

**JCOMM DATA MANAGEMENT  
COORDINATION GROUP**

**THIRD SESSION**

Ostend, Belgium, 26-28 March 2008

**FINAL REPORT**

**JCOMM Meeting Report No. 56**



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#### NOTE

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## EXECUTIVE SUMMARY

The Third Session of the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM) Data Management Coordination Group (DMCG) met in Oostende, Belgium at the International Oceanographic Data and Information Exchange (IODE) Programme Office from 26 to 28 March 2008, chaired by Bob Keeley. Bearing in mind that the Third Session of JCOMM will take place in November 2009 the Group stressed the importance of timely preparation of documentation. The Group reviewed progress with its work plan assigned by the Second JCOMM Session. It noted in particular the significant progress towards developing standards through the IODE/JCOMM Forum on Oceanographic Data Management and Exchange Standards held in January, 2008, and rapid progress with the JCOMM Pilot Project for the WMO Integrated Global Observing Systems (WIGOS). There was good progress on matters relating to table driven codes (TDCs). There is still significant work needed on establishing a Data Management Programme Area (DMPA) web presence. The Expert Team on Marine Climatology (ETMC) reported a reorganization of work with the creation of 2 task teams, the TT-MOCS (Marine-meteorological and Oceanographic Climatological Summaries) and the TT-DMVOS (Delayed Mode VOS data). ETMC will develop a database of extreme wave events in collaboration with the Expert Team on wind Waves and Storm Surges (ETWS) in the JCOMM Services Programme Area (SPA), develop marine climate indices in collaboration with the joint CLIVAR/CCI/JCOMM Expert Team on Climate Detection and Indices (ETCCDI) and extend the contents of the International Comprehensive Ocean-Atmosphere Data Set (I-COADS) in collaboration with SPA and others, and quality control process for surface meteorology and oceanographic measurements and continue to guide the development of the metadata pilot project for water temperature measurements (METAT) with support provided by the Chinese ocean data centre. As soon as possible, this metadata project will expand its view to include other instrumentation and variables. The IODE/JCOMM Expert Team on Data Management Practices (ETDMP) has carried out significant work done to collaborate with the WMO Information System (WIS) in a prototype development. The end-to-end (E2E) software developed as part of the prototype has been improved and is the basis of the recently approved development of the Ocean Data Portal (ODP) of IODE. This will also contribute to the JCOMM Pilot Project for WIGOS. Similarly for ETMC, ETDMP has created a task team to continue the development of the E2E technology and they will focus activities on supporting the WIGOS work. The main work of ETDMP will be refocused on standards development through managing the standards process that was formulated at the joint IODE/JCOMM Forum. This work will proceed from now until JCOMM-III as a pilot project. Closer collaboration has been established with other Programme Areas of JCOMM. The JCOMM Observations Programme Area (OPA) will be helping to write a document that explains how marine data can be distributed in both real-time and delayed mode. This will contribute to a catalogue of best practices being assembled by the JCOMM Management Committee. With SPA, there is the resolve to include both the Global Ocean Data Assimilation Experiment (GODAE) and the GODAE High Resolution Sea Surface Temperature (GHRST) Pilot Project products as part of the WIGOS developments. Solid collaboration has been established between IODE and the DMPA. The chairs of DMCG and of IODE now both are official members of the other committee. In addition, there was agreement to collaborate on updating reference material. This will contribute both to the Catalogue of best practices and the need to address the quality management framework activities being pursued by WMO. Finally, the activities of the ETDMP are jointly agreed to by DMPA and IODE. This is a significant advantage in building cooperation. The meeting concluded with a significant action list.

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## GENERAL SUMMARY OF THE WORK OF THE SESSION

### 1. WELCOME

#### 1.1 INTRODUCTIONS

1.1.1 The Chairperson of the JCOMM Data Management Coordination Group, Mr Robert Keeley opened the meeting at 9:00 a.m. on 26 March 2008 at the Project Office for the IOC International Oceanographic Data and Information Exchange (IODE) in Ostend, Belgium.

1.1.2 On behalf of the Secretary-General of WMO, Mr Michel Jarraud, and the Executive Secretary IOC, Dr Patricio Bernal, Mr Etienne Charpentier welcomed the participants to the meeting. He recalled that the WMO Fifteenth Congress agreed on establishing a comprehensive, coordinated, and sustainable system of observing systems with ensured access to its component observing systems' data and products through interoperability arrangements (Res. 30 – Cg XV). The WMO Integrated Global Observing Systems (WIGOS) framework will address all WMO Programmes and Co-sponsored programmes requirements, ensure availability of required information, meet data quality standards, and facilitate access in real/quasi-real time as well as to archived information. Cg-XV recommended to initiate five Pilot Projects, one being the integration of marine and other appropriate oceanographic observations into the Global Observing System (GOS). The JCOMM DMCG is expected to play a key role in the development of the Pilot Project through the development of interoperable arrangements between the Ocean Data Portal and the WIS. An *ad hoc* planning meeting for the JCOMM Pilot Project for WIGOS was planned just after the DMCG meeting in Oostende on 29 March 2008. He explained that this has been a busy inter-sessional period and that strong cooperation has been created between IOC and WMO in terms of data management. Mr Charpentier mentioned that the "First Session of the IODE/JCOMM Forum on Oceanographic Data Management and Exchange Standards" was a new highlight for WMO/IOC cooperation and the emerging WIGOS could also offer new opportunities for collaboration. The Secretariat representative concluded his remarks by assuring the continued commitment of WMO to support and strengthen the work of the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM) and to the Data Management Programme Area and its Expert Teams in particular, and wished for a successful meeting. He expressed the sincere thanks to the IOC Project Office for the International Data and Information Exchange (IODE) and to Mr Peter Pissierssens and his staff for the excellent support for the meetings.

1.1.3 Mr Peter Pissierssens, Head of the IOC Project Office for IODE and IODE Programme Coordinator welcomed the participants to the Project Office, on behalf of the IOC Executive Secretary. He expressed his appreciation for the momentum that had been gained by the work of the Data Management Programme Area of JCOMM and in particular by the E2E technology development by the ETDMP that had led to the development of the Ocean Data Portal but was now also linked to WMO's WIS. He noted that for IODE the cooperation with WMO within JCOMM is clearly successful and mutually beneficial. He called, however, for closer collaboration between IODE NODCs and WMO NMHSs. He noted further that in the area of standards setting the cooperation between IOC/IODE and WMO was also very promising, referring to the "First Session of the IODE/JCOMM Forum on Oceanographic Data Management and Exchange Standards". He ended by expressing his appreciation to the WMO Secretariat, to the DMPA coordinator, to the two Expert Team Chairs and the members of the DMCG and Expert Teams for their hard work.

1.1.4 The Chair then invited the participants to introduce themselves. The list of participants is provided in [Annex II](#)



## 1.2 LOCAL ARRANGEMENTS

1.2.1 Mr Peter Pissierssens informed the meeting on local arrangements and introduced the working documents for the Session. He reminded the participants that all documents had been made available through the IOC/JCOMM web site (<http://www.jcomm.info>).

## 1.3 APPROVAL OF THE AGENDA

1.3.1 The participants reviewed the agenda for the Session and adopted it. The agenda is reproduced in [Annex I](#).

## 2. PREPARATION FOR JCOMM-III

### 2.1 REVIEW OF WORK ASSIGNED BY JCOMM-II

2.1.1 The Group reviewed the work assigned by the Second Session of the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM), Halifax, Canada, 19-27 September 2005. (See Document 2.3 Appendix B). The Chair requested Group members to continue providing updates on implementation of the work plan.

2.1.2 The Group noted with appreciation that a substantial number of assignments had already been completed. The Group briefly discussed items that needed further attention prior to JCOMM-III including:

*“para. 7.1.4: Maintain a permanent list of oceanography and marine meteorology data management initiatives to promote complementarity and synergy”*: The Group noted that a list had not yet been compiled. The Group recalled that the list should not cover all national initiatives but focus on those that are considered as JCOMM initiatives. **The Group instructed the chair of DMCG and the two ET Chairs to prepare a short list and share it with the members of the DMCG.** It was noted that the ETMC has a draft list that can be used as a basis.

*“para. 7.1.8: Intensify collaboration of the IODE NODCs with WMO NMHS’s at the national level on JCOMM data management activities”*: The group noted that NODCs and NMHS’s are not generally working closely together yet and it was unlikely that this will change substantially by JCOMM-III. However, the Group noted that the development of the ODP and WIS will offer practical opportunities for collaboration. Reference was also made to the IOC Strategic Plan for Oceanographic Data and Information Management which will be further discussed under Agenda Item 8.3.

*“para 7.2.3 and 7.2.5, and Recommendation 7/1 (JCOMM-II): - Organize training workshops through the IOC Project Office for IODE”*: The Group noted that a few joint workshops had been organized (most recently the DBCP course held in 2007) but **called for more similar joint training activities.**

*“para. 7.2.6: Arrange for ongoing JCOMM representation on ICG/WIS”*: The Group recalled that Mr David Thomas is currently **representing JCOMM in the ICG/WIS** but was informed that Mr Thomas may leave his position in July 2008 and accordingly **a replacement will need to be found.**

*“para 7.6.2: Convene a joint JCOMM/GODAE Workshop on quality control and data assembly in conjunction with GODAR workshop in 2007”*: The Group was informed that this event was not organized but that the issue had been dealt with through the “First Session of the IODE/JCOMM Forum on Oceanographic Data Management and Exchange Standards (Oostende, Belgium, 21-25 January 2008)”.

*“para 7.6.7 and 7.6.10 – Ensure wider participation of GTSP and GOSUD in Expert Team Data Management Practices pilot projects, carrying out the functions of GTSP and GOSUD data services under the E2EDM prototype”*: The Group noted that this would be expected to develop more fully through WIS/WIGOS.

*“para 7.7.1 and Recommendation 7/2 (JCOMM-II) – Develop a JCOMM data management strategy to be closely coordinated with those of IODE and WMO Information system”*: The Group noted with appreciation that the plan had been finalized and will be published shortly for submission to JCOMM-III. The Group was further informed that an implementation plan is in preparation. This is being discussed under Agenda Item 9.

*“para 8.1.7, 8.1.2, 8.1.3, 8.1.15 (capacity building)”*: this will be addressed in the report of the CB Rapporteur.

*“para 8.3.1 – Develop a project on early warning system to mitigate flooding and earthquake effects on the Africa coast”*: The Group noted that this should be dealt with by the SPA.

*“para 11.1.5 – Incorporate the appropriate actions within the Plans prepared by GCOS and by the GEO into the activities of the relevant JCOMM coordination groups”*: The Group noted that several JCOMM DM activities are already contributing to GEO/GEOSS either through WIS or through WIGOS and accordingly the Group stated that no specific actions for GEO/GEOSS are required.

*“para 11.5.17 and Recommendation 11/1 (JCOMM-II) – Develop an action plan for JCOMM contributions to multi-hazard warning systems”*: The Group noted that the DMCG’s work is not directly relevant to this task but **recommended that training material on the application of data management to marine hazards be included in OceanTeacher.**

2.1.3 The Group reviewed the work assigned by the Fifth Session of the JCOMM Management Committee (WMO, Geneva, 5-7 October 2006) and the Sixth Session of the JCOMM Management Committee (UNESCO, Paris, 3-6 December 2007).

2.1.4 The Group noted with appreciation that a substantial number of assignments had already been completed. The Group briefly discussed items that needed further attention prior to JCOMM-III including:

*“MAN-V: 3.3 – The Committee agreed to task the DMCG with the coordination of the submission of materials to OceanTeacher”*: This item is discussed under [Agenda Item 2.2](#) and 4.2

*“MAN-V: 3.3.6 and 3.3.7 – metadata”*: The Group noted that these issues had been discussed during the “First Session of the IODE/JCOMM Forum on Oceanographic Data Management and Exchange Standards (Oostende, Belgium, 21-25 January 2008)”

*“MAN-V: 3.3.8 – Regarding the overall role of JCOMM within the WIS, the Committee asked the WMO Secretariat to prepare a questionnaire to Member States represented on JCOMM asking for information on potential JCOMM DCPCs for marine meteorological and oceanographic variables”*: The Group noted with regret that no IODE NODC had volunteered to establish a DCPC and **called on the IODE Officers to encourage participation from the IODE community.** This matter was also expected to come up at the WIGOS meeting to be held on 29 Mar, 2008.

*“MAN-V: 3.3.9 - The Committee also encouraged DMPA and other Programme Areas to engage in more unified data management operations”*: The Group was informed that the DMCG chair had attended both OCG and SCG meetings. It was his opinion that while

valuable, efforts should be made to increase the coordination. The Group agreed with his assessment and **called for closer cooperation and coordination with the OPA and SPA.**

## 2.2 REVIEW OF ACTIONS FROM DMCG-2

2.2.1 The Group reviewed the list of actions arising from the Second Session of the DMCG, Geneva, Switzerland, 10-12 October 2006. (See Document 9).

2.2.2 The Group noted with appreciation that most of the actions identified by DMCCG-II had been implemented and focused on the few actions that required attention:

*“Agenda Item 2.3 ETMC – c: Develop proposal for an Extreme Wave Event Archive”*: The Group was informed that there exists a draft proposal that was discussed at the JCOMM Expert Team for Wind Waves and Storm Surges and by the JCOMM Expert Team on Marine Climatology meetings which all expressed approval for the proposal. However no development work has been carried out since then. **The Group noted that a lead person will be needed to continue the work towards a final and formal proposal.** (See Also Agenda Item 5.1)

*“Agenda Item 2.4 Capacity Building – b: Identify missing digital library material and course material for OceanTeacher related to JCOMM subject areas”*: The Group was informed that at the MAN-VI, WMO had informed the MAN that WMO will maintain its own training web site and related tools rather than including these in OceanTeacher. Mr Pissierssens informed the Group that the current phase of OceanTeacher is ending in October 2008. Any need for actions that involve JCOMM and/or WMO would need to be timely planned and included in the planned proposal for a next phase that will be prepared by October 2008. **The Group expressed concern about the lack of clarity regarding future cooperation of WMO and IOC regarding OceanTeacher and called on the Management Committee to address this with guidance from the WMO and IOC Secretariats.**

*“Agenda Item 3.6 Tsunami Warning and Mitigation Systems: contribution of JCOMM – d: consider including the African Sea Level Data Facility in the JCOMM OPA scope of activities and address data sharing policy and monitoring aspects”*: The Group was informed that no action had been taken on this issue and **requested the DMCG Chair to discuss this matter with the Chair OPA.**

## 2.3 REPORTING TO JCOMM-III

2.3.1 The Group reviewed the DMPA activities since JCOMM-II, and agreed that the following information should be included in the report that will be presented to the third Session of JCOMM (JCOMM-III) which is planned for Morocco in November 2009.

1. Two meetings of the DMCG (DMCG-II, Geneva, Switzerland, 10-12 October 2006, and DMCG-III, Ostend, Belgium, 26-28 March 2008), and major outcomes. The DMCG agreed on a JCOMM Data Management Plan as well as on its related implementation plan. The plan has been reviewed by JCOMM PAs and the 19<sup>th</sup> Session of the IODE Committee (Trieste, Italy, 12-16 March 2007) and will be published in 2008.
2. One meeting of the ETMC (ETMC-II, Geneva, Switzerland, 26-27 March 2007) and progress with regards to the restructuring of the MCSS into two new Task Teams on Delayed Mode VOS Data (TT-DMVOS) and Marine Meteorological and Oceanographic Summaries (TT-MOCS).
3. Promoting the interoperability between the different data management systems being developed and/or implemented in the ocean community, including with the WMO

Information System (WIS), End-to-End (E2E) technology, and the IODE Ocean Data Portal, and engaging in the JCOMM Pilot Project for the WMO Integrated Global Observing Systems (WIGOS). A planning meeting for the Pilot Project is organized in Ostend, Belgium, 29 March 2008.

4. Further development of the JCOMM ODAS Metadata centre (ODASMS) operated by NMDIS, China, and modernization of the "On-line Information Service Bulletin on non-drifting ODAS" now operated by NMDIS.
5. A report on the progress of the Water Temperature Pilot Project (META-T)
6. The development of an extreme wave database in cooperation with the JCOMM Services Programme Area (SPA) Expert Team on Wind Waves and Storm Surges.
7. The development of marine indices (e.g. wind waves, sea-ice) in cooperation with the JCOMM SPA and its Expert Teams, as well as with the Joint CII/CLIVAR/JCOMM Expert Team on Climate Change Detection and Indices (ET-CCDI).
8. The First Session of the IODE/JCOMM Forum on Oceanographic Data Management and Exchange Standards, Ostend, Belgium, 21-25 January 2008. This resulted in progress on the establishment of a process for standards development and accreditation for marine and oceanographic data management.
9. The Third JCOMM Workshop on Advances in Marine Climatology (CLIMAR-III) will take place in Gdynia, Poland, 6-9 May 2008.

