

**INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION
(of UNESCO)**

**Nineteenth Session of the IOC Committee on International Oceanographic Data
and Information Exchange (IODE-XIX)
Trieste, Italy, 12-16 March 2007**

**Follow-up to the IODE review
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This document provides a status report on the implementation of the recommendations made by the IODE review and as adopted by IODE-XVIII, and identifies issues that still remain to be addressed. Parts of this document are copied from Document IOC/IODE-XIX/7

1. Summary of the IODE Review Conclusions

Comments received relating to the operational structure of IODE

The **general impression** of IODE's activities and its data centre system is positive. A great majority of the respondents believe that the objectives of the IODE Programme are still appropriate. IODE is considered beneficial to the marine scientific community as its constituent members compile a vast amount of data, quality control the data, transfer it into a few common standard formats, and give access to the data. On the other hand, there is an almost total consensus that the IODE Programme needs a major overhaul to better fulfil the changing data and user requirements. The respondents also expressed the need for IODE to expedite access to marine data, to acquire more data from the research community, and to extend its activities to a broad cross-section of marine disciplines. Although the basic data centre system is appreciated it needs to be further developed with the latest information technology.

The future of IODE does not lie in developing generalised standards and procedures in isolation from the work of other groups. IODE needs to become specific and pro-active. IODE must do more to encourage the use of standards for harmonization of protocols and formats across data centres so that clients can more easily read data files and build seamless products from multiple sources. There needs to be effective and whole hearted co-operation between IODE and JCOMM to effect complete and high quality end-to-end data management. Over the past few years, IODE has advanced more rapidly in making information available than in further improving the compilation of ocean data. It seems as if IODE has become more oriented towards technology rather than ocean sciences. The Review Group was fully aware that new and promising techniques must be applied for better communication. However, IODE has not performed well in tackling the more scientific problems, such as establishing the tools for a global compilation of data from other disciplines; large amounts of even physical data have not been compiled by NODCs and channelled into the IODE data centre system; and the data quality assurance is under-developed. IODE has not yet succeeded

in creating global data sets of even quality. This is an essential requirement of the global science programmes which monitor the slow global changes in the marine environment and try to forecast its development.

IODE Services: Only every second respondent is satisfied with the services which the IODE data centres offer. A great majority of respondents receive products from an outside project or institution rather than from an IODE centre. Many respondents feel that there are gaps in the products and services of IODE. IODE should not only deal with data and metadata; the interdisciplinary nature of the marine environment requires also the supply of products and services. IODE centres need to demonstrate the added value they contribute to data they manage. Data products are needed, especially from variables not traditionally managed by IODE centres, eg. biological, geophysical and remotely sensed data. There must be a strong link between global oceanographic research projects and the IODE network for the smooth flow of data. There is a need to work with the scientist developers of GOOS, GCOS, and GTOS to implement useful data products and analyses. The needs are broadly based and involve new data. Some NODCs have been taken up this challenge.

The Functioning of Groups of Experts: A major drawback of IODE is seen in the fact that one has to rely virtually exclusively on voluntary labour which makes any progress slow. No great value is seen in permanent groups of experts on technical issues. Critics say that IODE moves too slowly in the formation of new groups and in the abolition of groups which are no longer required. Once established, there is not an effective process to review the progress made by these bodies or their missions. The groups' success depends too much on the chairperson of the group. Often no specific goals or work plans were set for the groups. As a consequence the results are too often meagre.

Quality Control (QC) is vital. Many years ago, IODE agreed upon minimum quality control procedures. The survey of the Review Group however has shown that this agreement is not followed by many of the data centres. The Review Group draws the conclusion that the data archived in the IODE data centres are of a varying quality. IODE has no overall quality assurance strategy or peer-review process although individual centres do.

