile&fid=367&fcat_id=99.

343   Dr Edward Vanden Berghe recalled the Terms of Reference of the GE-BICH and reported that the Second Session had recommended a few slight modifications. The proposed revised Terms of Reference are:
  -   documenting the systems and taxonomic databases and inventories currently in use in various data centres;
  -   documenting the advantages and disadvantages of different methods and practices of compiling, managing and archiving biological and chemical data;
  -   developing standards and recommended practices for the management and exchange of biological and chemical data, including practices for operational biological data;
  -   encouraging data centres to compile inventories of past and present biological and chemical data holdings;
  -   encouraging data holders to contribute data to data centres for the creation of regional and global integrated oceanographic databases incorporating physical, chemical and biological data.

344   Dr Vanden Berghe reported that the Group so far concentrated on biological data, and more particularly on taxonomy/nomenclators.

345   He also mentioned that during the Second Session of the GE-BICH, the great potential of emerging technologies was recognized, and the need for pilot projects had been stressed to test the different systems and technologies.

346   He informed the Committee that the Group had adopted a detailed work plan that focuses on (i) OceanTeacher modules on biological data management; (ii) raising awareness of the socio-economic importance of data management; (iii) closer collaboration with OBIS, GBIF, ICES, ITIS, FAO; (iv) hosting of the URMO web site by the IODE Project Office; (v) collation of guidelines on data quality assurance and quality control for biological data; (vi)

pilot projects related to test different systems of distributed querying based on XML (DiGIR and BioCASE) with XML schemas other than Darwin Core and ABCD (using metadata and distributed taxonomic name lists as data types); and (vii) implement survey, requesting information about systems, databases and inventories currently in use in various data centres.

347   Dr Edward Vanden Berghe then provided a brief report on the 'Ocean Biodiversity Informatics (OBI)' conference, Hamburg, 29/11 - 1/12/2004. There were 169 participants, from 37 countries, 37 oral and 33 poster presentations. Two open discussion rounds were organized. During these discussions, the conclusions of the 'Colour of Ocean Data' conference in Brussels, 25-27/11/2002 were revisited, and a number of actions proposed. Another major point of discussion was data policy issues, and the advantages of free and open sharing of biodiversity data. The rewards for the data collector/custodian and possible mechanisms to stimulate scientists to make their data available were discussed. Much work remains to be done in this area. Biological guidelines must be collated and evaluated, and missing guidelines identified and developed. Data quality indicators must also be developed, and implemented by minimally intrusive quality assurance procedures.

348   The representative of ICES, Ms Julie Gillin suggested a second OBI conference to focus on biological data quality issues and continue the valuable cross-disciplinary interchange. She noted that ICES and OBIS offer to co-organize this Conference with IODE. The Bedford Institute of Oceanography will explore the feasibility of hosting the Conference during the last quarter of 2007.

349   **The Committee**, recognizing the importance of maintaining the momentum of the work being done by the GE-BICH and during the COD and OBI Conferences, **strongly welcomed** the proposal for a second OBI Conference.

350   The JCOMM Co-President, Dr Savi Narayanan, suggested that JCOMM Secretariat consider supporting financially, the activities of GE-BICH Pilot Projects as JCOMM's mandate related to non-physical variables is consistent with GE-BICH's Terms of Reference.

351   **The Committee welcomed with satisfaction** the achievements of the Group of Experts on Biological and Chemical Data Management and Exchange Practices and **stressed** the importance of the pilot projects.

352   **The Committee adopted** the summary report of the Second Session of the IODE Group of Experts on Biological and Chemical Data Management and Exchange Practices (GE-BICH), and recommendations included therein.

353   **The Committee adopted** Recommendation IODE-XVIII.2

6.1.2.   Group of Experts on Marine Information Management (GE-MIM)

354   This item was introduced by Ms Suzie Davies (Chair, GE-MIM). She referred to Document IOC/IODE-XVIII/28 *"Group of Experts on Marine Information Management"*.

355   The GE-MIM Chair presented a detailed report on the Eighth Session of the IODE Group of Experts on Marine Information Management (GE-MIM) that was held in Hobart, Tasmania, Australia on 2,3 and 10 September 2005 and on the major achievements of the Group from 2002 to date.

356   Ms Davies first reported on the progress with OceanPortal, OceanExpert, e-repositories for electronic publications and on the marine information management component of the ODINAFRICA, ODINCARSA and other regional networks that are operational or have been proposed.

357   With regard to OceanPortal Ms Davies reported that the visits to OceanPortal have grown spectacularly as from December 2003 and now number about 10,000 unique visits per month.

358   The OceanExpert site has been re-engineered and now includes many new features

(eg permissions, groups, expanded search capabilities). The system contains information on over 13,000 individuals. The number of visits has increased from about 4500/year to 7300/year but this is far inferior to the OceanPortal numbers. From a national science point of view, the GE-MIM considers OceanExpert as a vital tool for monitoring expertise in particular subject areas.

359   The project proposal for the development of an e-repository for electronic publications for Africa was successfully submitted to the Government of Flanders through the FUST and has received funding for 2004-2005. It is developing an OAI-compliant e-repository providing access to full-text publications created by scientists affiliated with ODINAFRICA and provides a platform facilitating the development of Africa e-journals.

360   Several activities were implemented in the framework of the ODINAFRICA project that strengthened the marine information management component of that project: education of marine librarians, provision of computer equipment and integrated library management system software (ILMS), development of an African Directory of Marine and Freshwater professionals, provision of ASFA, development of the AFRILIB union library catalogue (which is available online and now has over 9,500 records – visit through http://ioc.unesco.org/odinafrica/contents.php?id=268).

361   During the ODINCARSA pilot phase a network of over 60 institutions in 19 Latin American and Caribbean countries was created. An IAMSLIC Latin American group was created with a membership of 27 libraries and information centres in the region. ASFA coverage for Caribbean and Latin American countries has been improved by establishing ASFA input centres. A feasibility study has been completed for a regional catalogue of marine science libraries and a regional directory of marine experts was developed.

362   For the Pacific region (and as a follow-up to the request to establish an ODIN for the South Pacific region formulated during the 2nd GOOS regional forum meeting that was held in Fiji, 7-9 February 2004) a major capacity survey of marine information centres and libraries was undertaken by the GE-MIM in 2004. The results showed great variation in marine centres' infrastructure, level of staff expertise, and technical and financial resources. A needs assessment was made with specific listing of needs for capacity building. These focus on assisting existing networks and to take a collaborative approach, and to become involved in development of more broad-based support networks. The Pacific Islands Regional Group of IAMSLIC (PIRG) was re-established at the 30th IAMSLIC Conference (Hobart, Australia) that was organized back to back with GE-MIM-VIII.

363   Ms Davies informed the Committee that GE-MIM has been working cooperatively with organizations like IAMSLIC, EURASLIC and FAO for many years. In order to strengthen the relationship with IAMSLIC a Memorandum of Understanding was established between IOC and IAMSLIC in April 2004.

364   Ms Davies then proceeded with a detailed description of the actions proposed by GE-MIM-VIII for its inter-sessional period 2005-2007.

OceanPortal

365   The IODE Priority Survey ranked OceanPortal with the highest relevance. The GE-MIM plans to redefine the classification scheme, add scope notes, make OceanPortal OAI compliant and improve the metadata format. GE-MIM will work with IAMSLIC to develop the *Aqua Terra* portal. This will focus on subject specific web-based content (down to document level) – OceanPortal focuses on web-based resources (meta-level), resulting in two complementary portal products.

OceanExpert

366   GE-MIM will implement a number of enhancements and will evaluate the product at its next Session. GE-MIM will also develop a brief management plan for OceanExpert to

assist with its further development.

OceanTeacher

367   The IODE Priority Survey ranked OceanTeacher as 2nd highest priority. The GE-MIM expressed its concern about funding for OceanTeacher beyond the current 2005-2007 funding provided by Flanders and called for IOC to ensure long-term support for this important capacity building tool

e-repositories

368   GE-MIM-VIII saw great value in implementing a project in other regions, similar to the e-repository for Africa that is now being implemented (2004-2005), and recommended that similar projects be carried out in other regions.

ODINAFRICA

369   In accordance with the MOU between IOC and IAMSLIC, the GE-MIM-VIII urged ODINAFRICA participating institutions to make available their services, products and expertise to all AFRIAMSLIC members.

ODINCARSA

370   In order to improve input into ASFA of material from Latin America and the Caribbean, the ASFA Board has proposed the organization of Technical (staff) meetings in the region and has invited IOC to co-sponsor these meetings. The GE-MIM strongly endorses this proposal and requests IODE to provide the required financial support.

ODINCINDIO

371   The GE-MIM-VIII had welcomed the development of this new ODIN network and offered its expertise to assist with the MIM component of ODINCINDIO.

Pacific region

372   The GE-MIM-VIII recommended that future capacity building activities should be implemented in conjunction with existing initiatives such as the Pacific Islands Ocean Framework for Integrated Strategic Action (PIROF-ISA).

Eastern Europe region

373   In response to a request by EURASLIC, GE-MIM-VIII welcomed the proposed establishment of an ODIN for Eastern Europe to strengthen capability of marine libraries. GE-MIM-VIII recommended that, following the completion of a national and regional needs assessment, a proposal for an ODIN be prepared.

South East Asia region

374   GE-MIM supports the request by IAMSLIC to establish an ODIN for South East Asia and calls on IOC to consider providing advice and seed funding for related activities. GE-MIM-VIII further requested the IOC WESTPAC Secretariat to discuss this matter at the next WESTPAC Session.

Integrated Library Management System (ILMS) software

375   The GE-MIM will undertake a new analysis and assessment of available software products so the most suitable product can be used in existing and new ODIN networks.

GE-MIM Strategic Plan

376   The GE-MIM will develop a Strategic Plan that will provide direction for the Group over a 4-year period, with a formal review every 2 years. This will provide direction and focus for the Group and allow for a comprehensive and transparent reporting mechanism to the IODE Committee.

377   Ms Davies concluded by noting that, although a substantial amount of work is being carried out by GE-MIM members, funding is required for certain action items, such as sub-contracting, assistance to participants in meetings or conferences (with special attention to developing countries), and cost of GE-MIM Sessions.

378   The ODINAFRICA project coordinator thanked the GE-MIM group for the support provided over the past years. This included development of the training curriculum, identification of software used for MIM, identifying experts for training courses (all of whom who provided their time and expertise free of charge); development of products and services required by ODINAFRICA, and assistance with linking ODINAFRICA with IAMSLIC.

379   The ODINCARSA project coordinator, Mr Rodney Martinez, stressed that MIM is a very essential component in ODINCARSA. He noted that the coordination between ODINCARSA/MIM and IAMSLIC has been a key in the success of the ODINCARSA/MIM sub-programme. He called for the Committee to ensure that MIM is maintained and strengthened as an IOC and IODE component.

380   The ODINCINDIO project coordinator stated that MIM is an important component in ODINCINDIO and he looked forward to guidance and support from GE-MIM in this regard.

381   **The Committee adopted** the Summary Report of the Eighth Session of the Group and all recommendations contained therein, taking into consideration the decisions made by the Committee regarding the Groups of Experts.

6.1.3. JCOMM/IODE Expert Team On Data Management Practices (ETDMP)

382   This item was introduced by Dr. Nick Mikhailov (Chair, ETDMP). Reference was made to Document IOC/IODE-XVIII/31 *"JCOMM/IODE Expert Team on Data Management Practices (ETDMP)"*. Dr. Mikhailov recalled the terms of references of the Group:
- develop, recommend and implement principles and practices for an end-to-end data management system for JCOMM;
- recommend the best data management practices for adoption by JCOMM and other related/dependent activities, in particular for: (i) standards of metadata and formats; (ii) quality control and data assembly; (iii) data and product flow;
- review and assess the effectiveness of data management practices, including integration and consideration of new techniques and approaches;
- provide advice to the Data Management Coordination Group and other groups of JCOMM, as required, on data management practices;
- in concurrence with the co-presidents of the Commission, propose the establishment of projects and task teams, as required and, if established, oversee them, including the GTSPP, in order to develop effective data management practices;
- develop documentation and guidance material and promote the adoption of JCOMM data management practices;
- liaise and collaborate with other groups, as needed, to ensure access to required expertise and appropriate coordination, and to avoid duplication.

383   Dr Mikhailov reported that the First Session of the ETDMP was held in Ostend, Belgium from 15-18 September 2003. The ETDMP members discussed the requirements for end-to-end data management (E2EDM); existing and planned data management mechanisms and practices; cooperation with other programmes and expert teams; the strategy for the development of E2EDM; and future cooperation with the Ocean Information Technology

(OIT) Pilot Project.

384   He informed the Committee that the ETDMP Session agreed on an Action Plan for the inter-sessional period based on three pilot projects: metadata management, data assembly, quality control and quality assurance, and the development of an E2EDM Prototype. The Meeting Report is available through http://ioc3.unesco.org/iode/files.php?action=viewfile&fid=343&fcat_id=84.

385   He informed the Committee on the JCOMM/IODE E2EDM Strategy which defines the overall vision of the end-to-end data management process.

386   Dr Mikhailov informed the Committee that during 2003-2005 the main task of the ETDMP was to implement three Pilot Projects that have been proposed at the First Session of ETDMP, namely:
        – Pilot Project 1. Metadata Management
        – Pilot Project 2. Data Assembly, Quality Control and Quality Assurance
            – 2a-Unique Tags for Original Data
            – 2b-Data Quality Assessment and Flagging
        – Pilot Project 3. E2EDM Prototype

387   Dr. Mikhailov further reported on the *ad hoc* Session of the ETDMP held in Ostend, Belgium on 8 May 2004. The ETDMP members discussed the progress of the ETDMP Pilot projects and the ways to speedup their implementation. The group agreed on the necessary urgent actions and made the corrections to the Pilot projects Action Plan. The Report of the meeting is available through http://ioc3.unesco.org/iode/files.php?action=dlfile&fid=373

388   The Committee was informed on the cooperation activities of the JCOMM/IODE Expert Team On Data Management Practices with other programmes. Marine XML, OIT Pilot Project, US GOOS DMAC, WMO FWIS were mentioned.

389   Dr Mikhailov reported on the progress achieved by all Pilot Projects with special attention to the results of Pilot Project 3. The E2EDM (end-to-end data management) prototype for this project is ready and provides the integration of the distributed real-time and delayed-mode ocean and marine meteorological data, and access to the aggregated data. It now included two data providers: Russian NODC and VLIZ and an integration server was installed recently at the IODE Project Office in Ostend. The prototype was demonstrated to the Committee as a poster with a corresponding computer demonstration during a lunch-time presentation by Mr Sergey Belov (RIHMI-WDC).

390   Dr Mikhailov then presented the ETDMP work plan for 2006-2007 (following the ETDMP-1 recommendations it is expected to accomplish through the Pilot Projects in 2005):
        – development of the JCOMM/IODE E2EDM Implementation Plan;
        – continuation of the Pilot Projects;
        – cooperation with other programmes in the E2EDM field.

391   **The Committee expressed** its strong satisfaction with the great progress made by the ETDMP and the enthusiasm of its participants, and **adopted** the JCOMM/IODE ETDMP work plan for 2006-2007. **The Committee further urged** the JCOMM Co-President to endorse the work plan on behalf of JCOMM.

392   **The Committee recommended** to have on the web the manuals and guidelines available for new organizations wishing to join the E2EDM prototype and to expand the number of data providing Member States.

393   **The Committee noted with satisfaction** that ETDMP Pilot Project 3 is a good example of cooperation of the IODE and JCOMM.

394   **The Committee noted** that there are great possibilities for cooperation of the JCOMM/IODE ETDMP and OBIS and **recommended** to establish the common terminology and vocabulary.

6.2. GLOBAL PROJECTS

6.2.1. Aquatic Sciences and Fisheries Abstracts (ASFA)

395   This item is included under Agenda Item 6.1.2

6.2.2. Global Ocean Surface Underway Data Pilot Project (GOSUD)

396   This item was introduced by Mr Loic Petit de la Villeon. He referred to Document IOC/IODE-XVIII/27 *"The Global Ocean Surface Underway Data Project (GOSUD) – Progress Report 2003-2004"*.

397   Mr Petit de la Villeon reported that the Global Ocean Surface Underway Data Project continues to develop towards full capabilities to manage the surface data collected by ships while traversing from port to port. The annual report for 2003 has been completed and is available through http://www.gosud.org/doc/GOSUD_2003_Report.doc. He then provided a detailed update of activities of GOSUD and how it continues to develop. He reported that with some financial support from IODE, meetings of GOSUD participants were held in November, 2003 and in September, 2004 in conjunction with Argo meetings in Monterey, USA and Southampton, UK.

398   Mr Petit de la Villeon made a brief review of the latest group achievements. The GOSUD has produced a Users Manual that explains the primary data format used by the Project. A second manual describing the recommended QC procedures for the real time data has also been produced. Then he reported on data archive holdings and mentioned that major developments have taken place at the GDAC in Brest. In 2003 Brest started to make data available from an ftp server, and in 2004 a web server became available.

399   He informed the Committee on the achievements of the colleagues from Canada, France, Australia, US, Japan. He then reported that a collaboration has been formed between the Shipboard Automated Meteorological and Oceanographic Systems (SAMOS) project (formerly the High Resolution Marine Meteorology Project) and GOSUD. He mentioned that CLIVAR has expressed interest in GOSUD as a way to better organize and archive these data, The JCOMM Operations Program Area have started a project to report quarterly the data that have been collected in the context of meeting the targets posed by OOPC for an ocean climate observing system.

400   He informed the Committee that efforts will be made to convert new operations to routine. At the same time cooperation will be undertaken with SAMOS (Shipboard Automated Meteorological and Oceanographic Systems) to mesh their and GOSUD activities to streamline how each handles data and permits ready integration of the surface oceanography and meteorology observations. Real-time exchange of surface ocean data is limited by the present character code form TRACKOB. It will be necessary to use BUFR for real-time exchange on the GTS and so GOSUD is working towards a BUFR template for TRACKOB data. As this develops, a framework will then be available for exchanging many other kinds of surface observations in a single BUFR message. He emphasized that products derived directly from the observations are an important goal for GOSUD.

401   Mr Loic Petit de la Villleon encouraged all participants to find a way to disseminate the data they collect on the GTS and called for new data providers.

402   **The Committee noted with satisfaction** the great progress achieved by the Global Ocean Surface Underway Data Project.

403   **The Committee strongly encouraged** other organizations to participate in the project.

6.2.3. Global Oceanographic Data Archaeology and Rescue (GODAR)

404   This item was introduced by Mr. Sydney Levitus (GODAR Project Leader). He referred to Document IOC/IODE-XVIII/36 *"Global Oceanographic Data Archaeology and Rescue (GODAR)"*.

