

**THIRD MEETING  
OF THE  
JOINT STEERING GROUP FOR  
THE IODE OCEAN DATA PORTAL  
AND  
THE JCOMM PILOT PROJECT FOR WIGOS**

**(OSTEND, BELGIUM, 1-3 NOVEMBER 2010)**

**FINAL REPORT**

**JCOMM MEETING REPORT NO. 78**



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## EXECUTIVE SUMMARY

The third meeting of the Joint Steering Group for the IODE Ocean Data Portal (ODP) and the JCOMM Pilot Project for WIGOS was held at the Project Office of the IOC International Oceanographic Data and Information Exchange (IODE) in Ostend, Belgium from 1 to 3 November 2010.

The meeting reviewed the status of the WIGOS, including the WIGOS Concept of Operations (CONOPS), the WIGOS test of concept Development and Implementation Plan (WDIP), the WIGOS Development and Implementation Strategy (WDIS), and the status of the WIGOS Demonstration Projects. The meeting also reviewed the status of the JCOMM Pilot Project itself, and addressed outstanding issues, including (i) interoperability of ocean data systems with the IODE Ocean Data Portal and/or the WMO Information System (WIS), (ii) instrument practices and the review of WMO and IOC Technical Publications, (iii) quality management, and (iv) Capacity Building.

Practical achievements of the Pilot Project include the following:

- Establishment of a network of Regional Marine Instrument Centres in USA, China, and Morocco;
- Review of marine chapters of key WMO Publications;
- Enhanced links with the Association of Hydro-Meteorological Equipment Industry (HMEI) and the manufacturers of ocean instruments;
- Connection of key ocean data sets to the IODE Ocean Data Portal;
- Interoperability between the ODP and the WMO Information System (WIS);
- Establishment of a standards process for ocean data management and submission of several standards through that process;
- Organization of several training courses on instruments and data management.

Considering the successful achievements of the Pilot Project, and realization of the test of concept for the integration of marine meteorological and other appropriate oceanographic observations into WIGOS, the meeting agreed that the Pilot Project should now come to an end by the end of this year. This was therefore the last meeting of the joint Steering Group. The meeting recognized that a number of activities will continue even after the official end of the Pilot Project through JCOMM and the IODE. A Project Report was drafted and reviewed by the joint Steering Group. The report includes information on the achievements of the Pilot Project, test of concept, pending issues, lessons learned, benefits and impacts on Members/Member States regarding the integration of marine meteorological and other appropriate oceanographic observations into WIGOS, as well as Pilot Project legacy recommendations.

After consideration of the lessons learned, the meeting proposed some adjustments to the Pilot Project Report and legacy recommendations. The status of the Implementation Plan will also be updated and included in the Project Report. A small review group lead by the two co-Chairs of the Joint Steering Group will finalize the project report by the beginning of 2011.

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## GENERAL SUMMARY OF THE WORK OF THE SESSION

### 1. ORGANIZATION OF THE SESSION

1.1 Mr Greg Reed (Australia), and Mr Jitze van der Meulen (the Netherlands), Co-chairpersons of the Joint Steering Group for the IODE Ocean Data Portal and the JCOMM Pilot Project for WIGOS, opened the meeting at 0900 hours on 1 November 2010 at the Project Office of the IOC International Oceanographic Data and Information Exchange (IODE) in Ostend, Belgium. Mr Reed recalled that all working documents were made available through the IODE and JCOMM web sites. Mr Reed invited all participants to introduce themselves briefly. The list of participants is available as [Annex II](#).

1.2 Mr Reed introduced the Provisional Agenda (Document 1.2), and invited the meeting to review it and adopt it. The meeting adopted the Agenda ([Annex I](#)).

1.3 Mr Pissierssens (IOC Secretariat) welcomed the participants to Ostend and provided information on the working hours of the meeting and practical arrangements for the meeting.

1.4 Mr Greg Reed presented an overview of the IODE Ocean Data Portal (ODP) and JCOMM Pilot Project for WIGOS, and reported on progress since the second meeting of the Joint Steering Group (Ostend, 2009). In particular, he recalled the WIGOS objectives, and the deliverables of the JCOMM Pilot Project for WIGOS, stressing that this meeting will be focusing on finalizing the Project Report, including legacy recommendations.

### 2. STATUS OF THE IMPLEMENTATION PLAN

2.1 Introduced by Greg Reed, the meeting reviewed the Implementation Plan as adopted<sup>1</sup> at the first meeting of the Joint Steering Group (Geneva, 2008), and updated at the second meeting (Ostend, 2009). Further updating - based on the actions undertaken since October 2009 and to reflect progress, status of implementation, and updated targets - was made by the Secretariat in consultation with the Co-Chairpersons of the joint Steering Group. The latest version of the Implementation Plan was included in Annex IV of the draft Project Report as discussed under agenda item 8. The meeting made some further adjustments to the Implementation Plan. These will be reflected in Annex IV of the Project Report.

2.2 The meeting recalled that this was the last meeting of the joint Steering Group, and that the Pilot Project would come to an end by the end of this year. The meeting requested the two Co-Chairpersons, in liaison with the Secretariat to finalize the Implementation Plan and to replace Annex IV of the Project Report accordingly by the end of this year (**action; co-Chairs; end 2010**). The meeting recognized that a number of activities would continue even after the official end of the Pilot Project.

### 3. STATUS OF WIGOS

#### ***Sixty-second Session of the WMO Executive Council***

3.1 The meeting recalled that the sixty-second Session of the WMO Executive Council (EC-LXII), Geneva, Switzerland, 8-18 June 2010 noted the importance of the global observing systems of WMO and those co-sponsored with other international organizations, in particular the Global Ocean Observing System (GOOS), the Global Observing System (GOS), and the Global Climate Observing System (GCOS) for the ocean domain. The Council had requested that key outcomes and lessons learned from the successful WIGOS Projects, as well as WIGOS related projects

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1 : [http://www.wmo.int/pages/prog/www/wigos/documents/Impl\\_Plan\\_JCOMM.pdf](http://www.wmo.int/pages/prog/www/wigos/documents/Impl_Plan_JCOMM.pdf)

taken by Members or Regions, be evaluated and results be shared among Members. The meeting agreed that the Project Report included much of the required information for this evaluation.

### ***WIGOS Development and Implementation Strategy (WDIS)***

3.2 The meeting recalled that EC-LXII endorsed the WIGOS Development and Implementation Strategy (WDIS). The strategy document will be presented to Cg-XVI (16 May – 3 June 2011) for consideration. It will constitute a basic reference for the preparation of the more detailed WIGOS Implementation Plan to be developed after Cg-XVI. The WDIS is based on the WMO Strategic Planning and describes the steps to be followed by WMO to improve governance, management, and integration of observing systems. WDIS also includes capacity-building requirements and clearly specifies responsibilities across the WMO system for the further development and implementation of WIGOS, addressing coordination and technical challenges of the implementation process. The Implementation Phase (2012-2015), described in this report, builds on lessons learned from the Test of Concept Phase (2007-2011) and lays the groundwork for the Operational Phase (from 2016 onward).

3.3 The meeting noted that, in line with the EC-LXII request, JCOMM is incorporating WIGOS implementation activities into its operating plan and work programme. The meeting also noted that a WIGOS Implementation Plan (WIP) – to be approved by Cg-XVI – is being developed in line with the WDIS for guiding WIGOS during the implementation phase 2012-2015.

3.4 While recognizing that the JCOMM Pilot Project is about to end, the meeting agreed that much work remains in order to achieve complete integration of marine meteorological and other appropriate observations into the WMO global observing systems. The work needed is described as part of the Project Report and its legacy recommendations as discussed under agenda item 8.

### ***WIGOS Concept of Operations (CONOPS)***

3.5 The meeting noted that the WIGOS Concept of Operations (CONOPS) has been substantially updated by the third Session of the Executive Council Working Group on WIGOS and WIS (EC-WG/WIGOS-WIS), Geneva, Switzerland, 24-26 March 2010, and that those changes were approved by EC LXII with the understanding that it might be further refined in view of the lesson learned from the WIGOS Test of Concept Phase. The meeting agreed that the current version of the Pilot Project Implementation Plan was still entirely consistent with the CONOPS, and agreed that no changes had to be made to the Pilot Project Implementation Plan.

### ***WIGOS “Test of Concept” Development and Implementation Plan (WDIP)***

3.6 The meeting noted that the WIGOS “Test of Concept” Development and Implementation Plan (WDIP) has also been updated by the third Session of the EC-WG/WIGOS-WIS and that those changes were approved by EC LXII. The meeting agreed that the Pilot Project was perfectly in time according to the WDIP.

### ***Demonstration Projects***

3.7 The meeting reviewed the status of the WIGOS framework developments, including status of the WIGOS Demonstration Projects proposed by WMO Members in all of the six WMO Regional Associations.

3.8 The meeting recalled that the development of WIGOS Demonstration Projects in selected National Meteorological and Hydrological Services (NMHSs) had been proposed by the WMO Fifteenth Congress in 2007 as a way to address practical development and implementation of WIGOS concepts at the national and Regional Association levels and assist on the refinement of those concepts. Demonstration Projects focus on NMHSs in regional associations and are designed to demonstrate how integration of various observing system components can address

the essential elements of standardization of instruments and methods of observation, WIS information infrastructure, and end-product quality assurance.

3.9 Demonstration Projects are key for learning lessons for WIGOS development and implementation in order to eventually bring benefits to all Members. At least one 'test-bed' Demonstration Project has been identified within each of the Regional Associations and various levels of progress have been reported to date.

3.10 The meeting praised the national initiatives in this regard and agreed that JCOMM should continue to monitor very closely their developments, seeking better integration of those activities with regard to the implementation of the ocean observing systems, the harmonization of instrument practices, quality management, and the sharing of the data through the IODE Ocean Data Portal and the WIS.

3.11 The meeting particularly recommended that Demonstration Projects consider the requirements for the integration of marine meteorological and other appropriate oceanographic observations into WIGOS as documented in the draft Project Report (JCOMM Pilot Project for WIGOS). In particular, the following was recommended:

- RA-I/Kenya: Provision of ocean data collected nationally through the IODE ODP and WIS.
- RA-I/Morocco: consistency and complementarity between the WMO Regional Instrument Centre and the proposed WMO-IOC Regional Marine Instrument Centre (RMIC) in Casablanca. The metadata catalogue for marine data as being developed by Morocco should take into account JCOMM developments in this regard.
- RA-I/Namibia: Provision of ocean data collected nationally through the IODE ODP and WIS.
- RA-II/Republic of Korea: Provision of ocean data collected nationally through the IODE ODP and WIS.
- RA-III/Brazil: Enhancing the coordination and cooperation of the Brazilian monitoring activities with the JCOMM *in situ* Observations Programme Support Centre (JCOMMOPS) as far as ocean observations are concerned.
- RA-IV/USA: consideration of ocean observations to address the requirements for Numerical Weather Prediction (NWP).
- RA-V/Australia: consideration of instrument practices and data exchange through the IODE ODP.
- RA-VI/Russian Federation: consideration of data exchange through the IODE ODP.