It is not sufficient to quality control the data which have been submitted to the NODC (or an equivalent centre). The IODE centres must, along with the data, process and archive information (often called metadata) about the procedures for calibrating instruments and the algorithms which were used by the data collectors to process the raw values. Quality assurance ranges from the preparation of a measuring campaign to the final depository of the data. It should include participation in inter-laboratory comparison or proficiency-testing programmes. IODE must take steps to improve the data quality. However there is some danger in getting overzealous with the QC. It is very important that all QC procedures applied to data sets are based on sound science and are fully documented with the data sets so that changes can be identified when necessary in the future. It must also be considered that data quality is relative to the purpose for which it will be used, and such uses are not necessarily predictable. The use of data provides another level of quality assurance because it may identify errors or weaknesses in data that were previously unknown. Feedback from users should be sought.

Capacity building: IODE provides excellent assistance to developing nations to participate more effectively in international ocean data exchange and to build up their capabilities and infrastructure for improved management of marine data and information. The spectrum of proposals for strengthening capacity building activities ranges from collection, quality control, archiving and dissemination of data to the development of predictive models. IODE should be able to identify remotely sensed, real-time and GIS data, and access to the internet should be improved. There is an overwhelming support for the concept of training trainers who can provide training on IODE activity in a region. The OceanTeacher training courses received

interest and support. However, the wish was expressed that they should also be held in other languages than English. Learning aspects are being implemented quite well. Supply and maintenance of hardware to developing countries has not been fully addressed, because of funding or availability problems.

Comments received relating to the organizational structure of IODE

Data submission to NODC: Most respondents favour the existing network, but they see the necessity for restructuring, greater efficiency and faster reaction to the changing IT world. A network is needed but the present structure is deemed irrelevant by many. Critics see IODE as a body too slow to change and not effective enough to solve present day problems. Many NODCs are unable to effectively compile data. A new national structure has to be implemented to overcome this deficiency. NODCs may not be effective enough because of insufficient authority to request data from originators. Too many institutions are not too keen to submit data. Data originators still will not release data even after several years. Data submission to an NODC depends on the procedures within a nation, and it also depends on the willingness of funding agencies to enforce data policy. Too many data originators still believe that the data which they have collected with public money are their own.

IOC Data Policy: At its 22nd Session (2003) the Assembly approved a new data policy (Resolution IOC-XXII-6). The questionnaire and the surveys indicate that less than 50% of the respondents know about the existence of an IOC Data Policy.

NODCs: The existing data centre system, and here especially the NODCs, are still seen as the strength of IODE. However, a majority of the respondents believe that the NODCs should function differently from the way they do at present. An NODC should have a central role in ocean data management in each IOC country. In terms of management of data within a country a distributed system is viewed as being a better solution compared to the present hierarchical system.

IODE data centres should all be in the business of, or ready to cooperate with others in, dealing with real time data. Those centres which already have expertise in handling new types of data (e.g. environmental monitoring data) should provide services to COOP and to data centres which do not have that expertise.

IODE centres do interact with users but there is no co-ordinated mechanism to review their comments on an international basis and on a regular schedule to see if common issues arise. Mechanism for feedback needs improvement by the establishment of a permanent interface that collects feedback from IODE data users.

A few respondents suggested considering the usefulness of establishing a multi-national data centre by those countries in a region which have only small oceanographic activities. This concept, though perhaps difficult to implement, could possibly have enormous synergetic effects in the respective region; e.g. saving of money, accumulation of knowledge, unique data processing and quality control procedures, and improved and more complete data services.

RNODCs: The relevance of the Responsible National Oceanographic Data Centres which were established to support the World Data Centres for Oceanography is questioned. Many respondents were unclear about their function.

WDCs: The majority of the respondents said that World Data Centres are relevant and needed. Their main task should be to finally archive, and thus safeguard, the data on a global scale.

But there were also some critical remarks. It was questioned if all oceanographic WDCs meet

the mandate of a World Data Centre. With improved technology for exchanging data, there is a changed role for a WDC. They no longer can claim to have the most complete, nor most up-to-date data holdings. In many cases, they cannot claim the highest quality version of the data either. It is important to consider the future role of the WDCs.