405   Mr. Levitus informed the Committee that since its inception in 1993 as an IOC project, the GODAR Project continues its progress in locating, collecting, and disseminating in electronic form, historical ocean profile and plankton data that are at risk of loss due to media decay.

406   Mr. Levitus described the history of GODAR data collection. He thanked IOC Member States and other contributors to the GODAR Project. He strongly emphasized that it is a labor intensive task

407   All GODAR data has been placed in the World Ocean Database. This database is a heterogeneous database and is global, comprehensive, integrated, and scientifically quality-controlled. All of the data is in one well-documented format. All of the data are available on-line (web accessible) and via CD-ROM.

408   To date, data from approximately 1.05 million Station Data casts, 1.15 million MBT casts, 610,000 XBT casts, 145,000 high-resolution CTD casts, and 142,000 Plankton tows have been recovered and distributed without restriction to the international scientific community.

409   Substantial progress has been made in the collection of historical measurements of sea level from tide gauges. These were recommended for inclusion in the GODAR project as a new data type by the International GODAR Review Meeting, held in 1999. A total of 372 years of hourly sea level data has been rescued so far for tide gauges at 34 locations in 15 countries.

410   All GODAR project profiles and plankton data will be processed and released as part of "World Ocean Database 2004" (WOD04). Online distribution of WOD04 will start near the end of 2005 and distribution by CD-ROM and/or DVD will follow.

411   Mr. Levitus stated that the usefulness of the IODE NODC/WDC profile-plankton data can be indicated by citations in the scientific literature. This is based on a search of the ISI Scientific Citation Index as of March 2004. The data has been sited in 4,296 citations to date.

412   GODAR data and project announcements are placed in a variety of international sources including: UNESCO, ICES CIEM Information Newsletter, NOAA/Earth System Monitor, U.S. JGOFS News, Global Change Newsletter, Bulletin American Meteorological Society, EOS Transactions, Section News, Computing Magazine, NODC Environmental Information Bulletins, and the Arctic Forum 2002.

413   The Committee was requested to consider a budget requirement for the next fiscal year for the GODAR project of $10,000. This will be used to support the exchange of data managers and scientists between World Data Center for Oceanography, Silver Spring and contributing IODE data centers and oceanographic institutes.

414   **The Committee congratulated** Mr Levitus as GODAR Project Leader with the continued success of the GODAR Project and its products.

415   **The Committee endorsed** the continued support for the GODAR Project.

416   The Delegate from Japan announced that the GODAR WESTPAC – 2nd International Workshop was held in November 2004. He also informed the Committee that there are plans for the 3rd GODAR WESTPAC International Workshop to be held in Japan in 2006.

6.2.4. Global Temperature and Salinity Profile Programme (GTSPP)

417   This item was introduced by Mr. Scott Tomlinson (MEDS). He referred to Document

IOC/IODE-XVIII/26 *"Global Temperature and Salinity Profile Programme (GTSPP)"*.

418   Mr Tomlinson reported that the GTSPP project continues to develop capabilities and deal with greater volumes of data. He provided a brief review of statistics. The number of BATHYs and TESACs handled grew from about 178,000 in 2002 to more than 211,000 in 2003. Between 2002 and 2003, the number of delayed mode profiles entering the GTSPP archive increased by about 36,000 profiles. The bulk of the data came from the late 1990s and from 2003, but records were added from all years back to 1990.

419   He reported that the GTSPP archive contains a little over 1.7 million stations from 1990 to the end of 2003. Of these, about half are present in real-time forms (the delayed mode versions have not arrived) particularly for data from the more recent years. He also mentioned that timeliness of real-time data delivery continues to improve. He informed the Committee that data from Argo floats constitute a significant proportion of TESAC messages and it is the goal of Argo to provide these data to the GTS within 24 hours of data collection. By the end of 2002 about 54% of data were meeting the target. By the end of 2003 this had risen to 75% and at the end of 2004 the figure is more than 85%.

420   Mr Tomlinson then provided a brief report of activities of GTSPP and showed how it continues to develop in response to evolving needs. He recalled that at the last SOT meeting and in the 2002 Annual Report it was noted that a strategy was under development for attaching a single unique identifier to both the real-time and delayed mode versions of XBT data He informed the Committee that GTSPP will continue to monitor these results to test how well the unique identification scheme performs in allowing an unequivocal match of real-time to delayed mode profiles even when the profiles appear to be different. Speaking about Data Dictionary he noted that contributors to the data dictionary include major oceanographic institutes of Canada and the US NODC and that the GTSPP has agreement with BODC to link to their data dictionary but this has not yet been implemented. Mr Tomlinson welcomed other contributors to participate in the Data Dictionary activity.

421   He reported that GTSPP is contributing to the Observations Program Area (OPA) of JCOMM through the production of the metrics for temperature and salinity profile sampling.

422   Then he reported that GTSPP is an active contributor and partner in a number of other international programs: the monitoring that is done to the real-time GTS data is an important contribution to Argo, the GTSPP is a contributor to the CLIVAR program, GTSPP is also collaborating with the GODAE.

423   Mr Tomlinson provided the future directions of the GTSPP work: regular reconciliations between their archives, this work is planned to take place in 2005; providing data in an Argo GDAC-like format that is conforming to Argo data appear at the GDACs; providing a hard copy source of GTSPP data that can be sent to interested clients (the monthly updates of the GTSPP CD or DVD will be available online); continuation of assessment of the usefulness of a unique data identifier to link real-time and delayed mode versions of data; extension of the links of its data dictionary to that maintained by the BODC; collaborations with CLIVAR and GODAE.

424   Mr Tomlinson reported that with some financial support from IODE, one meeting of GTSPP participants was held in October 2004 in conjunction with an Argo meeting in Southampton, UK. The report of the meeting is available from the same URL as noted above. Mr Tomlinson also reported on future directions.

425   **The Committee noted** that the interest for the project results was high and **requested** that results should be reported to future IODE Committee Sessions along with the results of other projects.

426   **The Committee noted with appreciation** the great results of the GTSPP project

427   **The Committee noted** the agreement with BODC to link to their data dictionary and **recommended** to implement this as soon as possible.

6.2.5. Development of a marine XML (marineXML)

428   This item was introduced by Mr Robert Gelfeld (SGXML Co-chair). He referred to Document IOC/IODE-XVIII/33 *"Final Report of the ICES/IOC Study Group on the Development of Marine Data Exchange Systems using XML"*.

429   Mr Gelfeld informed the Committee that the ICES/IOC Study Group on the Development of Marine Data Exchange Systems Using XML (SGXML) has finished its assignment. It concentrated its three-year effort on metadata standards, parameter dictionaries and generic data structures for use in an XML-based language.

430   The Group evaluated several international metadata structures that support data discovery and produced mappings between some structures. In terms of the consolidation of data from different data nodes, the Group examined numerous parameter dictionaries and conducted mappings between several dictionaries, made structural advances to some dictionaries and attempted to account for dictionary issues imposed by units. Also for data consolidation, the Group developed a generic XML data structure from about 20 data objects. The structure was applied to case studies involving one and three-dimensional physical/biological data sets.

431   Mr. Gelfeld reported that the completion of the work of the MarineXML EC project and the final report of the SGXML provides an important point to consider the next steps for improving marine data exchange. The IOC/IODE website http://www.marinexml.net should provide a forum for resources such as schemas, manuals and software. This would include both directly hosted resources and links to resources hosted and maintained elsewhere. The links between these resources would be managed as an ontology to show what is available, how it is being used, what organization are engaged.

432   Mr. Gelfeld informed the Committee that the ICES/IOC Study Group recommends:
- the need for consolidation of metadata terminology;
- explicit oceanographic extensions to existing standards;
- ability to combine metadata holdings from distributed sources;
- adoption of the British dictionary as the marine community standard and the creation of a structure and procedures to manage the dictionary;
- further examination of XML-based biological systems;
- merger of the Canadian and Japanese marine XML structures with application in a demonstration project.

433   In addition, the EU MarineXML recommends:
- the IODE project office serve as the host and focal point for MarineXML;
- all MarineXML work should be compliant to the ISO standards register;
- explicit oceanographic extensions to existing standards;
- there is continued development on dictionary development.

434   The JCOMM/IODE ETDMP Chair, Mr N. Mikhailov informed the Committee that the JCOMM/IODE ETDMP Task Team has been working on XML for its metadata exchange project and he reported that some elements had already been developed.

435   The Chair GE-BICH reported that XML technology is being used in OBIS.

436   **Noting** the importance of MarineXML to the IODE community, **the Committee stressed the** need to continue work on MarineXML.

437   **The Committee adopted Recommendation IODE-XVIII.7**

6.2.6. Marine Environmental Data Inventory (MEDI)

438   This item was introduced by Mr. Greg Reed (Chair, SG-MEDI). He referred to Document IOC/IODE-XVIII/29 *"Marine Environmental Data Inventory (MEDI)"*.

439 Mr. Reed recalled that MEDI is a directory system for datasets, data catalogues and data inventories within the framework of the IODE programme. It has been set up to ensure the widest possible coverage of data holdings and includes a review of existing national and international data directory systems as well as implications of inter-operability with similar systems within other international organizations.

440 During the inter-sessional period, a total of 177 dataset descriptions were submitted by member states to the MEDI catalogue which is available online at the MEDI web site at http://ioc.unesco.org/MEDI. The MEDI authoring tool, which has been developed to encourage data collectors and scientists to produce metadata descriptions for their datasets, has been used to describe these datasets. The MEDI authoring tool has proved to be a useful means of collecting metadata and is currently used by more than thirty member states. MEDI has also raised the awareness in the IODE community to the importance of metadata. However, some users of the metadata tool have reported technical problems with the authoring tool.

441 The MEDI Africa project (part of ODINAFRICA) has successfully reviewed reformatted and quality controlled metadata from 18 African member states and this has resulted in a 55% increase in the number of metadata records recorded in MEDI. These new records will be added to the MEDI catalogue. MEDI has also been used in used in all IODE training activities during the inter-sessional period.

442 Mr Reed outlined the future activities for MEDI and proposed that:
  (i) the Steering Group for MEDI be reconvened to discuss the way ahead for MEDI;
  (ii) the MEDI Steering Group (SG-MEDI) should work with other national and international initiatives to develop a marine profile of ISO 19115;
  (iii) IODE should collaborate with other communities to develop an ISO 19115 compliant metadata tool; and
  (iv) MEDI continue to be used in IODE capacity building activities and students encouraged to use MEDI to describe their metadata and submit these to the MEDI catalogue.

443 He noted that the ISO 19100 series is a multi-part International Standard for Geographic Information that is being developed by Technical Committee 211 Geographic information/Geomatics of the International Organization for Standardization (ISO). ISO 19115, Geographic information – Metadata is part of the ISO 19100 series. This standard provides a procedure for describing digital geographic datasets using a comprehensive set of metadata elements. ISO 19115 is being adopted by many spatial data agencies and the WMO has published a working draft of the WMO Core Profile of the ISO 19115. It is assumed that MEDI should be ISO 19115 compliant.

444 He also described the required future activities that focus on (i) ISO 19115 Compatibility; (ii) the MEDI Authoring Tool; (iii) Capacity Building; and (iv) the Steering Group reconsideration. He referred to the financial requirements for the future work on MEDI.

445 Mr Reed explained that the cost of developing and maintaining a new metadata tool, compliant with ISO 19115, would be high and he noted that it may be more cost-effective for IODE to work with other communities who are developing similar tools.

446 **The Committee instructed** the SG-MEDI to work with other national and international initiatives to develop a marine profile of ISO 19115 and seek collaboration with other communities to develop an ISO 19115 compliant metadata tool.

447 **The Committee noted** that it would be difficult for IODE to maintain software applications on a long-term basis and **instructed** the Chair of the SG-MEDI and IODE Chair to work closely with other communities who are developing similar tools.

448 The representative of the Global Change Master Directory (GCMD)

(http://gcmd.nasa.gov/), Ms Melanie Meaux, explained that GCMD is the US coordinating node of the CEOS International Directory Network. It offers an ISO-compliant online authoring tool. Key partners of IODE such as GOOS, GOSIC, and JCADM are already using this authoring tool and are hosting their metadata through "portals" – which are subset views of the GCMD metadatabase. Other partners such as ODINAFRICA and ODINCARSA have expressed interest in importing their existing metadata records (MEDI-based on the GDMD DIF) to the GCMD. Recently, the GCMD has developed an ISO-compliant offline metadata authoring tool. It is important that a metadata tool be made available on a long-term basis to the IODE community to ensure metadata is uniformly collected and made available in the future. The GCMD offers to be a key partner in the further development and maintenance of a metadata authoring tool for IODE.

449   **The Committee decided** to include a session of the SG-MEDI in the 2005-2007 work plan.

450   **The Committee urged** Member States to utilize MEDI as appropriate, and to promote its use at the national level in relevant academic and ocean research facilities.

451   **The Committee** further **invited** Member States that use other systems, to ensure their ISO 19115 compliance so they can easily exchange records with MEDI.

452   **The Committee decided** to revise the Terms of reference of the MEDI Steering Group.

453   **The Committee adopted Recommendation IODE-XVIII.3**

6.2.7. Global Directory of Marine and Freshwater Professionals (OceanExpert)

454   This item was introduced by Ms Linda Pikula. Reference was made to Document IOC/IODE-XVIII/34 *"The Global Directory of Marine and Freshwater Professionals: OceanExpert)"*. In her introduction Ms Pikula provided a detailed overview of the history and development of GLODIR and its successor OceanExpert.

455   She recalled that OceanExpert had started as Global Directory of Marine (and Freshwater) Professionals in 1997 after the GE-MIM had noted that the International Directory of Marine Scientists project, developed and maintained in the 1970s and 1980s by several UN agencies had been stopped despite its high appreciation by the ocean research community.

456   The first version of the new GLODIR was launched in 1997 as a web product enabling experts to enter and edit their information. Whereas the first version used the full ASFA subject descriptor set to enable experts to define their expertise, this was quickly dropped as experts showed little enthusiasm to spend the time required to pick descriptors from this extensive list. It was therefore decided to use a far more limited list of subject descriptors.

457   In 1999 GE-MIM and a number of IASMLIC members agreed to cooperate in GLODIR as national or regional 'input coordinators'. This led to a rapid increase (doubling!) in the number of entries and GLODIR passed the size of 10,000 records at the end of 1999. At that time it was decided to add the citation field enabling experts to include short descriptions of their most important and/or recent scientific publications. This also proved to be a success as within a year over 15,000 citations were added.

458   Once a year all experts registered in GLODIR received an email inviting them to update their record. On average 30-40% of the experts responded to this request. A big problem turned out to be the password required for editing records: in many cases the registered experts forgot this password and needed to obtain it from the IODE Secretariat.

459   Another problem was that experts who had not provided an email address (or who had been registered by the national/regional coordinators without an email address): although

we attempted to send out printed update requests to over 3000 experts this proved to be an impractical, expensive and time consuming exercise that could not be maintained. By the year 2002 the number of records reached 13,500, of which 3000 did not have an email address.

460   In November 2002 the system was re-engineered and additional features were added. At that time GLODIR was re-branded as OceanExpert and the domain name www.oceanexpert.net was registered. Awareness was created for the new system in various ways.

461   GE-MIM-VIII (2004) made an extensive review of OceanExpert. It noted that the new system performed better from a technical point of view but found that the core problem of OceanExpert was the lack of volunteers offering to coordinate data entry and editing for individual institutions. GE-MIM had also noted that the system has not sent out email update requests for the past five years (the UNESCO mail server could not handle mass mailing to 10,000 addresses). As such many of the records in the database are known to be out of date.

462   The Group had noted with satisfaction that the regional directories (AFRIDIR, CARSADIR, HABDIR) were maintained regularly through the ODINAFRICA, ODINCARSA and HAB (Harmful Algal Blooms) projects respectively.

463   Despite these shortcomings the Group had noted that, from a national science manager point of view, a directory is still valuable as it enables national scientific committees to monitor the number of experts in a given subject area. The Directory could also be useful for employers to identify available experts. In this regard the Group had recommended the addition of the field "skills and expertise"

464   GE-MIM-VIII had identified additional features that were required and tasked the Secretariat to develop these as soon as possible. These included making each field searchable, management of groups, report generation, job opportunities service, adding link to ASFA records.

465   GE-MIM-VIII had established an inter-sessional working group, composed of Ms. Suzie Davies, Ms. Pauline Simpson, Mr. Peter Pissierssens and Mr. Benjamin Sims to (i) follow-up the implementation of the technical recommendations; (ii) prepare a brief management plan that will describe the terms of reference of OceanExpert, as well as a more detailed plan for future development. The inter-sessional group was tasked to complete its technical work by April 2005. The document on future developments was to be prepared early 2005 for submission to IODE-XVIII.

466   Ms Pikula noted that a number of the recommendations made by GE-MIM-VIII had been implemented already. The Group had further recommended to evaluate the product at its next Session.

467   **The Committee** expressed its appreciation for OceanExpert but instructed the inter-sessional working group to urgently resolve the remaining technical issues.

468   **The Committee called on** the newly nominated IODE National Coordinators for Marine Information Management to actively participate in the population, maintenance and promotion of OceanExpert at their national level.

469   **The Committee endorsed** the continued support for OceanExpert.

6.2.8.   OceanPortal

470   This item was introduced by Dr Murray Brown (IODE Contractor, Chief Editor of OceanPortal). He made reference to Document IOC/IODE-XVIII/24 "*OceanPortal*".

471   Dr Brown recalled that IODE has supported the creation of a global index of Internet websites containing ocean data and information, called OceanPortal (OP). It currently holds 5000+ records in eight super-categories/251 specific subject categories. OceanPortal has become a highly regarded international source-of-choice for marine site information, and it is

currently the most frequently visited of all IOC websites.

472   He reported that during the inter-sessional period, the IODE OceanPortal website database was enlarged by approximately 1500 records. This net increase followed two annual housecleaning efforts to check the continued accuracy of website URLs, to update records from individual inspections of sites, and to add categories to all records. This last activity was made possible by the installation of a new version of the metadata software which allows up to three categories per record (as opposed to the original one). Following recommendations from the Group of Experts for Marine Information Management, all of the categories related to marine information were re-organized.

473   Dr Brown re-iterated that the OceanPortal website provides a central, categorized assemblage of the entire set of Internet websites the IOC has identified as primary sources of ocean data and information, worldwide. The ensemble of utilities at OceanPortal allows easy access to thousands of pages at premier websites checked for quality by IOC staff. Judging from the available metrics (see Assessment Methods, below) it is the most heavily used website among all IOC resources (including the main IOC webpage), and also the most widely cited. These accomplishments bring OP to a very broad audience, promoting all IOC resources in the process.

