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FOR OCEANOGRAPHY AND MARINE
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WMO INTEGRATED SYSTEMS

WIGOS PILOT PROJECT FOR JCOMM

BACKGROUND MATERIAL

SUMMARY

Reference: JCOMM-III/Doc. 10.2

CONTENT OF DOCUMENT:

Appendix:

- Background material

BACKGROUND MATERIAL

Implementation of the WIGOS concept

1. The Fifteenth WMO Congress (WMO Cg-XV, May 2007) stressed that enhanced integration between the WMO and WMO-sponsored observing systems was expected to generate important benefits for its Members, their National Meteorological and Hydrological Services and for the Organization as a whole; it agreed to refer to that initiative by the acronym WIGOS (WMO Integrated Global Observing System) and adopted Resolution 30 (Cg-XV) – Towards enhanced integration between WMO observing systems.
2. Acting accordingly, the WMO Executive Council, at its fifty-ninth session (WMO EC-LIX, June 2007), established the Executive Council Working Group on the WMO Integrated Global Observing System and the WMO Information System (EC WG on WIGOS-WIS) to steer and monitor WIGOS activities and to coordinate them with the planning and development of WIS – Resolution 3 (EC-LIX). The EC WG drafted the WIGOS Concept of Operations (CONOPS) and WIGOS Development and Implementation Plan (WDIP), further reviewed and approved by EC-LX and EC-LXI, which can be downloaded from http://www.wmo.int/pages/prog/www/wigos/index_en.html.
3. Following the guidance given by WMO Cg-XV, five WIGOS Pilot Projects have been initiated, including the *Integration of Marine Meteorological and Other Appropriate Oceanic Observations into the WMO Global Observing System (GOS)*.
4. The WMO EC WG on WIGOS-WIS decided to include Demonstration Projects (DPs) on the Development and Implementation of WIGOS at NMHSs into WDIP. The WMO EC-LX (June 2008) recommended supporting the involvement of the NMHSs and the regional associations in the implementation of the WIGOS concept as crucial to ensure important benefits for all Members. The following countries took the initiative and formally agreed to implement DPs in their NMHSs: Kenya, Morocco, and Namibia (RA I), Republic of Korea (RA II), Brazil (RA III), the United States of America (RA IV), Australia (RA V) and the Russian Federation (RA VI).

WIGOS Pilot Project for JCOMM

5. In response to the WMO Cg-XV and EC-LIX, JCOMM has initiated a Pilot Project (PP) for the integration of *in situ* and space-based marine meteorological and other appropriate oceanic observations into the WMO Global Observing System (GOS), named WIGOS Pilot Project for JCOMM. The PP is being implemented and sustained by the WMO Members and UNESCO/IOC Member States, coordinated by JCOMM and the IODE of UNESCO/IOC, in order to prove concept, enhance standardization in terms of practices for instruments, improve quality management, and make appropriate key data sets (e.g. World Ocean Database, upper ocean thermal data from Argo profiling floats and XBTs, Deep Ocean time-series multi-disciplinary reference stations, high resolution SST from satellites, sea level stations, marine climatological data sets, satellite data, etc.) available in real-time and delayed mode to WMO and UNESCO/IOC applications. Access to these ocean data sets will be facilitated through the development of specific interoperability arrangements between the corresponding ocean data systems and the UNESCO/IOC-IODE Ocean Data Portal (ODP) and/or the WMO Information System (WIS), as well as ODP connectivity to the WIS. The Pilot Project is recommending producing data sets according to agreed upon standards and documenting the quality control procedures according to QMS principles. This integration is expected to enhance the coherence and consistency of the data sets and the availability of relevant instrument/platform metadata in order to permit traceability of the observations to standards, appropriate bias correction and effective quality monitoring. More timely and better quality data are expected while duplicates will be minimized.
6. This integration process ensures the continued partnership and participation of the UNESCO/IOC, which is responsible for the majority of the components of the Global Ocean