Sometimes the WDCs give users the impression that they work under a national policy rather than under the guidance of ICSU. The need for having three WDCs (Oceanography) is also questioned by many people. For those people who have not submitted data to a WDC it is sometimes difficult to receive data from that WDC.

MIM: IODE is obviously not properly dealing with Marine Information Management. The topic is too broad and IODE does not have sufficient competence and resources to respond to specific needs. The division between data and information is blurred. Closer co-operation between these two components of IODE would be useful. Some respondents appreciate that IODE is helping the computerisation of libraries and information centres in Ocean Data and Information Networks (ODIN) and participates actively in IAMSLIC. It is also appreciated that IODE provides training to librarians.

The Aquatic Sciences and Fisheries Abstract (ASFA), OceanPortal and UN Atlas of the Oceans are quite well known, used and appreciated. ASFA is the most popular bibliographic data base used.

OceanPortal is considered a quite complex site, especially in navigation. Sometimes this is a handicap for average library users. Some clients, especially those engaged in marine management, are very interested in it. A majority says that OceanTeacher has relevance to them as a source of training material, and they appreciate the quality of the training material. However, there is a severe language problem.

The usefulness of OceanExpert (dictionary of marine scientists) is questioned by several people. It would need updating, because many addresses are not valid.

The IODE web site is well known by marine information managers. A majority of the respondents find navigation, quality of content, and relevance to user of the MIM part of the IODE web site good. However, most of them are unsatisfied with the download speed.

ODIN: The Ocean Data and Information Network strategy received an overwhelming support by the respondents. This strategy coupled with the 'training trainers' initiative is generating positive impact in recipient countries by expanding capacity building and technology transfer opportunities. It is also contributing to strengthening links within the regions. The ODIN strategy should be expanded to other world regions. Training packages have proved very beneficial to Member states in ODIN regions.

External IODE Offices: The establishment of external IODE Offices was strongly supported, because the IOC Secretariat is understaffed and the IT technology which is available at UNESCO does not meet the requirements for effective access.

Comments received relating to other aspects

In the domain of providing products and services the language barrier still remains a problem. For those countries where oceanography is not yet well developed the public awareness of IODE should be reinforced. By far, the most data in the IODE system come from governmental institutions (94%). The connection of IODE data centres with universities seems to be poor.

2. Review of recommendations made by the Review Group and decisions made by IODE-XVIII based upon these

Review Recommendation 1: The IODE review recommended the modification of objectives of the IODE Committee

Action by IODE-XVIII: (para 281-282) adopted Recommendation IODE-XVIII.1 (The IODE Objectives).

Intersessional follow-up:

- 23rd Session of the IOC Assembly (21-30 June 2005) adopts Resolution XXIII-4 (INTERNATIONAL OCEANOGRAPHIC DATA AND INFORMATION EXCHANGE (IODE)) – see Appendix 1 – and in particular Annex I to that resolution which defines the new IODE Objectives.
- The revised objectives have been communicated to the IODE community through posting on the IODE web site (3 January 2006)

Required action by IODE-XIX: The Committee needs to identify a long-term strategy that defines how the IODE objectives will be achieved (see also Agenda Item 8.2).

Review Recommendation 2: The IODE review recommended to reduce the present number of IODE Officers drastically

The group of IODE Officers should consist of: the IODE Chairperson, the Vice-Chairperson, and the Chairpersons of groups joint with other organizations. The WDC Directors and selected regional, scientific or technical experts may be invited to Officers' Meetings, if the agenda calls for them. Taking into account that the IODE Committee meets every second year or so one Officers Meeting should follow immediately the Committee Meeting to finalize the Action Plan, a second meeting should be held during the intersessional period to review progress and prepare for the coming Committee meeting. (Ref.: sections 4.1.3 and 7.3)

Action by IODE-XVIII: (para 283-285) 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.