474   OceanPortal has not reached equilibrium between outside submittals (very low) and annual attrition of websites (10-15%), so active updating of existing records and addition of new records is necessary to maintain current level of service and resource base. It is proposed to continue the practice of an annual "housecleaning" to eliminate non-existent websites, relocate moved websites, to add new websites, and to continue the long-term project of adding new categorical descriptors to all records.

475   There have been 2.4 million unique outgoing record abstracts, since records were begun in July 2001. Using those abstracts, users have selected and used 200,000 website pages. There are approximately 500 pages views per weekday, at the present time. There are 19,300 citations of OceanPortal in Google (from non-OP web pages) which explains the very high score Google assigns to OP records. It is not uncommon to find OP records about resources to be placed before the actual resource records, during Google searches. This confirms OceanPortal's position as the premier ocean data and information index today.

476   Dr Brown noted that an annual budget of US$5,000 is required for the annual quality control of all 5000+ records; addition of approximately 500 new records.

477   **The Committee expressed** its appreciation for the success of OceanPortal and **thanked** in particular the OceanPortal Editor, Dr Murray Brown.

478   **The Committee** agreed that OceanPortal needs to be continued and **decided** to set aside funding in the inter-sessional work plan for the continued maintenance of OceanPortal.

6.2.9. OceanTeacher/ODIMex

479   This item was introduced by Dr Murray Brown (IODE Contractor, Chief Editor of OceanTeacher). He referred to Document IOC/IODE-XVIII/32 "*IODE OceanTeacher*".

480   Dr Brown recalled that the objective of OceanTeacher is to provide training tools for Oceanographic Data and Information Exchange. These tools are used during IODE Training Courses but can also be used for self training and continuous professional development. Early prototypes were used in various ad-hoc training activities in the late 1990's, but the current system of resources was initially developed in 2000, during the ODINAFRICA II program. Since that time Information Management materials have been added to the initial Data Management resources, and very intensive training activities have been based entirely on OceanTeacher (both in ODINAFRICA and ODINCARSA). The system continues to grow, and evolve structurally, to meet current training needs. Areas of special growth have been operational oceanography and biological oceanography.

481   Dr Brown noted that a project proposal (ODIMeX) for the further development of OceanTeacher had been successfully submitted to the Flanders-UNESCO Science Trust Fund (FUST) for funding. An amount of US$ 348,000 was made available between 2004 and 2007.

482   He informed the Committee that innovations introduced in the new project will be:
- OT entirely converted into e-learning environment;
- peer-reviewed content model;
- focus now also on training young scientists (not only data and information managers) on general concepts that should be more widely applied in research and operational work;
- focus on continuous professional development (as opposed to starting data and information centers in developing regions);
- greatly expanded coverage of operational oceanographic concepts, processes and products;
- addition of biology and diversity themes.

483   In the new system, the mass of primary resource materials will be a topically organized "Digital Library," paired in binary fashion with "Courses" similar to the current data management Manuals. The Digital Library can be browsed in the normal fashion (as the Resource Kit can be today), but teaching will normally take place through the Course documents which "point" to specific primary resources in a structured way, according to the desired topics for training.

484   During the second half of 2004, a complete housekeeping of all the materials in OT was begun. Pursuant to the above list of desired innovations, large amounts of older material captured from websites was replaced by newer, small versions with lesser chance for outdated or broken hyperlinks; the operational oceanography theme was supported throughout the structure by the addition of new material; biology and diversity themes were similarly supported; the "bridge" between information and data (Division 2 – Information Technology and Scientific Communication) was initiated and supplied with valuable materials that had been badly needed for some time (e.g. communications infrastructure); an intensive survey of state-of-the-art online data products was added; and software related to operational oceanographic products has been added to the Toolkit. In the process, in line with the intention to foster a Digital Library containing substantive materials, many areas previous covered by elementary descriptions derived from secondary sources have been replaced by many PDF file copies of original sources. The new structure (which includes only data management materials at this time) consists of 5333 files, occupying 1006 MB. This 2.5X increase is an indication of the enormity of the revision and updating project. The final Digital Library will probably be approximately 1.5+ GB when information management materials are included

485   The use of Course manuals by student trainers (i.e. former students working to be "certified" as IOC trainers) at the 2003 ODINCARSA workshop was an unqualified success, based on the completion of a complete curriculum by the student trainers (using volunteer students) without intervention by the IOC observer/facilitators.

486   A detailed work plan is part of the Project Document and full funding has been obtained for its implementation between 2004 and 2007.

487   The Committee was informed that OceanTeacher is managed by a Project Steering Group.

488   Dr Brown noted that a problem was still the wide range of skill levels of students that attend the courses.

489   **The Committee congratulated** the OceanTeacher development team with the results achieved and with obtaining extra-budgetary funds for the development and maintenance of OceanTeacher.

490   **The Committee thanked** the Government of Flanders for providing financial support to the ODIMeX/OceanTeacher project.

491   **The Committee,** while acknowledging the huge content of OceanTeacher, **called** on the project to consider translation into French and Spanish and requested Member States to assist with this task.

492   **The Committee** called on Member States to ensure that students, nominated for training courses are selected carefully on the basis of the course programme and their skill level that should be appropriate for the course.

6.2.10. Ocean information Technology Pilot Project

493   This item was introduced by Mr Vladimir Vladymyrov, Head of the IOC Project Office for IODE. Reference was made to Document IOC/IODE-XVIII/35 *"Ocean Information Technology Pilot Project (OIT)"*. He reminded the Committee of the history of the Project, Recommendation IODE-XVII.5 and the current status of the Project. He recalled the five specific components of the OIT Pilot Project:

(i)   metadata management;
(ii)   data circulation and communication;
(iii)   data assembly, quality control and quality assurance;
(iv)   archival; and
(v)   the user interface.

494   He emphasized that unfortunately, except those undertaken by the JCOMM/IODE ETDMP, as explained under Agenda Item 6.1.3, no other activity was implemented within the OIT Project during the inter-sessional period. He proposed to reactivate the OIT project and in particular:

(i)   reconsider the OIT steering committee;
(ii)   organize a meeting of the OIT steering committee in 2005;
(iii)   organize the Workshop on quality control and assembly of ocean data (previously planned for 2004) in 2005-2006 jointly with the JCOMM/IODE ETDMP.

495   **The Committee noted** with regret that the only activities of the OIT project implemented during the inter-sessional period were the pilot projects of the JCOMM/IODE ETDMP and that these did not cover all elements of the initial OIT work plan.

496   **The Committee recommended** to the IODE Officers and the JCOMM DMCG to reconsider the project action items in view of the recent activities of the JCOMM/IODE ETDMP and bring forward a revised work plan for implementation.

497   **The Committee further recommended** to find a sponsor for the project activity.

6.3.   IODE CAPACITY BUILDING

498   This agenda was introduced by Mr Ricardo Rojas, Vice-Chair of IODE. He recalled the long standing expertise of the IODE programme in capacity building, especially at the regional level, referring especially to the Ocean Data and Information Network strategy ODIN.

6.3.1.   Ocean Data and Information Network for Africa (ODINAFRICA)

499   This item was introduced by Mr Mika Odido (IOC Consultant, ODINAFRICA Project Manager). He reported that the implementation of the second phase of ODINAFRICA had ended in 2003. The achievements of ODINAFRICA-II included: (i) establishment of ten new NODCs in Benin, Cameroon, Comoros, Gabon, Ghana, Mauritania, Morocco, Senegal, Togo, and Tunisia, bringing the total number of NODCs in Africa to 22; (ii) improved internet connectivity several institutions; and (iii) the development of meta databases, data

archives, directories of experts and institutions, and library catalogues. In addition some of the institutions have already embarked on preparation of national marine atlases.

500   A symposium and exhibition on the achievements of ODINAFRICA was held in Brussels, Belgium from 8-10 September 2003. Participants included Ambassadors (based in Brussels, Belgium) of African Member States of IOC. During the symposium, the proposal for another phase of ODINAFRICA, developed in close collaboration with the GOOS and ICAM communities in Africa, the IOC Regional bodies in Africa (IOCEA and IOCWIO), and the IOC Secretariat, was endorsed. Because of the broader scope of coverage, more institutions and experts are participating in the programme. The goal of ODINAFRICA-III, whose implementation commenced in July 2004, is to improve data flow into the national oceanographic data and information centres in the participating countries, develop data and information products required for integrated management of the coastal areas of Africa, and increase the delivery of services to end users. An additional five countries (Angola, Algeria, Congo, Egypt and Namibia) have joined the network bring the total of participating countries to 25.

501   Mr Odido explained that ODINAFRICA-III has three thematic work packages: (i) Coastal Observing System, (ii) Data and Information Management, and (iii) Products Development and Dissemination. Fifteen (15) tide gauges will be installed to create a network of evenly spaced sea level stations along the African coast, providing data in near real-time, and addressing the key oceanographic phenomena. These will complement the networks already planned/developed within national, regional and global programmes and also contribute to the development of an early warning and mitigation system for natural hazards in particular tsunamis, storm surges and cyclones. The capacities of the NODCs to handle new and other data types, and to generate products for users will be strengthened through training courses covering (i) installation and maintenance of tide gauges; (ii) analysis and interpretation of sea level data; (iii) marine biodiversity data management; (iv) remote sensing; (v) GIS applications; and (vi) modeling. These will enable the NODCs to develop products such as Marine Atlases for their user communities.

502   Mr Odido noted that in ODINAFRICA-III the focus is placed on making centres with similar interests (e.g. from the same LME region) to work together on the development of products, in collaboration with other existing and planned initiatives. To this end linkages will be made with the Benguela Current, Gulf of Guinea, and Agulhas-Somali Current LME projects, as well as the African Coelacanth Project, the IGAD Climate Prediction and Applications Centre, ACMAD, and the Western Indian Ocean Marine Science Association (WIOMSA).

503   **The Committee acknowledged** the good progress that ODINAFRICA network has continued to make in developing capacity for data management in the participating countries.

504   Concerning sustainability of the centres that have been developed within ODINAFRICA, Dr Malika Bel Hassen informed the Committee that ODINAFRICA had assisted in achieving the objectives which had been set at the national level in Tunisia and enabled the centre to adopt a Pan African approach to their activities in place of the national focus they had before. This assures the NODC of continuity beyond the project period.

505   Mr Anis Diallo informed the Committee that two national workshops organized in Senegal, with support from ODINAFRICA, have helped in identifying needs at national level, strengthening collaboration between institutions, and led to development by the NODC of products addressing user needs. The national institutions now provide considerable support in terms of staff and funding for the running of the NODC. The NODC staffing level has increased to about 8 people (some working part time) thus allowing the NODC to carry out a larger load of activities. The integration of new data sets in the current phase of ODINAFRICA will require investment in more staff and equipment. It is therefore desirable that additional support be identified.

506   Dr Desiderius Masalu informed the Committee that in Tanzania the NODC has similarly been integrated within the national institution and receives national funding for its activities. The developments in the initial stages were slow, and a campaign was organized to sensitize key officials on the importance of the data management programme. This resulted in the establishment of a National Oceanographic Committee (NOC) in 2002 which now oversees the operations of the NODC. The NOC comprises Directors of stakeholder institutions which have all been assigned responsibilities in a distributed data base structure.

507   Ms Ana Maria Alfredo informed the Committee that the move towards sustainability has been slower in Mozambique. Consultations with key institutions are on-going and it is expected that these will lead to a streamlining of the organization structures.

508   **The Committee expressed its gratitude** to the Government of Flanders for their continued support to the ODINAFRICA project through funding the project for a third phase of ODINAFRICA-III amounting to USD2.5million for the period 2004-2007.

509   **The Committee noted with appreciation** that the data and information centres established with assistance from the ODINAFRICA project are well entrenched in national networks and **welcomed** in particular their core position in the National Oceanographic Committees.

510   **The Committee further welcomed** the efforts of the new centres to ensure their long term sustainability through a demand driven and stakeholder focused approach.

511   **The Committee noted with appreciation** that the additional support provided by the Government of Flanders (€500,000/year) could be utilized to fund training courses on remote sensing and GIS of which the need had been identified by the ODINAFRICA participating countries.

6.3.2.   Ocean Data and Information Network for the Caribbean and South America regions (ODINCARSA)

512   This item was introduced by Mr Rodney Martínez Gûingla (Regional Coordinator, ODINCARSA Project). He explained that ODINCARSA was set up primarily as a mechanism for assessing the current and potential state of development of national data centers and to create the means for mutual capacity building in South America and the Caribbean. It further sought to develop a cooperation network for managing and exchanging oceanographic data and information within these regions. The network brings together 19 IOC Member States: Argentina, Bahamas, Barbados, Belize, Brazil, Colombia, Chile, Cuba, Dominica, Ecuador, Haiti, Jamaica, Mexico, Nicaragua, Panama, Peru, Saint Lucia, Trinidad and Tobago and Venezuela.

513   The following activities were implemented in 2003 and 2004: the Second Training course for regional trainers on data management (Cartagena, Colombia, October 2003), and a planning workshop for Caribbean islands held in Barbados (December 2003). The National Coordinators and participants in the ODINCARSA training programmes from Chile, Colombia and Venezuela organized national workshops and meetings related to data management issues.

514   ODINCARSA has fostered working groups in the region to strengthen networking and share the existing capabilities between the Member States. One of these groups is the Latin American IAMSLIC Group, which is working with ODINCARSA on Marine Information Management issues with more than 27 libraries in the region. Products developed by regional groups include: Regional Directory of Experts, the regional Ocean Portal and the Regional Libraries Catalogue. A group is currently working on translation of Ocean Teacher to Spanish.

515   The first phase of ODINCARSA has provided training, technology transfer in the region and it has compiled key information about the current status of ocean data and

information management capabilities, as well as the identification of relevant institutions and contact persons in South America and Caribbean regions. All these elements formed the basis for development of a second phase of the project. ODINCARSA II which was launched in 2004, requires resources in order to implement the planned activities. The experts from South America who had been trained in the earlier phase can be used for training activities in the Caribbean Region and Central America.

516   Mr Gûingla pointed out that the implementation of ODINCARSA activities had been hampered by the limitation of resources.

517   **The Committee commended** the work done by ODINCARSA in building capacity and networks in the region.

518   **The Committee adopted** Recommendation IODE-XVIII.5

6.3.3. Ocean Data and Information Network for the Central Indian Ocean Region (ODINCINDIO)

519   The agenda item was introduced by Dr Zaker (Regional coordinator, ODINCINDIO). He informed the Committee on the progress made in developing the network since IODE XVII.

520   The results of a questionnaire sent out to littoral countries of the Indian Ocean (IOCINDIO and IOCWIO regions) on the existing data and information management capacity in the Indian Ocean region was discussed at an IOGOOS/IODE/IOCINDIO workshop on "Capacity Building and Strategy for Ocean Data and Information Management in Indian Ocean Region" held in Hyderabad, India in December 2003. The workshop noted the big difference in capacities available in the region. Nine countries have already established NODCs (Australia, France, India, Indonesia, Iraq, Malaysia, Pakistan, Sri Lanka and United Kingdom) while another ten are yet to establish NODCs (Oman, Qatar, Saudi Arabia, Thailand, UAE, Maldives, Myanmar, Bangladesh, Iraq and Kuwait). Three levels of capacity building were proposed- basic, medium and advanced. Capacity building for Modeling, Data assimilation, Satellite oceanography and Data products preparation is required.

521   The report of the Hyderabad meeting was presented to the Second IOGOOS workshop held in Colombo, Sri Lanka from 26-29 April 2004. The IOGOOS-II meeting acknowledged the results of the Hyderabad Meeting and endorsed its proposed work plan. The meeting recalled the importance of Capacity building as the basis for the achievements of IOGOOS objectives in terms of Data and Information Management and recognized the importance of ODINCINDIO as the Capacity Building Instrument for IOGOOS.

522   The IOC/ROPME Planning Meeting for the Ocean Data and Information Network for the Central Indian Ocean region (ODINCINDIO) was held in Tehran, Iran, INCO, 2-5 October 2004 to finalize the "Project Document for the Establishment of the Ocean Data and Information Network for the Central Indian Ocean region (ODINCINDIO)". The report of this meeting is available as IOC Workshop Report no.194.

523   Activities proposed include: Establishment of national oceanographic committees; and national oceanographic data and information centres; Capacity building in data and information management, Repatriation of data that have been collected by other countries in the waters of the participating countries; Development of national as well as regional on-line metadata system, data services, directory of marine experts, catalogue of library holdings, and electronic repository of indigenous publications; and Provision of ASFA bibliographic database system to some of the participating institutions.

524   The IODE secretariat pointed out the need to identify resources for implementation of these activities.

525   **The Committee congratulated** Dr Zaker on his achievement in identifying interested Member States in the IOCINDIO region to participate in the ODINCINDIO project.

526   **The Committee expressed its gratitude** to ROPME, IOGOOS and INCO for co-sponsoring the First ODINCINDIO Planning meeting which was held in Tehran, Iran in December 2003.

527   **The Committee welcomed with enthusiasm** the fact that IOGOOS has identified ODINCINDIO and ODINAFRICA as the data management capacity building instrument of IOGOOS.

528   **The Committee pointed out** the need to strengthen the ODIN projects as a mechanism for coordination of activities at the regional level in view of the abolition of the RNODCs and the position of Regional coordinator.

529   **The Committee adopted** Recommendation IODE-XVIII.4

530   The representative of OBIS noted that the ODINs provide a useful mechanism for participation of OBIS in IODE programmes. OBIS would appreciate an invitation to participate in the ODIN networks, though it may not be able to participate in all of them.

531   **The Committee instructed** ODIN project coordinators to liaise with the regional OBIS node managers to promote collaboration.

6.3.4.   Other Regions

6.3.4.1.   Polar Regions

532   The agenda item was introduced the Chair of IODE who reported on consultations that have been made with the SCAR-JCADM on possibilities for collaboration.

533   The Chair of JCADM, Mr Taco de Bruin, confirmed that JCADM was actively seeking collaboration with IODE, especially in view of the coming International Polar Year (IPY) which will include activities in both the Antarctic and Arctic oceans. He noted that though a committee like JCADM does not exist for Arctic, most countries with Antarctic programmes also have programmes in the Arctic region. Possible approach for collaboration would include encouraging the NODCs and NADCs to work closely at the national level, and expanding the Antarctic Master Directory using EDMED and MEDI databases. The

534   Mr de Bruin stated that the former RNODC-SOC and the Regional Centre for Argo should be involved in the planned collaboration. He informed the Committee that the former RNODC-SOC will be attending the next JCADM meeting planned for Buenos Aires between 12 and 16 September 2005. He stated that IODE could also collaborate with JCADM in capacity building, possibly through the use of some of the curriculum available in Ocean Teacher.