Observing System (GOOS), including UNESCO/IOC's IODE programme and its system of National Oceanographic Data Centres (NODCs), as they become part of an integrated system of systems with sustained sense of ownership. The Pilot Project is expected to demonstrate the strong and growing level of collaboration and coordination between the WMO and UNESCO/IOC stakeholders both striving to enhance and sustain global ocean observing networks and provide free and unrestricted data access, in line with the WMO and UNESCO/IOC data policies (respectively, WMO Congress Resolutions 40 (WMO Cg-XII) and 25 (WMO Cg-XIII), and the IOC Oceanographic Data Exchange Policy). Detailed information is available at http://www.wmo.int/pages/prog/www/wigos/marine_pp.html and <http://www.iode.org/wigos>.

7. In line with the Concept of Operations (CONOPS), the PP has developed comprehensive project and implementation plans, which include three major deliverables:

- Document and integrate instrument best practices and related standards – the goal is to define and agree on common standards between the meteorological and oceanographic communities for instruments and methods of observation as well as subsequent organization and handling of the data and information to serve consistent and better quality data to both the broad user and modelling communities. In this context, the PP promotes the development of a strong collaboration between JCOMM, CIMO and the Association of Hydro-Meteorological Equipment Industry (HMEI). This component of the PP addresses: (i) standardization of practices for instruments; (ii) the establishment of Regional Marine Instrument Centres (RMIC), including support for instrument/platform intercomparisons to ensure data homogeneity; (iii) the collection of instrument/platform metadata necessary to interpret the data correctly, increase the data coherence (e.g. bias correction), and for traceability of data to standards; (iv) enhanced cooperation with the manufacturers; and (v) updating of the WMO and UNESCO/IOC technical regulations in the framework of WIGOS [see also agenda item 6.2];
- Build marine data systems that are interoperable with the WIS – the goal is to provide access to marine meteorological and oceanographic data and information to serve a number of applications, including climate. This shall be done in an integrated way via the WIS or the UNESCO/IOC-IODE ODP and thereby facilitating access to well documented and standardized data. The Pilot Project proposes to achieve interoperability with WIS mainly through: (i) ocean data centres contributing to the UNESCO/IOC-IODE ODP; and (ii) UNESCO/IOC-IODE ODP becoming fully interoperable with the WIS. Much work remains to develop interoperability between the WMO and UNESCO/IOC communities at both the data discovery (metadata) and data level (compatible formats) [see agenda items 7 and 10.1];
- Promote Quality Management and standards – the goal is to coordinate the development of cost-effective Quality Management Systems by Members/Member States and to propose practical solutions or examples. During the different stages of the data production line, it is anticipated that improved quality management will result in better, timelier data, minimized duplication, and an operational data delivery system. This will be achieved through the compilation of regulatory documentation in a way consistent with the eight Quality Management Principles developed under ISO/TC176/SC2/WG15 (User/customer focus, Leadership, Involvement of people, Process approach, System approach to management, Continual improvements, Factual approach for decision making, Mutually beneficial supplier relationships). The IODE-JCOMM Ocean Data Standards Pilot Project (details available at <http://www.oceandatastandards.org>) will also provide a framework for the PP to further the development of appropriate widely accepted quality management standards to address issues such as instrument best practices, real-time and delayed-mode quality control procedures (automatic and/or manual), data collection and exchange formats, and products using the observational data [see agenda item 11.2].

8. Two meetings were held to develop and initiate the implementation of the WIGOS Pilot Project for JCOMM. Reports for these can be downloaded from http://www.wmo.int/pages/prog/www/wigos/marine_pp.html:

- *Ad hoc* planning meeting for the WIGOS Pilot Project for JCOMM, Ostend, Belgium, March 2008;
- Meeting of the PP Joint Steering Group (PP-JSG) for the UNESCO/IOC-IODE Ocean Data Portal and the WIGOS Pilot Project for JCOMM, Geneva, Switzerland, September 2008.