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.

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.

Intersessional follow-up:

- the revised composition of the IODE Officers has been communicated to the IODE community through posting on the IODE web site (2 January 2006)
- an IODE Officers meeting was held 6-7 February 2006 (Ostend, Belgium)

- an IODE Officers meeting is planned to be held on 17 March 2007 (Trieste, Italy)

Required action by IODE-XIX:

In view of the increasing demands on the Chair (due to eg responsibilities in JCOMM, GOOS, etc) and the unbalance between the tasks of the Chair and Vice-Chair, the Committee is invited to consider the revision of the management structure by electing two Co-Chairs rather than Chair and Vice-Chair.

Review Recommendation 3: The review recommended that that the Groups of Experts be abolished

Instead the IODE Committee should be encouraged to form Steering Groups (Steering Groups, along with ad-hoc groups, working groups and task teams, have in the past been created by IODE to assist the implementation of special projects. As such Steering Groups are bodies with a given lifespan and a clearly defined goal. In this context, the 'Steering Group' should be seen as a 'project management group' that is part of an approved project) with clearly defined goals. Any person or organisation may submit a project proposal either to the IODE Chairperson or to the IOC Secretariat. The proposal must be relevant to a strengthening of the international oceanographic data and information exchange. The proposal will be evaluated by the IODE Officers in consultation with external experts and passed on to an IOC Governing Body (Assembly or Executive Council) for approval, taking into account the financial implications. If the proposal is endorsed by the IODE Officers then the work may proceed pending approval if there are no immediate financial implications to IOC. Some specific action items of the old Group of Experts and projects could be the basis for some new steering groups. For example the continued development of Marine XML (4.1.13 and 4.2.5) could be supported in this way. A Steering Group should consist of no more than 6 competent experts. The person (or a group) who has submitted the project proposal should have the right to recommend the members of the group. (Ref.: sections 4.1.13; 4.1.14; 7.2; and 3.1 'The Functioning of GEs')

Action by IODE-XVII:

Para 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.

Para 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.

Para 290: The Committee adopted Resolution IODE-XVIII. (see Appendix 2)

Intersessional follow-up: a draft document was prepared by the Chairs of the three Groups of Experts and submitted to the February 2006 meeting of the IODE Officers (see Document IOC/INF-1224 page 24-26. The Officers requested the Chairs of the GEs, taking into consideration the comments by the Officers, to finalize the proposed structure and strategy as a working document and draft resolution for consideration and adoption by the IODE –XIX Session. This document was prepared as Document IOC/IODE-XIX/19 (Future Strategy and Structure for IODE Groups of Experts).

Required action by IODE-XIX : The Committee will be invited to review the Document and adopt the proposed Draft Resolution.

Review Recommendation 4: Regarding Distributed national data management systems the IODE review recommended a more distributed system in each country.

The data generating oceanographic institutions may initially keep their data in their own data base. The NODC and others should have access to this data base. The NODC should function as a national coordinator for the distributed data bases (that is, function as a hub). It agrees upon standards with the data originators, and it archives the data at the national level for holding an offsite backup. The NODC should be encouraged to establish a portal for easy navigation through the national distributed network. (Ref.: sections 4.1.11; 7.10; and 3.2 'NODCs' and 'Data Submission to NODC').

Action by IODE-XVII: (p

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

Para 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.

Para 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.

Intersessional follow-up: The Officers requested the Secretariat and Chair IODE to identify suitable experts, in consultation with the Chairs of the IODE GEs, who could provide connections between DMACS, SeaDataNet and other distributed system projects/initiatives.

Required action by IODE-XIX : The Committee will be requested to consider practical actions that promote the sharing of expertise regarding the development of distributed systems.

Review Recommendation 5: regarding Responsible National Oceanographic Data Centres (RNODCs) recommended to abolish the RNODCs.