535   **The Committee noted** that IODE-XIX will be held during the IPY. In view of this, **the Committee recommended** that IODE should direct its attention to focus on the polar data during IODE-XIX and **instructed** data centres to include information on related activities in their reports to IODE-XIX. The list of data types required for IPY should be sent to appropriate centres so that they can do data mining. WDC for Oceanography, Silver Spring offered to start the process moving as soon as possible.

6.3.4.2.   Eastern Europe

536   The President of EURASLIC, Mr Jan Haspeslagh, requested the Committee to endorse the proposal by GE-MIM to develop an ODIN for the ECET (Eastern Europe) countries. This initiative would be useful in lifting the level of MIM capacity available in these countries. He stated that EURASLIC can assist in developing such an ODIN network and can also approach MIM experts to provide a "training for trainers" for information managers from the region. This would enable the bridging of the language barrier during regional training as OceanTeacher is not available in Russian. He pointed out that though EURASIC is interested in developing this proposal, it cannot work on it alone due to the

limited resources (personnel) at its disposal.

537   **The Committee endorsed** the proposal that EURASLIC should work with GE-MIM to develop the proposal for an ODIN for ECET.

6.3.4.3.   WESTPAC

538   **The Committee recognized** the excellent work done by JODC in WESTPAC during the last 20 years, especially in capacity building related to data management and GODAR. JODC has been organizing two week training courses initially annually and recently biannually in its capacity as an RNODC. JODC would like to continue with these services, possibly under an alternative mechanism in view of the abolition of RNODCs.

539   **The Committee emphasized** the need to continue this work and **invited** the upcoming WESTPAC Session to consider the establishment of an ODIN network for the region.

6.3.4.4.   Pacific Islands

540   The Chair of GE-MIM reported that their Capacity Survey for the Pacific Islands had identified a great and obvious need for capacity building in the Pacific Islands which are not covered by WESTPAC and proposed that the Committee considers the possibility of establishing an ODIN network for the region.

541   **The Committee agreed** that GE-MIM should continue with its activities in the region and the progress reviewed at IODE-XIX.

6.3.5.   E-repository for Africa (OdinPubAfrica)

542   This item was introduced by Mr Marc Goovaerts. The goal of OdinPubAfrica is to develop an electronic platform to collect scientific documents (articles, conference papers, working papers ...) produced by experts from African research institutes in the field of oceanography and marine science. The initiative is funded by Government of Flanders, through the Flanders UNESCO Science Trust Fund. The University Library of LUC (Belgium) is coordinating the project, which started officially on August 1, 2005.

543   The OdinPubAfrica repository/website was installed on a Linux server at LUC (http://doclib.luc.ac.be/odin). Dspace was chosen as the repository software, which is primordially developed for a Tomcat web server and a Postgresql database. The repository structure for OdinPubAfrica has three levels: 1. Country or region, 2. Institutes, 3. Document collections. Every participating country and organization can be identified directly in the database and has a presentation page. The documents can be searched globally and on every level. The LUC Library developed extra functionalities in the Dspace software (bibliographic output screen, controlled input for authors and keywords).

544   A self-training package is being developed and a group of information managers will be trained in a traditional training course. They will be crucial in sustaining the development of the repository by helping colleagues with the self-training package. The training documents are available in English (http://www.luc.ac.be/bibliotheek/demos/OdinPubAfrica_e.htm) and in French (http://www.luc.ac.be/bibliotheek/demos/OdinPubAfrica_f.htm). The documents cover the organization and the challenges of the development of the OdinPubAfrica repository. But it focuses mostly on practical aspects of the project, from workflow organization to submission procedures. More documents will be uploaded during the project development (e.g. policy documents, action plans, folders created by the trainees). The training materials have also been made available at the ODIMEX website.

545   **The Committee noted** the world wide movement towards repositories, and especially the linking of repositories to metadata and datasets.

546   **The Committee considered** the possibility of setting up an e-journal for the data management community but **noted** that it may be better to work with existing e-journals which already have recognition and wide reach rather than starting something new. Concerning the development of a repository for IODE working documents, **the Committee noted** that most of the documents would need to be reviewed before publication. It may be advisable to identify working papers of publishable quality after the IODE sessions and request the authors to further develop them for publication.

6.3.6.   New Requirements in regional capacity building

547   The JCOMM Co-President, Dr Savi Narayanan, informed the Committee that JCOMM has four Programme Areas, one of which deals with Capacity Building (the CBPA). That Programme Area was created by merging the Capacity Building panel of GOOS with the JCOMM CBPA under one Coordinator who is currently Mariam Andrioli from Argentina. She who works with a group experts from different regions, and liaises with the Coordinators of the other JCOMM Programme Areas to ensure that capacity building requirements and activities are aligned and coordinated. The CBPA activities include technical support, provision of instruments and installation support (for example tide gauges for the Africa region), workshops and training sessions, travel support for expert meetings and conferences, etc. The GLOSS training workshops, waves and storm surge workshops, training of port meteorological officers are examples of such activities. Under this Programme Area there is a Task Team on resources which has the responsibility to connect those who need capacity building with donor organizations. An XBT training workshop is planned jointly by the Ship of Opportunity Implementation Panel (SOOPIP) of the Observations Programme Area and the Indian Ocean Global Ocean Observing System (IO-GOOS). The two and one-half day workshop is scheduled to be held in conjunction with IOGOOS-III (tentatively scheduled for mid 2005), and has been designed to enhance regional capacity of XBT observations.

548   The First ODIMeX Editorial and Planning Meeting, held in Cape Town in April 2004, was attended by Ms. Regina Folorunsho, who represented the JCOMM Capacity Building Coordination Group (CBCG) on the Steering Group for OceanTeacher. The CBPA also contributed to the Benguela Forecast Workshop paper "Mechanisms and Tools in Oceanographic Capacity Building" (Cape Town, November 2004) in support of this sub-regional capacity enhancement initiative in Africa.

549   **The Committee requested** that the JCOMM/IODE secretariat to maintain an up-to-date web page of upcoming training events. This will help the member countries to plan their participation in such activities or influence the content of such activities

7.   IODE PUBLIC AWARENESS

7.1   IODE WEB SITES

550   The IODE Technical Secretary informed the Committee that the IODE web site has been redesigned substantially since IODE-XVII. The web site now uses a re-engineered version of the BeeBox dynamic content management system. The site's last re-development was carried out in December/ 2004/ January 2005, when a contractor was hired to (i) redesign the graphic elements and layout of the site; and (ii) advise on improving user-friendliness and navigation of the site. This included splitting the site into two major chapters: "General Info" that targets scientists and other users interested in IODE products and services and "Expert info" that targets members of the IODE community (data and information managers).

551   The number of visits to the IODE site has grown steadily from 7356 in 2001, 22952 in 2002, 33572 in 2003 and 38744 in 2004. The average number of visits to the site per month is now (March 2005) about 3500 visits/month.

552   The IODE Chair noted that the web site looks attractive, but pointed out that it would

be good to have a way of downloading all the meeting documents at once (eg through ftp site), rather than one document at a time.

553   **The Committee expressed** its general satisfaction with the new web site and **requested** the Secretariat to continue developing the site, taking into account the comments from the Members of the Committee.

7.2.   IODE BROCHURES, POSTERS AND PUBLICATIONS

554   The IODE Chair recalled that the IODE Secretariat published a number of posters for wide distribution. She noted that IODE currently does not have a brochure and invited members of the Committee to discuss the possible production of such an information tool. She also invited members of the Committee to report on brochures, posters and publications that were published as the national level to promote the national oceanographic data centres and information centres as well as IODE. (This is also discussed under 7.3)

555   The Chair invited members of the Committee to briefly report on how IODE is promoted in NODC and related web sites.

556   Several delegations reported that they promote IODE by posting a link to the IODE website on their main pages, as well as placing IODE posters on walls. The need for translating the posters to other languages was highlighted.

557   **The Committee concluded** that the production of a brochure would be useful for publicizing the activities of IODE and **instructed** the IODE Secretariat to further study this issue.

558   **The Committee instructed** the IODE Secretariat to make the IODE posters available in an electronic and layered version so that they can be printed and customized locally.

559   **The Committee noted the need** to translate the posters to other languages so as to reach a wider community, and **recommended** that a composite poster covering all the IODE activities be produced as some institutions have limited space for posters.

8.   REQUIRED RESOURCES AND PLAN OF ACTION

560   The Committee was requested to draft a detailed work plan and budget based upon the priorities it has established during the Session (Agenda items 3 to 7). In drafting the work plan and budget the Committee was requested to take into consideration the limited funding provide through UNESCO's Regular Programme (approximately US$ 100,000/year). Referring to Document IOC/IODE-XVII/7 (Financial Report for the inter-sessional period 2003-2004) this amount is not likely to increase substantially. In order to provide to IODE the momentum it requires, as stated repeatedly by the Committee, additional funds will need to be provided to the Programme from extra-budgetary sources. In order to obtain such funds the Secretariat has launched repeated requests for funding during the previous inter-sessional periods. Few Member States have provided extra-budgetary support.

561   In addition the Committee was requested to note that many Member States have been unable to allocate funds for participation in IODE Sessions. Several support requests have been received for IODE-XVIII. The Committee was reminded that IOC Manual (IOC/INF-785 – page 41) under 'Responsibilities of Member States' states *"For the intergovernmental bodies (Sub-Commissions, Scientific and/or Technical Committees, Regional Committees and Task Teams), the Member States are expected to (i) nominate to their delegations to the meetings thereof appropriately qualified persons, as called for in Rule of Procedure No. 26; (ii) cover the cost of the attendance and participation of their delegates in the meetings thereof; (iii) provide the essential means to the individuals (delegates) or national institutions concerned to give effect to the decisions/recommendations of a give subsidiary body of which they are a member…".* The Committee members were requested to consider this issue as the inability of all Member States to participate in Sessions of the Committee negatively impacts

on the effectiveness of the programme and involvement of its Member States.

562   **The Committee adopted** <mark>Recommendation IODE-XVIII.8</mark>

9.   ELECTIONS OF CHAIR AND VICE-CHAIR

563   The IODE Technical Secretary reviewed the rules and practical arrangements for election of Officers of the IOC Subsidiary Bodies as they are presented in Document IOCINF-785, IOC Manual of 1989, Part I, Item 5 and in the Revised Rules of Procedure.

564   **The Committee re-elected unanimously** Dr Lesley Rickards and Mr Ricardo Rojas as Chair and Vice Chair of IODE for a second term. Dr Rickards and Mr Rojas expressed their appreciation to the delegates for the confidence they had expressed in them by giving them the opportunity to serve IODE for a second term.

565   **The Committee commended** the Chair and Vice Chair for their hard work and dynamic approach, which has ensured the efficient implementation of IODE activities.

10. DATE AND PLACE OF IODE-XIX

566   The IODE Chair invited the Committee to decide on the date and place of its Nineteenth Session and on any invitation from Member States to host the Session, bearing in mind that the inter-sessional period should be not less than 2 years and the Session should be arranged at the lowest possible cost to the IOC budget.

567   **The Committee recalled** that Italy had offered to host the Eighteenth Session of IODE-XVIII but this had been relocated to Ostend, Belgium to enable delegates to attend the official opening of the IODE Project Office. The delegate of Italy re-iterated their offer to host the Nineteenth Session of IODE in Rome in April 2007.

568   **The Committee noted** the offer of Italy to host next session in Rome in 2007, and **instructed** the Secretariat in consultation with the Chairman to follow-up on the offer.

11. ADOPTION OF THE SUMMARY REPORT

569   **The Committee adopted** the draft Summary Report of the Sessions, the Resolutions and Recommendations as they are presented in Annex II.

570   **The Committee requested** the IOC Secretariat and its Chairman to make editorial corrections as necessary, taking into account the discussions held during the Session.

571   **The Committee requested** the IODE Chair to present the Executive Summary with all Resolutions and Recommendations therein to the Twenty-Third Session of the IOC Assembly that will take place in June 2005 at the UNESCO Headquarters in Paris, France.

12. CLOSURE

572   The Chair closed the Session at 17h30 on Saturday 30 April 2005.

ANNEX I

AGENDA

1.   OPENING
2.   ADMINISTRATIVE ARRANGEMENTS
        2.1.   ADOPTION OF AGENDA
        2.2.   DESIGNATION OF RAPPORTEUR
        2.3.   SESSION TIME TABLE AND DOCUMENTATION
        2.4.   LOCAL ARRANGEMENTS

3.   STATUS OF IODE
        3.1.   CHAIRMAN'S REPORT
        3.2.   IOC PROJECT OFFICE FOR IODE
        3.3.   ACTIVITIES OF WORLD DATA CENTRES
                3.3.1.   World Data Center for Oceanography, Silver Spring, USA
                3.3.2.   World Data Centre for Oceanography, Obninsk, Russian Federation
                3.3.3.   World Data Center for Oceanography, Tianjin, China
                3.3.4.   World Data Center for Marine Geology and Geophysics, Moscow, Russian
                         Federation
                3.3.5.   World Data Center for Marine Environmental Sciences (WDC-MARE)
        3.4.   ACTIVITIES OF RNODCs
                3.4.1.   RNODC for Drifting Buoy Data
                3.4.2.   RNODC for the Indian Ocean
                3.4.3.   RNODCs in Japan (which covers WESTPAC, MARPOLMON, IGOSS,
                         ADCP)
                3.4.4.   RNODC for JASIN
                3.4.5.   RNODC for the Persian Gulf
        3.5.   REGIONAL CO-ORDINATORS REPORTS
                3.5.1.   IODE Regional Coordinator WESTPAC
                3.5.2.   IODE Regional Coordinator IOCINDIO
                3.5.3.   IODE Regional Coordinator IOCSOC
                3.5.4.   IODE Regional Coordinator for the Mediterranean region
                3.5.5.   IODE Regional Coordinator for the Eastern Pacific (El Niño)
                3.5.6.   Black Sea region
        3.6.   REPORTS OF NODCs AND DNAs
        3.7.   IODE DATA FLOW
        3.8.   IOC OCEANOGRAPHIC DATA EXCHANGE POLICY: IMPLEMENTATION BY
                MEMBER STATES

4.   COOPERATION WITH OTHER PROGRAMMES
        4.1.   COOPERATION WITH JCOMM
        4.2.   COOPERATION WITH GOOS
        4.3.   COOPERATION WITH SCIENCE AND MONITORING PROGRAMMES
        4.4.   OTHERS
                4.4.1.   ICES
                4.4.2.   SCAR
                4.4.3.   CDIAC
                4.4.4.   Caspian Environment Programme (CEP)
5.   FUTURE OF IODE
        5.1.   IODE REVIEW (PROGRESS REPORT)
        5.2.   FUTURE ROLE OF THE WDCs, RNODCs AND NODCs
        5.3.   EVOLUTION OF IODE AT THE NATIONAL LEVEL

ANNEX II

RESOLUTIONS AND RECOMMENDATIONS

RESOLUTIONS

Resolution IODE-XVIII.1   IODE REGIONAL CO-ORDINATORS

Resolution IODE-XVIII.2   RESPONSIBLE NATIONAL OCEANOGRAPHIC DATA CENTRES (RNODCs)

Resolution IODE-XVIII.3   IODE GROUPS OF EXPERTS

Resolution IODE-XVIII.4   ESTABLISHMENT OF AN INTER-SESSIONAL WORKING GROUP ON OCEAN DATA QUALITY CONTROL

RECOMMENDATIONS

Recommendation IODE-XVIII.1   THE IODE OBJECTIVES

Recommendation IODE-XVIII.2:   REVISION OF THE TERMS OF REFERENCE OF THE IODE GROUP OF EXPERTS ON BIOLOGICAL AND CHEMICAL DATA MANAGEMENT AND EXCHANGE PRACTICES (GE-BICH)

Recommendation IODE-XVIII.3:   MARINE ENVIRONMENTAL DATA INVENTORY (MEDI) PROGRAMME

Recommendation IODE-XVIII.4:   OCEAN DATA AND INFORMATION NETWORK FOR THE CENTRAL INDIAN OCEAN REGION (ODINCINDIO)

Recommendation IODE-XVIII.5:   OCEAN DATA AND INFORMATION NETWORK FOR THE CARIBBEAN AND SOUTH AMERICA REGIONS (ODINCARSA)

Recommendation IODE-XVIII.6:   THE IODE PROJECT OFFICE

Recommendation IODE-XVIII.7:   ESTABLISHMENT OF THE IODE XML STEERING GROUP

Recommendation IODE-XVIII.8:   PROGRAMME AND BUDGET FOR 2005-2007

RESOLUTIONS

Resolution IODE-VIII. 1

IODE REGIONAL CO-ORDINATORS

The IOC Committee on International Oceanographic Data and Information Exchange,

Recalling Resolution-XV.4 (IODE Regional Co-ordinators) that appointed IODE Regional Co-ordinators for each of the IOC regional programmes,

Further recalling Recommendation IODE-XVI.2 (Strengthening of the Regional Co-ordinators Mechanism) that amended the Terms of Reference for Regional Co-ordinators,

Noting that the IODE Review considered that the terms of reference for an IODE Regional Co-ordinator are too demanding to be executed by a single person who has full-time national duties,

Considering that the function of the IODE Regional Co-ordinator in many cases has been assumed successfully by project coordinators of ODIN projects (e.g. ODINAFRICA, ODINCARSA),

Agrees to abolish the system of IODE Regional Co-ordinators;

Decides that the functions of the former IODE Regional Co-ordinators be included in the Terms of Reference of the relevant IODE Ocean Data and Information Networks (ODIN).

Resolution IODE-VIII. 2

RESPONSIBLE NATIONAL OCEANOGRAPHIC DATA CENTRES (RNODCs)

The IOC Committee on International Oceanographic Data and Information Exchange,

Noting that the IODE Review reported that the various surveys had revealed that most RNODCs were not well known and little used,

Noting further that the IODE Review had questioned the relevance of RNODCs and recommended to abolish the RNODC system,

Recognizing however that some RNODCs perform well and provide useful products and services,

Agrees to abolish the system of IODE Responsible National Oceanographic Data Centres;

Requests that, where available, NODCs participating in Ocean Data and Information Networks (ODIN) assume the functions of former RNODCs;

Instructs the IODE Chair to discuss with host institutions of other RNODCs how their operations, if considered essential for the international community, could be maintained and properly acknowledged, or transferred to other Centres of the IODE network.