3.12 After consideration of the lessons learned, the meeting proposed some adjustments to the Pilot Project Report and legacy recommendations.

3.13 Based on the review of the CONOPS, WDIP, and the Demonstration Projects, the meeting agreed that while the Pilot Project will come to an end, JCOMM will continue to be involved in the development of WIGOS, particularly during the Implementation Phase, and will contribute to the WIGOS Manual through standards development. However, JCOMM will have to address how practically to address this issue. For example, JCOMM should be represented in an Inter Commission Coordination Group on WIGOS (ICG-WIGOS) once/if established by the WMO Executive Council. JCOMM will have to coordinate its WIGOS related activities within JCOMM in order to be able to provide appropriate input through the ICG-WIGOS, and the WIGOS Project Office to be established during the WIGOS Implementation Phase. For example, the JCOMM Management Committee could be looking at overall issues and quality management, the Observations Coordination Group at instrument practices and related standards, and the Data Management Coordination Group at data exchange, and related quality management. The meeting invited the Management Committee to propose a strategy in this regard for inclusion in the Pilot Project legacy (**action; MAN; Nov 2010**).

## **4. IODE OCEAN DATA PORTAL AND ITS INTEROPERABILITY WITH THE WIS**

### **4.1 Progress report on the IODE ODP work plan, including “light” Data Provider and version 2 development**

4.1.1 This agenda item was introduced by Dr Sergey Belov, referring to Document 4.1 (Progress report on the IODE ODP work plan, including “light” Data Provider and version 2 development). Dr Belov recalled that the IODE Ocean Data Portal (ODP) development has two stages: Version 1 (v1) and Version 2 (v2). The ODP v1 has the initial capabilities and is based on the technical specifications and software of the End-to-End Data Management (E2EDM) technology developed by the JCOMM/IODE Expert Team on Data Management Practices (ETDMP) and the Russian National Oceanographic Data Centre (NODC, RIHMI-WDC, Obninsk). ODP (v2) should have full capabilities including the use of the international interoperability standards and tools. The IODE work plan for 2009-2010 included actions on the above directions of the ODP development. In the ODP v1 it was planned to expand the functionality of the software for remote registration and submission of data sets into the ODP distributed data system (the so-called "light" Data Provider), using Service-Oriented Architecture (SOA) interactions, open source Geographical Information System (GIS) and Web Map Service (WMS), creation of thematic maps "on the fly", and improved end-user interface. For ODP v2 It was planned to realize an initial design phase and to prepare a "white paper" on this version of the portal.

4.1.2 Dr Belov recalled that ODP v1. includes three components: (i) ODP Data Provider; (ii) ODP Integration Server; and (iii) ODP Services. The Data Provider processes the local data sets in a semi-automated way, generates the discovery metadata and “transport netCDF data files” on request or in a time-scheduling manner. Data Provider services are based on the Open-source Project for a Network Data Access Protocol (OPeNDAP) data (point, profile and grid) structures and the specific metadata model is based on International Organization for Standardization (ISO) 19115 metadata standard. The Data Provider is able to work with SQL databases, CSV-like structured files, fixed position data files or any unstructured data files (e.g. multimedia, documents, etc). When the Data Provider is installed in the local data system and local data sets are registered, the latter becomes a data source for the ODP distributed data system. The Data Provider has the possibility to support various types of the data granularity. The data granularity level is adjusted dynamically in the process of the local dataset registration.

4.1.3 To accommodate data centres with strict security regulations the “light” Data Provider was developed. The advantages include (i) designated host(s); (ii) remote access to the Data Provider component without any software installations; and (iii) single point of data submission for data centres (user name & password required).

4.1.4 The Integration Server provides (i) registration and operation status monitoring of the distributed data sources; (ii) harvesting of the discovery metadata in coordination with the Data Provider; and (iii) management of the common codes/dictionaries and access to distributed data sources by ODP services. The Integration Server also interacts with other systems (portals) by means of discovery metadata exchange. It was noted further that ODP uses the BODC (British Oceanographic Data Centre) vocabulary dictionary and a number of standardized codelists.

4.1.5 ODP v1 services include: (i) discovery service disseminates metadata catalogue; (ii) viewing service based on a web-based application accessible through a web browser; (iii) analysis service - provides near real-time GIS-layer generation from distributed datasets both with interactive and fast presentation of multidisciplinary data and products on a map; and (iv) download service that allows the user to download selected data to their local computer after viewing as ASCII, NetCDF or zip. Recent improvements include a “shopping cart”, result table export (CSV, Excel, XML, PDF) as well as multilingual support , i.e. English, Russian and Spanish (Spanish through cooperation from Ariel Troisi, Argentina).

4.1.6 For ODP v2 a preliminary technical design document (white paper) has been completed. The v2 will have data interoperability principles that respect interoperability standards (Ocean Data

Standards) and specific services, multiple thematic domains, ISO and Open Geospatial Consortium (OGC) based architecture. The ODP service oriented architecture shall place no restrictions on the granularity of a service that can be integrated. The development process of ODP v2 is planned to take 2 years (2011-2012).

4.1.7 For metadata distribution and exchange GeoNetwork<sup>2</sup> will be used. WIS will use the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH) version 2 protocol supported by GeoNetwork. It was noted that migration from v1 to v2 will be transparent.

## **4.2 Interoperability between IODE ODP and SeaDataNet - Report progress on discussions with SeaDataNet (SDN)**

4.2.1 This agenda item was introduced by Mr Nick Mikhaylov (Russian Federation) referring to Document 4.2 (Interoperability between the IODE ODP and other data portal projects; progress report on discussions with the SDN).

4.2.2 Mr Mikhaylov recalled that discussions on interoperability with the Pan-European infrastructure for Ocean and Marine Data Management (SeaDataNet or SDN) started after IODE-XX. The aim was to prepare a paper on interaction between IODE ODP and SDN. It was to include (i) analysis of technical compliance of the ODP and SDN based on the comparison of the systems; (ii) possible interoperability solutions; (iii) proposal for establishing the ODP and SDN interactions; and (iv) focus on data sets, not on other objects, such as data products, the European Directory of Marine Environmental Research Projects (EDMERP), the European Directory of Marine Environmental Data (EDMED), etc.. It was stressed that data centres should avoid installing both SDN and ODP data provider systems. Most European IODE data centres are now providing their data through SDN but they also want their data to be accessible through IODE ODP. In the other direction IODE ODP should provide access to non-European data through SDN. A two-way exchange capability is therefore necessary: SDN covers European data sources; ODP covers international data sources, including European waters. There should be no duplication of effort or of data sets.

4.2.3 Both SDN and ODP aim for a comparable functionality but conceptually and technically there are considerable differences between SDN and ODP. The main issues are (i) discovery metadata format and granularity; (ii) user identification and role; (iii) technical procedures and tools for data providing. It was noted that both systems are still in continued development according to their respective work plans and serving their specific needs so major changes will be difficult. Accordingly Mr Mikhaylov recommended that interoperability work should be pragmatic. He identified three possible solutions. Solution 1 will achieve interoperability at the portal level but this will require users to login in to different systems. Solution 2 will focus on customized exchange and delivery of metadata and unrestricted data sets from the SDN portal to the ODP portal. In this model ODP is seen as a special user and an agreement is established. Technically there should be a regular transfer from SDN to ODP of a short list of metadata and unrestricted data sets to make these available for ODP users. The ODP portal will need to track use of these data sets. Solution 3 will be the most complex solution: focus on achieving interoperability at portal to portal level but with an integrated broker at the level of the ODP portal: (i) exchanging metadata (possibly aggregated) with integration at metadata level; (ii) users can combine requests for access to data sets from ODP and SDN sources requiring only one login. The technical solution will include developing and configuring a "broker system" that intermediates between the AAA (Authentication Authorization and Accounting) services of both systems and integrates the SDN data request services into the ODP request service. Currently the implementation of Solution 2 is considered in collaboration with countries in the Black Sea region (Russia, Ukraine, Georgia, Bulgaria, Romania). Specific actions have been identified to accomplish this experiment in time for discussion at IODE-XXI (March 2011). He further noted that an IODE-SDN agreement should be established that focuses on data types, data providers, geographic coverage, and training. It is expected that at IODE-XXI further discussions on the possible implementation of solution 3 will be held. A number

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2 : <http://geonetwork-opensource.org/>

of common components could be considered: (i) Metadata Access Services to access semantic metadata – parameters, units, platforms, organizations, from external repositories; (ii) Data Access Services on the ISO/OGC standards to access the data in databases, file systems and other data repositories; (iii) OGC Access Services to access geographical data as features, coverage, and maps - WMS, Web Feature Service (WFS), Web Coverage Service (WCS), Sensor Observation Services (SOS), other. Services and content will be registered in catalogs to support discovery; (iv) Web Portal Server basing on modern open source technology and standards such as JSR 286 and JBoss Portal including solving AAA issues; (v) Workflow Engine within a Service-Oriented Architecture (BPEL); and (vi) GIS Server. The GIS Server provides the services for representing the geographical and thematic data on maps.

4.2.4 It was noted that OpenWIS can be seen as the equivalent of GeoNetwork plus some special adapters. It was recommended that OpenWIS be contacted by IODE ODP to extend a number of adapters supported by OpenWIS. It was noted that many existing interoperability solutions are built on OPeNDAP and in order to achieve the highest levels of interoperability ODP and OpenWIS should consider OPeNDAP.

4.2.5 It was recommended to establish a platform for further discussions not only with SDN but also with other systems.

### **4.3 Interoperability of ocean data systems with the IODE ODP and/or the WIS - Report on progress**

4.3.1 This agenda item was introduced by Dr Sergey Belov referring to Document 4.3 (Interoperability between the IODE ODP and the WIS). He recalled that the interoperability of ODP will depend on 3 elements: metadata compatibility, data access regulations and the service interaction layer. The ODP metadata model has been built on the ISO 19115 metadata standard with some additional elements to meet the needs of several important data features. The main additional feature is data granularity, which reflects aspects on how the data is structured from its original nature and how the data will be structured in output data flow. In terms of metadata compatibility Dr Belov stated that metadata compatibility should be agreed on following levels: (i) format to format conversion; (ii) the routines to provide metadata conversion (style sheets, software); and (iii) crosswalk mapping rules. Regarding data access regulation, for those information systems which apply security restrictions on data - specific regulations should be agreed. Metadata should be available for inter-system exchange without any restrictions. Restrictions applied to specific datasets will not be used while involving specified datasets into the ODP. The service interaction layer implements a set of interfaces for ODP metadata and data provision to the interconnected system, as well as to access metadata and data from the ODP. The service layer should be presented by W3C Web services or API's. A number of ODP services are already implemented and provide the listed functionality: (i) access to the ODP metadata – data descriptions, vocabulary dictionary, code lists; (ii) access to the ODP data by request; (iii) services are implemented as W3C web services and HTTP POST/GET interfaces. Interaction between two connected systems can be provided either on a portal-to-portal level or through specific data access software components.