Instead, IODE should encourage national data centres and research programmes to identify, advertise, and coordinate institutions that are willing to take up special responsibilities (preparation of scientific products or provision of scientific services) as part of the distributed data centre system of IODE suggested above. (Ref.: sections 4.1.10; 7.9; and 3.2 'RNODCs')

Action by IODE-XVII:

Para 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.

Para 295: The Committee adopted Resolution IODE-XVIII.2 (see Appendix III)

Intersessional follow-up:

- The Officers requested the former RNODCs to document the products and services that were provided by the RNODCs and to incorporate these, as relevant, in the terms

of reference of the ODINs. The Officers tasked the Secretariat with this task in close cooperation with the (existing) ODIN project leaders.

- Exceptions to this migration are:
 - o RNODC for drifting buoys (Canada)
 - o JASIN (UK: to be closed), IGOSS (Japan, USA and Russia)
 - o MARPOLMON (Japan, USA and Russia)
 - o ADCP (Japan).
 - o The Officers requested the centres that hosted the former RNODCs for drifting buoys (Canada), IGOSS (Japan, USA and Russia), MARPOLMON (Japan, USA and Russia) and ADCP (Japan) to continue their work until the next Session of IODE. This matter will be further discussed with these centres prior to IODE-XIX (in close consultation with the JCOMM DMPA) for advice to IODE-XIX.

Required action by IODE-XIX : as no further action was undertaken between the IODE Officers meeting and the date of publication of this document, RNODCs are requested to provide the requested information as an annex to their National Report. The Secretariat will collate this information by 15 February 2007. The collected information will be sent to ODIN project leaders in relevant regions. In the exception cases the Secretariat will invite the centres that host the former RNODCs for proposals on the future of the RNODCs. In this regard reference is also made to Agenda Item 8.2). The IODE Committee will be invited to formulate clear instructions regarding the future of former RNODCs as well as on the archival of their historic data.

Review Recommendation 6: regarding countries of a region with relatively small oceanographic activities should consider the feasibility of establishing a joint multi-national oceanographic data centre.

The creation of such a centre, which should function as a regional hub could have enormous synergetic effects. (Ref.: sections 7.10; and 3.2 ‘NODCs’ and ‘Data Submission to NODC’).

Action by IODE-XVII:

Para 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.

Para 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.

Intersessional follow-up: no action required

Required action by IODE-XIX: the Committee is invited to recommend ways to guide Member States interested in developing national oceanographic data and marine information management capacity. This may require the revision of the Guide “Guide for Establishing a National Oceanographic Data Centre” (IOC Manuals and Guides No. 5) published in 1997. This revision may also take into consideration the input received for Recommendation 4.

Review Recommendation 7: regarding Quality Control, the IODE Review recommended that IODE make a strong endeavour to ensure a better quality of oceanographic data

Measured data should always be accompanied by information (metadata) about quality assurance procedures applied both before and during the measurement, and while analysing and processing the data. (Ref.: sections 6; and 3.1 'Quality Control (QC)')

Action by IODE-XVII:

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

Para 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.

Para 300: The Committee adopted Resolution IODE-XVIII.4 establishing an inter-sessional working group (see Appendix 4).

Intersessional follow-up: It was impossible to identify a Chair for this inter-sessional group during the inter-sessional period. The Secretariat prepared an online survey (17 May 2006) and collected data. A report was prepared (see Document IOC/IODE-XIX/13). Following the publication of this Document (11 January 2007) the Vice-Chair invited the members of the inter-sessional group to comment on the results of the Survey. The document resulting from these email discussions will be available as Document IOC/IODE-XIX/13 add.

Required action by IODE-XIX: whereas the IODE review considered quality control as an important and essential element of the IODE programme the results of the survey indicate a wide variety of reference documentation and software used for the quality control of oceanographic data. The Committee will be invited to discuss the need of a revision of the Guide "Manual of quality control procedures for validation of oceanographic data" (IOC Manuals and Guides No. 26) published in 1997. This revision may wish to take into consideration the publication of related documentation by recent relevant international projects.