Resolution IODE-VIII. 3

IODE GROUPS OF EXPERTS

The IOC Committee on International Oceanographic Data and Information Exchange,

Noting that the IODE Review had questioned the need for, and effectiveness of the IODE Groups of Experts,

Considering that:

(i)   the GE-MIM has been an extremely active Group of Experts that has been instrumental in generating many IODE Marine Information Management projects, products and services during its twenty years of existence;

(ii)   the GE-BICH deals with biological and chemical data which have been identified as important new areas for IODE;

(iii) the GE-TADE was merged with the JCOMM ETDMP into the JCOMM/IODE ETDMP and as such has a joint ownership,

Acknowledging that the IODE Groups of Experts need improved guidance to focus its activities,

Instructs the Chairs of the IODE Groups of Experts to jointly develop a strategy for the future, addressing issues such as:

(i)   recommending a new structure and membership format for IODE Groups of Experts, which offers more flexibility, increased access to expanded pool of experts, and stronger focus on the completion of tasks, whilst also maintaining a wider coordination role;

(ii)   suggesting mechanisms for improving communication and reporting between IODE Groups of Experts and National Co-ordinators for both data management and information management;

(iii) including in the new mechanism, the potential for establishing steering groups based on specific projects, and gaining appropriate external expert advice when required;

(iv)   suggesting mechanisms for improving communication amongst IODE Groups of Experts, and for offering direction to IODE Groups of Experts from the IODE Officer Group;

Instructs the Chairs of the IODE Groups of Experts to submit the strategy to the next Session of the IODE Officers for their consideration, and to the Nineteenth Session of the IODE Committee, for adoption.

Resolution IODE-VIII. 4

ESTABLISHMENT OF AN INTER-SESSIONAL WORKING GROUP ON QUALITY CONTROL OF OCEAN PROFILE DATA

The IOC Committee on International Oceanographic Data and Information Exchange,

Noting that the IODE Review stated that agreeing upon minimum quality control procedures for oceanographic data should be a core activity of the IODE programme,

Considering that the Manual of quality control procedures for validation of oceanographic data (IOC Manuals and Guides 26) dates from 1993,

Noting that the work of this Group contributes to the activities of the JCOMM/IODE ETDMP Pilot Project 2,

Decides to establish an inter-sessional working group that will:

(i)   review existing quality control procedures and software;

(ii)   discuss quality control issues of historical, real-time, delayed-mode and modern ocean profile data;

(iii)   prepare a report on (i) and (ii) above.

Decides that the Group will be composed of Sydney Levitus (USA), Nikolay Mikhailov (Russia), Loic Petit de la Villeon (France), Candida Seta (Mozambique), Hae-Seok Kang (Korea), Ruguang Yin (China) , Joon-Yong Yang (Korea), Scot Tomlinson (Canada), Ricardo Rojas (Chile), Catherine Maillard (France) and Edward Vanden Berghe (Belgium), Anis Diallo (Senegal) and Murray Brown (Chief Editor OceanTeacher);

Instructs that the Group will work by email;

Instructs the Group to submit its report to the next JCOMM/IODE ETDMP Session for its consideration and use, and its final report to the Nineteenth Session of the IODE Committee for adoption.

RECOMMENDATIONS

Recommendation IODE XVIII.1

THE IODE OBJECTIVES

The IOC Committee on International Oceanographic Data and Information Exchange,

Noting that the mandate of the Committee has remained largely unchanged since its establishment 42 years ago,

Recognizing that the scope of data that can be usefully exchanged internationally has changed enormously, and that requirements on timeliness, data quality, volume, and type of variables make examination of the remit and activities of IODE essential if it is to be a significant contribution to international oceanographic data management,

Taking into consideration the report of the IODE Review group which covered extensively the operations and implementation of IODE, and in particular its mandate, missions, structure, data centre network(s) and its (their) operation, mode of operation, activities of its subsidiary groups and projects, national development of its activities, and the extent to which IODE activities benefit member states,

Recommends that the Objectives of the IODE Programme be modified as follows:

(i)   to facilitate and promote the exchange of all marine data and information including metadata, products and information in real-time, near real time and delayed mode;

(ii)   to ensure the long term archival, management and services of all marine data and information;

(iii)   to promote the use of international standards, and develop or help in the development of standards and methods for the global exchange of marine data and information, using the most appropriate information management and information technology;

(iv)   to assist Member States to acquire the necessary capacity to manage marine data and information and become partners in the IODE network; and

(v)   to support international scientific and operational marine programmes of IOC and WMO and their sponsor organisations with advice and data management services.

Recommendation IODE-XVIII.2

REVISION OF THE TERMS OF REFERENCE OF THE
IODE GROUP OF EXPERTS ON BIOLOGICAL AND CHEMICAL DATA MANAGEMENT
AND EXCHANGE PRACTICES (GE-BICH)

The IOC Committee on International Oceanographic Data and Information Exchange,

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

Noting the continued development of global research, monitoring and observing programmes, that are relevant to issues such as climate change, ecosystem dynamics and biodiversity, and which rely heavily on biological and chemical data sets,

Further noting the need for integrated databases that combine physical, chemical and biological oceanographic data,

Recommends the revision of the Terms of Reference of the Group of Experts on Biological and Chemical Data Management and Exchange Practices to include:

(i)   documenting the systems and taxonomic databases and inventories 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 regional and global integrated oceanographic databases incorporating physical, chemical and biological data.

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 GOOS, COOP, JCOMM and other relevant programmes of IOC and other organizations;

Recommendation IODE-XVIII.3

MARINE ENVIRONMENTAL DATA INVENTORY (MEDI) PROGRAMME

The IOC Committee on International Oceanographic Data and Information Exchange,

Recognizing the value of a metadata 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-XVI.1 that established the MEDI Steering Group,

Further recalling that IODE-XVII recommended that MEDI should be ISO compliant,

Recommends that the MEDI Steering Group collaborate with national and international metadata initiatives to ensure a metadata system, that meets international standards, is available to the IODE member states and that the MEDI Steering Group be reconstituted with the following terms of reference:

(i)   identify and document current metadata management best practice,

(ii)   in collaboration with national and international initiatives, as well as the IODE Groups of Experts, recommend a marine profile of ISO19115 and develop relevant vocabularies to describe marine datasets,

(iii)   make available an ISO19115 compliant metadata entry tool to the IODE community to ensure metadata is uniformly collected.

Recommends that the membership of the Steering Group shall include Australia (AODCJF), Belgium (VLIZ), China (NODC), Tunisia (INSTM), UK (BODC) and USA (NODC) and other experts as appropriate, and shall be coordinated by Mr. G. Reed (Australia);

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

Urges Member States to use the MEDI system as appropriate and promote its use to the widest possible audience.

Recommendation IODE-XVIII.4

OCEAN DATA AND INFORMATION NETWORK FOR THE IOCINDIO REGION (ODINCINDIO)

The IOC Committee on International Oceanographic Data and Information Exchange,

Noting with satisfaction the completion of actions as requested by IODE-XVII regarding the proposal to establish and ODIN network for the IOCINDIO region,

Noting further the recognition by IOGOOS of ODINCINDIO as the data management capacity building tool for IOGOOS,

Further noting the interest of IOCINDIO Member States to join ODINCINDIO,

Welcoming the support of ROPME, IOGOOS and INCO for the First ODINCINDIO Planning meeting, held between 2 and 5 October 2004 in Tehran, Iran,

Taking into account the report of the First ODINCINDIO Planning meeting,

Recognising the role of ocean data and information management capacity building in the effective implementation of Indian Ocean Tsunami Warning System,

Recommends that an Ocean Data and Information Network for the IOCINDIO region be established;

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

(i)   to coordinate the necessary actions with the IOGOOS Secretariat, ROPME and ODINCINDIO participating Member States to obtain donor support for ODINCINDIO;

(ii) to provide funding for the implementation of the ODINCINDIO work plan (2005-2007);

(iii) to strengthen links with JCOMM and GOOS in terms of capacity building and oceanographic data and information management in the ODINCINDIO participating Member States

Urges Member States and donors to support this project by providing financial resources and/or in-kind support to enable the implementation of ODINCINDIO.

Recommendation IODE XVIII.5

OCEAN DATA AND INFORMATION NETWORK FOR THE CARIBBEAN AND SOUTH AMERICA REGIONS (ODINCARSA)

The IOC Committee of International Oceanographic Data and Information Exchange,

Expresses its appreciation of the recent progress of ODINCARSA activities, products and services, as described in the second report of ODINCARSA, presented to IODE XVIII,

Notes with satisfaction that ODINCARSA operations have enhanced the capacity of a number of ODINCARSA Member States for oceanographic data and information management,

Stresses the usefulness, in particular, of ODINCARSA's work so as to make available the Spanish version of Ocean Teacher, and the regional contributions to Ocean Expert,

Recommends the establishment of close links between the ODINCARSA, GOOS and JCOMM initiatives, especially to contribute to the establishment of warning and mitigation systems against ocean based natural disasters;

Invites all IOC Member States and interested organizations and Foundations to further support ODINCARSA by providing monetary and/or in kind contribution resources and technology transfer arrangements, to enable the full Implementation of the ODINCARSA Project.

Requests the IOC Executive Secretary to implement the following actions:

(iv) to coordinate the necessary actions with the IOCARIBE Secretariat, IOCARIBE Member States and other interested organizations in the IOCARIBE region to obtain donor support for ODINCARSA;

(v) to provide funding for the implementation of the ODINCARSA work plan (2005-2007);

(vi) to strengthen links with JCOMM and GOOS in terms of capacity building and oceanographic data and information management in the ODINCARSA participating Member States

Recommendation IODE-XVIII. 6

THE IODE PROJECT OFFICE

The IOC Committee on International Oceanographic Data and Information Exchange,

Recalling the acceptance by the IOC Assembly at its 22nd Session of the offer made by the Government of Flanders and the City of Oostende to host the IODE Project Office,

Noting with satisfaction the official opening of IOC Project Office for IODE on 25 April 2004,

Expressing its appreciation for the substantial additional support of €500,000/year pledged by the Government of Flanders to support capacity building activities at the IOC Project Office for IODE related to Africa, the Indian Ocean, Caribbean and Latin America regions,

Further noting that the main objectives of the Project Office are:

(i) to provide a creative environment facilitating the further development and maintenance of IODE Projects, services and products with emphasis on improving the efficiency and effectiveness of the data and product/service stream between the stage of sampling and the user; and

(ii) to assist in strengthening the capacity of Member States to manage oceanographic data and information (with special attention to the developing countries) and to provide ocean data and information products and services required by users,

Recognizing that, to achieve these objectives the IODE Project Office will:

(i) further develop, strengthen and maintain IOC/IODE ocean data and information management training programmes and training tools;

(ii)   provide an environment ('think tank') where ocean data and information experts and students can work, meet and discuss;

(iii)   develop, host and maintain IOC/IODE's ocean information systems and related public awareness tools;

(iv)   promote collaboration between all expert levels active in ocean data (and data product) and information management, including scientists, data managers and users;

(v)   host specialized short-term training courses in ocean data and information management; and

(vi)   provide a laboratory environment for the development and beta testing of ocean data and information management technology,

Calls on IOC Member States to provide additional support to promote, facilitate and strengthen the activities of the IOC Project Office for IODE and to consider secondment of national experts to the Office for short to long term assignments.

Recommendation IODE-XVIII.7

ESTABLISHMENT OF THE IODE XML STEERING GROUP

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 activities of the ICES/IOC Study Group on the Development of Marine Data Exchange Systems Using XML (SGXML) and the EU MarineXML project have concluded,

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

Recommends the establishment of a MarineXML Steering Group with the following terms of reference:
(i)   establish a Pilot Project to set up an ISO 19100 series of standards compliant standards register, with possible collaboration with IHO, to be hosted by the IODE Project Office;
(ii)   monitor and assist with XML development activities in other IODE/JCOMM groups, such as ETDMP, GEBICH and SGMEDI.

Recommends that the membership of the Steering Group shall included Belgium (VLIZ), China (NODC), The Netherlands (NODC), Russian Federation (NODC), United Kingdom (BODC), , the IODE Project Office and other relevant experts, and shall be coordinated by Mr Roy Lowry (UK);

Further recommends the MarineXML web site (MarineXML.net) be hosted by the IODE Project Office as a focal point for MarineXML activities;

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

<u>**Recommendation IODE-XVIII.8**</u>

PROGRAMME AND BUDGET FOR 2005-2007

The IOC Committee on International Oceanographic Data and Information Exchange,

Having reviewed its programme implementation requirements for the period 2005-2007,

Having been informed about the resources allocated to the IODE Programme from the UNESCO Regular Programme for the 2004-2005 and 2006-2007 biennia,

Being aware of the continuing severe financial constraints faced by UNESCO and its IOC,

Re-emphasizing the importance of high-quality oceanographic data and information, products and services for scientific, observation and ocean based disaster warning and mitigation programmes of the Commission, for member States, the private sector and other users,

Noting the increasing role of IODE in JCOMM and the growing collaboration with, and contribution to GOOS,

Calling attention to the continued process of reform of the IODE programme that takes into consideration the recommendations made by the IODE Review,

Expressing great appreciation to the Government of Flanders for hosting and supporting the IOC project Office for IODE and for its continuing and increasing financial support to IODE, as well as to other donors and Member States who are providing financial and in-kind support for IODE,

Appreciating the in-kind support for the IODE Programme provided by Member States through establishing and maintaining IODE Data Centres, provision of experts and through the provision of valuable ocean data and information products and services,

Calls on Member States to provide financial support to the IOC Trust Fund, earmarked for IODE, or in-kind support through the secondment of experts to the IOC Project Office for IODE or to the IODE secretariat;

Invites the IOC Secretary to ensure stable and long-term staffing arrangements for the IODE Secretariat and for the IOC Project Office for IODE;

Requests to the IODE Chair to bring to the attention of the next Session of the IOC assembly, the IODE Programme of work and budget for the period 2005-2007, as attached in the Annex to this Recommendation.

ANNEX I to Recommendation IODE-XVIII.8

	2005				2006				2007			
	RP	EB exp	EB req	TOTAL	RP	EB exp	EB req	TOTAL	RP	EB exp	EB req	TOTAL
IODE subsidiary bodies												
GE-MIM projects: see products & services				0				0				0
GE-MIM-IX Session				0		10,000		10,000				0
ETDMP pilot projects				0		10,000	90,000	100,000	5,000		75,000	80,000
ETDMP meeting				0		10,000		10,000				0
GE-BICH pilot projects		4,500		4,500		4,500		4,500				0
GE-BICH-III meeting				0		10,000		10,000				0
Capacity Building (training & related)								0				
ODINAFRICA		39,000		39,000		39,000		39,000		39,000		39,000
ODINCINDIO		91,000		91,000		91,000		91,000		91,000		91,000
ODINCARSA		91,000		91,000		91,000		91,000		91,000		91,000
JCOMM/IODE/GOOS Modeling Training		65,000		65,000		65,000		65,000		65,000		65,000
Young scientists DM training		39,000		39,000		39,000		39,000		39,000		39,000
GIS Training		39,000		39,000		39,000		39,000		39,000		39,000
MIM Travel grants	5,000			5,000	5,000			5,000	5,000			5,000
ASFA participation	2,000			2,000	2,000			2,000	2,000			2,000
Regional OceanPortal AFR				0			11,700	11,700		11,600		11,600
Regional OceanPortal LAC				0			23,400	23,400		23,300		23,300
Remote sensing training			40,000	40,000			40,000				40,000	40,000
Products and Services												
MARXML				0				0	5,000			5,000
MEDI				0		5,000		5,000	5,000			5,000
OCEANPORTAL				0		2,000		2,000	3,000			3,000
OCEANEXPERT				0		2,000		2,000	3,000			3,000
												0

Projects							0			
GODAR - WORLD				0	5,000		5,000	5,000		5,000
GTSPP				0			0	0		0
GOSUD				0			0	0		0
ODIMEX		67,100		67,100		134,000	134,000		42,900	42,900
ODINPubAfrica		48,400		48,400			0			0
ODINAFRICA-3 work package 3 (D&IM)		194,100		194,100		139,400	139,400		113,000	113,000
CCT Regional OceanPortals		60,500		60,500		15,000	15,000		15,000	15,000
				0						
Events				0						
IMDIS, Brest, France	5,000			5,000			0			0
OBI-II, venue to be decided								5,000	5,000	10,000
QC Ocean Data, Ostend									10,000	10,000
				0						0
Pilot Projects				0			0			0
GOSUD				0			0	0		0
ODINCARSA	10,000			10,000	10,000		10,000	10,000		10,000
OIT				0			0			0
ODIN for S.Pas. Ilands				0			0			0
ODINCINDIO			20,000	20,000	10,000		10,000	10,000		10,000
XML Steering Group				0	2,000		2,000	3,000		3,000
				0						0
Programme management				0			0			0
Staff and Officer travel	12,000			12,000	15,000		15,000	15,000		15,000
OFFICERS meeting				0	10,000		10,000			0
IODE project office (Operational exp.)	7,000		10,700	17,700		25,800	25,800		25,800	25,800
IODE-XIX				0			0	35,000		35,000
Other										
IOC Data management strategy dev. (*)	2,000			2,000	2,000		2,000			0
Public awareness				0			0			0

				0									0
TOTALS	**43,000**	**738,600**	**70,700**	**852,300**	**110,000**	**692,000**	**155,800**	**957,800**	**111,000**	**569,800**	**155,800**	**836,600**
Available	35,000	738,600	0	773,600	95,000	692,000	0	787,000	95,000	569,800	0	664,800
Difference	-8,000	0	-70,700	-78,700	-15,000	0	155,800	- 170,800	-16,000	0	- 155,800	- 171,800

RP: UNESCO regular Programme; **EB req**: Extra-budgetary requested from Member States or other donors;

EB exp: Extra-budgetary expected (confirmed) from Member States or other donors (includes also funds from cross-cutting themes UNESCO RP).

(*) this activity concerns all IOC sections. Costing represents 20% of total cost (based upon sharing among 5 sections)

ANNEX III

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ANNEX IV

SPEECHES AT THE OFFICIAL INAUGURATION
OF THE IOC PROJECT OFFICE FOR IODE

1- Speech by Ms. Fientje Moerman, Vice-Minister-President of the Flemish Government and Flemish Minister for Economy, Enterprise, Science, Innovation and Foreign Trade

Mister Deputy Director-General,
Mister Executive Secretary,
Colleagues, Excellencies, Distinguished Delegates and Guests,

I feel very honored to welcome such a large and distinguished international audience here in Ostend, and am grateful for your presence at the inauguration of the Project Office of UNESCO-IOC's *International Ocean Data and information Exchange* program.

Since Belgium was restructured to become a federal state with specific areas of responsibility for each of its entities, the Flemish government has developed its own international policy. One of Flanders' top policy priorities is to shore up its cooperation with multilateral organizations, particularly UNESCO.

To this end, in 1999 the Flemish Government set up the **Flanders UNESCO Science Trust Fund** (known as FUST) for a five-year period, which it extended by a similar term on the ninth of July 2004.