2.3.2 The Group agreed that the following recommendations or Resolutions should be proposed to JCOMM-III for adoption:

1. Versions IV of International Marine Meteorological Tape (IMMT) format (contingent on a recommendation from TT-DMVOS to proceed).
2. Version VI of the Minimum Quality Control Standards (MQCS) of the MCSS (contingent on a recommendation from TT-DMVOS to proceed).
3. Stress that access to ODAS metadata is essential for marine climatology. The implementation panels under JCOMM or its associated programmes as well as WMO and IOC Members/Member States should ensure the required metadata, both historical and operational, is submitted through the existing systems, and assist in the development of new systems. The Group agreed to propose a JCOMM Resolution in this regard.
4. Changes proposed by the ETMC to the Manual on Marine Meteorological Services (WMO-No. 558) and the Guide to Marine Meteorological Services (WMO-No. 471).
5. Revision of the ETMC Terms of Reference in light of the new TT-DMVOS and TT-MOCS Task Teams and the restructuring of the MCSS.
6. Revision of the ETDMP Terms of Reference in light of the discussions at the DMCG-III, IODE Officers meeting 2007 (27-30 November 2007), and First Session of the IODE/JCOMM Forum on Oceanographic Data Management and Exchange Standards. The ETDMP will play a leading role in helping to converge the diverse data systems in place in JCOMM, and oversee a standards process and the accreditation and development of standards for ocean data management under JCOMM and IODE.

7. Additional items as developed from this meeting and subsequent work in the intersessional period.

2.3.3 The Group requested the ETMC and ETDMP Chairpersons to provide the DMCG Chairperson with a report on the work planned and completed by their respective Expert Teams in time for the next Management meeting scheduled for early December, 2008. The Group agreed that it would be appropriate to include IODE input to the report to JCOMM-III. It asked Greg Reed (IODE Co-Chair) to coordinate the contribution. **It also requested Robert Keeley and the Secretariat to prepare a report on the JCOMM Pilot Project for WIGOS for presentation at JCOMM-III.**

2.3.4 The Group invited its members to propose/submit presentations on Ocean Data Portal (ODP), ODAS, and META-T to the JCOMM-III scientific and technology workshop that will be held just prior to JCOMM-III

2.3.7 The Group invited its chairperson, in liaison with Group Members, to prepare a work plan for DMPA to be proposed to JCOMM-III bearing in mind the work identified already in the Data Management plan and implementation plan .

2.3.8 Robert Keeley informed the Group that he will not continue as Chairperson for the Group after JCOMM-III. He **invited JCOMM Members to consider proposing candidates for the position of Chair.**

### **3. DMPA CHAIRPERSON'S REPORT**

#### **3.1 OVERVIEW**

3.1.1 The Chairperson reported that he had attended a number of meetings since the last DMCG meeting, including those from the other JCOMM Programme Areas as well as the sixth JCOMM Management Committee meeting. Of particular interest was a presentation to the WMO Executive Council working Group on WIGOS-WIS regarding a pilot project of JCOMM for WIGOS that will be discussed later by the Group.

3.1.2 The Chairperson noted that he had worked on a number of different topics including completing the Data Management Plan, aspects of converting GTS reporting to BUFR, collaborations with IODE, preparations for CLIMAR-III and the Meta-T discussions. All of these are treated in the agenda for this meeting. He also noted that he was scheduled to make a presentation at CLIMAR-III explaining JCOMM and DMPA.

3.1.3 He noted that at the Nineteenth Session of the IODE Committee (12-16 April 2007), the Chairperson of the JCOMM DMCG was accepted as an Officer of IODE. This is important since the work carried out by ETDMP is shared with IODE and so management of the ETDMP work plan is a joint responsibility. Additionally, it formalizes the connections between IODE and DMPA with the chair of one group being a member of the other committee.

3.1.4 At the 2007 OOPC meeting, he was approached by a panel member who remarked that there was no source of information about how data collected at sea could be inserted into the JCOMM and IODE data streams. As a result, a draft "Oceanographer's and Marine Meteorologist's Cookbook for Submitting Data in Real Time and In Delayed Mode" is in preparation that provides instructions for many kinds of data. Completion of this manual will require assistance from the OPA. The "cookbook" is providing information on procedures required to provide data for exchange in real-time, who to contact for assistance and other practical matters. Similar information will be available for delayed mode data. He explained that one of the impediments to getting greater participation in real-time data exchange was this lack of knowledge. **The Group requested Robert Keeley to coordinate the completion of the cookbook with Scott Woodruff, David Thomas,**

**and Candyce Clark.** The final version will eventually be posted on the DMPA web site and presented to JCOMM-III.

3.1.5 Finally, he noted that the DMPA web site has not yet been built. This is an important activity that will need to be addressed before JCOMM-III. It is discussed under Agenda item 3.3.

3.1.6 The Group requested Scott Woodruff to contact Thomas Loubrieu (IFREMER, Brest, France) and provide some background information to him regarding his participation at the first meeting of ET-ADRS, Washington, 23-25 April 2008 (e.g. add issues such as IMMT & IMMA, non-SI units in Table driven codes).

## 3.2 STANDARDS AND BEST PRACTICES

3.2.1 Mr Greg Reed reported on the work that has been conducted with regard to the development of a plan for defining a standards accreditation and a standards development process for ocean data management under JCOMM and IODE.

3.2.2 The First Session of the IODE/JCOMM Forum on Oceanographic Data Management and Exchange Standards was held from 21 to 25 January 2008 at the IOC Project Office for IODE in Oostende, Belgium. The objective of this meeting was to gain general agreement and commitment to adopt key standards related to ocean data management, which will facilitate data exchange between oceanographic institutions. The meeting was chaired by Robert Keeley (Chair, DMCG) and Greg Reed (Co-chair, IODE). The report of the meeting (IOC Workshop Report No. 206) can be downloaded from the newly established web site – <http://www.oceandatastandards.org>.

3.2.3 The Forum had discussed the process to adopt and formally publish proposed standards and agreed that the process must include exposure to the wider community for comment. The documentation required to describe a proposed standard should include:

1. Scope of the standard
2. Limitations (suitability of purpose)
3. Required tools or applications for effective support
4. Rules for information conversion from legacy systems
5. Technical obstacles (and recommendations to resolve them)

3.2.4 The following topics were discussed at the Forum:

1. Metadata. ISO 19115 (Geographic information — Metadata), or a community profile of ISO 19115, should be used for creating discovery metadata.
2. Ontology resources. General discussion on existing ontologies, ontology tools, services and processes.
3. Date and time. ISO 8601 (Data elements and interchange formats — Information interchange — Representation of dates and times) was recommended as the standard for data and time format.
4. Latitude, longitude, altitude. ISO 6709 (Standard representation of geographic point location by coordinates) was recommended as the standard.
5. Country codes. ISO 3166 (Codes for the representation of names of countries and their subdivisions, Part 1: Country codes and Part 3: Code for formerly used names of

countries) was recommended as the standard.

6. Platforms. A single standard was not recommended but the two existing lists of platforms maintained by USNODC and ICES should be maintained. The vocabulary list of platform types developed by SeaDataNet and maintained by BODC should be mapped to other platform instances such as GCMD.
7. Quality control. The meeting considered QC of T&S profiles, surface T&S, currents, sea level, surface waves and quality flags. No single standard was identified but further work was recommended to update and document existing procedures.
8. Code lists. The meeting discussed code lists and vocabularies for parameters, taxa, science keywords, instruments, institutions and projects. No single vocabulary was recommended for each of these lists. GCMD vocabularies for science keywords, instruments and parameters were identified as comprehensive lists that would benefit from revised management and mapping between other lists.

3.2.5 An *ad hoc* Steering Team was established by the Forum to manage and implement the work plan agreed at the meeting. Members of this Steering Team are JCOMM DMCG Chair (Robert Keeley), IODE Co-Chair (Greg Reed), IODE/JCOMM ETDMP Chair (Nick Mikhailov) and a representative of US IOOS. It had been agreed that a formal structure would be discussed at IODE-XX and JCOMM-III.

3.2.6 The Group agreed with the Process as proposed by the Forum and established the "Pilot Project on the IODE/JCOMM Standards Process". The Group further agreed that the Pilot Project will be managed by the IODE/JCOMM ETDMP and elected the Chairperson of the ETDMP to lead the Pilot Project. The Membership of the Pilot Project should be balanced between the WMO and IOC communities (see also [Agenda item 6.3](#)). and requested the ETDMP to create the membership in this way. The ETDMP will make the necessary arrangements for documenting and publishing of the recommended standards as well as to continue their management, including updating. Most of the work will be done by email and probably will not require organizing of actual meetings

3.2.7 The Group agreed that the JCOMM Observations Programme Area and Services Programme Area should also be engaged in the standards process as they also deal with data management issues (e.g. data collection formats, real-time QC, data distribution formats). The meeting noted that the other PAs could be involved in two ways: (i) The Task Team should have 1 or 2 PA representatives in its membership; and (ii) other PA groups should be invited to submit standards to become broader JCOMM standards. The Group agreed that the review team for any standard should request the participation of experts available in other JCOMM Programme Areas and in IODE Groups of Experts. The chair of DMCG was requested to consult with his counterparts in JCOMM and IODE. The Group invited the IODE Co-Chair, Greg Reed, to contact the IODE officers to seek agreement regarding the new ETDMP work plan, the creation of the Pilot Project on the IODE/JCOMM Standards Process as well as the membership of its Task Team. Greg Reed proposed to circulate the proposed membership to the IODE officers and to call for possible other nominations

3.2.8 The Group agreed to include in the Terms of Reference of the Pilot Project how to address the broader interests when a new standard is being proposed so that a consolidated proposal can eventually be made.

3.2.9 The Group recommended that JCOMM-III consider re-establishing the ETDMP with a coordinating role and limited membership (4 or 5 members). The Pilot Project would then evolve into a Task Team. It requested the DMCG Chairperson, in liaison with the IODE Co-Chairperson, and the ETDMP Chairperson to draft a recommendation for JCOMM-III for the ETDMP to take on the role of standards development, including managing the standards process and documenting,

updating and publishing recommended standards. It also asked the chairperson to draft new Terms of Reference for the ETDMP to be submitted to JCOMM-III.

3.2.10 The Group also noted with appreciation the decision by the last JCOMM Management Committee to compile a JCOMM catalogue of standards and best practices to be presented to JCOMM-III. The work of standards development and accreditation as well as the “cookbook” described earlier (3.1.4) will all contribute to this catalogue.

### 3.3 TABLE DRIVEN CODES

3.3.1 Mr Keeley reported on rationalization of templates for table driven codes. DMCG-2 recognized the requirement to have a representative of JCOMM on the Expert Team on Data Representation and Codes (ETDRC), the WMO committee responsible for maintaining table driven codes. Hester Viola, the present JCOMMOPS Technical Coordinator agreed to take on this duty and has been present at one meeting in the first quarter of 2007.

3.3.2 DMCG-2 outlined three tasks for a BUFR task team that was partially formed at that meeting. In November, Robert Keeley initiated emails to start discussions and to try to find a chair with no success.

3.3.3 The tasks were:

- a. to review and propose templates for data of interest to OPA groups;
- b. to bring Master Table 10 into conformance with WMO rules;
- c. to look at ways to standardize the content across templates.

3.3.4 The first task has mostly been tackled by the various groups of OPA and so there was little to do. The exception has been for VOS data. Those discussions are combining the requirements from Meta-T and representing information currently in FM-13 SHIP properly.

3.3.5 Nothing has progressed to determine what changes are needed to bring BUFR Master Table 10 into conformance with present WMO regulations. **The Group requested R. Keeley, Craig Donlon, and Etienne Charpentier to develop the changes needed to bring MT10 into conformance with present WMO rules for TDCs and to present this to the CBS ET/DRC.**

3.3.6 In January 2007, the acting chair of the TT, Robert Keeley, received the templates for profiling floats, moored and drifting buoys, XBT and XCTD, VOS, and underway data (TRACKOB). There is also a CREX form for sea level. He examined all of the templates for ocean data, and made an initial proposal of how to consolidate the information into appropriate sequences. For example, one template may have descriptors for instrument information while another template may not, or if so, asks for different information. The consolidation process looked to include a core suite of instrument information that would be reported in every template, and with the same set of descriptors. The same philosophy was carried over into the other information that was found in the templates. This first draft was circulated in August and some comments were received. However, the basic intent was unaffected by the comments, or more accurately unevaluated. The Group invited its TT on Table Driven Codes to decide if there is merit in consolidating information, and if so to produce a proposal for the next CBS ET DRC meeting.

3.3.7 In the mean time, the connection of what to report in real-time using BUFR to further the Meta-T discussions became entangled with this consolidation. Matters are stuck at this point.

3.3.8 Work remains, therefore, to complete steps 2 and 3 as outlined at DMCG-2. This would progress faster if a chair could be found.

3.3.9 The meeting agreed that the way JCOMM was addressing table driven codes had become complex and that many groups were involved (e.g. SOT TT, DMPA TDC TT, META-T). The Group agreed that proposing only one group to deal with table driven codes within JCOMM



would be more appropriate as it crosses across all Programme Areas and a broader audience was needed. It suggested that the SOT considers merging its Task Team on codes with the DMPA TDC Task Team and the META-T to directly submit its requirements to the DMPA TDC TT instead of through the SOT TT. **The Group requested Robert Keeley to liaise with the OPA and SPA chairpersons in this regard in the view to make recommendations to the Group for establishing a JCOMM cross-cutting Task Team on Table Driven Codes.** The Group noted that the ETMC had also to be involved in this exercise and that the newly formed TT should be notified of the recommendations coming from ETMC-II. **The JCOMM Representative in the CBS ET-ADRS (presently Mr Thomas Loubrieu) should also de facto become a member of the TT if/once established. The Group asked Robert Keeley to contact Mr Loubrieu in this regard. Group members are also invited to propose candidates.**

### 3.4 DMPA WEB SITE AND DOCUMENTATION

3.4.1 Mr Keeley reported on plans for developing a DMPA web site and documentation. He noted that the present JCOMM web site (<http://www.jcomm.info>) has a place holder for information about DMPA but that there is no content as yet. It is important for this to be remedied.

3.4.2 He presented information that is presently included in WMO web pages describing the various components of JCOMM including activities of the DMPA. He noted that much of the material that would be needed for a DMPA web site already exists on these pages. The material needs to be reviewed by DMCG members, and some updated, but that much of it is suitable. The main drawback from the chair's view is that the material does not appear under a JCOMM banner and "branding" and this is a desirable matter for JCOMM. However, he notes that because of the value of the present material and the work put into the WMO pages, it would be wasteful not to use as much as possible.

3.4.3 The Chair started the discussion with the following questions:

1. What is the best way to use the material currently on the WMO pages, but achieving the JCOMM branding that is important?
2. How to review and update the material written about the various "activities" including an assessment of the relevance? For example, it is not clear why GDSIDB is present since this has traditionally fallen under SPA.
3. Should the content on the separate ETMC site be moved to the DMPA site and maintained there?
4. Should the intersessional work plan and comments as presented in Doc 3.0 be included?
5. What additional information should be included?

3.4.4 The Group agreed to use the <http://www.jcomm.info> web site for presenting information relevant to the DMPA. **It asked a small *ad hoc* task team comprised of Robert Keeley (leader), Scott Woodruff, Nick Mikhailov, and the WMO and IOC Secretariats to look at the web site structure and make proposals back to the Group.** Some of the pages drafted by this task team will also be submitted to the Group for comment with the goal of having DMPA web pages ready by JCOMM-III. The Group agreed that the DMCG Chairperson should be the DMPA web editor. **The Group requested the small task team to populate the data management section of the JCOMM web site.**

### 3.5 WMO INTEGRATED GLOBAL OBSERVING SYSTEMS (WIGOS)

3.5.1 Mr Keeley reported on the development of a JCOMM Pilot Project for the integration of marine and other appropriate oceanographic data into the WMO Global Observing System (GOS) in the framework of the WMO Integrated Global Observing Systems (WIGOS). The Group noted that per Resolution 30, the WMO Fifteenth Congress (Cg-XV), Geneva, Switzerland, 7-21 May 2007, has agreed on establishing a comprehensive, coordinated, and sustainable system of observing systems with ensured access to its component observing systems' data and products through interoperable arrangements. The WMO Integrated Global Observing Systems (WIGOS) is the system of observing systems and the WMO Information System (WIS) provides access through the interoperable arrangements. WIGOS/WIS will address all WMO Programme requirements, ensure availability of required information, meet data quality standards, and facilitate access in real/quasi-real time as well as to archived information. In this contexts, Cg-XV has recommended to initiate Pilot Projects, one of which being the integration of marine and other appropriate oceanographic observations into the Global Observing System (GOS). The Fifty-ninth WMO Executive Council, Geneva, Switzerland, 28-30 May 2007, has established a Working Group on WIGOS and WIS (EC WG WIGOS-WIS) to follow the development of an over-arching WIGOS Development and Implementation Plan and also review the progress in the implementation of WIGOS/WIS "Pilot Projects".