4.3.2 Regarding ODP-WIS interaction Dr Belov recalled that ODP contributes to the WMO Information System (WIS) as one of the WIS prototype components, specifically as a Data Collection or Production Centre (DCPC) of the WIS. Metadata compatibility is provided by an ODP-WIS conversion service library. It provides a two-way export process from one metadata format into another. All metadata records are accompanied by links to data files. Data access regulations are avoided as all provided data are open access. The service interaction level is presented by GeoNetwork as a publicly available metadata catalogue and a ODP service for transferring accompanied data files to the selected GISC (Offenbach). Dr Belov noted that the ODP-WIS interoperability design decisions should take into account the requirements of the "WIS Compliance specifications of GISC, DCPC and NC" (2007, adopted by WMO) an in particular:

- WIS-TechSpec-1: Uploading of Metadata for Data and Products (Mandatory):
  - ODP provides samples or a complete set of Metadata compliant to the WMO-core-profile Version 1.1;
  - DWD validates the IODE ODP generated Metadata using its metadata-repository software;
  - Agreements on solutions for identified open issues (these may raise from JCOMM-specific versus WMO-specific specialities in metadata- implementations; granularity of the metadata-descriptions, data-policy, etc.);
  - Implementation of an OAI-Provider (GeoNetwork) at IODE ODP according to the above agreements;
  - Harvesting of IODE ODP OAI-Provider (GeoNetwork) by DWD's GISC;
- WIS-TechSpec-2: Uploading of Data and Products (Optional)
  - This is only needed for those data-files which IODE ODP publishes for global distribution by the GISCs. The availability in the GISCs' caches and information on data-policy (according to WMO Resolution 40 ("essential data" and "additional data") and WMO Resolution 25) needs to be coded in the respective metadata-records;
  - Agreement on file-naming (According to the GTS file-naming convention);
  - Set up of file-transfer of products from ODP to DWD's FTP-Server.

4.3.3 Mr Eliot Christian (WMO Secretariat) then proceeded with a presentation on Progress and Recommendations on Interoperability with the WIS. He recalled that WMO members had decided that WIS will build on the existing WMO Global Telecommunication System (GTS) but that WIS will support all WMO and related international programmes. WIS is being implemented as two parallel parts: Part A: continued consolidation and further improvements of the GTS for data and products delivery, and Part B: extension of services through flexible data discovery, access and retrieval services, as well as flexible timely delivery. WMO Member countries are implementing and will operate WIS, using existing centres with some additional or modified capabilities. WIS categorizes existing centres into three types of WIS centre: (i) Global Information System Centre (GISC); (ii) Data Collection or Production Centre (DCPC) and (iii) National Centre (NC). Existing National Meteorological and Hydrological Centres become WIS NCs. Every WIS NC must supply metadata for their data and products. DCPCs collect, disseminate, add value to, and archive regional or programme-specific data and products. DCPCs maintain catalogues of their holdings and services, and appropriate parts of these catalogues update a comprehensive catalogue of WIS holdings, hosted by the GISCs. GISCs also hold and distribute copies of at least 24 hours of WMO data and products intended for global distribution. As of today, WMO Members have identified 15 GISCs and over 100 DCPCs to be incorporated into WIS. Once the NCs are counted, well over 300 WIS Centres are expected. The first set of operational WIS Centres will be approved at the WMO Congress in May 2011. The IODE Ocean Data Portal will be nominated as a WIS DCPC. Its role in WIS will be as a "global centre for marine meteorological and oceanographic data and products".

4.3.4 Regarding WIS centres Mr Christian informed the meeting that designation as a WIS GISC, DCPC, or NC requires compliance with WIS requirements, compiled by the Inter-Commission Coordination Group on WIS (ICG-WIS). First, the candidate centre must describe its capabilities to support the GISC or DCPC functions. This is done by a knowledgeable representative of the candidate centre, using the provided online questionnaire tool. Dr Belov and Mr Christian have already started to draft a questionnaire response for the IODE Ocean Data Portal. Responses to the questionnaire should contain sufficient information and detail, including results of the demonstration tests, to ensure that a full assessment can be made by WMO's CBS Expert Team on GISC and DCPC Demonstration Process (ET-GDDP). The ET-GDDP will assess the questionnaire responses, asking for clarifications and helping the candidate centre to provide the relevant information. The ET-GDDP will also run the required demonstration tests that help to verify compliance with the interface specifications. Next the ET-GDDP will summarize the results of the assessment. Candidates will be either fully endorsed by ET-GDDP, or endorsed with qualifications. In the case of a qualified endorsement, the candidate must later demonstrate to CBS that all qualifications have been rectified. ET-GDDP may also invite a fully endorsed candidate to

provide a demonstration to CBS in the case of exemplary capabilities that would be of broad interest regarding WIS implementation.

4.3.5 Fifteen WIS interface compliance specifications<sup>3</sup> have been prepared. They include uploading of metadata for data and products, uploading of data and products, centralization of globally distributed data, maintenance of user identification and role information, consolidated view of distributed identification and role information, authentication of a user, authorization of a user role, Data Access and Retrieval (DAR) catalogue search and retrieval, consolidated view of distributed DAR metadata catalogues, downloading files via dedicated networks, downloading via non-dedicated networks, downloading via other methods, maintenance of dissemination metadata, consolidated view of distributed dissemination metadata catalogues., and reporting of quality of services. Some of the specifications are mandatory for one type of centre, while not for another. Any centre is welcome to implement interfaces beyond the minimum, and the functions of some DCPCs may be extensive.

4.3.6 The six WIS demonstration tests are the starting point to verify the interoperability needed to make WIS work. They include (i) uploading of Metadata for Data and Products into DAR catalogue; (ii) synchronizing DAR catalogues between GISC nodes; (iii) uploading and downloading of data between WIS Centres; (iv) centralization of Globally Distributed Data; (v) maintenance of users, roles, authorization, authentication and dissemination metadata; and (vi) DAR Catalogue Search and Retrieval.

4.3.7 Prof. Lin expressed concern that the IODE ODP will only be a DCPC rather than GISC bearing in mind that IODE represents many countries but also taking into account the close partnership between IOC and WMO through JCOMM. She explained that the term Global in GISC confused managers who do not appreciate the importance of DCPCs. Mr Christian stated that IODE ODP will be a global scope DCPC. Currently there are more than 100 DCPC candidates. Some countries have applied to host more than one DCPC. Often the DCPCs are discipline related (e.g. hydrology). GOSIC will be the DCPC representing GOOS, GCOS and GTOS.

4.3.8 The meeting noted that the current definitions of GISC and DCPC are not sufficiently clear and seem to imply hierarchy. The meeting recommended that the functioning of WIS and its components be well explained to avoid misunderstandings at the national and international organizational level.

4.3.9 The meeting was informed by Mr Eliot Christian that a draft application entry had been prepared in collaboration with Dr Sergey Belov for the establishment of an IODE ODP DCPC. The meeting reviewed and edited the draft entry. The meeting requested the IODE Co-Chair to submit the proposed application to the IODE Committee for their review and approval, and to submit the recommendation for the IODE ODP to become a WIS DCPC to the IOC Assembly for approval. (**action; G. Reed; March 2011 and June 2011**).

#### **4.4 Review of potential data sets, and potential for establishing more data provider nodes interoperable with the IODE ODP and/or WIS**

4.4.1 This agenda item was introduced by Dr Sergey Belov referring to Document 4.4 (Review of potential data sets, and potential for establishing more data provider nodes interoperable with the IODE ODP and/or WIS). The meeting recalled that a number of potential data providers had been identified by the First Session of the IODE Steering Group for the IODE Ocean Data Portal (20-22 September 2010). Currently the list of IODE ODP data providers includes the following:

- (i) Met Office (UK)
- (ii) Integrated Science Data Management, Fisheries and Oceans (Canada)
- (iii) National Marine Data and Information Service (NMDIS), State Oceanic Administration (SOA)(China)

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3 : <http://www.wmo.int/pages/prog/www/WIS/documents/TechnicalSpecification1-2.doc>

- (iv) National Oceanographic Data Center, National Oceanic and Atmospheric Administration (USA)
- (v) Integrated Marine Observing System (IMOS, Australia), Australian Oceanographic Data Network (AODN)
- (vi) Tbilisi State University, Georgian (Georgia)
- (vii) Marine Information Research Center (Japan)
- (viii) National Institute for Marine Research and Development (Romania)
- (ix) Institute of Biology of the Southern Seas National Academy of Sciences of Ukraine (Ukraine)
- (x) Marine Hydrophysical Institute National Academy of Sciences of Ukraine (Ukraine)
- (xi) National Oceanographic Data Centre (Bulgaria)
- (xii) National Oceanographic Data Centre (Russia)

4.4.2 10 data providers use the ODP data provider software; 2 data providers use the “light” Data Provider (US NODC and the Integrated Science Data Management – ISDM, Canada) hosted by the IOC Project Office for IODE, Ostend. 55 data sets are currently provided (35 of them currently available at IODE ODP) including over 800,000 profiles, 4000 satellite fields, etc.

4.4.3 Dr Belov also reported on the status of key data-sets that have been considered by the Pilot Project for connection to the IODE Ocean Data Portal and/or the WMO Information System. This status reflected in [Annex III](#).

4.4.4 Dr Belov invited participants who host other data to prepare an inventory file and make this available. Participants agreed to try and provide more data through the “light” Data Provider (LDP) of ODP as soon as possible. The meeting also noted that, as the Pilot Project was now ending, this work would be continued under the IODE ODP with the objective of contributing the data to WIGOS.

## 4.5 BUFR templates for ocean data

4.5.1 Mr Etienne Charpentier (WMO Secretariat) introduced this item. Good progress was made by the DMPA Task Team on Table Driven Codes (TT-TDC), formerly chaired by Mr Bob Keeley, and now chaired by Mr Bill Burnett (USA), thanks also to the active participation of the Technical Coordinator of the Data Buoy Cooperation Panel (DBCP), Ms Hester Viola (JCOMMOPS) but she regrettably left her position in October 2010. BUFR Master Table 10 (MT10) was reviewed by Bob Keeley and some changes proposed to make it conform with the WMO Manual on Codes. The Task Team is introducing ocean variable based BUFR sequences to include data and instrument/platform metadata to be reported in real-time. The plan is to eventually use the same BUFR sequence for a given variable in most ocean related BUFR templates. However, this effort will take time, and the migration to table driven codes to be completed in 2012 is pressing on. The XBT BUFR template has been validated by one centre but will have to be validated by a second centre. The VOS BUFR template is now in validation but may be removed and replaced by a new version taking into account the integration of sequences. The DBCP is working at updating the BUFR template for buoy data, including directional and non-directional wave data.

4.5.2 Mr van der Meulen recalled that the CBS ET-AWS (Expert Team on Requirements and Implementation of AWS Platforms) is working at the functional specification of AWS, and that the list of variables should be reviewed by JCOMM, and changes proposed regarding their naming in order to avoid ambiguities. New variables may have to be proposed for addition in the list. The meeting requested the Task Team on Table Driven Codes (TT-TDC) to undertake this review (**action; TT-TDC; 04/2011**). It was recalled that the number of bits proposed for coding salinity was not high enough to meet the stated accuracy<sup>4</sup>. Details on the variables already approved or proposed for validation were presented under agenda item 9.2.