Let me briefly reiterate the outlines and principles of the Flanders UNESCO Science Trust Fund and UNESCO's science programs. The Flemish UNESCO Trust Fund adheres to the following guidelines:

► Compliance of activities with the priorities set out by UNESCO and by the Flemish government in the respective areas of cooperation;

► the likely sustainability and continuity of the various activities;

► the multiplier effect of activities;

► the stimulation of networking; and

► the relevance and availability of scientific support from an existing collaborative network within Flemish institutions.

Priority is given to those activities that represent **a true partnership** between UNESCO, Flemish institutions and the beneficiary countries.

Financial resources will first be allocated to those projects selected by mutual agreement and consent. In addition, the Trust Fund also offers the possibility of bringing in specialized consultants to follow up on and/or devise special programs. The Fund also offers highly specific training and arranges short courses within a project context, except for study grants.

Our highly positive experiences with projects conducted in the maritime sector, sometimes under difficult circumstances, as part of the program of the Intergovernmental Oceanographic Commission - for instance *ODINAFRICA* (Ocean Data Centers in Africa) - prompted the decision to finance a second phase of the Science Trust Fund, allocating it a budget of more than one million euro per annum over a five-year period.

Recently, scientific projects have been financed within the scope of the *International Hydrological Program* **(IHP)** and the *Intergovernmental Oceanographic Commission* **(IOC).** The reasons for providing financial support for these programs have to do with the global nature of their subject matter and the sustainable availability of knowledge of these matters in Flanders. Special attention was paid to every social aspect of the topics in question.

With ODINAFRICA, for instance, UNESCO-IOC was able for the first time to apply its capacity-building strategy based on **linking the provision of equipment, training and operational support through regional networking (on a Pan-African scale).** This concept proved highly successful.

ODINAFRICA seeks to balance **training, empowerment,** and **basic ocean research,** and includes training activities designed to boost human capabilities; empowerment activities intended to help countries to build up their own research capability; and basic ocean research activities to enable African scientists to collaborate at international level.

The **evaluation of FUST during the period 1999 and 2003 was evaluated** taking account of UNESCO priorities for scientific programs (mid-term strategy 2002-2007) and the stated objectives of the **World Summit for Sustainable Development of Johannesburg** (2002), with special attention being paid to **Africa within NEPAD** (New Partnership for Africa's Development). Furthermore the Trust Fund helps to:
- Disseminate Flemish know-how to developing countries;
- increase Flanders' exposure by integrating Flemish know-how into the activities of multilateral organizations;
- transfer knowledge and technology into a multilateral construction, allowing channels to serve as initiatives for the negotiation of Flemish cooperation agreements at the scientific, technological, and socioeconomic level.

This approach will significantly enhance flanders' international position because of the specific cooperation resulting at the scientific level. additional benefits of the approach include:
- Expansion of scale: intensive cross-border cooperation and the development of multilateral networking;
- persistence: a better guarantee of continuity within a coherent framework;
- the efficient use of relatively limited resources.

The guidelines on which the first phase of the cooperation was based remain unchanged for the second, extended phase 2004-2008. The contribution of the Flemish government for 2005 will be 1.4 million euro (approximately 1.75 million US dollars).

As a member of the IOC, we are well aware that the organization has been working for 40 years to urge the governments of IOC Member States to take the oceans seriously. Regrettably, public opinion and the media only appeared to discover the leading role played by UNESCO in this issue very recently.

On the basis of the solid collaboration with the IOC and the results achieved by ODINAFRICA, in 2003 the Flemish government decided to host the IODE-Project Office in Ostend, at the site of the Flanders Marine Institute (VLIZ).

The offer to host the IOC/IODE Project Office should be seen as a **logical extension** of the support provided by the Flemish government to UNESCO and the IOC, and a move that emphasizes the importance of UNESCO's Intergovernmental Oceanographic Commission as the competent agency for the oceans under the United Nations.

In the dramatic context of the tsunami disaster that struck so many countries in the Indian Ocean on the twenty-sixth of December 2004, we must pay tribute to UNESCO's rapid response and acknowledge the excellent work done by the IOC.

UNESCO, and the IOC in particular, were given a clear mandate from the international community to coordinate the establishment of a Tsunami Warning and Mitigation System for the Indian Ocean. This has already resulted in international coordination meetings in Phuket, Paris, and Mauritius. Flanders underlines the importance of this work, and is lending its full support to efforts to have the status of the Indian Ocean Tsunami Warning System finalized by the IOC Assembly in June 2005.

In response to the IOC's appeal, I decided to bolster the **expert training program** related to data and information management. Special attention will be paid to training experts on early warning systems related to large- scale natural phenomena. Accordingly, the IODE Project Office will receive an **additional annual contribution of 500,000 euro**.

The Flemish government is convinced that a joint, integrated approach is the best way of solving the many problems faced by coastal areas dealing with major natural events. We are also convinced that the necessary instruments are available and that there is a willingness to cooperate in a bid to overcome any obstacles encountered.

The Flemish government and Flemish universities are committed to stimulating joint initiatives with the IOC and the IODE Project Office as an indication of their full partnership in this international cooperation.

Thank you for your attention.

2- Speech by Dr. Patricio Bernal, Executive Secretary IOC and Assistant-Director General of UNESCO on behalf of Mr Koichiro Matsuura, Director-General of UNESCO

Mr. Yves Leterme, Minister-President of the Flemish Government,
Mrs. Fientje Moerman, Vice-Minister-President and Flemish Minister for Science and Innovation,
Mr. Johan Vande Lanotte, Deputy Prime Minister of Belgium,
Mr. Paul Breyne, Governor of West Flanders and President of VLIZ,
Excellencies,
Ladies and Gentlemen,

On behalf of Mr Koïchiro Matsuura, Director-General of the United Nations Educational, Scientific and Cultural Organization (UNESCO), it is a great pleasure to be here with you to inaugurate the IOC/IODE Project Office in Ostend.

The Intergovernmental Oceanographic Commission (IOC) of UNESCO was founded in 1960 in recognition that ocean research and the development of ocean services require multilateral and international cooperation. Today, the IOC is a vibrant intergovernmental body within UNESCO with 130 Member States.

The IOC provides its Member States with a mechanism for global cooperation in the study and monitoring of the ocean. The IOC assists governments to address their individual and collective ocean and coastal problems through the sharing of knowledge, information and technology and through the coordination of national programmes.

The IOC's International Oceanographic Data and Information Exchange Committee (IODE) was established in 1961 to enhance marine research and the exploitation and development of the ocean by facilitating the exchange of oceanographic data and information between participating Member

States and by meeting the needs of users for data and information products. The IODE system forms a worldwide service-oriented network consisting of three main parts: first, National Oceanographic Data Centres; second, Responsible National Oceanographic Data Centres; and, third, World Data Centres - Oceanography. During the past forty years, IOC Member States have established over sixty oceanographic data centres in as many countries and their number is growing. Through this network, millions of ocean observations have been made available to Member States.

The timely, free and unrestricted international exchange of oceanographic data is essential for the efficient acquisition, integration and use of ocean observations gathered by the countries of the world. The observations serve a wide variety of purposes, including the prediction of weather and climate, the operational forecasting of the marine environment, the preservation of life, the mitigation of human-induced changes in the marine and coastal environment, and the advancement of scientific understanding.

In this regard, it is important to note an interesting historical fact - as early as 1961, in the middle of the Cold War when UNESCO was actively promoting scientific cooperation to reduce international tensions, the IODE Programme stressed the importance of sharing oceanographic data between Member States. The IODE oceanographic data centres and ICSU World Data Centres have maintained a successful programme based on the full and open exchange of data between IOC Member States for over forty years.

This important principle has been challenged at times but it has remained a solid and permanent core principle of UNESCO's IOC and its IODE programme. In 2003, the IOC Assembly adopted its new "IOC Oceanographic Data Exchange Policy", whose first clause clearly states that "Member States shall provide timely, free and unrestricted access to all data, associated metadata and products generated under the auspices of IOC programmes". The importance of sharing and exchanging data has also come to the forefront recently after the devastating Indian Ocean tsunami of 26 December 2004. I am pleased to say that the regional tsunami warning and mitigation system now being built will be grounded upon the principle of "free and unrestricted" access to data by all participating Member States.

Ladies and Gentlemen,

Oceanography had developed from a science dealing mostly with local processes to one that is now studying ocean processes at the basin and global scales. As a result, researchers depend critically on the availability of an effective international exchange system to provide data and information from all available sources. Moreover, scientists studying local processes benefit substantially from access to relevant data collected by other Member States. Since the collection of oceanographic data is very expensive, the economic benefit of obtaining data by exchange as opposed to collecting it oneself is huge. This is especially important for developing countries.

From the outset, the main objectives of the IODE Programme have been clear:
- to facilitate and promote the exchange of oceanographic data and information;
- to develop standards, formats and methods for the global exchange of oceanographic data and information; and
- to assist Member States to acquire the necessary capacity to manage oceanographic data and information and become partners in the IODE network.

Those objectives are as relevant as ever but, in an era of rapid ICT development, the IODE Programme faces many new challenges. For example, the communities of users have increased in number and they are highly demanding. Today, the institutions participating in IODE must lead the way in coordinating access to marine data and information to support the broad needs of the scientists, policy-makers, marine resources managers, the commercial sector and the general public.

Another challenge is the type and scale of data. Whereas in the past IODE data centres focused mainly on delayed-mode, physical oceanography data, attention today is given to all ocean-related data. These include not only physical but also chemical and biological oceanographic data. And they include operational real-time data streams as well as delayed-mode data.

IODE now closely collaborates with, and services the needs of, the other IOC and related programmes as well as international bodies such as Ocean Sciences, the Global Ocean Observing System (GOOS), the Joint IOC/WMO Commission on Oceanography and Marine Meteorology (JCOMM), and, of course, the Tsunami Warning Systems.

It is precisely in order to respond to these challenges that an IODE Project Office is being established in Ostend. Its main objectives are two-fold:
- First, to provide a creative environment facilitating the further development and maintenance of IODE Projects, services and products. Emphasis will be placed on improving the efficiency and effectiveness of the data and product/service stream between the stage of sampling and the user; and
- Second, to assist in strengthening the capacity of Member States to manage oceanographic data and information, with special attention to the developing countries, and to provide ocean data and information products and services required by users.

To achieve these objectives the IODE Project Office will:
- further develop, strengthen and maintain IOC/IODE ocean data and information management training programmes and training tools;
- provide an environment ('think tank') where ocean data and information experts and students can work, meet and discuss;
- develop, host and maintain IOC/IODE's ocean information systems and related public awareness tools;
- promote collaboration between all expert levels active in ocean data (and data product) and information management, including scientists, data managers and users;
- host specialized short-term training courses in ocean data and information management; and
- provide a laboratory environment for the development and beta testing of ocean data and information management technology.

In March 2003, the 17th session of the IODE Committee received a formal offer from the Government of Flanders (Kingdom of Belgium) to host the IODE Project Office in Ostend. In this offer, the Government of Flanders committed itself to provide office space with an approximate floor space of 1100 square metres including basic infrastructure, the cost of all utilities and the cost of provision of a broadband Internet connection.

In addition, in the wake of the Indian Ocean Tsunami, the Government of Flanders has pledged an additional 500,000 Euros per annum to support training activities at the Project Office that will be related primarily to data management in general, but also to the development and operation of tsunami warning systems in Africa, South East Asia and the Caribbean. This additional input will allow the IOC to substantially increase its training activities and to promote effective coastal zone management and multi-hazard natural disaster warning systems such as wind waves and storm surges.

The renovation works of the building have just been finished and today we officially inaugurate the Project Office. In fact, the first training activities already started last week when two ODINAFRICA training courses on oceanographic and biodiversity data management were held at the brand new Project Office.

We expect that the Project Office in Ostend will become a beehive of activities and a meeting place of oceanographers, ocean data managers, ocean librarians and many other experts studying the

world's oceans. I am told that at least ten training and meeting events will take place this year. Internships of students and secondments of experts have already started. I also understand that the Office will soon benefit from a link to a world class Internet connection that will enable the Office to become a global metadata and data hub.

The establishment of the Project Office and the successful start of its work could not be possible without the support and special attention of the Flemish Government, minister-president Yves Leterme, and especially vice minister-president Fientje Moerman in her capacity as Flemish Minister for Science and Innovation, responsible for the Flanders UNESCO Science Trust Funds and the Flanders Marine Institute.

I would like to express our gratitude also to the Permanent Delegate of Belgium to UNESCO, Ambassador Yves Haesendonck, the representatives of Flanders' Science and Innovation Administration, the Belgian representatives to the UNESCO/IOC Executive Council, the bench of Mayor and Aldermen of the City of Ostend, and the city architect, Michel De Lange, for the buildings and the renovation.

Last but not least, I want to express our appreciation of the close collaboration and support received from the president, the board, the scientific committee and the staff of the Flanders Marine Institute (VLIZ) that hosted the Project Office from September 2004 during the building renovation. VLIZ has been a strong advocate and partner of IOC and IODE, and its help is much appreciated.

Thank you for your attention.

3- Speech by Mr Paul Breyne, Governor of West-Flanders and President of the Board of Directors of the Flanders Marine Institute (VLIZ)

Excellencies
Distinguished delegates and guests
Ladies and gentlemen

It is with great pride and pleasure that I address you today.

I am not only addressing you as the governor of West Flanders, Belgium's only coastal province, but also as the president of the Flanders Marine Institute or VLIZ.

As governor of West Flanders I am proud because it is a rare occasion that such a prestigious international organisation opens an office in my province. The presence of UNESCO in West Flanders will undoubtedly increase the visibility of our region internationally. The future activities of the IOC project office are furthermore in line with the policy of innovation that I promoted in this year's speech at the start of the provincial working year, and will contribute to the competitiveness of the province.

As the president of VLIZ, I want to take this opportunity to elaborate on some of the objectives and activities of the institute, on the engagements of its oceanographic data centre in the Intergovernmental Oceanographic Commission of UNESCO and on the past, present and future relationship between VLIZ and the Project Office that we inaugurate today.

The general objective of VLIZ is to support marine scientific research in Flanders. The institute's strategic goals and activities are outlined in five-year management agreements between VLIZ, the Flemish Government and the Province of West Flanders. The second agreement in the institute's history was signed earlier today. The many and ambitious tasks of VLIZ include the management of a research vessel and associated infrastructure, developing information and

communication services and the management of an oceanographic data centre. New in the agreement is that the Flemish Government will utilise VLIZ as an instrument to support UNESCO's IOC Project Office for IODE.

The Flanders Marine Institute acts as a co-ordination and information platform for marine sciences in Flanders. And – important for today's event – it hosts the "Flanders Marine Data and Information Centre" or VMDC. The aim of the VMDC is to a service-oriented data centre, with fast and open access to high quality data and information from a wide range of marine sciences.

Soon after its establishment the data centre became the "National Oceanographic Data Centre" for Flanders within the IODE network of data centres that operates under the umbrella of the IOC.

The objectives, the activities and the data policy of the data centre are inspired by its role as National Oceanographic Data Centre. An important goal is to encourage regional, national and international co-operation, capacity building and technological innovation.

The data centre of VLIZ is playing an active role within the IODE network. As examples I mention the co-organisation of international symposia on oceanographic data management, the participation in joint projects and in expert groups and working groups, and public outreach efforts.

The data centre participates in the "Group of Experts on Biological and Chemical Data Management and Exchange Practises", in the "Expert Team on Data Management Practices" of the Joint Commission of Oceanography and Marine Meteorology, in the "Group of Experts on Marine Information Management" and in the advisory board of the "Aquatic Sciences and Fisheries Abstracts". Furthermore, the role VLIZ plays in the "Ocean Biogeographic Information System" of the Census of Marine Life (OBIS) will be very important for facilitating future collaboration and links between the physical oceanography and marine biology worlds.

In this way VLIZ contributes to the development of international standards and protocols for data exchange and wants to serve as a pioneer in developing new technologies in an international context.

From the above it is obvious that supporting the IOC project office is in accordance with the general goals and objectives of VLIZ. During the past few months the collaboration has of course been focusing on facilitating the start-up of the Project Office that we inaugurate today.

VLIZ is a young institute. For the historical record I can mention that we became operational in the year 2000 and that our offices in Oostende were officially opened in May 2002. IOC staff was present at this event and the opportunities offered by the location became obvious at that time. Discussions between VLIZ and IOC, between VLIZ and the City of Oostende, discussions within the board of directors and the scientific committee of VLIZ and between VLIZ and the Flemish government soon resulted in an announcement and a formal offer by Flanders to host a UNESCO Project Office in Oostende. Important milestones were the "Colour of Ocean Data" symposium organized by VLIZ, IOC and the Belgian Federal Science Policy in Brussels in November of 2002 and the IODE-17 meeting that took place in March 2003. Soon after IOC was able to accept Flanders' offer.

And now – only two years later – the IOC opens its Project Office in Oostende where it will become VLIZ's nearest neighbour. The proximity of the Project office to VLIZ will enable a close collaboration between the two organisations. And that is something we are looking forward to. This situation is – I believe – a good example of a win-win situation, with clear benefits for both parties.

VLIZ is a young, modern and dynamical institute. This makes it a good environment to serve as host location. In the first five years of its existence VLIZ has become the most important coordination and information platform for marine sciences in Flanders. As president of VLIZ I like to

believe that the good national and international reputation of the institute and its data centre has contributed to the decentralization of part of IOC's activities to Oostende.

VLIZ has a professional staff and places itself at the core of a network of institutions, marine scientists and public servants in Flanders. The institute thus combines in-house expertise with the expertise that is present in its extensive network. I am sure that this construction will prove to be a plus for the IOC Project Office in the future. UNESCO will find both within VLIZ and in the VLIZ-network a cooperative and creative environment. On the other hand it goes without saying that VLIZ and its network, and this is the whole marine science community in Flanders, will greatly benefit from the presence of the Project Office, its activities and its visiting experts from all over the world. Thanks to a close collaboration with the project office, VLIZ will be at the head of development of new technologies for data management and international standards for data exchange.

Other arguments that allowed IOC to accept Flanders' offer may have included the geographical location of Ostend, close to Brussels in the centre of Europe and the beautiful, maritime location of the offices with excellently equipped training and meeting room facilities, the good internet connectivity and the excellent administrative and technical support staff of VLIZ. But also the high density of universities and high schools in Flanders will create opportunities for recruiting students, interns and staff. Another win-win situation where the Project Office will have easy access to skilled and motivated human resources, while our Flemish students, young scientists and IT specialists will have the opportunity to have training and to gain experience in an international environment. And the research vessel "Zeeleeuw" that VLIZ manages in partnership with the fleet division of the Flemish "Waterways and Maritime Affairs Administration" can serve as a test-bed for on-board technologies developed by the project office.

Now allow me now to briefly express my thanks to the following persons and organizations.