9. Issues related to the WIGOS Pilot Project for JCOMM were also addressed in other JCOMM and UNESCO/IOC-IODE meetings. Reports for these can be downloaded from <http://www.jcomm.info/Publications>:

- Twenty-fourth Session of the Data Buoy Cooperation Panel (DBCP), Cape Town, South Africa, October 2008;
- End-to-end Data Management (E2E) workshop, Obninsk, Russian Federation, March 2009;
- Twentieth Session of the UNESCO/IOC International Oceanographic Data and Information Exchange (IODE), Beijing, China, May 2009;
- Fifth Session of the JCOMM Ship Observations Team (SOT), Geneva, Switzerland, May 2009.

10. Major outcomes of these meetings include:

- Progress in further improving ODP-version 1 for connecting specific data sets to ODP and WIS, and the development of a plan for the ODP-version 2 in the next two years;
- The development of a Catalogue of Best Practices and Standards under JCOMM [see agenda item 11.2];
- The demonstration of a new ODP functionality which addresses the issue of security (Light Data Provider);
- The development of an *Oceanographer's and Marine Meteorologist's Cookbook for Submitting Data in Real Time and in Delayed Mode*.

11. Additionally:

- The DBCP agreed to make efforts to integrate its Best Practices into the WIGOS as appropriate, and recommended that the buoy manufacturers establish links with the HMEI;
- The SOT discussed: (i) a proposal to have the ship metadata from WMO-No. 47 eventually included as part of WIS, and the regulatory part included in the future WIS manual; and (ii) a proposal to integrate the VOS Climate Project (VOSclim) vessels as an additional class of VOS. Moreover, the SOT will review the WMO Technical Regulations in the view to achieve better standardization of instrument best practices;
- While recognizing that it was difficult at this point in the PP to make precise recommendations regarding the convergence of the WMO Core Metadata Profile, and

other ISO 19115 metadata profiles used in the marine community (e.g. Marine Community Profile (MCP), SeaDataNET Common Data Index (CDI)), the PP-JSG recommended to submit MCP and/or any other relevant metadata profiles through the IODE-JCOMM Ocean Data Standards Pilot Project for review by a wider user community. This process would help MCP to build on WIS specifications and for the development of specific recommendations that will achieve interoperability with WIS.

12. The PP-JSG identified thirteen potential partners and data contributors for providing key data sets to the PP. A joint WMO-IOC letter was sent to them. The following agencies replied favourably and further discussions took place with them:

- The Integrated Science Data Management (ISDM, Canada) for buoy data;
- The Australian Ocean Data Centre Joint Facility (AODCJF, Australia) for XBT data;
- The National Oceanic and Atmospheric Administration (NOAA, USA) for the International Comprehensive Ocean-Atmosphere Data Set (ICOADS), the Water Temperature Metadata Pilot Project (META-T), the World Ocean Atlas (WOA), the World Ocean Database (WOD), the Global High Resolution SST Pilot Project (GHRSSST), the Global Temperature and Salinity Profile Programme (GTSP);
- The Met Office (UK) and the Deutscher WetterDienst (DWD, Germany) for the Marine Climatology Summaries Scheme (MCSS) Global Collecting Centres (GCCs).

13. Potential benefits that the Meteorological and Oceanographic agencies could gain from developing the PP have been included in the Project Plan. Based on gained experience with partners and other WIGOS PPs and DPs, a document describing the benefits of the PP, focusing initially on the NODCs, will be produced towards the end of the PP and is intended to be used by the Directors of NODCs to generate national support for the development of interoperable arrangements between NODCs and WIS. The document will facilitate decision making regarding essential software/hardware developments.

14. In terms of Capacity Building, the PP is focusing on the cooperation of developing countries in the Ocean Data Portal project, the need for collaboration in the development of training materials between WMO and UNESCO/IOC on topics related to JCOMM, the promotion of WIGOS at the national level, and the organization of training courses in topics relevant to the WIGOS Pilot Project for JCOMM. The following training courses were held:

- ODINBlackSea training course on the establishment of national Ocean Data Portal nodes in the Black Sea region, Obninsk, Russian Federation, March 2009;
 - ODIN-WESTPAC training course establishment of national Ocean Data Portal nodes, Seoul, Republic of Korea, September 2009.
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