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4 : Required measurement uncertainties are published in the CIMO Guide (WMO-No. 8)

4.5.3 The meeting also recommended to the TT-TDC that it should be working on defining strategies for enhancing interoperability between data systems in terms of real-time data exchange. In particular, the meeting recommended that the TT-TDC finalize its proposal for integrating BUFR requirements by variable while noting that the migration to table driven codes due in 2012 is a priority, and the validation of the existing BUFR templates had to be done before.

## **4.6 Instrument Platform metadata**

4.6.1 Mr Charpentier reported on JCOMM approaches for managing instrument/platform metadata. The meeting recalled that JCOMM-III passed a recommendation urging members to submit metadata they collect from different platforms through JCOMMOPS to the Ocean Data Acquisition System (ODAS) Metadata Service (ODASMS, China). The Water Temperature metadata Pilot Project (META-T), chaired by Mr Derrick Snowden (USA), has been working at developing mirrored metadata servers for instrument metadata from platforms reporting water temperature. A number of instrument metadata are also required for real-time distribution, and BUFR templates have been substantially reviewed to permit their inclusion in BUFR reports. The meeting noted that the META-T Pilot Project, has been going on for 4 years with limited success. While the revision of BUFR templates went well, the establishment of the mirrored metadata servers between China and USA was less successful. At its third Session (Melbourne, Australia, February 2010), the JCOMM Expert Team on Marine Climatology (ETMC) expressed concerns about the viability of the META-T servers and was proposing to set up a small pilot activity to evaluate effectiveness of the servers in the USA and China to serve user needs.

4.6.2 Mr Derrick Snowden reported that the Pilot Project did not achieve the mirrored server but the members learned along the way. The USA (NDBC) has been working at collecting and managing instrument metadata on a platform basis through dedicated servers for the tropical moored buoys, the Voluntary Observing Ships (VOS), and the OceanSITES. Focusing on moored buoys and VOS, NDBC has developed a relatively complete metadata data model. Additionally a web service satisfying real time needs is nearly complete. The service is not yet fully functional as a generic file format for metadata exchange still needs to be developed. While some efforts at NDBC are progressing, to date, no partners have been identified who are willing to develop similar instrument metadata services for Argo, XBTs, surface drifters, or tide gauges. Also, Mr Snowden explained that the goal of creating a single service for all JCOMM platform metadata is unlikely to be successful. Rather a strategy of developing metadata servers in close cooperation with platform operators should be pursued. For example, a tide gauge metadata service should be developed by an operator within the tide gauge community or at least closely coordinated by the JCOMM Global Sea-level Observing System (GLOSS) Group of Experts. Similarly, the drifting buoy metadata service should be developed by or in close coordination with the DBCP/Global Drifter Programme.

4.6.3 The meeting noted that during the past decade, despite regular recommendations made to Members/Member States for submitting instrument metadata to JCOMMOPS and the ODASMS, progress has been slow. However, it appears that the increasing requirements for observational data, including ocean observations, of the Global Framework for Climate Services (GFCS), is raising Members/Member States' attention on the need to collect and exchange instrument metadata.

4.6.4 Prof Lin provided brief information on the operations of the ODAS Metadata Service. She reported that not much information has been collected so far from relevant ocean observation platforms, and that efforts should continue to receive more metadata. The meeting recommended that JCOMMOPS should play a pro-active role in this regard through direct contacts with platform operators. The meeting invited China and the USA to coordinate and collaborate on related developments. Mr Snowden explained that the work of NDBC is documented under the US Integrated Ocean Observing System (IOOS) and that there are two versions of the software. The software and documentation can be shared with China.

4.6.5 The meeting recommended that the META-T Pilot Project should document its lessons learned, propose legacy recommendations, and come to an end. Participants active in metadata development issues are recommended to contact the ETDMP/Task Team on Metadata to maintain involvement in international developments, perhaps these groups should be merged.

#### 4.7 Integration between *in situ* and satellite ocean data

4.7.1 Mr Etienne Charpentier introduced this item. The meeting agreed that there is a good potential for JCOMM to be involved in the integration between *in situ* and satellite ocean observations. Some guidance is provided in the Project Report. Such strategies have been proposed to optimize the utility of complimentary of *in situ* and satellite observing networks, leading to enhanced return on observing system investments, and to enhance the quality monitoring of the *in situ* networks. For example JCOMM should be promoting the development of pilot activities to deploy *in situ* instruments that provide for higher resolution data in targeted geographical areas in order to better understand the impact of *in situ* observations on satellite products, and better estimate the quality of *in situ* observations. Such pilot activities can be useful for network optimization. The meeting stressed that the depth of measurement for sea surface temperature and salinity measurements are important metadata to collect and to make available to those who produce satellite products. The meeting recommended to update legacy recommendation number 3 to reflect this recommendations (**action; Project Report review group; end 2010**). Satellite products can also be used to estimate the quality of *in situ* data and feed-back to platform operators for corrective action.

### 5. INSTRUMENT BEST PRACTICES

#### 5.1 Regional Marine Instrument Centres (RMIC)

5.1.1 The meeting reviewed the latest developments regarding the establishment of WMO-IOC Regional Marine Instrument Centres (RMIC), following Recommendation 1 (JCOMM-III) defining their Terms of Reference as proposed by the Pilot Project.

5.1.2 The meeting discussed and agreed on the selection process for the RMICs as discussed in recent months with the JCOMM Co-President, Peter Dexter (Australia). The meeting invited the JCOMM Management Committee (MAN) to review the proposed process and to endorse it (**action; OCG & MAN; ASAP**).

5.1.3 The meeting then discussed the plans for establishing RMICs in RA-I (Morocco), and RA-II (China).

5.1.4 In particular, the meeting reviewed a detailed report from the National Centre of Ocean Standards and Metrology (NCOSM), Tianjin, China, regarding the establishment of an RMIC for the Asia-Pacific region, and describing the capabilities and functions of the RMIC according to the RMIC Terms of Reference, including a statement of compliance. The meeting thanked the NCOSM, SOA, and China for their efforts, endorsed the report submitted by China, and recommended that the Management Committee (MAN) proceed with the required formalities through JCOMM to eventually establish the centre (**action; MAN; Nov 2010**). The meeting also thanked China for offering to host a Marine Instrumentation workshop at the candidate RMIC in Tianjin in early 2011 and requested the Secretariat to assist in its organization, including for proposing an appropriate date for the workshop (**action; Secretariat; 2011**).

5.1.5 The meeting, while recognizing that the Terms of Reference of the RMICs were appropriate, noted that the name of the RMICs did not precisely reflect their exact roles. In particular, RMICs are essentially involved in the calibration, evaluation and testing of marine instruments and are not competing with the industry. In order to avoid misperception, the meeting agreed with the proposal to rename RMICs to "Regional Marine Instrument calibration, testing, and

intercomparison Centres (RMICs)” in the Chinese translation of the RMIC while keeping the name “Regional Marine Instrument Centre” in other official languages of WMO and IOC. The meeting requested the Secretariats to make sure that this recommendation be taken into account in future WMO and IOC documents making reference to the RMICs (**action; WMO Secretariat; ongoing**).

5.1.6 In order to further improve the comparability of global marine observation data and to achieve better standardization and traceability, the meeting agreed that the RMIC Terms of reference should be updated in such a way that they could (i) play a role in the development of appropriate quality control procedures of ocean data through the JCOMM mechanisms, and (ii) assist Members/Member States in their region of interest to establish their own quality control systems for ocean observations. The meeting invited the Management Committee to address this issue in the view to propose changes to the Terms of Reference (ToR) of RMICs for JCOMM-IV (**action; MAN; Nov. 2010**). The meeting also invited the RMICs to collaborate between themselves.

5.1.7 The meeting agreed that it would be useful at some point to investigate what role the RMICs could play in the development of appropriate international standards for instruments and methods of observations.

5.1.8 Mr Samir Issara (Morocco) presented an overview of the ocean observation activities in Morocco as well as the plans for establishing an RMIC in Casablanca for the WMO Regional Association I following its offer at JCOMM-III, and to extend the functions of the Regional Instrument Centre (RIC) which Morocco is already operating.

5.1.9 The meeting thanked Morocco for its offer to host an RMIC for the WMO Regional Association I in Casablanca, and invited Morocco to submit a report to the OCG – similar to the report submitted by China with capabilities, functions, and statement of compliance – prior to the fourth meeting of the JCOMM Observations Coordination Group (OCG, Hobart, 18-19 April 2011) for the formal establishment of the RMIC/Casablanca (**action; Morocco; Feb 2011**). The meeting also recommended organizing a marine instrumentation workshop at the candidate RMIC in 2012 and requested the Secretariat to assist in this regard (**action; Secretariat; 2012**).

5.1.10 The meeting discussed interactions of the JCOMM Pilot Project for WIGOS and the WMO Commission on Instruments and Methods of Observation (CIMO) in terms of instrument best practices in view to facilitate instrument best practices integration. In this regard the representative of CIMO, Mr Jitze van der Meulen, informed the meeting on the new structure of CIMO after the CIMO Fifteenth Session (CIMO-XV) in Helsinki, September 2010. He stated that three new Open Programme Area Groups (OPAGs) were established, dealing with Standardization & Intercomparisons, with Remote Sensing (inclusive satellite observations) and with Capacity Building (inclusive Manuals and Guides, like the CIMO Guide). Within the three Open Programme Area Groups (OPAGs) several expert teams (ET) will be active. There will be an “Expert Team on Instrument Intercomparisons (*in situ* surface, upper-air and marine)”, so marine is explicitly mentioned. One of the eight already suggested intercomparisons is identified as “WMO Pilot Intercomparison of Sea-level and Tsunami Monitoring Instruments.” Referring to the development of standards he informed that as part of the CIMO Pilot Project for WIGOS a classification scheme was adopted for the siting of observing systems to indicate the quality or uncertainty of measured variables. Reason for this publication is mainly based on the necessity to classify observational data, provided by third party data providers, which are not under the authority of national meteorological, oceanographic or hydrological services. CIMO-XV recommended publishing this scheme as a mutual WMO/ISO standard. Because this scheme refers to land weather stations only he requested the participants to be helpful in expanding this scheme for use in the marine environment (*i.e.* for sea observing systems).

## 5.2 Outcome of the JCOMM marine instrument workshop for Regional Association IV

5.2.1 The meeting noted with appreciation the successful outcome of the JCOMM marine instrument workshop for Regional Association (RA) IV organized in Bay St Louis, USA, 13-15 April 2010. The goal of the workshop was to test the RMIC concept.

5.2.2 The feedback received from the participants has been excellent, demonstrating the demand that existed in developing countries for more training on instrument practices and standards, quality assurance, marine observing programme management and operational aspects, and data exchange. The workshop permitted to initiate new collaborations in the view to improve availability of ocean observations from the Regional Association, as well as the quality and traceability to standards of the corresponding data.