3.5.2 The Group noted that following Cg-XV and EC-LIX recommendations, JCOMM engaged in the drafting of a JCOMM Pilot Project for WIGOS as an important contribution in the development of WIGOS/WIS. Informal discussions took place between the chairperson of the DMCG, the JCOMM Co-Presidents, and the Secretariats to develop a vision for the JCOMM Proposal. A first version of the JCOMM Pilot Project for WIGOS plan focused on (i) integration of best practices and standards, (ii) developing interoperability of ocean data systems with the WIS, and (iii) Quality Management (QM) was presented to the IODE Officers meeting, Ostend, Belgium, 27-30 November 2007, to the Sixth Session of the JCOMM Management Committee, Paris, France, 3-6 December 2007, and to the first Session of the EC WG WIGOS-WIS, Geneva, Switzerland, 4-7 December 2007. All three meetings welcomed the initiative by JCOMM and recommended to continue developing the plan in close cooperation between the WMO and IOC communities, and respecting the ownership of all partners in the system.

3.5.3 The first Session of the EC WG WIGOS-WIS has defined the WIGOS Concept of Operations (CONOPS), a vision of what WIGOS should eventually become once fully implemented and operational. The Working Group also reviewed the draft Pilot Projects, including the one proposed by JCOMM. The Working Group welcomed the JCOMM initiative, praised the approach of the proposal, which clearly showed (i) the benefits for both the ocean and meteorological communities; (ii) the need to follow specific data policies; and (iii) required funding to coordinate the development of the Pilot Project. The Working Group recommended that JCOMM coordinate with CIMO on matters related to Best Practices during the implementation of the Pilot Project; and that the Pilot Project be developed gradually in order to immediately show the benefits to both communities and reassure the IOC of its full partnership in its development.

3.5.4 The EC Working Group established a Sub-Group (SG-WIGOS), lead by the President of the Commission on Instruments and Methods of Observations to provide overall technical guidance, assistance and support for the implementation of the WIGOS concept based on strategic directive of the Fifteenth WMO Congress, and in particular to elaborate in detail the three levels of integration of WIGOS as described in the CONOPS, to refine the CONOPS itself, and to coordinate the WIGOS planning phases (including the Pilot Projects) according to the over-arching WIGOS Development and Implementation Plan.

3.5.5 At the IODE/JCOMM Forum on Oceanographic Data Management and Exchange Standards, Ostend, Belgium, 21-25 January 2008 the role of ETDMP in managing the standards process and in the development of E2E technology was discussed. The Forum agreed that the JCOMM/IODE ETDMP should be directly involved in the Pilot Project, thanks to its experience in developing the E2E technology and interoperability of the Russian NODC in Obninsk with the WIS

(NODC therefore acting as a WIS DCPC). An ad hoc planning meeting is planned in Ostend on 29 March 2008 just after the DMCG-III. This meeting will further develop the project.

3.5.6 The Group endorsed the actions undertaken so far under the leadership of its Chairperson and strongly supported the development of the JCOMM Pilot Project for WIGOS. Noting substantial potential synergies, the Group agreed that both the IODE Ocean Data Portal and the JCOMM WIGOS Pilot Project would benefit from merging their Steering Groups. **The group therefore recommended the establishment of one single Steering Group for both Projects while noting that the issue as well as the Steering group membership had still to be discussed at the *ad hoc* planning meeting for the JCOMM Pilot Project for WIGOS, Ostend, 29 March 2008, and that the final decision would lie with the IODE on one hand and the WMO Executive Council working Group on WIGOS-WIS on the other hand.** (see Also Agenda Item 6.2)

3.5.7 The Group agreed that management and minimization of duplicates was an important issue to address in the framework of the JCOMM Pilot Project for WIGOS. In particular, the promotion of "best copy" data sets was an effective way of doing so and recommended this be considered by the Pilot Project.

3.5.8 While noting that the decision will be made by the ad hoc planning meeting for the JCOMM Pilot Project for WIGOS, and the rapid development of the ODP and standards process, the meeting recommended that **another meeting for the Pilot Project be organized towards the end of 2008.**

3.5.9 Additional recommendations and actions are proposed by the meeting under agenda items 6.2 and 8.2.6.

## 3.6 COMPUTER MODELS

3.6.1 Mr Keeley addressed the issue of computer model output and related data management. He recalled that the Data Management plan of JCOMM now addressed this issue and made the following recommendations:

- Recommendation 5.7a: JCOMM to work with the modelling community to define the characteristics that determine which outputs should be archived.
- Recommendation 5.7b: JCOMM to work with relevant modelling groups to develop cost-effective strategies for the storage and archival of operational model outputs and products.
- Recommendation 5.7c: Appropriate model characteristics will be archived with model results.
- Recommendation 5.7d: JCOMM will collaborate with model developers to decide the long-term value of preserving outputs of retired versions of models.

3.6.2 Mr Keeley reported that not much progress had been made so far but that the Group had to address what could realistically be done before JCOMM-III. He noted that the implementation plan had no task or action identified so far in this regard. **The Group members were invited to make proposals for including action items in the DM implementation plan regarding computer models.**

3.6.3 The Group noted that operational outputs were being managed by other groups, e.g. JCOMM SPA, GODAE, etc. and that model fields output are used by certain applications (e.g. ecosystems, climate) in place of direct observations being assimilated. Also, some of the model outputs are being made readily available regularly (e.g. GODAE). The Group considered that its role could be to facilitate intercomparisons and making the operational model results more readily available. The group noted that GODAE had already engaged in intercomparisons but that standards were needed in terms of file naming conventions, vocabularies, and parameters. GODAE was therefore regarded as a good example for what the DMCG could propose and that interaction with GODAE was therefore needed. Some recommendations will have to be made

regarding how to distribute and make available model output. **The Group invited Sylvie Pouliquen to initiate interaction with GODAE to learn from its experience regarding how to distribute and make available model output, how to target their distribution, how to manage intercomparisons, and propose required standards (file naming conventions, vocabularies, parameters) and to report her findings and recommendations to the chair of DMCG to be passed forward to the JCOMM Pilot Project chair.**

3.6.4 The Group agreed that the WIGOS initiative was a good opportunity to start working on model output distribution. WIGOS will have to consider a number of data sources to make available via the WIS and the ODP (e.g. US NODC for in situ, GODAE model outputs). **The Group invited Robert Keeley to raise this issue at the ad hoc planning meeting for the JCOMM Pilot Project for WIGOS.**

3.6.5 The Group noted that USA was archiving NCEP real time ocean forecast model but that the work was being re-evaluated because of data volumes and limitations.

3.6.6 Although not model output, the Group noted that video data volumes were significant in certain applications (e.g. biology) and that such data should be included in the DM plan on its next revision.

3.6.7 The Group agreed that no further recommendation was required regarding archiving.

## **4. RAPPORTEUR REPORTS**

### **4.1 REPORT BY THE DMPA SATELLITE EXPERT**

4.1.1 The DMPA Satellite expert, Hiroshi Kawamura could not attend the Meeting so the DMCG considered his written report on the current state of data management for ocean data collected by satellite (Document 4.1).

4.1.2 The Group recalled that in order to develop high-resolution SST using the in-situ and satellite measurements, the GODAE and GOOS/OOPC Chairperson (N. Smith) had issued a "Prospectus for GODAE SST project" (Appendix) to the SST experts in the world. The objective of the project was to *"Develop a global, high-resolution sea surface temperature analysis with proper consideration of the skin effect and sufficient temporal resolution to resolve the diurnal cycle, that is available in real-time for all environmental and climate applications"*.

4.1.3 Fulfilling this requirement, the GHRSSST project has developed merged SST products, which are cloud-free high-resolution daily global SSTs (Donlon *et al.*, 2007). Merging the satellite SST has the rational basis that all the satellite SSTs are tuned against globally distributed in-situ SSTs. Their real-time operation is also achieved through the cooperation of the world operational/R&D institutions. However, a part of the requirement *"with proper consideration of the skin effect and sufficient temporal resolution to resolve the diurnal cycle"* was left for further research and developments.

4.1.5 The Group agreed that in order to develop satellite-based SST products beyond the GHRSSSTs, a challenge is to realize higher temporal resolution of the products to resolve the diurnal cycle though proper consideration of the skin effect. The meeting recalled that that the present GHRSSSTs are daily products tuned against the bulk SSTs.

4.1.6 The Group requested Mr Keeley to investigate to what extent drifter, VOS, and other in-situ data are included or used in GHRSSST products. The Group further requested Mr Keeley to contact Dr Craig Donlon (Chairperson, JCOMM Services Coordination Group) regarding the instrument validation component.

4.1.7 The Group invited the Secretariat to liaise with the SPA in the view (i) to update the user requirements of new SSTs with the higher temporal resolution identifying new users (see the prospectus for a GODAE SST Project), and (ii) to identify the in-situ SST sources and to clarify their temporal resolution and vertical resolution in the surface layer (a few meters from the surface).

## 4.2 REPORT BY THE DMPA CAPACITY BUILDING RAPPORTEUR

4.2.1 The DMPA Capacity Building rapporteur, Dr Rudy Herman, reported on his activities on behalf of the DMCG during the last inter-sessional period.

1. During this intersessional period 2006-2007 efforts have been made to define and prioritize the regional DM training needs for different training levels.
2. OceanTeacher is subject to continuous improvement based on the experiences gained from the training activities in the IOC Project Office for IODE. Efforts have been made to make OceanTeacher more user-friendly and better accessible. It is now planned to migrate OceanTeacher to MediaWiki (for the digital library component) and Moodle (for the course component) and this will also be used as an occasion to fully review and update the material as well as the structure. Dr Herman reported that the current phase of the OceanTeacher project will end in 2008. A new project phase may be considered.
3. Focus has been on “training of trainers” and “hands-on-training”. Innovative approaches making use of new technologies, such as video conferences, web-based applications, etc. were fully embedded into all Capacity Building activities.
4. During the intersessional period the number of joint training events increased not only within the JCOMM context (e.g. JCOMM/GOOS/IODE Jamboree, E2EDM) but also with other international organizations e.g. IODE/IOI, IODE/Marbef, SeaDataNet-DM.

4.2.2 The Group noted that the JCOMM Capacity Building Strategy had not yet been completed (MAN-VI had recommended further work by an ad hoc group) and stressed the need to assess data management training needs in developing countries and regions. In this regard **the Group recommended that a survey be organized by the IODE Project Office, in close cooperation with the CB Rapporteurs.**

4.2.3 In order to improve the interaction between the three CB Rapporteurs a joint meeting should be planned in September/October 2008 to ensure that CB requirements are brought more properly to and from the Programme Areas. The IODE Project Office offered to host and (co-)fund this meeting.

4.2.4 The Group was further informed that the ODINAFRICA-III project will end in September 2008. It is planned to submit a new project for funding as from 2009. A drafting workshop will be organized at the IODE Project Office between 20-23 May 2008. In order to promote closer collaboration between the IODE NODCs and WMO NMHS's it was recommended that **an expert representing the NMHS community in Africa participates in this meeting. Mr Etienne Charpentier was requested to provide the name of a suitable expert to the IODE Secretariat.**

4.2.5 Dr Herman pointed out that the current agreement that covers the funding of the IOC project Office for IODE will be reviewed in 2009 and, if positive, should be renewed for five years. This support will substantially contribute not only to IODE activities but also to the JCOMM DMPA activities. The Group expressed its appreciation for the substantial support provided by the Government of Flanders to IOC/IODE and to JCOMM and **requested the Chair DMCG to convey this message to the Flemish Government evaluators.**

4.2.6 Regarding cooperation between IOC/IODE's OceanTeacher and WMO's training systems the Group recommended that the IODE Project Office invites Mr. Eliot Christian ([echristian@usgs.gov](mailto:echristian@usgs.gov)) and invites him to come to Oostende (possibly early June 2008), when Dr. Murray Brown, Dr. Wouter Rommens and possibly Mr. Greg Reed are in Oostende) to discuss technical interoperability between WMO WIS and OceanTeacher.

## 5. ETMC ACTIVITIES

### 5.1 CHAIRPERSON'S REPORT

5.1.1 The Chairperson of the ETMC, Mr Scott Woodruff, reported on the activities of the ETMC since the last DMCG meeting. ETMC-II (JCOMM 2007) was held in Geneva, Switzerland, 26-27 March 2007 (preparatory documents and additional background are available from: <http://icoads.noaa.gov/etmc/>). Among a wide variety of other topics, ETMC-II discussed enhanced linkages with the JCOMM Services Programme Area (SPA), including its Expert Teams on Wind Waves and Storm Surges (ETWS) and on Sea Ice (ETSI); and, as appropriate, to other commissions and organizations, including the WMO Commission for Climatology (CCI) and the Joint CCI/CLIVAR/JCOMM Expert Team on Climate Change Detection and Indices (ETCCDI).

5.1.2 Following recommendations by DMCG-II and SCG-III for development of the Extreme Waves Database, working together with ETWS and appropriate IODE or meteorological centres where in situ extreme wave and meteorological data exist, possibilities for contributing to or hosting such a facility were discussed by ETMC-II, but remain largely unresolved. Since the ETMC-II discussions, however, a few erroneous wave extremes archived at NOAA's National Data Buoy Center (NDBC) have been rectified, and various follow-on discussions initiated (e.g., among Australia, Canada, and USA). **Mr Terry Tielking expressed interest in exploring hosting of the database at the US NODC.** The potential for calculation of wave monthly summaries for ICOADS in cooperation with ETWS formed a related topic at ETMC-II, and remains under continuing discussion with ETWS (V. Swail). **The Group recommended that wave summaries be developed as part of ICOADS and if possible be discussed at CLIMAR-III.**

5.1.3 Two ETMC members (Dr Elizabeth Kent and Mr Woodruff; among four JCOMM representatives) participated at ETCCDI-II (Niagara-on-the-Lake, Canada, 14-16 Nov. 2006). As an outcome of that meeting, and in cooperation with SPA, development of marine/climate indices is gradually progressing, and will be presented at CLIMAR-III (6-9 May 2008, Gdynia, Poland); that workshop will be followed (in De Bilt, Netherlands) by an ETCCDI progress meeting (13 May) and "Extremes in a Changing Climate" workshop (organized jointly by ETCCDI and the ENSEMBLES-RT5; 14-15 May). While new linkages with CCI were discussed at ETMC-II, there has been little or no progress since in further developing those (in areas such as: impacts on land vs. marine visual observations arising from AWS, instrument standards/best practices, and historical data/metadata rescue; see Background, Table 1). It is anticipated, however, that TT-MOCS, once fully formed, will form a very useful formal point of interaction with both CCI and ETCCDI on a number of these issues.

5.1.4 The Group noted that David Parker (UK Metoffice) and other ETCCDI representatives from JCOMM were planning to attend the next ETCCDI meeting and that presentation were planned at CLIMAR-III on ETCCDI and marine indices. The Group noted that the writing of a white paper on the issue had been started by Elizabeth Kent. **It invited her to liaise with the UK Metoffice, ETWS, ETMC, and ETSI for finalizing the paper** as the others have been working on the issue as well.

5.1.5 ETMC-II discussed the status of historical data rescue, including the "RECOVERY of Logbooks And International Marine data" (RECLAIM; <http://icoads.noaa.gov/reclaim/>) project. Continuing connections with other ETMC data and metadata archaeology activities, including documenting the history of marine ship codes (e.g., WMO-No. 306, *Manual on Codes*), were also

discussed (see also Background, Table 1). As part of this discussion, ETMC-II endorsed making the German Weather Service (DWD) historical marine archive available, in accordance with a recommendation from the GCOS AOPC/OOPC Working Group on Surface Pressure. Certain high-priority selections from the DWD archive have since been made available and are presently being blended into ICOADS. The Group thanked DWD for this submission and encourage DWD to provide the other portion of the data as they are able to do so. **The Group recommended the ETMC Chairperson discuss this with the DWD Representative at CLIMAR-III.**

5.1.6 ETMC-II reviewed results from the Second JCOMM Workshop on Advances in Marine Climatology (CLIMAR-II), which took place in Brussels, November 2003, and the Second International Workshop on Advances in the Use of Historical Marine Climate Data (MARCDAT-II), Exeter, UK, October 2005; which continued the alternating sequence (with approximately 2-year intervals) of these successful, and closely related, workshops (with consolidated recommendations tracked at: <http://www.marineclimatology.net/>). Among the recommendations from CLIMAR-II, subsequently endorsed by JCOMM-II, was to hold a CLIMAR-III, which is upcoming 6-9 May 2008 in Gdynia (for further details, see DMGC-III/Doc. 5.6).

5.1.7 Mr Woodruff reported that the new cross-cutting Task Team on Delayed-mode VOS data (TT-DMVOS) (ref. DMCG-III/Doc. 5.2), which started functioning as of April 2007 and includes membership from both OPA and DMPA, represents a new active area of collaboration. This Task Team will focus primarily on modernizing the management and quality control of the delayed-mode VOS data, while at the same time exploring possible connections with the management of real-time VOS and other ship-based data (e.g., SAMOS and GOSUD).

5.1.8 The Group agreed to further promote enhanced linkages between the CCI and the ETMC, in areas including historical data and metadata rescue. **It invited Scott Woodruff to ask Bill Wright to propose a representative of CCI to attend the planned TT-MOCS planning meeting (immediately after CLIMAR-III on 10 May 2008, Gdynia, Poland) to bridge the gap between marine meteorological and ocean climatologies.**

5.1.9 The Group discussed the need for producing sub-surface climatologies. It noted the work of Syd Levitus in this regard and recommended that efforts should not be duplicated. **The Group recommended that the TT-MOCS address the blending of surface observations from the World Ocean Database into ICOADS.**

5.1.10 The Chairperson of the ETMC invited Group Members to propose additional documents to be considered by the NOAA Climate Database Modernization Programme (e.g. imaging ICOADS, ETMC documents, IOC M&G #3, documents related to observing practices).