- The staff of VLIZ, especially the administrative and technical support staff.
- The UNECO Centre Flanders for organizing the exhibition on the oceans and oceanographic data management in the Project Office
- The UNESCO Platform Flanders for the production of a special issue of the magazine "UNESCO-info" that brings the importance of oceanographic data management and international collaboration closer to the public at large.
- The Provincial Council and the Flemish Government for the confidence shown in VLIZ and its data centre through the new 5-year management agreement.
- The Flemish Government and especially "VLIZ-minister" Fientje Moerman for the continuous support and for confiding in the institute for supporting the Project Office.
- I want to thank the city of Ostend - and city architect Michel De Lange and his team - for the renovation of the project office. I want to take this opportunity to thank the City in advance for considering to support the Project Office and VLIZ in the future. Indeed, as for the province of West Flanders, I'm persuaded of the fact that the presence of this centre of excellence in Oostende will contribute significantly to the city's national and international presige and visibility, to local employment, to the Meetings, Incentives, Congresses, Exhibitions or MICE-tourism, amongst other benefits. I therefore hope that the City can help us solve some remaining problems that can make the Project Office even more successful than it already promises to become. In concreto I think of the present poor reachability of the Office by public transport and the lack of cheap accommodation for students and visiting experts.

Finally, honoured guests from Belgium and abroad, I want to stress that VLIZ is an open house. You are all welcome to visit the institute at any time. And our doors are open for the general public in the weekend of 7 and 8 May.

In conclusion, Mr Barbosa, Mr Bernal, I think it is fair to say that VLIZ has played an important role in creating the Project Office in Oostende. I see beautiful perspectives for joint work in

the future. And I want to assure you that the board of directors, the scientific committee and the staff of VLIZ will continue their loyal and enthousiastic support to the IOC, to the Project Office for IODE and to its manager dr. Vladymyrov.

ANNEX V

LIST OF DOCUMENTS

1. WORKING DOCUMENTS

Document code	Document Title (click on document name to download in MS-Word version or on 'pdf' to download PDF version) as available	Author	Agenda Item
IOC/IODE-XVIII/1 prov. rev.	Provisional Agenda	Secretariat	2.1
IOC/IODE-XVIII/1 add. prov.	Provisional Timetable	Secretariat	2.3
IOC/IODE-XVIII/2	Action Paper	Secretariat/ Chairs	2.1
IOC/IODE-XVIII/3 prov	Draft summary report (to be prepared during Session)	Secretariat	11
IOC/IODE-XVIII/4 prov	Provisional List of Documents (this document)	Secretariat	2.3
IOC/IODE-XVIII/5	Provisional List of Participants	Secretariat	
IOC/IODE-XVIII/6	Chairs' Report	L. Rickards/ R. Rojas	3.1
IOC/IODE-XVIII/7	Financial report for the inter sessional period 2003-2004	Secretariat	3.1
IOC/IODE-XVIII/8	Reports on Activities of the World Data Centres 8.1 WDC for Oceanography, Silver Spring 8.2 WDC for Oceanography, Obninsk 8.3 WDC for Oceanography, Tianjin 8.4 WDC for Marine Geology and Geophysics, Russian Federation	WDC Directors	3.2
IOC/IODE-XVIII/9	Reports on activities of the RNODCs 9.1 RNODC Report - Persian Gulf 9.2 RNODC Report - Drifting Buoy 9.3 RNODC Report - Indian Ocean 9.4 RNODC Report - in Japan (WESTPAC, IGOSS, ADCP, MARPOLMON) 9.5 RNODC Report - JASIN (Joint Air Sea INteraction Project)	Directors of RNODCs	3.3
IOC/IODE-XVIII/10	Reports on activities of the NODCs and DNAs – SEE 3.	Directors NODCs/DNAs	3.4/ 3.5
IOC/IODE-XVIII/11	Reports on activities of the IODE Regional Coordinators 11.1. IODE Regional Coordinator WESTPAC 11.2. IODE Regional Coordinator IOCINDIO 11.3. IODE Regional Coordinator IOCEA 11.4. IODE Regional Coordinator IOCINCWIO 11.5. IODE Regional Coordinator IOCARIBE 11.6. IODE Regional Coordinator IOCSOC 11.7. IODE Regional Coordinator Mediterranean region	Regional Coordinators	3.6

	11.8. IODE Regional Coordinator for the Black Sea region 11.9. IODE Regional Coordinator for the Eastern Pacific (El Nino)		
IOC/IODE-XVIII/12	The IODE project Office	Secretariat (V. Vladymyrov)	3.7
IOC/IODE-XVIII/13	IODE Data Flow	L.Rickards	3.8
IOC/IODE-XVIII/14	IOC Oceanographic Data Exchange Policy: Implementation by Member States	CANCELLED	3.9
IOC/IODE-XVIII/15	Cooperation with JCOMM	JCOMM Co-Presidents	4.1
IOC/IODE-XVIII/16	Cooperation with GOOS	Director GPO	4.2
IOC/IODE-XVIII/17	Cooperation with Science and Monitoring Programmes	Chair	4.3
IOC/IODE-XVIII/18	IODE Review	D. Kohnke	5.1
IOC/IODE-XVIII/19	Future role of WDCs, RNODCs and NODCs	R. Rojas	5.2
IOC/IODE-XVIII/20	Implications of GOOS and JCOMM development on IODE	S. Narayanan	5.3
IOC/IODE-XVIII/21	Evolution of IODE at the national level	L. Rickards	5.4
IOC/IODE-XVIII/22	IOC Strategic Plan for Oceanographic Data and Information Management	S. Narayanan	5.5
IOC/IODE-XVIII/23	Results of the IODE Priority Survey (pdf)	P.Pissierssens	all items
IOC/IODE-XVIII/24	OceanPortal	M.Brown	6.2.8
IOC/IODE-XVIII/25	Ocean Data and Information Network for the Caribbean and South America Regions (ODINCARSA)	R. Martinez Guingia	6.3.1.2
IOC/IODE-XVIII/26	Global Temperature and Salinity Profile Programme (GTSPP)	R. Keeley	6.2.3
IOC/IODE-XVIII/27	Global Ocean Surface Underway Data Pilot Project (GOSUD)	R. Keeley	6.2.4
IOC/IODE-XVIII/28	Group of Experts on Marine Information Management (GEMIM)	S. Davies	6.1.2
IOC/IODE-XVIII/29	Marine Environmental Data Inventory	G. Reed	6.2.6
IOC/IODE-XVIII/30	Group of Experts on Biological and Chemical Data Management and Exchange Practices (GE-BICH)	Edward Vanden Berghe	6.1.1
IOC/IODE-XVIII/31	JCOMM/IODE Expert Team on Data Management Practices (ETDMP)	Nick Mikhailov	6.1.2
IOC/IODE-XVIII/32	OceanTeacher/ODIMex	M. Brown	6.2.6
IOC/IODE-XVIII/33	Development of Marine Data Exchange Systems using XML	A.Isenor	6.2.5
IOC/IODE-XVIII/34	Global Directory of Marine Freshwater Professional (OceanExpert)	V. Vladymyrov	6.2.7
IOC/IODE-XVIII/35	Ocean Information Technology Pilot Project (OIT)	V. Vladymyrov	6.2.10
IOC/IODE-XVIII/36	Global Oceanographic Data Archaeology and Rescue (GODAR)	S. Levitus	6.2.2

IOC/IODE-XVIII/37	E-repository for Africa	M. Goovaerts	6.3.1.5
IOC/IODE-XVIII/38	Ocean Data and Information Network for Africa (ODINAFRICA)	M. Odido	6.3.1.1
IOC/IODE-XVIII/39	IODE AND THE SCAR/COMNAP JOINT COMMITTEE ON ANTARCTIC DATA MANAGEMENT	Taco de Bruin	6.3.1.4

2. INFORMATION DOCUMENTS

Document Number	Title	Author
IOC/IODE-XVIII/Inf. 1	Local arrangements for IODE-XVIII	Secretariat
IOC/IODE-XVIII/Inf. 1.1	Location map for banquet - 29 April	Secretariat
IOC/IODE-XVIII/Inf. 2	Format guidelines for the submission of national reports for the purpose of Session of the IODE Committee	Secretariat
IOC/IODE-XVIII/Inf. 3	Format guidelines for the submission of reports of IODE regional coordinators for the purpose of Session of the IODE Committee	Secretariat
IOC/IODE-XVIII/Inf. 4	Report On Activities Of The Responsible National Oceanographic Data Centres	Secretariat
IOC/IODE-XVIII/Inf. 5	Report On Activities of the World Data Centres Oceanography	Secretariat
IOC/IODE-XVIII/Inf. 6	List of IODE Publications 2003-2005 See: http://ioc3.unesco.org/iode/files2.php and select year	CANCELLED
IOC/IODE-XVIII/Inf. 7	IOC Circular Letters related to IODE (2003-2005)	Secretariat
IOC/IODE-XVIII/3	Summary Report of the Seventeenth Session of the IOC Committee on IODE (Paris, France, 3-7 March 2003)	Secretariat
IOC/IODE-XVIII/Inf. 8	The Ocean Biogeographic Information System (OBIS)	Mark Costello
IOC/IODE-XVIII/Inf. 9	Using XML Technology for Marine Data Exchange. A Position Paper of the MarineXML Initiative	Vladimir Vladymyrov et al.
Other documents		
IOC/EC-XXXVII/2 Annex 16 rev	Proposal on initial guidelines for the IOC draft programme 2006-2007	Secretariat

3. REPORTS ON ACTIVITIES OF THE NODCS AND DNAS

Through IOC Circular Letter 2121 of 20 August 2004, IODE National Coordinators were invited for IODE-XVIII and were requested to submit their progress reports by 1 November 2004. Below you will find the list of reports received. They can be downloaded from the web site in MS-Word format.

Country	Document reference and download	Submitted by
1 Argentina	IOC/IODE-XVIII/10.1	Ariel Hernan Troisi
2 Australia	IOC/IODE-XVIII/10.2	G. Reed
3 Barbados	IOC/IODE-XVIII/10.3	L. Inniss
4 Belgium	IOC/IODE-XVIII/10.4	S. Scory
5 Belgium (Flanders)	IOC/IODE-XVIII/10.5	Edward Vanden Berghe
6 Belize		
7 Benin	IOC/IODE-XVIII/10.7	R. Djiman
8 Brazil	IOC/IODE-XVIII/10.8	Amaury Poyares Rocha
9 Bulgaria	IOC/IODE-XVIII/10.9	A. Palazov
10 Cameroon	IOC/IODE-XVIII/10.10	J. Folak
11 Canada	IOC/IODE-XVIII/10.11	S. Tomlinson
12 Chile	IOC/IODE-XVIII/10.12	R. Rojas
13 China	IOC/IODE-XVIII/10.13	Shaohua Lin
14 Colombia	IOC/IODE-XVIII/10.14	C. Parra
15 Comoros		
16 Costa Rica	IOC/IODE-XVIII/10.16	Luis Manuel Murillo Bolanos
17 Côte d'Ivoire		
18 Croatia	IOC/IODE-XVIII/10.18	Vlado Dadic
19 Cuba	IOC/IODE-XVIII/10.19	Julieta Gutiérrez Hernández
20 Cyprus	IOC/IODE-XVIII/10.20	George Zodiatis
21 Denmark		
22 Ecuador	IOC/IODE-XVIII/10.22	Katiusca Briones Estébanez
23 Egypt	IOC/IODE-XVIII/10.23	Ahmed El Nemur
24 Finland	IOC/IODE-XVIII/10.24	R. Olsonen
25 France	IOC/IODE-XVIII/10.25	Catherine Mailliard
26 Gabon	IOC/IODE-XVIII/10.26	M.D Mounganga
27 Georgia	IOC/IODE-XVIII/10.27	K. Bilashvili
28 Germany	IOC/IODE-XVIII-10.28	Friedrich Nast
29 Ghana		
30 Greece	IOC/IODE-XVIII/10.30	Efstathios Balopoulos
31 Guatemala		
32 Guinea	IOC/IODE-XVIII/10.32	Sekou Cisse
33 Iceland	IOC/IODE-XVIII/10.33	O. Astthorson
34 India	IOC/IODE-XVIII/10.34 IOC/IODE-XVIII/10.34.2	J.S. Sarupria and E. Pattabhi Rama Rao
35 Iran, Islamic Republic of	IOC/IODE-XVIII/10.35	F. Ghiasi
36 Iraq		
37 Ireland	IOC/IODE-XVIII/10.37	Martina Hennessy
38 Israel	IOC/IODE-XVIII/10.38	Issac Gertman
39 Italy	IOC/IODE/XVIII/10.39	Renzo Mosetti
40 Japan	IOC/IODE-XVIII/10.40	Teruo Kanazawa
41 Kenya		
42 Korea, DPR		

43 Korea, Rep. of	IOC/IODE-XVIII/10.43	Joon-Yong Yang
44 Lebanon	IOC/IODE-XVIII/10.44	Nijad Kabbara
45 Madagascar	IOC/IODE-XVIII/10.45	John Bemiasa
46 Malaysia		
47 Malta	IOC/IODE-XVIII/10.47	Aldo Draga
48 Mauritania		
49 Mauritius	IOC/IODE-XVIII/10.49	Mohamudally Beebeejaun
50 Mexico		
51 Morocco		
52 Mozambique	IOC/IODE-XVIII/10.52	Albano Gove
53 Netherlands	IOC/IODE-XVIII/10.53	Taco de Bruin
54 Nigeria	IOC/IODE-XVIII/10.54	Larry Awosika
55 Norway	IOC/IODE-XVIII/10.55	Helge Sagen
56 Pakistan		
57 Panama		
58 Peru	IOC/IODE-XVIII/10.58	Aste Evans Atilio
59 Philippines		
60 Poland		
61 Portugal		
62 Romania		
63 Russian Federation	IOC/IODE-XVIII/10.63	N. Mikhailov
64 Senegal	IOC/IODE-XVIII/10.64	Anis Diallo
65 Seychelles		
66 Slovenia	IOC/IODE-XVIII/10.66	Vlado Malacic
67 South Africa	IOC/IODE-XVIII/10.67	Marten Grundlingh
68 South Africa (2)		
69 Spain	IOC/IODE-XVIII/10.69	Maris Jesus Garcia
70 Sri Lanka		
71 Sweden	IOC/IODE-XVIII/10.71	Jan Szaron
72 Switzerland		
73 Tanzania	IOC/IODE-XVIII/10.73	Dr Desiderius CP MASALU
74 Togo	IOC/IODE-XVIII/10.74	A. Blivi
75 Tunisia	IOC/IODE-XVIII/10.75	Malika Bel Hassen Abid
76 Trinidad & Tobago	IOC/IODE-XVIII/10/76	Maria Lera-Andalcio
77 Turkey	IOC/IODE-XVIII/10.77	M. Ozyalvac
78 Ukraine	IOC/IODE-XVIII/10.78	A. Khaliulin
79 United Kingdom	IOC/IODE-XVIII/10.79	Lesley Rickards
80 United States	IOC/IODE-XVIII/10.80	K. Schnebele
81 Uruguay		
82 Venezuela	IOC/IODE-XVIII/10.82	Oscar Maldonato
83 Viet Nam	IOC/IODE-XVIII/10.83	Lau Va Khin

ANNEX VI

IODE-XVIII (2005-2007) ACTION SHEET

No.	Para.	Action	By whom
1	62	**The Committee recommended** maintaining a calendar of events at the Project Office and making this available through the planned Project Office web site.	IODE Project Office/ -
2	65	**Noting** the importance of promoting the IOC Project Office for IODE, **the Committee encouraged** Member States to promote the Project office and to second relevant experts on short or long-term basis to the Project Office.	Member States
3	80	**The Committee requested** all IODE data centres, and other institutions in IOC Member States that manage oceanographic data, to perform more thorough quality control on data before they are submitted.	IODE data centres and other institutions in IOC Member states
4	82	**The Committee requested** all IODE data centres, and other institutions in IOC Member States that manage oceanographic data, to check their national ocean-profile holdings against those contained in the "World Ocean Database," which is maintained by WDC for Oceanography, Silver Spring.	IODE data centres and other institutions in IOC Member states
5	94	Considering that this varied offering of the WDCs may not be clear to end users, **the Committee recommended** the development of an information page on the IODE web site that will guide users to the relevant products and services available from the WDCs.	IODE Secretariat
6	112	**The Committee recommended** that all data centres consider making their metadata-databases OAI compliant	IODE data centres
7	167	**The Committee welcomed** the nomination of 29 IODE National Coordinators for marine information management and called on Member States that have not yet nominated such an expert, to do so as soon as possible. In this regard the **Committee requested** the Secretariat to issue a Circular Letter to all IOC Member States	IODE Secretariat
8	177	**The Committee requested** Member States to provide separate reports for data management and information management as from the next Session of the Committee.	IODE national coordinators for data management/ IODE national coordinators

			for information management
9	180	**The Committee instructed** the Chair and Secretariat to prepare various levels of summary versions of the national reports for presentation during the IOC Assembly, to demonstrate the considerable advances made by, and changes occurring in the NODCs.	IODE Chair; IODE Secretariat
10	196	**The Committee welcomed** the adoption of the IOC Oceanographic Data Exchange Policy by the IOC Assembly and **called** on Member States to use the policy as a basis for national policies on oceanographic data exchange.	IOC Member States
11	212, 213	**The The Committee recognized** that any merger between IODE and JCOMM DMPA activities must be considered with great care. **The Committee stated** that this is a matter that needs careful study and consideration and **recommended** that this be included in the preparations of the IOC Data Management Strategy.	Consultant; IOC Member States
12	217	**The Committee welcomed** the organization of this first joint IODE/JCOMM training event and **recommended** its support by IODE, JCOMM and IOC Member States.	JCOMM, IODE, IOC Member States
13	222	**The Committee noted with appreciation** that at the regional level, in particular through the ODINAFRICA, ODINCARSA and the starting ODINCINDIO projects, cooperation between regional GOOS alliances and IODE ODIN projects have been initiated and well received, and **called** for the further strengthening of such cooperation.	IOC Member States
14	233	**The Committee instructed** the IODE Chair to discuss closer collaboration with the OBIS Chair.	IODE Chair
15	252	**The Committee instructed** the Chair to continue to seek close collaboration with JCADM and to find ways, together with the Chief Officers of JCADM, to expand the existing collaboration.	IODE Chair258
16	258	**The Committee welcomed** the participation of CDIAC in IODE-XVIII and **instructed** the Chair and IODE Secretariat to seek closer collaboration with this centre.	IODE Chair; IODE Secretariat
17	279	**The Committee instructed** the Chair and IODE Secretariat to compile the surveys results into an information document for distribution to the IODE	IODE Chair; IODE Secretariat