5.2.3 The meeting noted with appreciation the kind offer from the USA to assist in the preparation and organization of the 2011 RMIC workshop in China.

## 5.3 Relationship with the manufacturers

5.3.1 Mr Bruce Sumner (Switzerland) presented an overview of the Association of Hydro-Meteorological Equipment Industry (HMEI<sup>5</sup>). The meeting noted with appreciation that closer links have now been established with the manufacturers of ocean measuring instruments. Many are regularly attending Data Buoy Cooperation Panel (DBCP) and Ship Observations Team (SOT) meetings. The HMEI was invited to attend the fifth SOT meeting and has usefully contributed to the work of the Session.

5.3.2 The meeting also recalled that following Pilot Project recommendation, JCOMM-III has considered that the HMEI could be a mechanism to represent manufacturers within the WMO and UNESCO/IOC through JCOMM. JCOMM-III has suggested that the HMEI could be given similar status within the UNESCO/IOC as those non-governmental organizations that were already granted consultative status by WMO. This will allow: (1) future interaction, cooperation and collaboration of HMEI with both the WMO and the UNESCO/IOC, including JCOMM Expert Teams and Panels; and (2) the participation of HMEI in specific JCOMM activities such as pilot projects, technology developments, instrument evaluations, and intercomparisons. The meeting noted that this could be realized by way of a Memorandum of Understanding between the IOC and the HMEI. The meeting invited the IOC and the HMEI to pursue negotiation in this regard (**action; IOC & HMEI; ASAP**), and requested the Secretariat to invite the participation of manufacturers of ocean measuring equipment in the HMEI once such a MOU is signed (**action; Secretariat; November 2011**).

## 5.4 Documenting instrument best practices

5.4.1 The meeting noted with appreciation that thanks to the pro-active role of the Pilot Project, substantial changes have been made to the following publications and approved by CIMO and JCOMM respectively:

- WMO Publications No. 8, Guide to Meteorological Instruments and Methods of Observation: the marine chapter has been substantially updated by the Data Buoy Cooperation Panel and the section on moored buoys completely re-written and much information added.
- WMO Publication No. 471, Guide to Marine Meteorological Services: the section describing the VOS Scheme has been substantially reviewed and updated by the Ship Observations Team (SOT), primarily to integrate the Voluntary Observing Ship (VOS) Climate Project (VOSCLim) into the wider VOS as a new class of vessel.

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5 : <http://www.hydrometeoindustry.org>

5.4.2 With respect to the CIMO Guide it was stated that a new editorial board responsible for future updates of the Guide was established. This board should actively respond to Members' suggestions to improve the Guide within short timeframes. More details are available in the final report of the CIMO-XV meeting published on the WMO website<sup>6</sup>. The HMEI Representative, Mr Bruce Sumner recalled that the CIMO guide is important to the manufacturers as they use it for setting the specifications of their instruments. CIMO-XV accepted HMEI to participate in the editorial board for the CIMO Guide.

5.4.3 The meeting recalled that it had reviewed the list of Publications relevant to the Pilot Project and discussed how these could be further updated and integrated with the view of achieving higher level standards. The meeting noted with appreciation that the DBCP and the WMO Secretariat have committed some resources to recruit a consultant to review WMO and IOC Publications relevant to instrument practices for buoy observations. This activity will be part of the Pilot Project legacy. Referring to the strategy for updating WMO and IOC Publications in light of the Pilot Project developments as proposed at the previous meeting of the joint Steering Group, the meeting agreed with some adjustments to be reflected in the Project Report based on lessons learned from the DBCP consultant.

## **6. QUALITY MANAGEMENT**

### **6.1 Status of the JCOMM Catalogue of Best Practices and Standards**

6.1.1 This agenda item was introduced by Mr Greg Reed referring to Document 6 (Quality Management). Mr Reed recalled that the "Catalogue of Best Practices and Standards" developed under JCOMM and IODE of UNESCO/IOC had been prepared by Mr Robert Gelfeld and a test site has been published on the web<sup>7</sup> by the UNESCO/IOC Project Office for IODE.

6.1.2 Mr Reed informed the meeting that there are currently 64 publications in the catalogue. It was reviewed by JCOMM-III and ETDMP has taken on the role of managing this project. The documents included have been published up to 30 years ago so they need to be reviewed. ETDMP has identified the Expert Teams and Steering Groups responsible for reviewing and possibly updating the documents. The first document that has been updated is the Global Temperature and Salinity Profile Programme (GTSP) Real-Time Quality Control manual. The new version will be published in the next few weeks. The review must be seen as a long-term undertaking and some documents may be redundant whereas others need to be updated. We also need to look at duplication and establish a policy to systematically review publications. This undertaking will be a joint IODE-WMO initiative under JCOMM.

6.1.3 Mr Reed informed the meeting that documents suggested for inclusion to the catalogue should be submitted to the ETDMP. Suggestions for improvements of the web-based application can be submitted to the IODE Secretariat (p.pissierssens@unesco.org).

### **6.2 Report on the JCOMM/IODE Ocean Data Standards Pilot Project (ODS)**

6.2.1 This agenda item was introduced by Mr Greg Reed referring to Document 6 (Quality Management) and to the web site<sup>8</sup>. Mr Reed explained that the JCOMM/IODE Ocean Data Standards (ODS) Task Team of the JCOMM/IODE ETDMP is aimed at developing a standardization process to achieve broad agreement and commitment to adopt a number of standards related to the management and exchange of ocean and meteorological data. The ODS Task Team (including Paul Oloo – Kenya –, Yutaka Michida – Japan –, and Mathieu Ouellet – Canada) will coordinate the development of best practices procedures in the marine community through the JCOMM/IODE Ocean Data Standards Process.

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6 : <http://www.wmo.int/pages/prog/www/IMOP/IMOP-home.html>

7 : <http://bestpractice.iode.org/>

8 : <http://www.oceandatastandards.org>

6.2.2 Mr Reed summarized the progress as follows:

- One recommended standard was published on 6 January 2010 after expert review and community review in UNESCO Manuals and Guides 54(1) 'Recommendation to Adopt ISO 3166-1 and 3166-3 Country Codes as the Standard for Identifying Countries in Oceanographic Data Exchange'.
- Two proposals have been submitted to the ETDMP for consideration and adoption as community wide standards. They include 'The Proposal to adopt ISO 8601:2004 as the standard for the representation of Dates and Times in Oceanographic Data Exchange' which was submitted in May 2010 and is currently in the final stages of the expert review. Another proposal is 'The Proposal to adopt the SDN Common Data Index metadata profile (CDI) as a Standard for Oceanographic Data Exchange' which was submitted during the ETDMP-II Session in April 2010, has commenced the expert review phase. A fourth for ISO 6709 (latitude, longitude) will be submitted in November 2010;
- It is expected that additional standards will be submitted to the standard process for consideration.

6.2.3 The meeting was informed that in the USA, the Integrated Ocean Observing System (IOOS) attempted to create a process similar to the ODS, with limited success. A decision may be taken to close down the IOOS standards process and instead use ODS.

6.2.4 It was recalled that WMO can publish standards jointly with ISO. The ISO documents are sold for a fee which causes difficulties for a number of IOC Member States.

### **6.3 Publishing of Best Practices and Standards by WMO and IOC**

6.3.1 See agenda item 5.4

## **7. CAPACITY BUILDING**

### **7.1 IODE ODP Capacity building activities**

7.1.1 This agenda item was introduced by Dr Sergey Belov (Russian Federation), referring to Document 7 (Capacity Building). He informed the meeting that three training courses on ocean data management have been organized so far: (i) Training workshop for IOC Ocean Data and Information Network (ODIN) Black Sea held in March 2009; (ii) Training course for ODINWESTPAC held in September 2009; and (iii) Training course for Turkey and Georgia held December 2009). The courses resulted in interest to establish data provider nodes. In addition expert missions were undertaken to Australia and China (2010) to discuss and assist with the establishment of IODE ODP data provider software. To assist with training, videos of lecturers recorded during the WESTPAC training course were made available online. Dr Belov informed the meeting that other countries in the IOC Sub-Commission for the Western Pacific (WESTPAC) region expressed interest in additional training. Prof Lin expressed interest in hosting a course in China and requested support from IODE. Mr Reed recommended that this request be submitted to IODE-XXI (March 2011).

7.1.2 Dr Belov informed the meeting that a Wiki will be established shortly to make available more documentation and to assist existing and potential data providers. Materials will also continue to be made available through the OceanTeacher web site.

## **7.2 Possibilities for capacity building related to the JCOMM Pilot Project for WIGOS**

7.2.1 This agenda item was introduced by Mr Etienne Charpentier. The meeting recalled that Capacity Building is part of the objectives of the activities of the network of Regional Marine Instrument Centres (RMICs). Training workshops are intended to be organized regularly at RMICs in the view to provide appropriate guidance on instrument practices, calibration procedures, quality management, and the recording and sharing of appropriate instrument/platform metadata.

7.2.2 The fourth meeting of the JCOMM Data Management Coordination Group (DMCG), Ostend, Belgium, 8-9 April 2010 has also recommended organizing the following training activities:

- (i) Training Course on the use of Table driven codes for marine meteorology and operational oceanography;
- (ii) Training Course on the establishment of ODP data nodes (v1) in regions;
- (iii) Training Course/Workshop on Instrument Metadata (requirements and practical exchange).

7.2.3 Mr Charpentier recalled that the Partnership for New GEOSS Applications (PANGEA) concept proposed by JCOMM builds on and complements other existing capacity building programs by promoting the use of ocean observations to ensure regional socio-economic sustainability through (i) regular repeatable training workshops conducted in exchange for annual sea days aboard PANGEA partner's ships for deployments and routine maintenance of ocean observations; (ii) in-country practical applications training of ocean data provided to large and diverse groups of regional participants, rather than a few selected individuals travelling to a workshop far away. Developing maritime Nations are empowered to effectively contribute to the Global Earth Observing System of Systems (GEOSS) by offering their often underutilized ships to deploy observational equipment provided by their PANGEA partners. This approach ensures ocean observations are viewed not only as important for science, but also for economic prosperity, and are therefore deemed a high priority for fiscal decisions. A more sustainable capacity for the region can be achieved through the increases in both near real-time *in situ* ocean observational data and information as well as the more effective applications of existing and new data. The meeting agreed to include PANGEA as part of the Pilot Project legacy recommendations.

## **7.3 Cooperation with the IODE OceanTeacher Project**

7.3.1 This agenda item was introduced by Mr Greg Reed. Referring to the information provided on RMIC Mr Reed called on the organizers to make their training materials available for inclusion in OceanTeacher.