5.1.11 The Group endorsed the following ETMC-II recommendation for adoption by JCOMM-III: For rigs and platforms, manual observing-systems should be treated as a "ship" and their metadata included in the Pub. 47; automated systems onboard rigs and platforms should be treated as a "buoy" and their metadata included in the ODASMS. It invited the Secretariat to contact the SOT Chair and suggest that it makes the recommendation to JCOMM-III. The Group invited the ETMC to look at the ODAS metadata format and make recommendation to JCOMM-III in case changes had to be proposed.

## 5.2 TT-DMVOS (GCCS, IMMT, IMMA) AND TT-MOCS (MEMBERSHIP)

5.2.1 The Group recalled that at its second meeting, Geneva, Switzerland, 10-12 October 2006, a proposal was made for the modernization and restructuring of the Marine Climatological Summaries Scheme (MCSS), established in 1963 (Resolution 35, Cg-IV). The MCSS is responsible for the international exchange, quality control and archival of delayed-mode marine climatological data, in support of global climate studies and the provision of a range of marine climatological services. DMCG-II had agreed to propose a separation of the management of the two separate functions of the MCSS into (i) delayed-mode VOS data handling and (ii) the preparation of the Marine Climatological Summaries (MCS).

5.2.2 Since DMCG-II, discussions took place with the Expert Team on Marine Climatology, the Expert Team on Wind Waves and Storm Surges (ETWS), the Expert Team on Sea Ice (ETSI), the joint CCI/CLIVAR/JCOMM Expert Team on Climate Change Detection and Indices (ETCCDI), the Ship Observations Team (SOT), as well as with the WMO Commission for Climatology (CCI). This led to discussions on these topics at the Second meeting of the ETMC, Geneva, Switzerland, 26-27 March 2007, and the Fourth Session of the SOT, Geneva, 16-21 April 2007.

5.2.3 ETMC-II recommended the establishment of a cross-cutting Task Team on Marine and Oceanographic Climatological Summaries (TT-MOCS). To assist in the process, an *ad hoc* cross-cutting Task Team was established to draft the Terms of Reference for the proposed TT-MOCS, with membership from ETMC, ETSI, ETWS, CCI, and ETCCDI. ETMC had recommended the consideration of a number of tasks or issues by the future TT-MOCS, in liaison as appropriate with the TT-DMVOS. The *ad hoc* Task Team completed its work by the end of 2007. Their recommendations and proposed Terms of Reference and Membership for the TT-MOCS are provided in [Annex III](#). In particular the proposed TT-MOCS will identify existing and potential users of, and review requirements for, marine climatological summary products and their dissemination, particularly for climate change detection, monitoring and indicators of climate trends on appropriate time scales. The Task Team will also consider the potential for integrated products (e.g. meteorological, oceanographic, sea-ice), and explore linkages between marine and coastal land based products; develop accordingly a list of potential products, consider production and delivery mechanisms, and their appropriate structure. It will develop metrics for the marine climatology products and their delivery (including documentation and standardization of QC, data and products usage, data adequacy for product quality). The Task Team will liaise with the TT-DMVOS for updating the MCSS, review its organizational structures and responsibilities, including the definition of the role and functions of the RMs concerning generation of marine climatological products, and propose changes to the *Manual on* and the *Guide to Marine Meteorological Services* accordingly. Finally, the Task Team will also contribute to the development of internationally agreed Higher-level Quality Control Standards (HQCS). **The Group approved the recommendations from the *ad hoc* cross-cutting Task Team that drafted the Terms of Reference of the TT-MOCS, and endorsed the proposed Terms Of Reference and Membership.**

5.2.4 The Terms of Reference and Membership of the Task Team on Delayed mode VOS data (TT-DMVOS) that were drafted at DMCG-II, were reviewed, amended, and approved by the ETMC-II, and SOT-IV. It was agreed that the Task Team would focus primarily on modernizing the management and quality control of the delayed-mode VOS data, while at the same time exploring possible connections with the management of real-time VOS and other ship-based data (e.g., Shipboard Automated Meteorological and Oceanographic System (SAMOS) and GOSUD). To develop a clearer separation between data processing, and the preparation of climatological summaries, the team's scope will be limited to data management. Because the RMs and the GCCs have primary involvement in the data processing, they were invited to contribute to the work (however, the review and modernization of the MCS is clearly also an important task, which will be considered separately by the TT-MOCS, and to which the RMs will also be invited to contribute). In addition, as part of the collective modernization of the data management and the MCS, it is anticipated, in due course, that the "MCSS" terminology will be replaced by a new and more up-to-date terminology reflecting a separation between the two functions. The Terms of Reference of the TT-DMVOS and its current membership are provided in [Annex IV](#). The Task Team started functioning as of April 2007 and has produced a working plan for 2007 to 2010 which is reproduced in [Annex V](#). **The Group approved and endorsed the revised Terms of Reference and Membership of TT-DMVOS recommended by the ETMC-II and the SOT-IV.**

5.2.5 A side meeting of TT-DMVOS, including a discussion about TT-MOCS with available members of the *ad hoc* cross-cutting Task Team planning for TT-MOCS, will be organized immediately after CLIMAR-III (10 May) to discuss the restructuring of the MCSS and make specific recommendations. **The Group requested Scott Woodruff to check who would be attending the side meeting on 10 May and to report back to the Chairperson of the DMCG.**



5.2.6 The Group noted that developing a workplan for TT-MOCS was difficult until a Chairperson is installed. It requested the Task Team to clarify membership and leadership of TT-MOCS at its side meeting at CLIMAR-III and then to develop a workplan for the TT-MOCS. The chair of ETMC was requested to monitor this.

5.2.7 The Group noted that Expert Teams were in principle financially supported by the WMO and IOC but not the Task Teams which are supposed to be self funded. The TT-DMVOS and TT-MOCS are assumed to be viable from that perspective. **The Group recommended to address the TT-MOCS membership bearing in mind the funding requirements. It recommended to include IODE representation in the TT-MOCS.**

5.2.8 The Group requested that the TT-DMVOS and TT-MOCS coordinate their actions in liaison with other appropriate JCOMM Expert Teams (ETMC, ETSI, ETWS), the joint JCOMM/CCI/CLIVAR ETCCDI, the CCI, the DMCG Chairperson, and the Secretariat, in the view to propose and document a restructured MCSS for JCOMM-III.

### 5.3 MARINE QC SCOPING DOCUMENT

5.3.1 DMCG-II (Geneva, Switzerland, 10-12 October 2006) requested an overview report on marine quality control (QC) issues, focused on surface marine data reported by Voluntary Observing Ships (VOS) and Research Vessels (R/Vs), to help initiate the process of standardizing QC of marine meteorological and oceanographic data within JCOMM. Authorship of the report was assigned initially to the Chairs of ETMC, DMCG, Shipboard Automated Meteorological and Oceanographic System (SAMOS), and the Global Ocean Surface Underway Data (GOSUD) Pilot Project.

5.3.2 The Group noted that a GOSUD/SAMOS meeting is planned for June 2008 to address the resolving of differences in the marine QC scoping document and to make recommendations so that data are processed in a coherent way (SAMOS-surface marine data; GOSUD-surface ocean data). The IODE/JCOMM Standards Process should also be involved in this issue. **The Group invited Scott Woodruff to explore possible broadened involvement (e.g. Liz Kent, Dick Reynolds) in the report authorship with the chairpersons of the ETMC, SAMOS, GOSUD, GHRSSST, etc.**

5.3.3 The Group asked the ETMC to explore possible linkages with the GHRSSST-PP quality monitoring approach and databases (ref. ETMC-II action item 2.4.1.6). With this work, plus expanded authorship, changes were anticipated in the document to broaden its applicability. It is anticipated that the QC scoping document should eventually be finalized by the end of 2008. At this point, it was recommended that it be submitted to the IODE/JCOMM Standards Process for consideration. **The Group asked Robert Keeley to circulate the standards process documentation to the QC document authors in expectation of its completion.**

### 5.4 SHIP MASKING AND BUFR/TDCS (INCL. IMMEDIATE IMPACTS ON ICOADS)

5.4.1 The Group addressed a number of other issues of interest to the ETMC, including impacts of the masking of ship's call signs from GTS reports, the development of BUFR templates and use of table driven codes and their impact on the International Comprehensive Ocean-Atmosphere Data Set (ICOADS). With regards to the emerging issue of GTS ship call sign masking to protect the identity of VOS, in response to security and commercial concerns, ETMC-II agreed on some general recommendations, later conveyed to SOT (Background, Table 1).

5.4.2 Scott Woodruff provided up to date information on the US perspective at the meeting and reported that discussions were underway with NOAA regarding ICOADS as ship masking impacted on the quality of ICOADS. Some options were under consideration for releasing unmasked data, i.e. after 30 days, 90 days, or never. He reported that the issue would be raised at CLIMAR-III but stressed the ship masking introduced substantial complexity into the system.

5.4.3 ETMC-II recalled that ETMC-I made a limited review of marine BUFR data (<http://icoads.noaa.gov/etmc/etmc1/doc3.2.pdf>), based on comparisons of BUFR data from NCEP with originally reported ship (FM 13) and buoy (FM 18) data, and noted that a number of those findings and recommendations were still outstanding. [Annex VI](#) provides some updated examples of the subtle problems that can develop as a result of transforming originally reported data into BUFR. ETMC-II generally recommended that work should be undertaken to carefully validate TDC's (including BUFR) so as to ensure that all the originally reported data are completely and accurately preserved. A set of additional general recommendations was also made by ETMC-II, related to a key recommendation from the JCOMM Data Management Strategy (see Background, Table 2). From the ETMC perspective, and closely linked to the ongoing work of the META-T project (item 5.5), clearer lines of responsibility and institutional processes within WMO and JCOMM appear to be needed for developing the structure and content of templates for BUFR/TDC's, taking into account important JCOMM archival and marine climatology considerations.

5.4.4 Also related to TDC's/BUFR, ETMC-II discussed differences that have been detected between GTS data from different operational centres (e.g., ECMWF, UK Met Office, NOAA/NCEP and JMA), apparently because of QC, storage, or archival decisions made at those centres. To help improve and validate the data collection process, ETMC-II recommended a detailed intercomparison (being undertaken by Dr Elizabeth Kent, UK) between FM 13 (GTS SHIP code) sample (e.g. one month) data sets received at key operational centres (FM 18, BUOY code data will also be collected and considered later for another intercomparison). Moreover, ETMC-II tasked Mr Takashi Yoshida (Japan) to investigate whether similar studies had already been made (which results are planned for inclusion on the ETMC website in due course).

5.4.5 The Group recommended Scott Woodruff to relay the DMCG concerns regarding ship masking to the SOT TT on ship masking i.e.

1. When new call signs are issued, are they legitimate or masked?
2. The SOT is invited to provide for clear instructions regarding how and when one can unmask data and distribute the corresponding VOS observations.
3. What is the delay to unmask reports?
4. The comparison of real time data with the delayed mode data is made difficult when the call sign is not available.
5. The call sign is the only key to metadata and equipment even before access to pub47 or ODAS is ready.
6. Reducing the call sign restriction delay to 3 days would be an enormous step forward.

5.4.6 The Group noted that the issue was fortunately still confined to FM13 SHIP reports (i.e. VOS only) but expressed concerns that the problem could spill over to SOOP and ASAP ships as well. For example, one BATHY report was identified with generic SHIP masking.

5.4.7 **As far as the ETMC recommendations, the Group made a few comments for the ETMC to consider.** These are summarized in Tables 1 and 2 below. For example, storing original and converted data can be a strategy but is not necessarily required provided appropriate measures are taken to verify the accuracy of the conversion process. All archives must ensure that unit conversions follow international or accepted practices.

5.4.8 The Group discussed the possibility of a formal review role for ETMC in assessing the impacts of the implementation of TDC's/BUFR on marine climatology. **The Group invited the ETMC to make recommendations via the proposed JCOMM Table Driven Codes Task Team.**

**Table 1.** ETMC-II recommendations regarding ship call sign masking, later conveyed to SOT.

<u>No.</u>	<u>Action</u>	<u>DMCG-III comment</u>
1	The call sign should not be masked in the delayed-mode data flow including e-logbooks ( <b>action SOT</b> ).	OK
2	A unique report identifier is required for all VOS including VOSCLim.	OK
3	Information about the issue, its solutions and technical implications should be made available via the ETMC website, as appropriate.	OK

**Table 2.** In addition to the general recommendation that work should be undertaken to carefully validate BUFR/TDC's so as to ensure that all the originally reported data are completely and accurately preserved, ETMC-II strongly recommended that these important general requirements\* be kept under consideration regarding BUFR/TDC's.

<u>No.</u>	<u>Action</u>	<u>DMCG-III comment</u>
(i)	Need for certified decoders and encoders (e.g. portable software for validating BUFR reports) ( <b>action, CBS</b> ).	OK
(ii)	Archives should ensure permanent access to the originally reported data, e.g. attaching the original data format to the BUFR reports following NCEP's practice.	In principle OK. Storing original and converted data can be a strategy but may be difficult in practice. In all circumstances it is crucial that format conversions be carefully checked to ensure no loss or corruption of information All archives must ensure that unit conversions use accepted international practices..
(iii)	Unique identifiers should be developed for original reports (ref. Table 1, item 2).	OK
(iv)	Consideration of meteorological and oceanographic variables in both Master Table 10 (MT10) and Master Table 0 (MT0).	Some clarification needed (see ETMC-II final report, para 3.3)
(v)	Consistency with climatological practices, e.g. the use of non-SI units, is required for marine climatology, because unit transformations or conversions of data frequently lead to some loss of information.	There are legitimate reasons why we would need non-SI units (e.g. chemistry, volumetric measurements)
(vi)	BUFR reports need to be carefully validated for marine climatology requirements; experience shows that operational BUFR reports did not always comply with such requirements (any conversion between formats must be rigorously tested).	OK
(vii)	Whilst BUFR/CREX formats are mandated for future real-time GTS exchange of data, ETMC-II recognized that TDC's are not necessarily the best choice for all types of data storage and exchange. <del>More compact formats e.g. ASCII or compressed ASCII are suitable for expensive</del>	DMCG agreed to delete the second sentence (crossed out here) as this was not necessarily a true statement.

\* In formulating the above recommendations, ETMC-II also considered Rec. 4.2c from the JCOMM Data Management Strategy draft document (IOC/IODE-XIX/48; R. Keeley, 11 December 2007): "Enhanced interaction between JCOMM and CBS or other appropriate WMO committees is needed to expand the scope of TDCs to more fully incorporate JCOMM considerations, including software reliability, human readability, and the archival and exchange of historical and delayed-mode data in its originally reported form."

~~platform to shore transmission; and simple, comprehensive formats are suitable for data exchange in delayed mode and archival.~~

## 5.5 WATER TEMPERATURE INSTRUMENTAL METADATA PILOT PROJECT (META-T) AND OCEAN DATA ACQUISITION SYSTEMS (ODAS)

### 5.5.1 Water Temperature instrumental Metadata Pilot Project (META-T)

5.5.1.1 Ms Chen Jixiang reported on the development of (i) the ODAS Metadata Service (ODASMS) for the collection and distribution of Ocean Data Acquisition Systems (ODAS) metadata, and (ii) the Water Temperature instrument metadata Pilot Project (Meta-T). The Group noted with appreciation that the META-T Pilot Project has made some progress in recent months (<http://marinemetadata.org/meta-t>). Bill Burnett has been elected to co-Chair the META-T Steering Team with Ms Elanor Gowland. META-T has had active discussions on what information is required to travel with the data, and what is relatively static and so can be housed and referenced separately. The work of META-T crosses over into Ocean Data Acquisition Systems (ODAS) metadata developments, because a database of ODAS metadata (instrument characteristics) is being hosted at the National Marine Data and Information Service (NMDIS, China). META-T also links to the further development of BUFR templates, since it is partly through these templates that the metadata will be transmitted with the data. There are active email discussions between members of the JCOMM Observations and the Data Management Programme Areas, the WMO secretariat and input from the CBS Expert Team on Data Representation and Codes (ETDRC).

5.5.1.2 The Pilot Project has proposed three categories for the instrumental metadata from the types of platforms currently under consideration: 1) real-time with observations (push); 2) real-time via metadata servers (pull), and 3) delayed mode, as well as the mechanisms to make the SST and/or temperature profile metadata available in real time. The NOAA National Data Buoy Centre (NDBC), USA, and NMDIS, China, have offered to develop and run mirrored metadata servers for category 2 metadata. Work remains to set up the META-T servers at both the NMDIS and NDBC and agree on the communication between the two centres for mirroring the metadata servers (category 1 and 2 metadata). The Group noted that the category 1 metadata were by definition available via the observational reports (e.g. probe type in XBT, call sign, kind of profiling float) and that the main challenge for the end users was therefore accessing category 2 metadata. The Group invited NMDIS and NDBC to address collecting category 2 metadata as a priority while category 1 metadata can still be made available via the META-T servers.