		National Coordinators (for data management and for information management).	
18	285	Taking into account that the IODE Committee meets approximately every two years, **the Committee decided** that one Officers Meeting should follow immediately future Committee Sessions to finalize the inter-sessional Work Plan, and a second meeting should be held during the inter-sessional period to review progress and prepare for the coming Committee Session.	IODE Secretariat; IODE Officers
19	288	**The Committee noted** that there had not been sufficient guidance to the Groups of Experts in terms of issues to deal with and in terms of follow-up, and **tasked** the IODE Officers to closely monitor and guide the Groups.	IODE Officers
20	292, 293	**The Committee welcomed** the initiatives of several Member States to develop distributed systems and **invited** these countries to share relevant expertise with other Member States who wish to develop similar systems. **The Committee re-iterated** the need for national central focal points for data and information functions traditionally assumed by NODCs and marine libraries and **called** on Member States not to lose sight of this requirement.	IOC Member States
21	294	**The Committee decided** to abolish the system of RNODCs. However, to ensure that the resources and expertise acquired in the regional RNODCs will not be lost, **the Committee instructed** the ODIN projects to incorporate the resources of existing regional RNODCs. Similarly, **the Committee instructed** the Chair to discuss with host centres of other RNODCs how their operations, if considered essential for the international (science) community, could be maintained and properly acknowledged.	ODIN Project Coordinators; IODE Chair
22	305, 306	**The Committee decided** to abolish the system of IODE Regional Coordinators. **The Committee instructed** the coordinators of ODIN projects to assume the responsibilities formerly assumed by the IODE Regional Coordinators.	ODIN Project Coordinators
23	309	**The Committee urged** IOC Member States, who not have done so, to urgently identify IODE National Coordinators for Oceanographic Data Management and IODE National Coordinators for Marine	IOC Member States

		Information Management.	
24	310	**The Committee welcomed** the adoption of the IOC Oceanographic Data Exchange Policy by the IOC Assembly during its twenty-third Session and **urged** Member States to apply the policy nationally.	IOC Member States
25	314	**The Committee urged** the IOC Secretariat to harmonize the IOC web sites.	IOC Secretariat
26	320	**The Committee instructed** the IODE Officers to discuss how IODE will deliver its services to users, in particular through the WDCs. **The Committee further instructed** the Officers to investigate how the institutions that currently host RNODCs that are operational, can continue to provide services, taking into consideration the decision by the Committee to abolish the RNODC system.	IODE Officers
27	323	**The Committee urged** NODCs to take into consideration the global move towards distributed systems which would also be reflected in GEOSS. However **the Committee cautioned** countries that distributed systems would still require a focal point for national data acquisition and liaison with international programmes.	IOC Member States
28	337, 338, 339	**The Committee requested** the IODE Chair to report the findings of the First Session of the Task Team [on IOC's data management strategfy] and the meeting of the sessional working group [at IODE-XVIII] to the 23rd Session of the IOC Assembly in June 2005.	IODE Chair
		The Committee requested the Executive Secretary IOC to identify the necessary funding for the proposed Consultant in 2005 and early 2006, to ensure timely delivery of the strategy document.	Executive secretary IOC
		The Committee endorsed the outline and time lines proposed by the sessional group, and **requested** the IODE Secretariat to avail the document well ahead of the next IODE-XIX and the 24th Session of the IOC Assembly.	IODE Secretariat
29	349	**The Committee**, recognizing the importance of maintaining the momentum of the work being done by the GE-BICH and during the COD and OBI Conferences, **strongly welcomed** the proposal for a second OBI Conference.	IODE Secretariat, Chair GE-BICH
30	391	**The Committee expressed** its strong satisfaction with the great progress made by the ETDMP and the	JCOMM Co-President

		enthusiasm of its participants, and **adopted** the JCOMM/IODE ETDMP work plan for 2006-2007. **The Committee further urged** the JCOMM Co-President to endorse the work plan on behalf of JCOMM.	
31	392	**The Committee recommended** to have on the web the manuals and guidelines available for new organizations wishing to join the E2EDM prototype and to expand the number of data providing Member States.	IODE Secretariat
32	394	**The Committee noted** that there are great possibilities for cooperation of the JCOMM/IODE ETDMP and OBIS and **recommended** to establish the common terminology and vocabulary.	JCOMM/IODE ETDMP; OBIS
33	403	**The Committee strongly encouraged** other organizations to participate in the project.	Relevant Organizations
34	415	**The Committee noted** that the interest for the [GTSPP] project results was high and **requested** that results should be reported to future IODE Committee Sessions along with the results of other projects.	GTSPP; IODE Secretariat
35	427	**The Committee noted** the agreement with BODC to link to their data dictionary and **recommended** to implement this as soon as possible.	BODC
36	446, 447, 450 451	**The Committee instructed** the SG-MEDI to work with other national and international initiatives to develop a marine profile of ISO 19115 and seek collaboration with other communities to develop an ISO 19115 compliant metadata tool. **The Committee noted** that it would be difficult for IODE to maintain software applications on a long-term basis and **instructed** the Chair of the SG-MEDI and IODE Chair to work closely with other communities who are developing similar tools **The Committee urged** Member States to utilize MEDI as appropriate, and to promote its use at the national level in relevant academic and ocean research facilities. **The Committee** further **invited** Member States that use other systems, to ensure their ISO 19115 compliance so they can easily exchange records with MEDI.	SG-MEDI Chair SG-MEDI; IODE Chair IOC Member States IOC Member States
37	467, 468	**The Committee** expressed its appreciation for OceanExpert but instructed the inter-sessional working	OceanExpert inter-sessional working

		group to urgently resolve the remaining technical issues. **The Committee called on** the newly nominated IODE National Coordinators for Marine Information Management to actively participate in the population, maintenance and promotion of OceanExpert at their national level.	group
38	491, 492	**The Committee,** while acknowledging the huge content of OceanTeacher**, called** on the project to consider translation into French and Spanish and requested Member States to assist with this task.	SG-OceanTeacher
		The Committee called on Member States to ensure that students, nominated for training courses are selected carefully on the basis of the course programme and their skill level that should be appropriate for the course.	IOC Member States
39	496, 497	**The Committee recommended** to the IODE Officers and the JCOMM DMCG to reconsider the project action items in view of the recent activities of the JCOMM/IODE ETDMP and bring forward a revised work plan for implementation. **The Committee further recommended** to find a sponsor for the project activity.	IODE Officers;JCOMM DMCG
40	531	**The Committee instructed** ODIN coordinators to liaise with the regional OBIS node managers to promote collaboration	ODIN project coordinators
41	535	**The Committee noted** that IODE-XIX will be held during the IPY. In view of this, **the Committee recommended** that IODE should direct its attention to focus on the polar data during IODE-XIX and **instructed** data centres to include information on related activities in their reports to IODE-XIX. The list of data types required for IPY should be sent to appropriate centres so that they can do data mining. WDC for Oceanography, Silver Spring offered to start the process moving as soon as possible	IODE data centres WDC for Oceanography, Silver Spring
42	537	**The Committee endorsed** the proposal that EURASLIC should work with GE-MIM to develop the proposal for an ODIN for ECT.	EURASLIC; GE-MIM
43	539	**The Committee emphasized** the need to continue this work and **invited** the upcoming WESTPAC Session to consider the establishment of an ODIN network for the region.	WESTPAC
44	541	**The Committee agreed** that GE-MIM should continue with its activities in the [Pacifif Islands] region and the progress reviewed at IODE-XIX	GE-MIM

45	549	**The Committee requested** that the JCOMM/IODE secretariat to maintain an up-to-date web page of upcoming training events. This will help the member countries to plan their participation in such activities or influence the content of such activities	JCOMM and IODE Secretariats
46	553	**The Committee expressed** its general satisfaction with the new web site and **requested** the Secretariat to continue developing the site, taking into account the comments from the Members of the Committee.	IODE Secretariat
47	557	**The Committee concluded** that the production of a brochure would be useful for publicizing the activities of IODE and **instructed** the IODE Secretariat to further study this issue.	IODE Secretariat
48	558,559	**The Committee instructed** the IODE Secretariat to make the IODE posters available in an electronic and layered version so that they can be printed and customized locally. **The Committee noted the need** to translate the posters to other languages so as to reach a wider community, and **recommended** that a composite poster covering all the IODE activities be produced as some institutions have limited space for posters.	IODE Secretariat
49	568	**The Committee noted** the offer of Italy to host next session in Rome in 2007, and **instructed** the Secretariat in consultation with the Chairman to follow-up on the offer.	IODE Secretariat
50	570	**The Committee requested** the IOC Secretariat and its Chairman to make editorial corrections as necessary, taking into account the discussions held during the Session.	IODE Secretariat, IODE Chair
51	571	**The Committee requested** the IODE Chair to present the Executive Summary with all Resolutions and Recommendations therein to the Twenty-Third Session of the IOC Assembly that will take place in June 2005 at the UNESCO Headquarters in Paris, France.	IODE Chair

ANNEX VII

LIST OF ACRONYMS

ACMAD	African Centre of Meteorological Applications for Development
ADCP	Acoustic Doppler Current Profiler
AFRIAMSLIC	African Aquatic & Marine Science Libraries & Information Centres
AFRIDIR	African Directory of Marine and Freshwater Professionals (ODINAFRICA)
AFRILIB	Africa's Library Holdings (ODINAFRICA)
AMD	Antarctic Master Directory
ASDD	Australian Spatial Data Directory
ASFA	Aquatic Sciences & Fisheries Abstracts
BioCASE	Biological Collection Access Service in Europe
BODC	British Oceanographic Data Centre
BUFR	Binary Universal Form for Representation of Meteorological Data
CARBOOCEAN IP	CarboOcean Integrated Project
CARSADIR	Caribbean & South American Directory of Marine and Freshwater Professionals (ODINCARSA)
CBCG	Capacity Building Coordination Group (JCOMM)
CBPA	Capacity Building Programme Area (JCOMM)
CBS	Commission for Basic Systems (WMO)
CDIAC	Carbon Dioxide Information Analysis Center
CEP	Caspian Environment Programme
CLIVAR	Climate Variability and Predictability Programme
COINet	China Oceanic Information Network
CoML	Census of Marine Life
COMNAP	Council of Managers of National Antarctic Programmes
COOP	Coastal Ocean Observations Panel
CSIRO	Commonwealth Scientific & Industrial Research Organization (Australia)
CTD	Conductivity-Temperature-Depth Probe
DiGIR	Distributed Generic Information Retrieval
DMAC	IOOS Data Management & Communication
DMCG	Data Management Coordination Group (JCOMM)
DMPA	Data Management Programme Area (JCOMM)
DNA	Designated National Agency
DOI	Digital Object Identifier
DOME	Database on Oceanography & Marine Ecosystems

E2EDM	End-to-End Data Management
ECOMIC	Ecological Study Dataset of Microbial Web in Tokyo Bay (Japan)
ECET	European Countries in Economic Transition
EDIOS	European Directory of the Initial Ocean-observing System
EDMED	European Directory of Marine Environmental Datasets
ENSO	El Nino & Southern Oscillation
ETDMP	Expert Team on Data Management Practices (JCOMM/IODE)
EU	European Union
MAMA	Mediterranean network to Assess and upgrade Monitoring and forecasting Activity
EU/TACIS	European Union/Technical Assistance to Eastern Europe & Central Asia
EURASLIC	European Association of Aquatic Sciences Libraries and Information Centres
EuroGOOS	European Global Ocean Observing System
FAO	Food & Agriculture Organization of the United Nations
FERHI	Far Eastern Regional Hydrometeorological Research Institute
FUST	Flanders-UNESCO Science Trust Fund
FWIS	Future WMO Information System Requirements
GBIF	Global Biodiversity Information Facility
GCMD	Global Change Master Directory
GCOS	Global Climate Observing System
GDAC	Global Data Assembly Centre
GE-BICH	IODE Group of Experts on Biological & Chemical Data Management & Exchange Practices
GE-MIM	IODE Group of Experts on Marine Information Management
GEOHAB	Global Ecology & Oceanography of Harmful Algal Blooms
GEOSS	Global Earth Observation System of Systems
GE-TADE	IODE Group of Experts on the Technical Aspects of Data Exchange
GIS	Geographic Information Systems
GLOBEC	GLOBal ocean ECosystems Dynamics
GLODAP	Global Ocean Data Analysis Project
GLODIR	Global Directory of Marine (& Freshwater) Professionals
GLOSS	Global Sea-Level Observing System
GMES	Global Monitoring for Environment & Security
GODAE	Global Ocean Data Assimilation Experiment
GODAR	Global Oceanographic Data Archaeology & Rescue
GOOS	Global Ocean Observing System

GOSIC	Global Observing System Information Center
GOSUD	Global Ocean Surface Underway Data Pilot Project
GTOS	Global Terrestrial Observing System
GTS	Global Telecommunication System (WMO)
GTSPP	Global Temperature & Salinity Profile Programme
HAB	Harmful Algal Blooms (IOC)
HABDIR	Global Directory of Harmful Algal Bloom Experts
HNODC	Hellenic National Oceanographic Data Centre
HODC	Hellenic Oceanographic Data Center
IAMSLIC	International Association of Aquatic & Marine Science Libraries & Information Centers
ICAM	Integrated Coastal Area Management
ICES	International Council for Exploration of the Sea
IFREMER	Institut Français de Recherche pour l'Exploitation de la Mer (French Institute of Research & Exploitation of the Sea)
IGAD	Intergovernmental Authority on Development
IGBP	International Geosphere-Biosphere Programme
IGOSS	Integrated Global Ocean Services System
ILMS	Library Management System Software
IMBER	Integrated Marine Biogeochemistry & Ecosystem Research
IMO	International Maritime Organization
INCOIS	Indian National Centre for Ocean Information Services
IOC	Intergovernmental Oceanographic Commission
IOCEA	IOC Regional Committee for the Central Eastern Atlantic
IOCINDIO	IOC Regional Committee for the Central Indian Ocean
IOCSOC	IOC Regional Committee for the Southern Ocean
IOCWIO	IOC Regional Committee for the Cooperative Investigation in the North & Central Western Indian Ocean
IODC	Indian Oceanographic Data Center
IODE	International Oceanographic Data & Information Exchange
IOGOOS	Indian Ocean Global Ocean Observing System
IOS	Institute of Ocean Sciences (Italy)
IPY	International Polar Year
ISO	International Organization for Standardization
ITIS	Integrated Taxonomic Information System
JASIN	Joint Air Sea Interaction Project
JCADM	Joint Committee on Antarctic Data Management
JCOMM	Joint WMO-IOC Technical Commission for Oceanography & Marine Meteorology

J-DOSS	JODC Data Online Service System
JEXAM	Japanese Experiment on Asian Monsoon
JGOFS	Joint Global Ocean Flux Study
JODC	Japan Oceanographic Data Centre
KODC	Korea Oceanographic Data Centre
LME	Large Marine Ecosystems
LOICZ	Land-Ocean Interactions in the Coastal Zone
LUC	Limburgs Universitair Centrum (Belgium)
MARIS	Marine Information Service(Netherlands)
MARPOLMON	Marine Pollution Monitoring System
MBARI	Monterey Bay Aquarium Research Institute
MBT	Mechanical BathyThermograph
MEDI	Marine Environmental Data Inventory
MEDS	Marine Environmental Data Service (Canada)
MHI	Marine Hydrophysical Institute (Ukraine)
MIIS	Marine Integrated Information System on the Indian Ocean
MMI	Marine Metadata Interoperability
MOU	Memorandum of Understanding
NADC	National Antarctic Data Centre
NCDC	National Climatic Data Centre (USA)
NEAR-GOOS	North-East Asian Regional Global Ocean Observing System
NGDC	National Geophysical Data Center (USA)
NIO	National Institute of Oceanography (India)
NMDIS	National Marine Data & Information Service
NMHS	National Meteorological & Hydrological Services
NOAA	National Oceanic & Atmospheric Administration
NOC	National Oceanographic Committee
NODC	National Oceanographic Data Centre
NOP	National Oceanographic Programme
NSF	National Science Foundation
OAI	Open Archives Initiative
OBI	Ocean Biodiversity Informatics
OBIS	Ocean Biogeographic Information System
OBISMC	OBIS Management Committee
OCEANIC	Ocean Information Center (University of Delaware, USA)
ODAS	Ocean Data Acquisition Systems

ODIMeX	Integrated Expert & Training System for Oceanographic Data & Information Management
ODIN	Ocean Data and Information Network
ODINAFRICA	Ocean Data & Information Network for Africa
ODINCARSA	Ocean Data & Information Network for the Caribbean & South American regions
ODINCINDIO	Ocean Data & Information Network for the Central Indian Ocean Region
OIT	Ocean Information Technology
OOPC	Ocean Observation Panel for Climate
OP	OceanPortal
OPA	Observations Programme Area (JCOMM)
PANGAEA	Publishing Network for Geoscientific & Environmental Data
PAPA	Project on Marine Data & Information Management in the Baltic Region
PICES	North Pacific Marine Science Organization
PIRG	Pacific Islands Regional Group
PIROF-ISA	Pacific Islands regional Ocean Framework for Integrated Strategic Action
RDMDB	Regional Delayed Mode Data Base (NEAR-GOOS)
RIHMI	Russian Institute of HydroMeteorological Information
RNODC-INDO	Responsible National Oceanographic Data Centre for the Indian Ocean Region
RON	Regional OBIS Node
SAMOS	Shipboard Automated Meteorological & Oceanographic Systems
SCAR	Scientific Committee for Artic Research
SCOR	Scientific Committee for Oceanic Research
SEAMAP	Spatial Ecological Analysis of Megavertebrate Populations (OBIS)
SGXML	Study Group on the Development of Marine Data Exchange Systems Using XML
SOLAS	Surface Ocean - Lower Atmosphere Study
SOOPIP	Ship of Opportunity Programme Implementation Panel
SOT	Ship Observations Team (JCOMM)
SVP	Surface Velocity Programme
TESAC	Temperature, Salinity, Currents
TRACKOB	Report of Marine Surface Observations along a Ship`s Track
UCAR	University Corporation of Atmospheric Research (USA)
UNESCO	United Nations Education, Science & Cultural Organization
URMO	UNESCO-IOC Register of Marine Organisms
USDOE	United States Department of Energy
VLIZ	Vlaams Instituut voor de Zee (Flanders Marine Institute) (Belgium)

VMDC	Vlaams Marien Data Centrum (of VLIZ)
VOS	Volunteer Observing Ship
WDC-MARE	World Data Center for Marine Environmental Sciences
WDC-MGG	World Data Center for Marine Geology and Geophysics
WESTPAC	IOC Sub-Commission for the Western Pacific Region
WHP	WOCE Hydrographic Programme
WMO	World Meteorological Organization
WOA	World Ocean Atlas
WOCE	World Ocean Circulation Experiment
WOD	World Ocean Database
WOD04	World Ocean Database 2004
XBT	Expendable BathyTermograph
XML	eXtensible Markup Language

[end]