## **8. REPORTING TO THE WMO AND IOC EXECUTIVE BODIES, AND PROJECT REPORT**

### **8.1 Project report and legacy recommendations**

#### **8.1.1 Achievements, test of concept, and pending issues**

8.1.1.1 The meeting recalled that details on the Pilot Project achievements, test of concept, and pending issues have been documented in the Project Report. Practical achievements of the Pilot Project include the following:

- Establishment of a network of Regional Marine Instrument Centres in USA, China, and Morocco;
- Review of marine chapters of key WMO Publications;
- Enhanced links with the HMEI and the manufacturers of ocean instruments;
- Connection of key ocean data sets to the IODE Ocean Data Portal;
- Interoperability between the ODP and the WMO Information System (WIS);

- Establishment of a standards process for ocean data management and submission of several standards through that process;
- Organization of several training courses on instruments and data management.

#### 8.1.2 Benefits of WIGOS integration regarding oceanographic observations for NMHSs, NODCs, and ocean data users

8.1.2.1 The meeting agreed that WMO Members and Member States of partner organizations such as IOC of UNESCO will benefit from the integration of marine meteorological and other appropriate observations into WIGOS in a number of ways. Some benefits, in particular at the Observing Systems implementer level, have already been realized to some extent through the Pilot Project.

8.1.2.2 Benefits will be realized at different levels for different types of actors, i.e.

- (i) Those implementing and operating the observing networks, producing the data, and making them available (i.e. mainly specific services within NMHSs and Oceanographic Institutes);
- (ii) Those using ocean observations in real-time and delayed mode to deliver products and services (i.e. mainly governmental agencies such as NMHSs and private companies); and
- (iii) The general public and end users benefiting from those products and services.

8.1.2.3 Benefits have been categorized as follows, with details and rationale provided in the Project Report:

- Reduced financial demands on Members
- Better products and services
- Increased visibility for Members producing ocean observations, and related products and services
- Better research for future applications

#### 8.1.3 Impact of the marine observing systems integration, and use of recommended standards on the operations of NMHSs, and NODCs.

8.1.3.1 The meeting had identified a number of impacts of the marine observing systems integration, and use of recommended standards on the operations of NMHSs, and NODCs. Impacts have been identified in terms of (i) instrument practices; (ii) data exchange; and (iii) quality management. These are detailed in the Project Report.

#### 8.1.4 Lessons learned

8.1.4.1 The meeting recalled that many lessons learned from this Pilot Project have fed into the work of the Sub-Group of the Executive Council Working Group on WIGOS and WIS, and details can be found in a preparatory document for the Second Session of the Sub-Group<sup>9</sup> (Geneva, Switzerland, 19-23 October 2009). Only the most important lessons learned relevant to this Pilot Project are detailed below.

8.1.4.2 The meeting agreed that the Pilot Project had realized substantial progress in many issues that would have been slower to achieve or would not have been achieved at all otherwise. The achievements are detailed in the Project Report.

8.1.4.3 The meeting recognized that the success of the Pilot Project has been due to a number of factors:

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<sup>9</sup> : [http://www.wmo.int/pages/prog/www/WIGOS-WIS/meetings/WIGOS-2\\_Geneva2009/Doc-4-3.doc](http://www.wmo.int/pages/prog/www/WIGOS-WIS/meetings/WIGOS-2_Geneva2009/Doc-4-3.doc)

- JCOMM, which is a joint Technical Commission between WMO and IOC, provided the appropriate governance and mechanisms to engage with all partners having potential interest in the development of the Pilot Project.
- The IOC provided excellent cooperation, mainly through its International Oceanographic Data and Information Exchange (IODE) Committee. Good working relationships were established between the WMO and IOC Secretariats which built trust and shared the work. Good communication drew attention to the rationale for WIGOS, and address concerns. By establishing a joint Steering Group for the Pilot Project, IOC had ownership upfront and could influence its development.
- The benefits of the Pilot Project were well understood by all partners and the members of the joint Steering Group, and there was confidence that the synergies proposed between the WIS and the ODP of IODE would facilitate better access to both oceanographic and meteorological data.
- Increased resources provided by both WMO and IOC Secretariats in support of the Pilot Project built synergies between many Expert Teams, Panels, and groups under JCOMM, IODE, CIMO, and CBS, which lead to improved cooperation.
- Ability to build on past experience with regard to the End-to-End (E2E) technology developed jointly between IODE and JCOMM through the Expert Team on Data Management Practices (ETDMP).

8.1.4.4 These lessons learned are also listed in the Project Report.

#### 8.1.5 Legacy recommendations

8.1.5.1 The Joint Steering Group, after having considered the deliverables, achievements, identified pending issues, and lessons learned, proposed to include the following legacy recommendations as part of the Project Report:

- (1) The type of governance existing between WMO and IOC through JCOMM should be preserved, and the JCOMM activities related to marine meteorology and other appropriate oceanographic observations should play an active role in the WIGOS implementation phase, and eventually become part of WIGOS once it becomes operational.
- (2) WMO and IOC Publications should be regularly reviewed based on the proposed methodology (Annex VII of the project report). This should be done by addressing harmonization of standards related to (i) Quality Control, (ii) the collection of instrument/platform metadata, (iii) instrument practices and intercomparisons, and (iv) satellite data telecommunication issues.
- (3) WMO and IOC should act pro-actively to facilitate the collection, distribution (including in real-time, and through dedicated servers), and discovery of instrument/platform metadata. In particular, the depth of the SST (Sea Surface Temperature) and SSS (Sea Surface Salinity) measurements should be reported as accurately as possible for use in satellite products as appropriate.
- (4) JCOMM should develop guidelines for marine instrument intercomparisons, publish them as JCOMM Technical Report, and provide input to the CIMO Guide accordingly.
- (5) JCOMM should further develop the network of WMO-IOC Regional Marine Instrument Centres (RMIC) in all regions, promote their activities, conduct training workshops, and instrument intercomparisons.
- (6) The cooperation with the manufacturers should be strengthened through HMEI.
- (7) IODE should continue the development of the IODE ODP and interconnect with the WIS as a WIS centre.

- (8) IODE should seek interoperability of the ODP with other (non IODE) ocean related data centres,
- (9) JCOMM should work to increase the amount of oceanographic and marine meteorological data provided by data centres to the ODP and WIS
- (10) WMO and IOC should promote the JCOMM/IOE Standards process, seek harmonization of standards between WMO and IOC, and make sure that processes are documented.
- (11) JCOMM should promote quality management in compliance with the WMO Quality Management Framework (QMF).
- (12) WMO and IOC should promote establishment of an international forum of users of satellite data telecommunication systems.
- (13) JCOMMOPS, which is providing support for the implementation, and monitoring of marine observing networks on a day to day basis should be strengthened through voluntary financial contributions by Members/Member States.
- (14) The JCOMM PANGAEA concept should be supported to enhance partnership between developed and developing countries with regard to data use and implementation of ocean observing networks.
- (15) JCOMM should communicate information – based on this project report – about the benefits to various communities of the integration of marine meteorological and other appropriate oceanographic observations into WIGOS.
- (16) JCOMM should be promoting pilot activities to evaluate how *in situ* and satellite based observing systems complement each other; in the view to make recommendations for the optimization of the *in situ* networks.

#### 8.1.6 Project Report

8.1.6.1 The meeting reviewed the latest version of the Project Report of the JCOMM Pilot Project for WIGOS. The report had been circulated to the joint Steering Group by email, and the feedback received included in the version presented to this meeting by the Secretariat. The report includes information on the achievements of the Pilot Project, pending issues, lessons learned, benefits and impacts on Members/Member States regarding the integration of marine meteorological and other appropriate oceanographic observations into WIGOS, as well as Pilot Project legacy recommendations.

- New Annex VI – formal adoption process for the RMIC
- Foreword: new paragraph on the review of the WMO and IOC Publications
- Para 4.3.6 item (vii) – reference to the formal adoption process for the RMICs to be discussed at MAN-8
- Para 4.3.6 item (viii) – Feedback from the RMIC workshop for RA-IV added in the text.
- Para 4.3.7 item (e) – Reference to Annex VI (formal RMIC adoption process)
- Para 9, legacy recommendation 1 – Addition of the role of JCOMM in the further integration of marine meteorological and other appropriate oceanographic observations into WIGOS during the implementation and operational phases of WIGOS.
- Annex IV – Project Implementation Plan updated.

8.1.6.2 The meeting noted that the name of the Pilot Project appeared in different forms in the project report, due to a change of name during the course of the Project, and requested the Secretariat to scan the report, and make changes so that the correct name of “JCOMM Pilot Project for WIGOS” appears where appropriate in the document (**action; Secretariat; ASAP**).

8.1.6.3 The meeting agreed on the following plan for finalizing the report:

- Joint Steering Group members are invited to provide comments and propose changes by email to the Secretariats ([echarpentier@wmo.int](mailto:echarpentier@wmo.int) and [p.pissierssens@unesco.org](mailto:p.pissierssens@unesco.org) ) during November 2010 (**action; JSG; end Nov 2010**).
- A small review group comprised of Jitze van der Meulen, Greg Reed, and the Secretariats is established to make minor changes, and finalize the report in December 2010 (**action; review group; end Dec 2010**).
- The report in its final form is approved by the two co-Chairs of the Joint Steering Group in the beginning of January 2011 (**action; co-Chairs; Jan 2011**).

## **8.2 Reporting to the WMO Executive Council Working Group on WIGOS and WIS through its Sub-Group on WIGOS**

8.2.1 The meeting recalled that JCOMM has been regularly represented at past meetings of the WMO Executive Council Working Group on WIGOS and WIS (EC-WG/WIGOS-WIS), and its Sub Group and the achievement and lessons learned from the Pilot Project well communicated and taken into account, especially when discussing and refining the CONOPS, WDIP, and WDIS. As the Pilot Project is now coming to an end, the Project Report will provide for final reporting elements of the Pilot Project, including legacy recommendations.

## **8.3 Addressing the priorities proposed by JCOMM-III and reporting to JCOMM**

8.3.1 The meeting recalled the priority activities recommended by JCOMM-III for this JCOMM intersessional period. The following ones are directly relevant to the Pilot Project and its legacy:

### ***Relevant OPA priorities***

- Integration in the WMO Integrated Global Observing System (WIGOS), including the review and update of appropriate WMO and UNESCO/IOC Technical Publications (4 WMO Publications, and 2 UNESCO/IOC Publications), and the establishment of Regional Marine Instrument Centres (RMIC) in the regions (target 6 regions);
- Implementation of the Partnership for New GEOSS Applications Concept (PANGEA) – i.e. developing partnership with developing countries regarding the use of ocean observations and products, and their participation in the maintenance of the observing networks (target 1 workshop per year);

### ***Relevant DMPA priorities***

- Develop standards/best practices in the marine community through the IODE-JCOMM Standards Process;
- Continue to work under the JCOMM Pilot Project for WIGOS to make the ODP and WIS interoperable as well as other ocean data systems interoperable with ODP and/or WIS;
- Upgrade present BUFR encoding for marine variables to include instrument/platform metadata;
- Complete Meta-T and ODAS implementation and capture of instrument/platform metadata;
- Modernize the Marine Climatological Summaries Scheme;
- Review and update the Data Management Plan;

- Update the *Catalogue of Standards and Best Practices* and contribute to the implementation of Quality Management Systems (QMS) in compliance with the WMO Quality Management Framework (QMF);

#### 8.4 Reporting to the IOC Committee on IODE

8.4.1 This agenda item was introduced by Mr Greg Reed. He informed the meeting that the IOC Committee on IODE will meet 23-26 March 2011. He noted that the Session will be preceded by the IODE 50<sup>th</sup> anniversary Conference. Both events will be held in Liège, Belgium. Mr Reed suggested that a paper on the Pilot Project could be considered for the Conference. **(action; JSG; end of 2010)**. On a related issue Mr Kenneth Casey (USA) reminded the meeting that the US-NODC celebrated its 50<sup>th</sup> anniversary on 1 November 2010.