5.5.1.3 Specific data streams have been considered (e.g. drifting buoys, ships, floats, etc.) and the categorization of related metadata types initiated. Good progress was made regarding the VOS data stream and the list of category 1 metadata for the VOS template is completed. **The Group agreed with the list proposed by META-T.**

5.5.1.4 META-T now appears to be in a position to make recommendations to the SOT Task Team on Codes as well as to the DMCG Task Team on Table Driven Codes in order to take the META-T requirements for category 1 metadata into account when defining requirements for the BUFR templates for VOS data. However, just the process of developing and reviewing the VOS list within META-T has highlighted these interrelated issues:

1. The high complexity and some apparent inflexibility in BUFR, which has hampered to some extent wide and effective review by users involved in META-T.
2. The possible need for a more structured and inclusive review process, to ensure that any BUFR templates approved in the future have been fully vetted. This includes assessment of potential impacts (both positive and negative) on the climate record of any format changes (possibly also involving ETMC), and agreement about how those

considerations are weighed in the approval process both within and externally to JCOMM. (see item 3.3)

5.5.1.5 The Group requested the Secretariat to contact the SOT and DMCG codes groups and to suggest they consider ship metadata proposed by META-T in the development of proposals for ship BUFR templates (See item 3.3).

5.5.1.6 WMO Pub. 47 metadata form a key component of the VOS metadata, and WMO needs to ensure that those metadata are flowing smoothly and made publicly available in a timely fashion. The Group expressed strong concerns regarding the delay of availability of Pub47. **The Group urged WMO to allocate sufficient resources to the development and maintenance of the Pub47 database applications to ensure a timely availability of VOS metadata to end users** (quality monitoring, climate studies, VOS operators, Port Meteorological Officers).

5.5.1.7 META-T now needs to select another type of platform (i.e. another data stream, e.g. buoys, floats, OceanSITES, tide gauges, or other types of ODAS) for which to develop a similar list of metadata.

5.5.1.8 Informal META-T discussions are planned in conjunction with CLIMAR-III, and an oral presentation will be made about the project at the workshop, which should stimulate some useful feedback from the climate research and wider data management communities. **Results and recommendations based on the META-T work should also be presented to JCOMM-III. The Group invited NMDIS and NDBC to prepare a presentation of META-T and META-T server for JCOMM-III. (see 2.3.4)**

5.5.1.9 **The Group requested NMDIS and NDBC to discuss the real-time receiving and updating mechanism for META-T.** The NMDIS proposed to receive and update metadata on a daily basis in text or XML format through FTP on the Internet, so as to ensure the consistency of the data that reside on both the NMDIS and NDBC servers.

5.5.1.10 The Group noted that the buoy metadata database made available by JCOMMOPS via FTP was not up to date and requested JCOMMOPS to update its system for the period after July 2007 and to keep it up to date. **The Group asked its Chairperson to draft a Resolution for JCOMM-III urging Members to submit metadata to the ODASMS.** The Resolution should also request JCOMMOPS and/or future OPSC to routinely contact platform operators so that the metadata are being submitted, including for operational platforms and for historical ones. Platform operators must be aware of the ODAS metadata facility and urged to make routine submissions of the metadata. Some of the metadata that are not currently available are nevertheless required to interpret the data properly. **Finally, the Group recommended that JCOMMOPS should establish links with the Instrument Engineer Association (HMEI) regarding the metadata issue to see how the manufacturers can cooperate in collecting the metadata.**

5.5.1.11 The Group required that ODASMS records the history of changes to platform metadata (instrument change, platforms stopping operation, etc. and the dates on which these occur).

## 5.5.2 ODAS

5.5.2.1 The Group also recalled the recommendation by the ETMC that the ODAS database will take over the information maintenance formerly managed in the "On-line Information Service Bulletin on non-drifting ODAS" operated by the Integrated Science Data Management (formerly MEDS) of Canada.

5.5.2.2 In recent years, the ODAS Metadata Service (ODASMS), operated by the National Marine Data and Information Service (NMDIS, China) was engaged in the development of ODAS metadata and its website (<http://www.odas.org.cn/>). By the time of writing this report, the ODASMS holds 9018 platform records, including 4581 Profile Float, 3452 Drifting Buoy, 621 Fixed Platform, and 264 Moored Buoy records. These records are derived from the DBCP, China Argo Data

Center and the GLOSS project. The ODAS Metadata Management Center thoroughly analysed the source metadata to prepare for the complicated extraction of metadata information, standardization processing and format transformation. The ODASMS website provides access to the ODAS metadata and related graphic products.

5.5.2.3 The current ODAS metadata standard was developed by the CMM (now JCOMM) Subgroup on Marine Climatology (now ETMC) and adopted by JCOMM-I. Following ETMC-II recommendations, and in liaison with the ETMC Chairperson, NMDIS has been working on electronic versions of the standard, which are available for download from NMDIS at <http://www.odas.org.cn/>. Three additional fields have been added in the Header Record, i.e. latest date, latest longitude, and latest latitude, to describe the latest status of the platforms. Also, an XML Schema for ODAS metadata has been proposed and is also available for download on the web site. However, these electronic versions have not been discussed with the META-T.

5.5.2.4 Concerning the compliance of the ODAS format with the VOS metadata produced by the META-T, two methods were proposed by the NMDIS. One is to adjust the ODAS metadata format to be compliant with VOS metadata, and VOS metadata are submitted to the ODAS metadata centre in this kind of adjusted format. However, this method is time consuming and requires more resources. The second method is to submit the VOS metadata to the ODAS metadata centre according to the META-T format. The centre would then extract the ODAS metadata from the VOS metadata and release them on the website, as well as release the VOS metadata online using the META-T format. The ODASMS would provide the linkage between the two types of metadata. The NMDIS representative explained that the latter solution was preferred, because similar methodology can then be used once metadata lists concerning other types of platforms (buoys, floats, OceanSITES, tide gauges) are developed. This would permit to avoid adjusting the ODAS format again and again and would also ensure no loss of all META-T metadata. Considering that there will be a requirement to update the information systems to deal with other metadata and within a reasonable time frame, it is important to have a robust way to manage information coming in changing inputs **The Group proposed consideration of the feasibility of extending the ODAS metadata template to address additional JCOMM platform types. The Group recommended that NMDIS and NDBC exchange views on the issues in order to make a consolidated proposal.**

5.5.2.5 NMDIS reported that it had updated the ODASMS according to previous recommendations by the Group and permitted proper submission of metadata by Members/Member states. NMDIS has documented the procedures for Members/Member states to apply for FTP access and submit the metadata. **The Group recommended NMDIS to develop a web form for uploading the metadata on a case by case basis.**

5.5.2.6 The Group also recalled that it was important that WMO and IOC Members/Member States as well as observing platform operators be aware of the ODASMS and routinely submit their metadata to the ODAS metadata centres in China. **The Group agreed to propose a Resolution for JCOMM-III in this regard and asked the chairperson and the Secretariat to work on the issue.** The NMDIS proposed to start with the submission of non-drifting ODAS metadata to the ODAS metadata centre, and then with the monthly submission of the Members/Member States metadata in text or XML format. The centre offered to provide Members/Member states with appropriate FTP accounts so that they can submit their metadata. The centre proposed to issue the status of metadata submission on the ODASMS website on a monthly basis, and report to the DMCG annually. The Group requested NMDIS to proceed accordingly.

5.5.2.7 The Group invited the ETMC to consider extending the ODAS metadata format to address all types of marine and oceanographic observing platforms and to consider META-T requirements.

5.5.2.8 The Group requested Scott Woodruff to check the status of ETMC recommendations to assess potential impacts (both positive and negative) on the climate record of any BUFR format changes proposed by META-T in liaison with other appropriate JCOMM Expert Teams (e.g. ETMC). The Group requested the Task Team on Table Driven Codes (in liaison with META-T,

ETMC, and the SOT) to proceed with regard to the proposals to be made to the ETDRC for the ship related BUFR templates.

## 5.6 THIRD WORKSHOP ON ADVANCES IN MARINE CLIMATOLOGY (CLIMAR-III)

5.6.1 The Group was briefed on the status of the organization of the Third Workshop on Advances in Marine Climatology (CLIMAR-III), Gdynia, Poland, 6-9 May 2008. The workshop aims to build on the outcomes of the two previous CLIMAR workshops (2003 and 1999); and on the outcomes of the alternating and closely related “Advances in the Use of Historical Marine Climate Data” (MARCDAT) workshops (2005 and 2002). All these workshops have brought together a wide spectrum of marine data users and managers of marine data and products, and have included an underlying focus on the continuing evaluation, utilization, and improvement of the International Comprehensive Ocean-Atmosphere Data Set (ICOADS).

5.6.2 CLIMAR-II took place at Residence Palace, Brussels, Belgium, 17-22 November 2003, together with the 150th anniversary celebration of the Brussels Maritime Conference of 1853. CLIMAR-II focused on key issues of marine climatology such as development of new-generation global and regional climatologies of basic surface variables, and of improved surface air-sea fluxes governing the impact of the oceans on atmospheric climate variability. An additional workshop goal was to revise *Advances in the Applications of Marine Climatology* (JCOMM TR No. 13 and WMO/TD-No. 1081)--which constitutes the Dynamic Part of the *Guide to the Applications of Marine Climatology* (WMO/TD-No. 781)--and the resulting Revision 1 (June 2005) of this publication recently became freely available via the WMO website. Based on the success of these past workshops, JCOMM-II (Halifax, September 2005), agreed to the proposal for a third such self-funded workshop.

5.6.3 Major goals of CLIMAR-III are: (i) to review ongoing developments in the flow and standardization of marine (meteorological and oceanographic) data and metadata under JCOMM, (ii) to foster and coordinate the development of marine (meteorological and oceanographic) climate data and products, including ICOADS, and (iii) to seek and compile appropriate contributions for a second revision of the JCOMM TR No. 13.

5.6.4 A wide range of professionals will be participating in the meeting (approximately 80 are currently registered)—involved in the fields of applications of marine climatology, climatological data archival and retrieval, climate research including modelling, and users of marine climate data and products. The workshop is planned as a mix of oral (currently 7 invited, and 39 contributed) and poster presentations (currently 30), plus targeted plenary discussions. The poster sessions are expected to be as lively as the oral sessions, with all posters accessible throughout the workshop.

5.6.5 The Workshop is being organized jointly by JCOMM, and by the Institute of Meteorology and Water Management (IMGW), Poland, and sponsored by the WMO and IOC, the IMGW, the University of Gdansk, and the US National Oceanic and Atmospheric Administration. The main workshop website (<http://icoads.noaa.gov/climar3/>) is hosted at NOAA's Earth System Research Laboratory, and UK's National Oceanography Centre, Southampton has provides extensive underlying website support by hosting the workshop on-line registration and abstract facilities.

5.6.6 The ETMC chair invited the Group to look at the issues to be discussed at CLIMAR-III and suggest topics to be discussed in plenary.. Group members were invited to send new suggestions to Scott Woodruff. Possible issues include the following:

- Data archaeology
- Value added ICOADS products observations with bias adjustment agreed upon by the community
- META-T and assembling metadata in a place available to everyone

- Marine indices and relationship of ETMC with ETCCDI; input from CLIMAR-III users will be valuable; what procedures; who are the users of indices?
- Creation of the two new TT MOCS & DMVOS: how the MCSS scheme should be modernized. Presentation by Nicky Scott planned on TT-DMVOS.

## 6. ETDMP ACTIVITIES

### 6.1 CHAIRPERSON'S REPORT

6.1.1 Dr N. Mikhailov, Chair of the ETDMP provided a detailed presentation on progress of the work of the ETDMP. He explained that the work of the ETDMP during 2006-2007 had focused on the E2EDM pilot project, and more particularly on the improvement of technical specifications and software components of E2EDM technology, IODE Ocean Data Portal and web-site prototypes, and providing Data Collection and Production Centre (DCPC) functions (Obninsk platform, Russian Federation) under the WIS prototype for JCOMM. In addition substantial E2EDM documentation (11 documents) have been developed.

6.1.2 A training course on E2EDM was held titled "Training on the End to End data Management (E2EDM) system. How to be connected to the system" at the IOC Project Office for IODE (Oostende, Belgium, 22-25 October 2007) to promote the establishment of data providers. The course was attended by 15 participants from 9 countries. It was demonstrated that the installation of the data provider software on the host server is easily done. **The Group invited Robert Keeley to liaise with the JCOMM Pilot Project for WIGOS and contact the participants of the E2E course that was organized at the IODE project office and seek their interest in participation in WIGOS. The Group invited Robert Keeley at appropriate occasions to encourage the development of the end-to-end technology by inviting members to implement the technology at data centres providing ocean data to meet the objectives of WMO and IOC in the JCOMM, IODE, and WIGOS frameworks.**

6.1.3 The Ocean Data Portal (ODP) prototype (<http://www.oceandataportal.net>) was redesigned to make it more user friendly. It includes the integration server, which harvests the metadata from the data providers and provides access to the data sets from the data providers. This topic is discussed in detail under Agenda Item 6.2.

6.1.4 Cooperation was established with the WMO WIS prototype and interoperability was tested between the E2EDM prototype and WMO WIS. It will be necessary to agree on a WIS/MCP/E2EDM profile for the metadata (ie. WIS migrates to ISO-19136 and 19139 and similar for ODP). This topic is discussed in detail under Agenda Item 6.2.

6.1.5 Cooperation with SeaDataNet (SDN) focused on (i) development of the Download Manager based upon the E2E Data Provider concept (completed); (ii) analysis of the functionality required in SDN and provide proposals for the application of the E2EDM technology so as to fulfill a number of or all functions of SDN V2 (paper is ready but no discussion); (iii) discussions on the development of unified data exchange protocols with regard to CF/netCDF and metadata profile in the ISO 19136 (GML)/19139 environment.

6.1.6 The Group agreed that the excellent work carried out by the ETDMP illustrates well the rationale for the joint ownership of the ETDMP by IODE and JCOMM. In addition the E2E technology developed by ETDMP technology provides contributes to the JCOMM Pilot Project for WIGOS as well as to the IODE ODP Project.

6.1.7 The Group noted that the E2E documentation referred to under 6.1.1 would benefit from a language review and edit. In addition, it was recommended to add a step-by-step set of instructions to assist with the setting up of an E2E data provider. It was agreed that this task will be undertaken by Mr Robert Keeley, Mr Scott Woodruff and Mr Greg Reed, in consultation with Mr Mikhailov.



6.1.8 The Group, noting the wide use of OGC compliant systems and web services, called on the E2E and ODP Pilot Project team, to ensure that ODP is interoperable with existing data systems and WIS.

6.1.9 The Group recommended, in order to promote the adoption of E2E and ODP, to involve the IODE Ocean Data and Information Networks (ODINs) in ODP implementation, e.g. as data providers, as well as in WIGOS. In this regard the Group also called for closer collaboration with SeaDataNet.

## 6.2 JCOMM PILOT PROJECT FOR WIGOS, IODE OCEAN DATA PORTAL (ODP), AND OTHER PILOT PROJECTS

6.2.1 Mr Mikhailov reported on the status of the End-to-End (E2E) technology development and involvement of the ETDMP with recent initiatives such as the JCOMM Pilot Project for WIGOS, the IODE Ocean Data Portal (ODP), and other projects.

6.2.2 Mr Mikhailov reminded the meeting that the Ocean Data Portal Project had been established through Recommendation IODE-XIX.4 (The Ocean Data Portal Project) by the IODE Committee during its nineteenth Session (Trieste, Italy, 12-16 March 2007) (See [Annex VII](#)). The Recommendation was subsequently adopted by the twenty-fourth Session of the IOC Assembly.

6.2.3 The Group noted that there existed substantial potential for synergies between the IODE Ocean Data Portal and the JCOMM Pilot Project for WIGOS. In order to avoid duplication and to promote collaboration between the two projects the Group **agreed that both the IODE Ocean Data Portal and the JCOMM WIGOS Pilot Project would benefit from merging their Steering Groups and recommended the establishment of a “Joint Steering Group for the IODE Ocean Data Portal Project and JCOMM Pilot Project for WIGOS”**. It was noted that the Joint Steering Group would work under the supervision and guidance of the JCOMM/IODE ETDMP and report to the Sub-Group of the WMO EC Working Group on WIGOS-WIS.

6.2.4 The Group noted however that the recommendation as well as the combined Steering group membership still needed to be discussed at the *ad hoc* planning meeting for the JCOMM Pilot Project for WIGOS, Oostende, 29 March 2008, and that the final decision would lie with the IODE Committee on one hand and the WMO Executive Council working Group on WIGOS-WIS on the other hand. (see Also Agenda Items 3.5 and 8.2.6).

6.2.5 The Group asked Nick Mikhailov to prepare a document on ODP vision, overall architecture and practical aspects to be provided to the members of the joint Steering Group.