Review Recommendation 8: regarding Cooperation with scientific programmes, institutions and agencies, the IODE review recommended for IODE to intensify its interaction with appropriate scientific programmes, institutions or agencies,

either nationally or internationally, in the development and production of scientific services and products, especially with regard to areas of IODE weakness such as biological data (including species and fisheries data). (Ref.: sections 7.12; 3.1 'IODE Services' and 'General impressions')

Action by IODE-XVII: at IODE-XVIII this was discussed under Agenda Item 4.3 (cooperation with science and monitoring programmes):

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

Para 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.

Para 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.

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

Intersessional follow-up: this is covered under the collaboration of OBIS and IODE within GE-BICH (see Document IOC/IODE-XIX/20)

Required action by IODE-XIX: the Committee is invited to review ongoing cooperation between IODE and OBIS and to make concrete recommendations for further actions. Reference is made to Agenda Item 6.1.3 (related to the development of an Ocean Data Portal)

Review Recommendation 9: regarding the development of a global data set for long-term archival, the IODE review recommended that that IOC consults ICSU and scientific partners on the best way to build, in consultation with IODE, one master global data set of the best possible scientific quality for long-term archival.

There should be IODE or ICSU backups or ‘mirror site’ at other locations to maximise data security. It further recommends that the WDCs provide open access to these data. (Ref.: sections 4.1.9; 7.8; and 3.2 ‘WDCs’)

Action by IODE-XVII: This matter was covered under Agenda Item 3.3 as the WDC Oceanography, Silver Spring maintains the WOD.

Para 83: 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.

Para 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.

Intersessional follow-up:

para 83: no progress has been reported by the WDC for Oceanography Silver Spring; para 94: Secretariat has requested WDCs to provide information and links to relevant products and services (January 2007)

Required action by IODE-XIX: the Committee will be requested to (i) recommend further action regarding the building of a global data set ; (ii) review the web page of WDC products and services.

Review Recommendation 10: regarding MEDI the IODE review recommends that the IODE reviews the need and resources required for... the Global Change Master Directory (GCMD), the European Directory of Marine Environmental Data (EDMED), and the Global Observing Systems Information Center (GOSIC) Dataset Registry considering the developments in online search engines.

Action by IODE-XVII : this was covered under agenda item 6.2.6 on MEDI:

Para 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.

Para 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.

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

Para 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.

Para 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.

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

Para 453 The Committee adopted Recommendation IODE-XVIII.3 (see Appendix 5)

Intersessional follow-up: The MEDI Steering Group met for its third Session between 11 and 13 September 2006 in Philadelphia, USA. Reference is made to Document IOC/SD/MEDI-III/3 as well as to Document IOC/IODE-XIX/28.

Required action by IODE-XIX : **reference is made to the action items listed in Document IOC/IODE-XIX/28**

Review Recommendation 11: the IODE review recommended to abolish the system of IODE Regional Coordinators

Action by IODE-XVII:

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

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

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

Para 307 The Committee adopted Resolution IODE-XVIII.1 (See Appendix 6)

Para 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.

Intersessional follow-up: this matter was discussed at the IODE Officers Meeting (February 2006): The Officers requested the Secretariat to contact ODIN coordinators and inform them of the responsibilities of the former IODE Regional Coordinators.

Most regions are covered by ODINs:

- IOCINDIO: ODINCINDIO
- IOCEA: ODINAFRICA
- IOCWIO: ODINAFRICA
- IOCARIBE: ODINCARSA (Covers Caribbean and South America)
- El Niño: ODINCARSA

Action taken: The above ODIN project leaders are well aware of the responsibilities of the former IODE regional coordinators and these have been subsumed by the concerned ODIN projects.