8.4.2 Mr Reed pointed out that a number of components of the Pilot Project were IODE activities. These will continue beyond the end of the Pilot Project. He recalled that the IODE Committee, at its 20<sup>th</sup> Session, had revised the terms of reference of the JCOMM/IODE ETDMP and this revision included the documenting of standards and best practices. In September 2010 the first session of the IODE Steering Group for the Ocean Data Portal project (SG-ODP) was held and progress was reviewed. Mr Reed recalled that the list of data providers identified in the JCOMM Pilot Project for WIGOS had been updated there (see also agenda item 4.4). He concluded stating that the progress of the IODE ODP is substantial as the number of profiles is now close to 1 million. Several new data providers were identified during the past few months and they will join the network soon.

8.4.3 The meeting requested the IODE Co-Chair to convey to the IODE Committee its appreciation for the further expansion of the IODE ODP network and looked forward to the linking of the IODE ODP and WIS. **(action; G. Reed; March 2011)**

### 9. COMMUNICATION ACTIVITIES ON THE IODE ODP AND JCOMM PILOT PROJECT FOR WIGOS

#### 9.1 Web site(s)

9.1.1 This agenda item was introduced by Mr Peter Pissierssens who identified the following web sites:

- The JCOMM web site – <http://www.jcomm.info>
- The Best Practices web site – <http://bestpractice.iode.org>
- The Ocean Data Standards web site – <http://www.oceandatastandards.org>
- The IODE OceanDataPortal web site – <http://www.oceandataportal.org>
- The IODE web site – <http://www.iode.org> – contains a page dedicated to the JCOMM Pilot Project for WIGOS
- The WMO web site has the following pages available:
  - o WMO Information System (WIS) – <http://www.wmo.int/wis>
  - o WMO Integrated Global Observing System (WIGOS) – <http://www.wmo.int/wigos>
  - o JCOMM Pilot Project for WIGOS – [http://www.wmo.int/pages/prog/www/wigos/marine\\_pp.html](http://www.wmo.int/pages/prog/www/wigos/marine_pp.html)

9.1.2 Mr Pissierssens invited the meeting to identify any needs for further web content related to the Pilot Project taking into account the termination of the Project. The meeting requested that the executive summary (included in the Report as Foreword), achievements, benefits, legacy recommendations be included in pages to be hosted by the JCOMM, IODE and WMO web sites. **(action; Secretariats; end of 2010)**

## 9.2 Any other business

9.2.1 The representative of CIMO, Mr J.P. van der Meulen, informed the meeting on the table of AWS variables developed by the CBS Expert Team on Requirements and Implementation of AWS platforms (ET-AWS), identified as “Functional Specifications for Automatic Weather Stations”, including ranges, resolution and BUFR descriptors. This table contains a list specific for marine variables. The meeting recommended that the Observations Coordination Group (OCG) should review the list and provide the upcoming ET-AWS meetings with comments or additions to this list (**action; OCG; OCG-III**). JCOMM should give input via a representative at the forthcoming ET-AWS meeting. Table and further details are available in the final report of the 2010 meeting of the ET AWS, published on the WMO website (CBS-IOS related Meetings<sup>10</sup>).

## 10. CLOSURE OF THE SESSION

10.1 The Meeting reviewed and agreed on the actions arising from the meeting. These are summarized in [Annex IV](#).

10.2 The two co-Chairs Mr Greg Reed and Mr Jitze van der Meulen thanked all the participants for their input to the meeting. They also thanked the Joint Steering Group members for their contribution over the last two years to ensure the success of the Pilot Project which has resulted in significant progress in meeting the objectives of the project. Mr Reed noted that the JCOMM Pilot Project has been arguably the most successful of all the WIGOS Pilot Projects and has made an important contribution to the test of concept of WIGOS. The success of the JCOMM Pilot Project for WIGOS has been due to the strong collaboration between the Project partners: JCOMM, IODE, CIMO, and CBS. The success has also been due to the excellent cooperation between the WMO and IOC Secretariats. The co-Chairs thanked Mr Charpentier and Mr Pissierssens for all their work during the Pilot Project. The future of WIGOS will be decided by WMO Cg-XVI next year and Mr Reed stated that there should be a role for both JCOMM and IODE to contribute to the Implementation Phase of WIGOS.

10.4 The Meeting of the Joint Steering Group of the IODE Ocean Data Portal and the JCOMM Pilot Project for WIGOS closed at 13h00 hours on 3 November 2010.

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10 : <http://www.wmo.int/pages/prog/www/CBS-Reports/IOS-index.html>

## **ANNEX I**

### **AGENDA**

#### **1. ORGANIZATION OF THE SESSION**

- 1.1 Opening of the meeting
- 1.2 Adoption of the agenda
- 1.3 Working arrangements

#### **2. STATUS OF THE IMPLEMENTATION PLAN**

#### **3. STATUS OF WIGOS**

- 3.1 WIGOS Development and Implementation Strategy (WDIS)
- 3.2 WIGOS Concept of Operations (CONOPS)
- 3.3 WIGOS "Test of Concept" Development and Implementation Plan (WDIP)
- 3.4 Demonstration Projects

#### **4. IODE OCEAN DATA PORTAL AND ITS INTEROPERABILITY WITH THE WIS**

- 4.1 Progress report on the IODE ODP work plan, including "light" Data Provider and version 2 development
- 4.2 Interoperability between IODE ODP and other data portal projects - Report progress on discussions with SeaDataNet
- 4.3 Interoperability of ocean data systems with the IODE ODP and/or the WIS - Report on progress
- 4.4 Review of potential data sets, and potential for establishing more data provider nodes interoperable with the IODE ODP and/or WIS
- 4.5 BUFR templates for ocean data
- 4.6 Instrument Platform metadata
- 4.7 Integration between *in situ* and satellite ocean data

#### **5. INSTRUMENT BEST PRACTICES**

- 5.1 Regional Marine Instrument Centres (RMIC)
- 5.2 Outcome of the JCOMM marine instrument workshop for Regional Association IV, Bay St Louis, USA, 13-15 April 2010
- 5.3 Relationship with the manufacturers
- 5.4 Documenting instrument best practices

#### **6. QUALITY MANAGEMENT**

- 6.1 Status of the JCOMM Catalogue of Best Practices and Standards
- 6.2 Report on the JCOMM/IODE Ocean Data Standards Pilot Project (ODS)
- 6.3 Publishing of Best Practices and Standards by WMO and IOC

#### **7. CAPACITY BUILDING**

- 7.1 IODE ODP Capacity building activities
- 7.2 Possibilities for capacity building related to the JCOMM Pilot Project for WIGOS
- 7.3 Cooperation with the IODE OceanTeacher Project

#### **8. REPORTING TO THE WMO AND IOC EXECUTIVE BODIES, AND PROJECT REPORT**

- 8.1 Project report and legacy recommendations

- 8.2 Reporting to the WMO Executive Council Working Group on WIGOS and WIS through its Sub-Group on WIGOS
- 8.3 Addressing the priorities proposed by JCOMM-III, and reporting to JCOMM
- 8.4 Reporting to the IOC Committee on IODE

**9. COMMUNICATION ACTIVITIES ON THE IODE ODP AND JCOMM PILOT PROJECT FOR WIGOS**

- 9.1 Web site(s)
- 9.2 Any other business

**10. CLOSURE OF THE SESSION**

- 10.1 Updating the Implementation Plan
  - 10.2 Review of Action Items arising from the meeting
  - 10.3 Closure
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**ANNEX II**

**LIST OF PARTICIPANTS**

<b>JOINT STEERING GROUP MEMBERS</b>	
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<b>INVITED OBSERVERS</b>	
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ANNEX III

STATUS OF KEY DATA-SETS TO CONSIDERED FOR CONNECTION TO THE OCEAN DATA PORTAL AND/OR THE WMO INFORMATION SYSTEM

Data set	Status
World Ocean Atlas (WOA)	<i>Submission in process</i>
SeaDataNet (SDN)	<i>Under discussion</i>
Argo temperature and profile data	Agreement use "light" Data Provider received. Discussions in progress.
Russian National Oceanographic Data Centre (R NODC)	<i>Online</i>
Upper-ocean T & S gridded <i>in situ</i> fields from the ISDM (Canada)	<i>Online</i>
Sea level data from PSMSL	<i>Under discussion</i>
Group for High Resolution Sea Surface Temperature (GRHSST)	<i>Submission in process</i>
Expendable BathyThermograph (XBT) temperature data	<i>Submission in process</i>
International Comprehensive Ocean Atmosphere Data Set (ICOADS)	<i>Under discussion</i>
Global Collecting Centres (GCC, i.e. delayed mode VOS data)	<i>Data Provider installation completed 29 October. Submission in process</i>
Instrument/Platform metadata	<i>Under discussion</i>
Global Temperature and Salinity Profile Programme (GTSP)	<i>Online</i>
Surface vector wind data	<i>Under discussion</i>
Surface Currents from HF Radar	<i>Under discussion</i>
ODAS	<i>Online</i>