## 6.3 ETDMP MEMBERSHIP RENEWAL AND FUTURE PLAN

6.3.1 The Group noted that the issue of the membership of the ETDMP was now also related to Agenda Item 3.1 (Standards and best practices) where the “Pilot Project on the IODE/JCOMM Standards Process” had been established, where it had been agreed that the Pilot Project will be implemented by a Task Team and managed by the IODE/JCOMM ETDMP, and where the Chairperson of the ETDMP had been elected to lead the Pilot Project. It had further been decided that the Project will be implemented by a Task Team and had requested the ETDMP to create the membership in such a way that it will contribute to good advertisement and broad community support, which is needed, and to balance membership between WMO and IOC. It was further recalled that under Agenda Item 6.2 the Group had recommended the establishment of the “Joint Steering Group for the IODE Ocean Data Portal Project and the JCOMM Pilot Project for WIGOS” which would operate under the leadership of the ETDMP.

6.3.2 It was recalled that the issue of membership of the Task Team for the “Pilot Project on the IODE/JCOMM Standards Process” was discussed under Agenda Item 3.1.

6.3.3 The Group then addressed the future role of the ETDMP bearing in mind the new responsibilities assigned to it, and considered the renewal of its membership and Terms of Reference. **The Group tasked its Chair and Chair ETDMP to draft new Terms of Reference for the ETDMP as well as recommended expertise requirements for potential members, so that these can be submitted to IODE-XX (March/April 2009) and JCOMM-III (November 2009) for adoption.**

## 7. FORMATS

### 7.1 NETCDF AND CF USE

7.1.1 The Group reviewed coding issues for the exchange, and archiving of oceanographic data, and in particular the netCDF Climate and Forecast (CF) convention.

7.1.2 The Group agreed that netCDF data model was very powerful in but that it was difficult to represent certain features with it (e.g. trajectories, point data). The OPA is using netCDF for certain of its components (e.g. Argos, OceanSITES, GOSUD) and work had to be done in terms of standardization.

7.1.3 The Group noted that a JCOMM representative, Mr Thomas Loubrieu (IFREMER, France), was now participating in the CBS Expert Team on the Assessment of Data Representation Systems (ET-ADRS). The role of the ET-ADRS is to assess advantages and disadvantages, including implications (need for defining standardization, data processing development and integration, costs and benefits: flexibility, compression, feasibility of implementation, etc.), of different data representation systems (e.g. BUFR, CREX, XML, netCDF, HDF) for use in real time operational international exchanges between NMHSs and in transmission of information to users outside the NMHSs. The Expert Team will develop recommendations on the most appropriate system depending on the type of exchange applications and report on the possible impacts of its findings on the migration to table-driven code forms. **The Group requested its Chairperson to contact Thomas Loubrieu requesting a report on the outcome of ET-ADRS.**

### 7.2 XML ACTIVITIES

7.2.1 The Group reviewed the use of XML in ocean data management activities. It noted that the use of XML was embedded in other activities and that XML was not a “stand alone” format as it is application driven. The use of XML for the data discovery component and E2E technology will be done through existing standard mechanisms (e.g. ISO 19115). Other applications such as ODASMS, META-T, WMO Pub No. 47 were also proposing XML. Also, IODE has established a Working Group on Marine XML though it is currently inactive.

7.2.2 The Group agreed that some coordination was required in the use of XML and suggested that this was best tackled through a submission through the Standards Process. With no other coordinating group addressing this issue, it was hoped that the MarineXML WG would tackle this. Keeley was requested to contact IODE to propose this.

## 8. COLLABORATIONS

### 8.1 OTHER JCOMM PROGRAMME AREAS

The Group addressed cooperation and cross cutting issues with the JCOMM Observations Programme Area (OPA) and the JCOMM Services Programme Area (SPA).

### 8.1.1 Collaboration with the JCOMM Observations Programme Area (OPA)

8.1.1.1 There are a number of areas where active collaboration with the JCOMM Observations Programme Area (OPA) is required and has taken place (see agenda item 3.1 on standards and best practices; agenda item 3.4 on WIGOS; agenda item 5.5 on Meta-T pilot project). The DMCG is encouraged to identify other areas (such as metadata in general, data formats, the idea for a “cookbook” for how data collected at sea could be inserted into the JCOMM and IODE data streams) where this collaboration should be strengthened.

8.1.1.2 The Group agreed that it should complete the content of the “Oceanographer’s and Marine Meteorologist’s Cookbook for Submitting Data in Real Time and In Delayed Mode” in liaison with the OPA (see also agenda item 3). This will facilitate the insertion of appropriate data into the JCOMM and IODE data streams. In particular it should document the flow of data from the observing systems to the data collection systems to the data distribution systems and then to the archives. The Group noted with appreciation that a template was available from Robert Keeley. It recommended completing the cookbook by JCOMM-III so that it eventually becomes a component of the MAN catalogue of data systems, as well as of OceanTeacher (see 3.1.4).

8.1.1.3 The chair noted that there were a number of data management activities carried out in other Programme Areas. An evident weakness was that there was no formal representation from OPA and SPA in the DMCG. This was offset to a degree by some members of DMCG being active in these other areas. Through this informal representation, there were collaborations, but not coordinated across the PAs. The Group agreed that this could be improved through developing guidelines regarding the qualifications required for the DMCG members (e.g. add a current DM experience in OPA) or through formal representation on DMCG. **The Group invited Robert Keeley to draft new Terms of Reference for the DMCG and to circulate them to the Group members. Group members were invited to provide comments to the Chairperson so that the draft Terms Of Reference can be completed by early 2009 for submission to JCOMM-III.**

8.1.1.4 Candyce Clark presented background information about the OPA strategic workplan implementing the ocean component of GCOS. She noted the strong collaboration with DMPA (e.g. META-T, GTSP, GOSUD, Table driven codes) and the high level of integration of the different components of the ocean observing system. Strong cooperation was also foreseen in with WIGOS, on interoperability issues and instrument best practices. She explained that one of the lessons learned from the development of the observing networks within OPA was that these were not independent from the activities under the different JCOMM Programme Areas.

### 8.1.2 Collaboration with the JCOMM Services Programme Area (SPA)

8.1.2.1 The Secretariat presented a report on the current development of the Global Ocean Data Assimilation Experiment (GODAE), its future development, and links with the activities under the JCOMM DMPA ([Annex VIII](#)). The meeting noted the requirements for the transition of GODAE products and services into an operational system serving a number of requirements, including climate and seasonal forecasting, navy applications, marine safety, fisheries, the offshore industry and management of shelf/coast area. The JCOMM SPA is already promoting a number of tasks, certain of which are of direct interest to the DMPA, i.e. (i) documenting ocean products data processing, (ii) monitoring and harmonizing ocean products distribution systems through metrics and standardized formats, and (iii) quality assessment.

8.1.2.2 The Group noted the request from the Management Committee, at its sixth session (Paris, December 2007), to the SPA to prepare a comprehensive **JCOMM Catalogue of Operational Ocean Products and Services** including quasi-operational products, including those of GODAE, and a draft document *Standard Data and Metadata Formats for Ocean Products* in collaboration with IODE, DMPA and GODAE. **The Group invited Sylvie Pouliquen to initiate collaboration with the SPA in the development of a JCOMM Catalogue of Operational Ocean Products and Services, and in drafting a document Standard Data and Metadata Formats for Ocean**

**Products, and to raise the Group's attention to some of the issues if needed.** She may propose other DMCG members to participate if needed. Deadline 30 June 2008.

8.1.2.3 The Group noted the development by the SCG of a *Guide to Ocean Products' Formats, Symbology and Nomenclature* (OpForSyn). SCG has outlined a draft table of contents and is now recommending to develop an on-line document system to manage it as part of the SPA web site. **The Group invited Sylvie Pouliquen to assist in understanding what role the DMCG could play in the development of the *Guide to Ocean Products' Formats, Symbology and Nomenclature* (OpForSyn); and to investigate establishing link with the standards process. Deadline 30 June 2008.**

8.1.2.4 The Group noted recent discussions regarding the GODAE legacy and the related establishment by the Management Committee at its 6<sup>th</sup> Session of an Expert Team on Operational Ocean Forecast Systems (ET-OOFS). Of interest to the DMPA, the Expert Team will in particular develop and maintain a *Guide to Operational Oceanographic Forecasting Systems*, and maintain liaison with the DMPA on data management issues related to OOFS.

8.1.2.5 The Group noted with interest the excellent development of the GODAE High Resolution SST Pilot Project (GHSST) since its last session, as well as new initiatives to further develop related products (e.g. operational use, data sharing in common format, monitoring uncertainty estimates of satellite data streams, 'poor-mans' ensemble of global daily high resolution SST products, SST reanalysis, new products for diurnal variability). The sixth session of the JCOMM Management Committee endorsed the proposal to strengthen the relationship between JCOMM and the GHSST-PP project office and science team (e.g., satellite coordination activities, end-to-end technologies, operational standards and services, WIGOS/WIS).

8.1.2.6 The Group discussed the linkages between the ETMC and the Expert Team on Wind Waves and Storm Surges (ETWS) ([Annex IX](#)) because of issues of common interest, i.e. (i) wave and surge climatologies, (ii) marine climate indices (including sea-ice related) through the participation in the joint CCI/CLIVAR/JCOMM Expert Team on climate change Detection and Indices (ETCCDI) and related discussion at the CLIMAR-III workshop, and (iii) the development of the extreme wave database (details under agenda item 5). The Group noted the increasing cooperation of the SPA with the International Association of Oil and Gas Producers (OGP) regarding (1) emerging impacts of climate change on the offshore activities and industry requirements for met-ocean services in a changing climate; (2) key areas for future research and development towards the adaptation of the offshore industry and its met-ocean services to the climate change; and (3) coordination of existing and future research and development initiatives for better protection of the marine environment and increased safety and efficiency of offshore operations. A joint OGP/JCOMM/WCRP Workshop on *Climate Change and the Offshore Industry* is being planned at WMO Headquarters in Geneva, 27-29 May 2008. **The Group invited Scott Woodruff to liaise with Val Swail and investigate the participation of an ETMC expert at the OGP/JCOMM/WCRP Workshop on *Climate Change and the Offshore Industry*, Geneva, 27-29 May 2008; that person if participating will report back to the DMCG Chairperson.**

## 8.2 WMO (WIS, QMF, CIMO, ETC.)

8.2.1 The WMO Secretariat representative reported on the outcome from the fifteenth WMO Congress, Geneva, Switzerland from 7 to 25 May 2007, and the fifty-ninth WMO Executive Council, Geneva, Switzerland from 28 to 30 May 2007.

8.2.2 The WMO Cg-XV amended the preamble of the WMO Convention, with effect from 1 June 2007, to reflect and make clear how the scope and responsibilities of the Organization have evolved since it was established in 1950. The WMO Strategic Plan for 2008-2011 and beyond was approved, including three top-level objectives, five strategic thrusts and the eleven Organization-wide expected results for the 15th financial period. Particularly the following Expected Results have been approved: the integration of WMO observing systems (ER-4), the development and

implementation of the WMO Information System (WIS) (ER-5), and enhanced capabilities of Members in multi-hazard early warning and disaster prevention and preparedness (ER-6).

8.2.3 The WMO Cg-XV drew the attention of Members to the risk of disruption in essential observational datasets and urged Members to ensure continuity of measurements and timely transfer of research-based systems into operational status. Congress urged the WMO Secretary-General, IOC Executive Secretary and the co-presidents of JCOMM to further strengthen the integration of WMO and IOC activities, in order to provide a more effective and cost-efficient JCOMM work plan. Congress requested the Secretary-General to work with Members and space agencies to ensure better continuity and overlap of relevant space-based and in situ ocean observing systems and to move experimental observing systems into operational status.

8.2.4 The Group was briefed on the recent WMO Secretariat Restructuring as a result of Cg-XV decisions and recommendations with regard to Result Based Management. The Group stressed that it was expecting consistent support from the WMO Secretariat for the JCOMM Data Management Programme Area as a whole. In particular, the Group agreed that the ETMC was fundamentally a Data Management activity and that the two new Task Teams for DMVOS and MOCS were closely related and therefore required consistent and full support from the Secretariat.

8.2.5 The Group then reviewed its activities linking with WMO activities such as the WMO Information System (WIS), the Quality Management Framework (QMF), and the Commission for Instruments and Methods of Observation (CIMO).

#### 8.2.1 WMO Information System (WIS)

8.2.1.1 Following DMCG-II recommendations, the Group was pleased to note the continued participation of Mr David Thomas in the Inter-commission Coordination Group on the WMO Information System (ICG-WIS) on behalf of JCOMM, as well as the nomination of Mr Greg Reed in the WIS Inter-Programme Expert Team on Metadata Implementation (IPET-MI).

8.2.1.2 Mr David Thomas reported on the outcome of the fourth meeting of the Intercommission Coordination Group on the WMO Information System (WIS), Reading, UK, 4-7 September 2007. Key aspects of the meeting included a strong JCOMM role, especially with the successful development of the JCOMM end-to-end Data Management Pilot Project (Obrninsk, Russian Federation). The latest JCOMM response to the WIS user requirements questionnaire was completed, and included frequency and other information useful for system designers in their capacity planning. The ICG-WIS meeting also discussed the WIS project and updated implementation plan.

8.2.1.3 Ocean data centres implementing the JCOMM E2E technology will have the possibility to connect themselves to the WIS as Data Collection and Production Centres (DCPC). A checklist of technical requirements for data providers for E2E technology implementation was prepared by the ETDMP and submitted to the Nineteenth Session of the IODE, Trieste, 12-16 March 2007. The checklist is provided in [Annex X](#). In order to ensure that the project tasks are up to date, **the DMCG recommended that JCOMM members implementing WIS related projects provide the WIS Project Manager with relevant information (e.g., management and sharing of information).**

8.2.1.4 Following recommendations from the IODE Officers meeting, Ostend, Belgium, 27-30 November 2007, and the first IODE/JCOMM Forum on Oceanographic Data Management and Exchange Standards, Ostend, Belgium, 21-25 January 2007, work has started to reconcile marine profiles and the WMO core metadata profile. Mr Greg Reed is conducting a comparison of the two profiles and will make recommendations accordingly. The Group recalled that vocabularies are important, as they not only permit to facilitate data discovery but also help understanding the data. **The Group therefore recommended that the consolidation of vocabularies ought to be investigated: (i) Between the WMO Core Profile, the Marine Community Profile (MCP) and**

**the SeaDataNet Common Data Index (CDI); (ii) Ontologies between the WMO Core Metadata Profile and the MCP.**

8.2.1.5 **The Group asked the ETDMP to make recommendations to the IPET-MI regarding the development of future version of the WMO profile** based of its experience in the development of the E2E technology in collaboration with WIS. Also, the design paper for the Ocean Data Portal can be used as a starting point to document the differences between ODP and WIS.

8.2.1.6 The Group noted that JCOMM was willing to increase its participation in WIS but that it required efforts by Members. The Group agreed that WMO Information Systems (WIS) aspects with regard to ocean data management were now covered under the JCOMM Pilot Project for WIGOS, which was discussed under agenda items 3.4 and 6.2 since the Pilot Project includes promoting the development of interoperable arrangements between ocean data systems and the WIS. Thanks to the E2E technology developments, the Russian Federation NODC is now ready to act as a JCOMM DCPC but other centres may wish to become DCPCs to serve specific regional or global data sets to the WIS and to access data-sets of interest to them from the WIS. The Group noted that the WIS offered multi-disciplinary access to meteorological, hydrological, and climate data sets which were not readily available before and required negotiations with NMHS (acting as a WIS DCPC will permit to gain direct access instead of having to seek access to the GTS via national connections).

8.2.1.7 The Group agreed that the JCOMM “Oceanographer’s and Marine Meteorologist’s Cookbook for Submitting Data in Real Time and In Delayed Mode” should eventually be included in the future JCOMM manual (see 3.2.10 and 3.1.4).

## 8.2.2 WMO Quality Management Framework (QMF)

8.2.2.1 The Group noted the developments related to the WMO Quality Management Framework that took place since DMCG-II. In particular, the Group noted the recommendations from the Second Session of the Inter-Commission Task Team on Quality Management Framework (ICT-QMF), Geneva, Switzerland, 15-17 January 2007, as well as the outcome from the WMO Fifteenth Congress which adopted Resolution 32 (Cg-XV).

8.2.2.2 The Group noted the recommendation by Cg-XV to develop a Volume IV of the WMO Technical Regulations dedicated to Quality Management. A table of content for such a volume was drafted by ICT-QMF-2. Cg-XV has also requested the Technical Commissions (i) to maintain an up-to-date catalogue of all technical publications applicable to the WMO QMF and review these publications according to quality management principles; (ii) to provide, following the guidance of EC, necessary contributions to a Volume IV of WMO Technical Regulations for adoption at the earliest possible date; and (iii) to provide quality-related technical guidance, advice, review and assessment, as appropriate. **The Group agreed to contribute as appropriate to a Volume IV of WMO Technical Regulations. It requested the Secretariat to circulate the outline of Volume-IV to Robert Keeley, Greg Reed, and Peter Pissierssens in order to ascertain what contributions are appropriate.**

8.2.2.3 The Group noted with appreciation the recent development of a working arrangement between WMO and ISO. In December 2007, the ISO council agreed to recognize WMO as an International Standardizing Body. Approval from WMO Members is now being pursued by correspondence.