- WESTPAC: ODINWESTPAC is in preparation phase.
- IOCSOC: It was noted that there had been some discussions on the establishment of “Polar” ODINs,
- Black Sea: starting establishment of an ODIN for the Black Sea (outcome of EU ASCABOS kickoff meeting, January 2006, Istanbul).
- Mediterranean: partly covered by ODINAFRICA. May also be covered by SeaDataNet

Action taken: as the above have not yet established ODINs no specific action has been taken

The Officers noted that certain areas are currently not covered by IOC regional bodies or by IODE. These are Pacific Islands, Eastern Europe, Polar regions (SCAR, IASC), North Atlantic (although covered by ICES). The Officers requested the Chair to contact agencies/programmes operating in regions currently not covered by IOC or IODE regional programmes with the view of establishing joint ODIN-type initiatives.

Action taken: to be reported by Chair

Required action by IODE-XIX: to be discussed

Review Recommendation 12: regarding IODE National Coordinators the IODE review recommended that the IOC Secretariat urges those IOC Member States which have not yet done so to nominate an IODE National Coordinator so as to improve liaison between their national oceanographic institutions and the IOC Secretariat.

Action by IODE-XVII:

Para 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.

Intersessional follow-up: IOC Circular Letter 2215 was sent on 20 November 2006 invited Member States to nominate IODE National Coordinators for Marine Information Management. This Letter resulted in one additional nomination.

Required action by IODE-XIX: It is noted that IODE counts 84 IODE National coordinators for oceanographic data management, but only 30 IODE National Coordinators for marine information management. Despite numerous email reminders and Circular Letters this number has not increased substantially since 2005. The Committee is requested to recommend action to increase this number.

Review Recommendation 13: regarding the IOC Oceanographic Data Exchange Policy the IODE review recommended that the 23rd Session of the Assembly demands that IOC’s Member States implement IOC’s Data Policy which was approved by the 22nd Assembly in 2003 at their national level.

Action by IODE-XVII

Para 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 .

Intersessional follow-up: The IODE Officers (February 2006) requested NODCs to attach a copy of their national data policy to their next IODE national report. The Officers requested the IODE Secretariat to re-send IOC Circular Letter 2123.

Action taken: Circular Letter 2211 (15/12/06) inviting Member States to IODE-XIX, included a request to report on the implementation of the Policy at the national level. Reference is made to Document IOC/IODE-XIX/44 (IOC Oceanographic Data Exchange Policy: implementation by Member States).

Required action by IODE-XIX: the Committee is requested to comment on the status of implementation of the Policy by Member States with the view of reporting to the 2007 IOC Assembly on this matter.

Review Recommendation 14: regarding the IODE unit at the IOC Secretariat, because of its cross-cutting nature, its special expertise, and unique role for the global exchange of marine data, the IODE review recommended to keep the IODE unit on the same administrative level to maintain its efficiency.

The unit should continue to operate independently from other IOC Programmes. (This recommendation may be subject to any future broader re-organization of the IOC Secretariat.)

Action by IODE-XVII

Para 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.

Intersessional follow-up:

The Officers (February 2006) expressed their concern about the restructuring of the IOC and the impact of this on IODE. The Officers requested the Chair to write a letter to the IOC Officers and to report to the EC 20. The Chair included this concern in her address to the IOC Executive Council.

The IOC Executive Council did not follow IODE in its request and restructured IOC, placing IODE in the Ocean Observations and Services (OOS) Section, under the management of the Director of the GOOS Project Office. Reference is made to Document IOC/IODE-XIX/14 (Restructuring of the IOC and its impact on IODE)

Required action by IODE-XIX: The Committee will be requested to comment on the new structure under Agenda Item 4.1

Review Recommendation 15: regarding IODE operational activity maintenance the IODE review recommended for the IOC Secretariat to consider ways and means for contracting out to private consultants IODE related operational activities.

The possibility of outsourcing to an NODC or national agency on a volunteer basis should also be recognized.

Action by IODE-XVII

Para 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.