**ANNEX IV**

**ACTION ITEMS ARISING FROM THE MEETING**

<b>No.</b>	<b>Ref.</b>	<b>Action item</b>	<b>By whom</b>	<b>Deadline</b>
1	2.2	the two Co-Chairpersons, in liaison with the Secretariat to finalize the status of the Implementation Plan and to replace Annex IV of the Project Report accordingly by the end of this year	co-Chairs	end 2010
2	3.13	to propose a strategy - for inclusion in the Pilot Project legacy - regarding JCOMM's future involvement with regard to WIGOS developments	MAN-8	Nov 2010
3	4.3.9	to submit the proposed application for the establishment of an IODE ODP DCPC to the IODE Committee for their review and approval, and to submit the recommendation for the IODE ODP to become a WIS DCPC to the IOC Assembly for approval	G. Reed	March 2011 and June 2011
4	4.5.2 9.2.1	to review the list of variables of ET-AWS functional specifications, including variable names, and provide the upcoming ET AWS meetings with comments or additions to this list	TT-TDC, OCG & Secretariat	04/2011
5	4.7.1	to update legacy recommendation number 3	Review group	end 2010
6	5.1.2	to review the proposed selection process for the RMICs and to endorse it	OCG & MAN	ASAP
7	5.1.4	To proceed with the required formalities through JCOMM to eventually establish the RMIC/Tianjin	MAN	Nov 2010
8	5.1.4	to assist in organizing a workshop in 2011 at the RMIC/Tianjin	Secretariat	2011
9	5.1.5	to make sure that the recommendation regarding the name of the RMIC in Chinese translations is taken into account in future WMO and IOC documents making reference to the RMICs	WMO Secretariat	ongoing
10	5.1.6	to address the issue of updating the ToR of RMICs for JCOMM-IV	MAN	Nov. 2010
11	5.1.9	to submit a report to the OCG-III – similar to the report submitted by China with capabilities, functions, and statement of compliance – for the formal establishment of the RMIC/Casablanca	Morocco	Feb 2011
12	5.1.9	to assist in organizing a marine instrumentation workshop at the candidate RMIC/Casablanca in 2012	Secretariat	2012
13	5.3.2	IOC and the HMEI to pursue negotiations in the view to establish a MOU	IOC & HMEI	ASAP
14	5.3.2	to invite the participation of manufacturers of ocean measuring equipment in the HMEI once such a MOU is signed	Secretariat	Nov 2011
15	8.1.6.2	to scan the project report, and make changes so that the correct name of "JCOMM Pilot Project for WIGOS" appears where appropriate in the document	Secretariat	ASAP
16	8.1.6.3 (1)	to provide comments and propose changes to the project report by email to the Secretariats ( <a href="mailto:echarpentier@wmo.int">echarpentier@wmo.int</a> and <a href="mailto:p.pissierssens@unesco.org">p.pissierssens@unesco.org</a> )	JSG	end Nov 2010
17	8.1.6.3 (2)	to make minor changes, and finalize the project report	review group	end Dec 2010
18	8.1.6.3 (3)	to approve the project report in its final form	co-Chairs	Jan 2011
19	8.4.1	to consider submitting a paper on the Pilot Project for the IODE 50 <sup>th</sup> anniversary Conference	JSG	end of 2010
20	8.4.3	to convey to the IODE Committee its appreciation for the further expansion of the IODE ODP network and look forward to the linking of the IODE ODP and WIS	G. Reed	March 2011
21	9.1.2	The executive summary (included in the Report as Foreword), achievements, benefits, legacy recommendations should be included in pages to be hosted by the JCOMM, IODE and WMO web sites.	Secretariats	end of 2010

## ANNEX V

### ACRONYM LIST

AAA	Authorization, Authentication and Accounting
AODN	Australian Oceanographic Data Network
AOPC	Atmospheric Observation Panel for Climate
Argo	International profiling float programme
ASCII	American Standard Code for Information Interchange
ASAP	Automated Shipboard Aerological Programme
ASAP	As soon as possible
BCOS	Bureau Composite Observing System (Australia)
BPEL	Business Process Engineering Language
BODC	British Oceanographic Data Centre (UK)
BOM	Bureau of Meteorology (Australia)
BUFR	Binary Universal Form for the Representation of Meteorological Data
CB	Capacity-Building
CBS	WMO Commission for Basic Systems
CDI	SeaDataNet Common Data Index
Cg	WMO Congress
CIMO	WMO Commission on Instruments and Methods of Observation
CONOPS	WIGOS Concept of Operations
CSV	Comma-Separated Values
DAR	Data Access and Retrieval
DBCP	Data Buoy Co-operation Panel
DBMS	Database Management System
DCD	Data Collection Platform
DCPC	Data Collection or Production Centre (of WIS)
DMAC	IOOS Data Management and Communications (USA)
DMCG	JCOMM Data Management Coordination Group
DMPA	JCOMM Data Management Programme Area
DOI	Digital Object Identifier
DP	Data Provider
DWD	Deutscher WetterDienst (Germany)
E2E	End-to-End Data Management
E2EDM	End-to-End Data Management Pilot Project
EC	Executive Council
EC-WG/WIGOS-WIS	Executive Council working Group on WIGOS and WIS
EDMED	European Directory of Marine Environmental Data
EDMERP	European Directory of Marine Environmental Research Projects
EDMO	European Directory of Marine Organizations
ET-AWS	Expert Team on Requirements and Implementation of Automatic Weather Station (AWS) Platforms
ETDMP	JCOMM/IODE Expert Team on Data Management Practices
ET-EGOS	CBS Expert Team on the Evolution of the Global Observing System
ET-GDDP	CBS Expert Team on GISC and DCPC Demonstration Process
ETMC	JCOMM Expert Team on Marine Climatology
ETRP	WMO Education and Training Programme
ET-WISC	CBS Expert Team on WIS GISCS and DCPCs
FAQ	Frequently Asked Questions
FTP	File Transfer Protocol
GAW	Global Atmosphere Watch
GCC	Global Collecting Centre
GCOS	Global Climate Observing System
GDAC	Global Data Assembly Centre
GEO	Group on Earth Observations
GEOSS	Global Earth Observing System of Systems

GeoNetWork	A catalog application to manage spatially referenced resources ( <a href="http://geonetwork-opensource.org/">http://geonetwork-opensource.org/</a> )
GEOSS	Global Earth Observation System of Systems
GFCS	Global Framework for Climate Services
GHRSSST	Group for High Resolution SST Pilot Project
GIS	Geographic Information System
GISC	Global Information System Centres (of WIS)
GLOSS	JCOMM Global Sea-level Observing System
GODAE	Global Ocean Data Assimilation Experiment
GOOS	IOC-WMO-UNEP-ICSU Global Ocean Observing System
GOS	WMO Global Observing System
GOSUD	Global Ocean Surface Underway Data Pilot Project
GTS	Global Telecommunication System
GTSP	Global Temperature and Salinity Profile Programme
HMEI	Association of Hydro-Meteorological Equipment Industry
HTTP	HyperText Transfer Protocol
ICADS	International Comprehensive Ocean-Atmosphere Data Set
ICG-WIS	Inter-commission Coordination Group on the WMO Information System
ICG-WIGOS	Inter Commission Coordination Group on WIGOS
ICSU	International Council for Science
ICT IOS	Implementation-Coordination Team on IOS
ICTT-QMF	Inter Commission Task Team on Quality Management Framework
IOC	Intergovernmental Oceanographic Commission
IODE	International Oceanographic Data and Information Exchange
IOOS	Integrated Ocean Observing System (USA)
IOS	Integrated Observing Systems
IMOP	WMO Programme for Instruments and Methods of Observation
IMOS	Integrated Marine Observing System (Australia)
INSPIRE	Infrastructure for Spatial Information in Europe
IOCCP	IOC International Ocean Carbon Coordination Project
IODE	IOC International Oceanographic Data and Information Exchange
IP	Implementation Plan
IPET-MI	CBS Inter Programme Expert Team on Metadata Implementation
ISDM	Integrated Science Data Management (Canada)
ISO	International Organization for Standardization
JCOMM	Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology
JCOMMOPS	JCOMM <i>in situ</i> Observation Programme Support Centre
LDCs	Least Developed Countries
LDP	ODP "light" Data Provider
MAN	JCOMM Management Committee
MARIS	Maris Technologies, Ltd (UK)
MCP	Marine Community Profile
MCSS	Marine Climatological Summaries Scheme
MCS	Marine Climatological Summary
MERSEA	Marine Environment and Security for the European Area (of EU)
META-T	Water Temperature metadata Pilot Project
M&G	Manual and Guides
MIM	MERSEA Information Management
MQCS	Minimum Quality Control Standards
NC	National Centre (of WIS)
NCDC	National Climate Data Centre
NCOSM	SOA National Centre of Ocean Standards and Metrology
NDBC	National Data Buoy Centre (of NOAA, USA)
netCDF	Network Common Data Form
NMDIS	SOA National Marine Data and Information Service (China)
NMHS	National Meteorological and Hydrographic Service

NOAA	National Oceanic and Atmospheric Administration (USA)
NODC	IODE National Oceanographic Data Centre
NWP	Numerical Weather Prediction
OAI-PMH	Open Archives Initiative Protocol for Metadata Harvesting
OBIS	Ocean Bio-geographical Information System
OceanSITES	OCEAN Sustained Interdisciplinary Timeseries Environment observation System
OCG	JCOMM Observations Coordination Group
ODAS	Ocean Data Acquisition System
ODASMS	ODAS Metadata Service (China)
ODIN	IOC Ocean Data and Information Network
ODINAFRICA	Ocean Data and Information Network for Africa
ODINBlackSea	Ocean Data and Information Network for the Black Sea
ODINCARSA	Ocean Data and Information Network for the Caribbean and South America
ODINWESTPAC	Ocean Data and Information Network for the WESTPAC
ODP	IODE Ocean Data Portal
ODS	Ocean Data Standards process
OGC	Open Geospatial Consortium
OPA	JCOMM Observations Programme Area
OPAG	Open Programme Area Group
OPeNDAP	Open-source Project for a Network Data Access Protocol
OT	OceanTeacher
PA	Programme Area (of JCOMM)
PANGEA	Partnership for New GEOSS Applications
PDF	Portable Document Format
PIRATA	Pilot Research Moored Array in the Tropical Atlantic
PO	Project Office
PSMSL	Permanent Service for Mean Sea Level
QA	Quality Assurance
QC	Quality Control
QMF	WMO Quality Management Framework
QMS	Quality Management System
RA	WMO Regional Association
RIHMI-WDC	Russian Research Institute of Hydrometeorological Information - World Data Center
RMIC	WMO-IOC Regional Marine Instrument Centre
RNODC	(IODE) Responsible National Oceanographic Data Centre
RNODC/DB	RNODC for Drifting Buoys
RRR	Rolling Review of Requirements
SDN	SeaDataNet
SeaDataNet	Pan-European infrastructure for Ocean and Marine Data Management
SG-ODP	IODE Steering Group for the Ocean Data Portal project
SOA	Service-Oriented Architecture
SOA	State Oceanic Administration (China)
SOC	JCOMM Specialized Oceanography Centre
SOC/DB	SOC for Drifting Buoys
SOS	Sensor Observation Services
SOT	JCOMM Ship Observations Team
SQL	Structured Query Language
SST	Sea Surface Salinity
SST	Sea Surface Temperature
TAO	Tropical Atmosphere Ocean network of tropical moorings
ToR	Terms of Reference
TT-TDC	JCOMM DMPA Task Team on Table Driven Codes
VCP	Voluntary Cooperation Programme
VGISC	Virtual GISC (Europe)
VOS	Voluntary Observing Ship

VOSclim	VOS Climate Project
W3C	World Wide Web Consortium
WCS	Web Coverage Service
WDC	ICSU World Data Centre
WDIP	WIGOS Test of Concept Development and Implementation Plan
WDIS	WIGOS Development and Implementation Strategy
WESTPAC	IOC Sub-Commission for the Western Pacific
WFS	Web Feature Service
WG	Working Group
WHOI	Woods Hole Oceanographic Institution
WIGOS	WMO Integrated Global Observing System
WIP	WIGOS Implementation Plan
WIS	WMO Information System
WMO	World Meteorological Organization
WMS	Web Map Service
WOA	World Ocean Atlas
XBT	Expendable Bathythermograph
XML	Extensible Markup Language

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