8.2.2.4 The Group reviewed the list of JCOMM Publications, and agreed to follow the recommendation by ICT-QMF-2 that the list should eventually include the publications that the commissions considered essential for the on-going sustainability of the WMO QMF, so as to ensure effective planning, operation and control of processes related to meteorological, hydrological, marine, and related environment data, products and services.

8.2.2.5 The Group noted that work had already started to update some of the IOC Publications and Manual and Guides (e.g. M&G#5 has been updated; M&G#22 is being updated). **The Group recommended that the JCOMM Technical Report No. 13 (Advances in the Applications of Marine Climatology, the Dynamic Part of the WMO Guide to the Applications of Marine Climatology) should be deleted from the list of JCOMM Publications. However, the static part, i.e. WMO/TD-No. 781 - Guide to the Applications of Marine Climatology - should remain in the list.**

8.2.2.6 The Group recommended that in cooperation with IODE Officers, the list of documentation be reviewed and propose which ones should be updated, consolidated, merged, or declared obsolete. At the same time, Group members were invited to provide Robert Keeley with comments regarding the list. Meanwhile, the Group requested Robert Keeley to provide the WMO Secretariat with up to date information (e.g. publications being updated, who is responsible for updating any publications, etc.) in order to update the JCOMM list of publications.

8.2.2.7 The Group recommended an expert to look at one or more quality management related documents in order to make determine if there were terminology changes that would be required in updating IODE and JCOMM documents. **It requested Robert Keeley, Greg Reed, and the Secretariats to carry out this examination.**

8.2.2.8 The Group noted that at its sixth Session, Paris, December 2007, the JCOMM Management Committee recommended producing a catalogue on JCOMM best practices and standards with assistance from a consultant, The plan is to publish the catalogue as a JCOMM Technical Document, and present it to JCOMM-III. The document will address separately the different types of users, such as observing platform operators, creators and providers of products, and deliverers of products, to present the material in a way appropriate to each. Each platform view (to include ocean satellites as well as *in situ* platforms) would hold information about standards and best practices of the entire system from observing platform information to data and metadata formats, quality control procedures, data exchange and archiving, and final products. The Group agreed that the production of the catalogue was consistent with the recommendations from ICT-QMF-2 and Resolution 32 (Cg-XV) and **offered to assist the consultant in its work when recruited and to contribute to the production of the catalogue as appropriate.**

### 8.2.3 Commission on Instruments and Methods of Observation (CIMO)

8.2.3.1 The meeting recalled that the WMO Commission for Instruments and Methods of Observation (CIMO) was responsible for matters relating to international standardization and compatibility of instruments and methods of observation of meteorological, related geophysical, and environmental variables.

8.2.3.2 The meeting noted that standards and best practices have in some cases been developed separately between the meteorological and oceanographic communities through CIMO and the IODE respectively. For example, the WMO Publication No. 8, Guide for Instruments and Methods of Observation, includes in its Part II, Observing Systems, a Chapter dedicated to Marine Observations (Part II, Chapter 4). Other publications as mentioned in paragraph 8.2.2 above will also have to be considered.

8.2.3.3 The meeting agreed that efforts have to be made to establish better coordination between the two communities in the view to provide better integration of the best practices, and to document them. The meeting noted that the first IODE/JCOMM Forum on Oceanographic Data Management and Exchange Standards, Ostend, Belgium, 21-25 January 2008 provided a first step in coordination. The meeting agreed that the JCOMM Pilot Project for WIGOS was now a working mechanism to realize such an coordination, as (i) documenting and integrating best practices and standards being used amongst the marine meteorological and oceanographic communities is one of the key deliverables for the Pilot Project, and (ii) CIMO played an essential role in WIGOS. **The Group therefore recommended to establish the links with CIMO in the WIGOS framework and invited OPA to consider starting this collaboration with regard to the XBT fall rate**

**evaluation activity** (see also agenda item 8.2.6 below). **The Group invited CIMO to provide resources in assisting JCOMM in intercomparison work, e.g. XBT fall rate.**

8.2.4 CBS Expert Team on Data Representation and Codes (see agenda item 3.2)

8.2.5 CBS Expert Team on Assessment of Data Representation Systems (ET-ADRS)

8.2.5.1 The Group noted that the extraordinary session of CBS, Seoul, Republic of Korea, November 2006, agreed to study the implications of using data forms, such as XML or NetCDF, for meteorological data, especially in operational meteorological real time exchanges, and to assess the development efforts and resources that would be required.

8.2.5.2 Cg-XV strongly supported the initiative of CBS to assess Data Representation Systems and agreed on the establishment of the Expert Team on the Assessment of Data Representation Systems (ET-ADRS). The Team is tasked of assessing advantages and disadvantages, including implications (need for defining standardization, data processing development and integration, costs and benefits: flexibility, compression, feasibility of implementation, etc.), of different data representation systems (e.g. BUFR, CREX, XML, NetCDF, HDF) for use in real-time operational international exchanges between NMHSs and in transmission of information to users outside the NMHSs. The Expert Team will develop recommendations on the most appropriate system depending on the type of exchange applications and report on the possible impacts of its findings on the migration to table-driven code forms. The Expert Team will develop a proposal for a CBS policy on data representation systems for submission to CBS-XIV.

8.2.5.3 JCOMM has then been invited by the CBS Management Group to nominate an expert for participating in the new ET-ADRS. The DMCG Chairperson has nominated Mr Thomas Loubrieu, IFREMER, France, to participate on behalf of JCOMM. **The Group endorsed the nomination of Mr Loubrieu. (see 3.3.9)**

8.2.6 WMO Integrated Global Observing Systems (WIGOS)

8.2.6.1 The Group revisited its role in the development of the WIGOS framework in light of discussions during the meeting (see agenda items 3.5 and 6.2).

8.2.6.2 The Group requested Greg reed in coordination with the Chairperson of the ETDMP to make recommendations to the IPET-MI regarding the development of future version of the WMO profile.

8.2.6.3 The Group recommended that both Observations and Data Management Programme Areas document and integrate best practices and standards being used amongst the marine meteorological and oceanographic communities through the development of the JCOMM Pilot Project for WIGOS.

8.3 IODE (METADATA, ETC.)

The Group reviewed its activities linking with the IOC International Oceanographic Data and Information Exchange (IODE).

8.3.1 The Nineteenth Session of the IOC Committee on International Oceanographic Data and Information Exchange (IODE-XIX) was held from 12 to 16 March 2007. The Committee reaffirmed the importance of the cooperation between IODE and JCOMM.

8.3.2 The "IOC Strategic Plan for Oceanographic Data and Information Management (2008-2011)" was adopted by the 24th Session of the IOC Assembly in June 2007. The IOC Data and Information Management Strategy will deliver the following:



1. process and archive data on a diverse range of variables according to scientifically sound and well-documented standards and formats;
2. distribute data on a diverse range of variables (observations and model outputs) in both real time and in “delayed” modes depending on the needs of user groups and their technical capabilities (automatic dissemination as well as “on demand”); and
3. enable efficient access to data on core variables and derived products (including forecasts, alerts and warnings) by users who have a broad range of capabilities.

#### 8.3.3 The major elements of the Strategy are:

1. Adherence to the IOC Oceanographic Data Exchange Policy;
2. Governance by a management committee, aided by a technical task team, supported by data and information coordination units;
3. A permanent long-term data archiving centre for all data, which operates to agreed standards;
4. Recommended best practice for quality control, documented and made easily accessible and available;
5. Acceptance and implementation of a set of interoperability arrangements, including technical specifications for collecting, processing, storing, and disseminating shared data, metadata and products;
6. Interoperability between the different end-to-end systems for IOC data and with other systems (e.g. GEOSS, International Council for Science (ICSU), International Council for the Exploration of the Sea (ICES), Census of Marine Life (CoML)/Ocean Biogeographic Information System (OBIS), US Integrated Ocean Observing System Data Management and Communications (IOOS DMAC) system, SeaDataNet, etc.) through the use of service oriented architecture;
7. To continue to develop Ocean Data and Information Networks (ODINs) backed up by OceanTeacher as a capacity building tool, whilst extending OceanTeacher through cooperation with WMO, JCOMM and others as appropriate;
8. Development of appropriate metrics to help evaluate the data and information system; and;
9. Facilitation of proper citation of data sets by providing all the required elements of a citation including an unambiguous, unchanging reference.

8.3.4 To provide a governance system to implement the Strategy, it is proposed to establish an “IOC Data and Information Management Advisory Group” which will bring together the various programme elements of IOC as well as of bodies and organizations collaborating closely with IOC, such as JCOMM. It has been recommended that membership of the Advisory Group will include the JCOMM DMPA Coordinator

8.3.5 The Strategic Plan is available from the IODE web site at: <http://www.iode.org/strategy>

8.3.6 The First Session of the IODE/JCOMM Forum on Oceanographic Data Management and Exchange Standards was held from 21-25 January 2008 at the IOC Project Office for IODE in Oostende, Belgium. Full details are discussed under Agenda Item 3.1.

8.3.7 The IODE committee endorsed the establishment of the IODE Ocean Data Portal Project (<http://www.oceandataportal.org>). The objective of the Ocean Data Portal (ODP) is to facilitate and promote the exchange and dissemination of marine data and services. The ODP will deliver a standards-based infrastructure that will provide seamless access to collections and inventories of marine data from the NODCs in the IODE network and will allow for discovery, evaluation (through visualization and metadata review) and access to data via web services. The system architecture will use Web-oriented information technologies to access non-homogeneous and geographically distributed marine data and information and will build on the existing E2E system. The Ocean Data Portal will support the data access requirements of other IOC programme areas, including GOOS, JCOMM, HAB and the Tsunami warning system. The ODP development will also work closely with other international initiatives including WIS and GEOSS to ensure interoperability with other domains. A prototype is available at <http://e2edm.vliz.be/e2edmclient/>. A Steering Group to implement the Project has also been established.

8.3.8 The activities of ETDMP are reported at Agenda Item 6. As a result of the changing role of the ETDMP, which now includes reviewing the IODE/JCOMM standards process, the IODE Officers called for the terms of reference of the ETDMP to be revised by JCOMM-III and IODE-XX, and requested the JCOMM DMCG, together with the IODE Officers, to prepare a draft terms of reference,

8.3.9 The Marine Community Profile of ISO 19115 is one of the candidate metadata standards discussed at the IODE/JCOMM Forum on Oceanographic Data Management and Exchange Standards (see Agenda Item 3.1). Mr. Reed participated in a one-week virtual meeting of the CBS Inter-Programme Expert Team on Metadata Implementation (IPET-MI) in July 2007. The meeting reviewed the WMO core profile and looked into some key challenges of further development of the profile: (i) how to create supporting catalogues (ii) development of tools; (iii) how to publicize and further extend the standard. The meeting discussed implementation tools and how to import from WIS into the WMO core profile and noted the GeoNetwork tool is one that is freely available, developed by FAO. Mr. Reed noted that there are many similarities between the WMO and marine community profile and a final recommendation for a metadata profile that will meet the needs of the IODE community will be available by mid-2008 (action from Standards Forum meeting).

8.3.10 The IODE Officers reviewed the JCOMM Capacity Building Strategy and agreed that there is no need to develop a separate IODE Capacity Building Strategy, noting that the IODE/ODIN Capacity Building methodology, which is based upon the provision of infrastructure, training and operational support, the promotion of inter-institutional and inter-personal networking, the sharing of information and data, is part of the proposed JCOMM Strategy. JCOMM and IODE should have one strategy and the JCOMM Capacity Building Strategy could be adopted as joint CB strategy.

8.3.11 The IODE Officer stressed the need for JCOMM experts to provide content for OceanTeacher (<http://www.oceanteacher.org>). The objective of OceanTeacher is to provide training tools for Oceanographic Data and Information management. OceanTeacher is also used as a repository for knowledge and training materials related to operational oceanography (GOOS) and marine meteorology (WMO and JCOMM).

8.3.12 A joint IODE/JCOMM E2EDM System Training course was held at the IOC Project Office for IODE in October 2007. The objectives of this course were (i) to provide the trainees with basic information on the E2EDM technology and knowledge necessary to implement the E2E-based distributed data systems for the IODE ODIN's; and (ii) to prepare the trainees for the preliminary phase of setting up a distributed data system for ODINBlackSea.

8.3.13 The IODE Officers approved a request made by Dr Cesar Toro on behalf of ODINCARSA to co-fund a joint IODE/JCOMM training course in storm surge modeling for the Caribbean in 2009. This activity is planned to take place at the IOC Project Office for IODE. **The Group recommended that JCOMM experts should participate in this event.**

## 8.4 GEOSS

The Group discussed its activities that are relevant to the Global Earth Observing System of Systems (GEOSS).

8.4.1 The Group recalled that it had requested members of the DMCG to actively participate in telephone conferences of GEOSS as regarding data management matters. However due to the high frequency of these conferences the Group concluded that very few members had been able to follow-up on this matter. However the Chair noted that the documents resulting from GEOSS regarding data management were very much in line of JCOMM actions.

8.4.2 The Group recommended that interaction with GEO/GEOSS should take place through WIGOS/WIS and related projects such as the "Pilot Project on the IODE/JCOMM Standards Process", the "IODE Ocean Data Portal Project" and the "JCOMM Pilot Project for WIGOS". It was further recommended that progress with the Standards Process should also be reported to GEOSS for inclusion in the GEOSS standards registry (<http://seabass.ieee.org/groups/geoss/>)

## 9. IMPLEMENTATION PLAN

### 9.1 REVIEW OF CONTENT AND ACTIONS

The Group reviewed its implementation plan in light of the discussions at this meeting and updated it accordingly. It reviewed the actions and recommendation arising from this meeting and produced a work plan for the next intersessional period. The work plan is listed in [Annex XI](#)

## 10. CLOSING OF THE SESSION

The Third Session of the JCOMM Data Management Coordination Group closed at 12h30, Friday, 28 March 2008.

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## **ANNEX I**

### **AGENDA**

#### **1. WELCOME**

Introductions  
Local arrangements  
Approval of the agenda

#### **2. PREPARATION FOR JCOMM-III**

Review of work assigned by JCOMM-II  
Review of actions from DMCG-2  
Reporting to JCOMM-III

- i. Chairpersons (DMPA, ETMC, ETDMP, Task Teams)
- ii. Possible restructuring/redefining roles
- iii. Other resolutions

#### **3. DMPA CHAIRPERSON'S REPORT**

Overview  
Standards and best practices  
Table driven codes  
DMPA web site and documentation  
WMO Integrated Global Observing Systems (WIGOS)  
Computer models

#### **4. RAPPORTEUR REPORTS**

Report by the DMPA Satellite expert  
Report by the DMPA Capacity Building rapporteur

#### **5. ETMC ACTIVITIES**

Chairperson's report  
TT-DMVOS (GCCs, IMMT, IMMA) and TT-MOCS (membership)  
Marine QC scoping document  
Ship masking and BUFR/TDCs (incl. immediate impacts on ICOADS)  
Water Temperature instrumental metadata Pilot Project (Meta-T) and Ocean Data Acquisition Systems (ODAS)  
Third Workshop on Advances in Marine Climatology (CLIMAR-III)

#### **6. ETDMP ACTIVITIES**

Chairperson's report  
JCOMM Pilot Project for WIGOS, IODE Ocean Data Portal (ODP), and other Pilot Projects  
ETDMP membership renewal and future plan

#### **7. FORMATS**

netCDF and CF use  
XML activities

**8. COLLABORATIONS**

Other JCOMM Programme Areas  
WMO (WIS, QMF, CIMO, etc.)  
IODE (metadata, etc.)  
GEOSS

**9. IMPLEMENTATION PLAN**

Review of content and actions

**10. CLOSING OF THE SESSION**

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## ANNEX II

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### ANNEX III

#### TERMS OF REFERENCE OF THE JCOMM/DMPA/ETMC TASK TEAM ON MARINE-METEOROLOGICAL AND OCEANOGRAPHIC CLIMATOLOGICAL SUMMARIES (TT-MOCS)

The Task Team on Marine-meteorological and Oceanographic Climatological Summaries (TT-MOCS) will:

1. Identify existing and potential users of, and review requirements for, marine climatological summary products and their dissemination, including in particular for climate change detection, monitoring and indices as indicators of climate trends on appropriate time scales;
2. Consider the potential for integrated products (e.g. meteorological, oceanographic, sea-ice), and explore linkages between marine and coastal land based products; develop accordingly a list of potential products, consider production and delivery mechanisms, and their appropriate structure;
3. Develop metrics for the marine climatology products and their delivery including: (i) documentation and standardization of QC of climatological summaries (including Marine Climatological Summaries - MCS) (ii) data and products usage, and (iii) data adequacy for product quality;
4. Update, jointly with TT-DMVOS, the Marine Climatological Summaries Scheme (MCSS), and review the organizational structures and responsibilities, including the definition of the role and functions of the RMs concerning generation of marine climatological products;
5. Propose changes to JCOMM to the *Manual on* and the *Guide to Marine Meteorological Services* to reflect the proposed changes in the MCSS;
6. Contribute to the development of internationally agreed Higher-level Quality Control Standards (HQCS);
7. Liaise with other JCOMM Teams and Panels (ETSI, ETWS, SOT, TT-DMVOS), the CCI (including its ET2.2 on Climate Monitoring including the Use of Satellite and Marine Data and Products and ET1.3 on the Rescue, Preservation and Digitization of Climate Record), and the joint CCI/CLIVAR/JCOMM ETCCDI, where appropriate for the tasks above;
8. Report to the ETMC at its regular sessions.