Intersessional follow-up: The Officers requested more input and cooperation from GOOS, OBIS and JCOMM in terms of substance (Oceanteacher content). The Officers urged IOC, other organizations or projects to contribute financially or in-kind to further develop OT and to organize training activities based upon OT.

Required action by IODE-XIX: The Committee will be requested to provide guidance on the funding of operational activities of the IODE programme.

Review Recommendation 16: The IODE review recommended that the IOC websites should be simplified and should have a common style and navigational system

Action by IODE-XVII

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

Para 315 Reference is made also to Agenda Item 7.1.

Intersessional follow-up:

The Officers (February 2006) were informed that efforts are underway to harmonize the GOOS and IODE web sites.

Action taken: a new content management system is now being used that enables linkages between IODE, GOOS and JCOMM web sites. The integrated website system enables management of content, documents, events and people. The latter uses IODE's OceanExpert as its database system, thereby promoting and strengthening OceanExpert as a global directory of marine professionals. The new IODE web site has been launched on 16 January 2007. During the next months content needs to be prepared to populate the site.

Required action by IODE-XIX: the Committee will be invited to comment on the new site

Review Recommendation 17: regarding the role of IODE in the JCOMM/IODE ETDMP the Review recommended that IODE plays a pro-active role in the ETDMP and that the Officers monitor progress with particular care to avoid the same structural problems as the other groups of experts.

Action by IODE-XVII

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

Intersessional follow-up: This matter is covered as part of the GE discussions

Required action by IODE-XIX: n/a

APPENDIX 1

Resolution XXIII-4

INTERNATIONAL OCEANOGRAPHIC DATA AND INFORMATION EXCHANGE (IODE)

The Intergovernmental Oceanographic Commission,

Recognizing that global research, monitoring and observing programmes that are relevant to issues such as climate change, ecosystem dynamics and biodiversity, rely on multi-disciplinary data management, according to internationally agreed standards for their processing, quality control and archival,

Acknowledging the increasing role of the IODE Programme and its data and information centres in global observational and operational programmes,

Acknowledging further the considerable achievement of the IODE Programme in building capacity in Member States, specifically through the development of Ocean Data and Information Networks (ODIN) and the related OceanTeacher training and education system,

Welcomes the opening of the IOC Project Office for IODE in Ostend, Belgium, and **thanks** the Government of Flanders for the considerable additional financial support for capacity-building activities at the Project Office related to oceanographic data and information management;

Accepts the Executive Summary Report of the IODE-XVIII Session, **endorses** the Recommendations contained therein, and **notes with appreciation** the outcome of the IODE Review;

Decides to:

- (i) promote the development of regional Ocean Data and Information Networks;
- (ii) task the IOC Secretariat to ensure that all IOC programmes include data management in their activities and that these are developed in close collaboration with IODE and taken into consideration in the planned IOC data-management strategy;
- (iii) revise the objectives of the IODE Programme, as detailed in the Annex to this Resolution;

Urges Member States to:

- (i) increase their participation in international oceanographic data and information exchange through the establishment and/or strengthening of national data and information management infrastructures;
- (ii) ensure that these facilities are closely involved in and utilized for the management of data obtained from national, regional or international ocean programmes and projects;

Invites Member States to assist in the implementation of the IODE-XVIII work plan through the provision of extra-budgetary funds and/or the secondment of experts to the IOC Secretariat and/or IOC Project Office for IODE.

Identified funding (2006–2007):

UNESCO Regular Programme:	US\$ 124,300 for programme activities US\$ 120,000 for staff (ALD — Appointment of Limited Duration (ALD)— total required US\$ 200,000)
Extra-budgetary confirmed:	US\$ 1,261,800
Extra-budgetary requested:	US\$ 487,700 (of which 80,000 for ALD)

Annex to Resolution XXIII-4

The IODE Objectives

The Objectives of the IODE Programme shall be:

- (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 organizations with advice and data-management services.

APPENDIX 2

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.

APPENDIX 3

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.

APPENDIX 4

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.

APPENDIX 5

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.

[end of document]