Membership of TT-MOCS is open to all ETMC Members and is to include those members holding the positions listed below. The Task Team will select its Chairperson among its members:

- (a) ETMC members: Co-chairpersons of the TT-DMVOS, who also represent the GCCs, interested RMs, members also on ETCCDI.
  - (b) External to ETMC: CCI, ETWS, ETSI, and others as agreed by the Task Team.
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## ANNEX IV

### TERMS OF REFERENCE (TOR) OF THE JCOMM DMPA TASK TEAM ON DELAYED-MODE VOLUNTARY OBSERVING SHIP DATA (TT-DMVOS) (as proposed by ETMC-II and SOT-IV)

**Background:** The Marine Climatological Summaries Scheme (MCSS), established in 1963 (Resolution 35, Cg-IV), has as its primary objective the international exchange, quality control and archival of delayed-mode marine climatological data, in support of global climate studies and the provision of a range of marine climatological services. Eight countries (Germany, Hong Kong, China, India, Japan, Netherlands, Russian Federation; United Kingdom and USA) were designated as Responsible Members (RMs) to gather and process the data, including also data from other Contributing Members (CMs) worldwide; and regularly publish Marine Climatological Summaries (MCS) for representative areas, in chart and/or tabular forms. Two Global Data Collecting Centres (GCCs) were established in 1993 in Germany and the United Kingdom to facilitate and enhance the flow and quality control of the data. Eventually all data are to be archived in the appropriate archives, including ICOADS.

**Scope:** In practice, the delayed-mode marine climatological data, handled under the MCSS, and published in the MCS, have generally been limited to Voluntary Observing Ship (VOS) data (i.e., excluding buoy or other non-ship data), in accordance with the original intent of the MCSS. The Task Team will focus primarily on modernizing the management and quality control of the delayed-mode VOS data, while at the same time exploring possible connections with the management of real-time VOS and other ship-based data (e.g., Shipboard Automated Meteorological and Oceanographic System (SAMOS) and GOSUD). To develop a clearer separation between data processing, and the preparation of climatological summaries, the team's scope will be limited to data management. Because the RMs and the GCCs have primary involvement in the data processing, they will be invited to contribute to the work. The review and modernization of the MCS is clearly also an important task, which will be considered separately by the ETMC, and to which the RMs will be invited to contribute. In addition, as part of the collective modernization of the data management and the MCS, it is anticipated, in due course, that the "MCSS" terminology will be replaced by a new and more up-to-date terminology reflecting a separation between the two functions.

#### **The self-funded Task Team will primarily work via email and shall:**

1. Examine current delayed-mode VOS data management practices, including those of the GCCs, and streamline them as possible to reduce redundancies (if any), standardize operations, and exploit appropriate modern technologies;
2. Examine possibilities for commonality of the data management of the delayed-mode data, with real-time VOS data;
3. Keep under review the International Maritime Meteorological Tape (IMMT) format, and suggest changes if necessary;
4. Keep under review the Minimum Quality Control Standards (MQCS), and suggest changes if necessary;
5. Submit proposals to the JCOMM via the ETMC for revising technical publications, in particular the WMO *Manual* (No. 558) and *Guide* (No. 471) *on Marine Meteorological Services*, to incorporate possible changes in the IMMT and the MQCS, and to reinvent the MCSS terminology;
6. Review the International Maritime Meteorological Archive (IMMA) format, and suggest ways to reconcile the IMMT and IMMA formats;
7. Establish and maintain a website to share relevant information;
8. Collaborate and liaise with VOSclim and other groups (e.g., SAMOS and GOSUD), as needed, both to ensure access to expertise and appropriate coordination.

**Membership from ETMC; including both GCCs as Co-chairs, and all RMs presently represented on the ETMC):**

Elanor Gowland (Co-chairperson, Germany)  
Reinhard Zöllner (Co-chairperson, Germany)  
Elizabeth C. Kent (United Kingdom)  
Frits B. Koek (the Netherlands)  
Alexander Vorontsov (Russia)  
Wing-tak Wong (China)  
Takashi Yoshida (Japan)  
Scott D. Woodruff (USA)

**Membership from the SOT:**

Graeme Ball (Chairperson of the OPA/SOT, Australia)  
Julie Fletcher (Chairperson of the OPA/SOT/VOS Panel, New Zealand)  
Shawn Smith (USA)  
Henry Kleta (Germany)  
Bruce Sumner (HMEI, associate Member)  
A representative from US/NOAA/NCDC

**Reporting mechanisms:**

The Team will produce a project plan to guide operations for the next three years. The plan should explain the linkages to other components of the JCOMM, including the SOT and other pertinent programs.

The Team will establish an annual reporting mechanism to the ETMC and the SOT.  
The Team will report to the ETMC and the SOT

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**ANNEX V**

**TASK TEAM ON DELAYED MODE VOS DATA (TT-DMVOS)**  
**Working Plan for 2007 – 2010**

<b>Task No.</b>	<b>Task</b>	<b>Detail</b>	<b>who</b>	<b>when</b>	<b>Status</b>
1	Mutual links on GCCs homepages	Each of the current GCC websites should create an active link to the other.	GCCs	By end October 2007	Done
2	Create a unique homepage and email address for the GCCs and investigate ways of making GCC information available, plus in due course explore the possibility of making data freely available	A single website is to be developed for GCCs, to provide access to information regarding data, data-flow, current developments and the Annual report. It should also be investigated how to make data available to users via the site, and monitor the use.	GCCs, supported by TT-members	Start investigation asap complete by end December 2008	Yet to start – work expected to start April 2008
3	GCCs to take a more active role in the collection of data	GCCs to contact CMs to encourage dataflow to the GCCs. Where possible, the GCCs should provide advice/support in getting non-submitting countries to set up a system to allow their data to be contributed.	GCCs	As soon as work plan agreed by TT-DMVOS	Dec 2007 - GCCs distributed an information gathering questionnaire to 39 countries (to confirm active CMs and identify countries willing to submit data but having difficulties). Results are currently being collated and are expected for March/April 2008. Results of questionnaire will determine a new list of CMs within MCSS.
4	Review and suggest changes to the function of the RMs and GCCs	Investigate whether the RM role is still required in its current state (to be responsible for data for a specific geographic area). Consider whether it will be beneficial to make data available to all CMs quarterly i.e. from an FTP server.	GCCs, members of the TT-DMVOS	Start investigations / discussions asap. Decide RM and GCC role by April 2008 for presentation at CLIMAR III in May	GCCs discussions commenced July 2007. Further discussion with rest of TT expected March/April 2008.
5	Develop and standardize higher level quality control	To agree on an appropriate HQCS and decide how flags should be set (with input from TT-DMOCS).	GCCs, TT-DMVOS, TT-	Start: January 2008, decide on	Yet to start

	standards (HQCS)	Software to be developed in-line with these decisions and thoroughly tested by both GCCs.	MOCS, and external experts as appropriate	HQC standards by December 2008, software developed by end April 2009	
6	GCCs to apply standardized HQCS and archive the HQ controlled data (data stream CMs to GCCs unchanged); GCCs reporting to ETMC via TT-DMVOS	GCCs to routinely apply HQCS software (setting flags only) to collected data prior to archiving.	GCCs	start: after completion of Task 5, routinely apply HQCS by end September 2009	
7	Discuss a simplified VOSclim data flow, i.e. routinely transmit quarterly contributions of CMs to the DAC, and document the impact this would have	Discuss benefits of sending the complete global dataset to DAC in USA and what impact would this have. Also consider whether they could collect this data from an FTP server. Consideration should also be given to the frequency and method of data distribution and definition of VOSclim. Recommendation should be supplied to ETMC/SOT via annual reporting mechanism (task 15)	TT-DMVOS, GCCs	Start: October 2007, decide by end January 2008	GCCs discussions commenced July 2007. Further discussion with rest of TT expected March/April 2008
8	Review and suggest an appropriate data storage structure for archival of delayed mode data. Also consider the storage and use of additional remarks and phenomena reports.	Decide on the most suitable database structure for storage of delayed mode data, taking into account the reconciliation of IMMT and IMMA formats. Consider a structure that data can be easily retrieved and which other data types may eventually be stored. Also think about storage of meteorological and quality metadata.	GCCs, supported by appropriate experts	Start: May 2008, depending greatly on codes but aim to complete by end December 2008 (prior to archival of standardized HQ controlled data by the GCCs )	
9	Review and suggest an appropriate data structure for archival of real-time data	Decide on the most suitable method of storage for real-time data. Consider how the chosen real-time data storage links to the delayed-mode data storage.	TT-DMVOS, GCCs and ETMC chair	Start: May 2008, depending greatly on codes but aim to complete by end December 2008	
10	Investigate how suggested changes to MQCS-V could be implemented	Changes suggested to MQCS-V at ETMC were initially agreed but formal acceptance may not be until ETMC 2011. Therefore, ways to implement these changes sooner should be investigated. As a result GCC software will require upgrading to reflect this.	TT-DMVOS, GCCs	start: September 2007	GCC Germany has already developed a test upgrade software in preparation. GCC UK yet to start work on this.

11	Investigate ways to reconcile the IMMT and IMMA formats, and suggest improvements.	Compare and contrast the differences and similarities between IMMA and IMMT formats. Decide on the particular strengths of each that may be ultimately combined in a new format, with appropriate consideration to the characteristics of Table Driven Codes (e.g., BUFR). Also investigate software for conversion of IMMA to other data formats, and vice versa. Consider particularly the idea of including unique identifiers on each observation and also conversion issues concerning netCDF.	Chair ETMC, Co-Chairs and members of the TT-DMVOS	Start: October 2007, report thoughts by April 2008	NCDC has provided Chair ETMC with a program to convert from IMMT-III to IMMA.  GCC Germany have started some initial investigations.
12	Develop appropriate promotional material to make the system widely known in the marine community	Investigate and action various methods of promoting the work of the GCCs (i.e. international marine publications and a newsletter to PMOs).	GCCs, members of the TT	Iterative. What's available now, and change information in line with the change of processes.	Yet to start
13	Investigate and implement suitable end products for use by international users	Liaison with TT-MOCS regarding the planned modernization of the marine climatological summaries, including investigating the types of end products users would like (i.e. charts/summaries) and possibilities for generating these routinely.	TT-MOCS, TT-DMVOS, and GCCs	After completion of tasks 5,6 & 8 – summer 2010	
14	Start discussions in the direction of an enhanced Marine Climatological Information System (MARINECLIS)	Investigate the feasibility of disseminating data and marine climatological products via a dedicated internet platform in support of user requirements.	Chair ETMC, Co-Chairs TT-DMVOS, Chair TT-MOCS, experts	Start discussions asap, taking into account as appropriate findings in tasks 2 & 4.	Yet to start (to be linked with item #19 - ICOADS already provides such a "platform"). TT-MOCS and TT-DMVOS to be involved.
15	Develop an annual reporting mechanism between TT-DMVOS, ETMC and SOT	Ensure ETMC and SOT are kept informed annually of developments any problems with achieving the work plan.	Co-Chairs TT-DMVOS in cooperation with Chairs ETMC and SOT	To start in 2008 and then continue annually	
16	Update GCCs function description within WMO manuals/guides	GCCs to update descriptions of MCSS dataflow, and other changes to MCSS in liaison with TT-MOCS, within the WMO 'Guide to Marine Meteorological Services' (WMO-No. 471) and 'Manual on Marine Meteorological Services' (WMO-No. 558).	GCCs, TT-MOCS	After new dataflow system is fully agreed and tasks 2, 4, 5, 6, 8, 9 & 13 are complete	
17	Set up TT-DMVOS meeting to chart progress	Align this meeting to coincide with CLIMAR-III	TT-DMVOS	Book meeting by end November 2007, set agenda	Meeting planned with CLIMAR-III

				by end March 2008	
18	Draft new ToR for the ETMC	Consider TT-DMVOS's important place within ETMC and include in the ToR	Secretariat, Chair ETMC, Chairs TT-DMVOS & MOCS	by CLIMAR-III (May 2008), starting asap	Discussions at DMCG-III, then CLIMAR-III
19	Draft proposal to ETMC regarding ICOADS role in modernised dataflow	Draft a proposal that would be circulated through ETMC for agreement around CLIMAR-III, regarding a proposed formalisation of the role of ICOADS in the context of modernising the delayed-mode data flow, and related issues, with the aim to develop a recommendation for JCOMM-III	TT-DMVOS	Prior to meeting (task 9), by beginning March 2008	
20	Review GHRSSST-PP database	Review the structure and content of the GHRSSST-PP database prior to operational implementation. Feedback results to ETMC.	TT-DMVOS	Start asap, complete by December 2007	Yet to start

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## ANNEX VI

### Comparisons of NCEP BUFR with SHIP (FM 13) GTS Messages: 2006 Wind Data

(Revised portions of ETMC-II/Doc. 3.3 APPENDIX M, 19 September 2007)

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#### 1. Introduction

This note discusses how small differences between the processing of originally reported FM 13 wind data by ICOADS, versus by NCEP in their translation to BUFR, can introduce measurable differences in the output data. Such differences could for example lead to spurious data artifacts when switching data sources for climate change studies.

While preservation of original FM 13 (and other GTS) messages is not presently part of WMO's BUFR templates, NCEP very beneficially archives these messages with the translated BUFR data. This NCEP policy remains critical because it provides one means for detection of such differences, and also allows the possibility of future correction of these and other data problems or omissions.

Similarly, the IMMA format used for ICOADS has a supplementary "attachment," which is routinely used to store a wide variety of input data (including the FM 13 and other GTS message strings retrieved from NCEP BUFR), so that those more original data can readily be tapped in the event of translation errors or omissions.

For centers archiving only translated BUFR data and not also original messages (e.g., UK Met Office), one useful criterion for the design of WMO templates could be whether each BUFR field can be certified 100% reversible to the original data (including information about original precision, if BUFR carries additional precision). Just the two field examples presented here do not fulfill that proposed requirement, which (due e.g. to the fact that some inadvertent translation differences will likely always occur due to software bugs or finite precision errors) is likely unattainable. In that case the most robust WMO policy may therefore be to simply build into BUFR templates, or into other JCOMM data management policies, features for archival of the original data (like NCEP BUFR and IMMA).

#### 2. Bias ( $0.1 \text{ ms}^{-1}$ ) in some wind speeds converted from knots to $\text{ms}^{-1}$

The blue bar to the right in Figure 1 illustrates the approximate amount of wind speeds that were biased  $+0.1 \text{ m/s}$  in 2006 data when converted by NCEP from FM 13 to BUFR using the GEMPAK constant (1.9425), which is based on the US nautical mile. This problem was corrected in ICOADS Release 2.4 for October 1999-May 2007<sup>1</sup> by recomputing any such wind speed values using a constant based on the international nautical mile (WMO 1966). NOTE: Effective 1 July 1954 the international nautical mile was adopted by the US Dept. of Commerce (List 1966, p. 3). Additional background information and Fortran conversion routines are available in: <http://icoads.noaa.gov/software/lmrlib>.

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<sup>1</sup> Starting 1 March 1997 data are available processed by NCEP into the BUFR format. In the present ICOADS.RT archive, a translation from the original GTS (FM 13/18) strings was used for Mar. 1997-Sep. 1999 (thus applying to currently available ICOADS data for 1998-Sep. 1999), rather than NCEP's translation into BUFR (more information [here](#)).





Table 1. FM 13 wind direction dd (code 0877; WMO 1995a) as translated to IMMA field D (similarly for the omitted dd values 03-35), including additional codes 361-2 for calm and variable. In the shaded area, BUFR wind reporting standards (from WMO 1995b) are listed.

<i>FM 13</i>	<i>code 0877: dd</i>	<i>D</i>	<i>BUFR wind reporting standards:</i>		
			<i>Speed</i>	<i>Direction</i>	
//	No observation	Missing	No observation	Missing	Missing
00	Calm	361	Calm	0	0*
01	5°-14°	10°	Normal observation	> 0	10°
02	15°-24°	20°	"	"	20°
...	...	...	"	"	...
36	355°-4°	360°	"	"	360°
99	Variable, or all directions	362	Light and variable	>0	0*
			Speed only	>0	Missing
			Direction only	Missing	1°-360°

\* While WMO (1995b) describes the "Unit" of BUFR wind directions as "Degree true," outside of the wind reporting standards footnote it does not specify whether the value zero is only a code, or could also represent 0°.

Table 2. ICOADS wind editing data changes made for the calculation of monthly summary statistics (note: the original wind data are not modified) so that the direction D and speed W would be more consistent (from Slutz et al. 1985, Table E2.1). For the NCEP BUFR data, these changes could only be applied as stated in ICOADS through Sep. 1999 (since as noted above translated BUFR wind fields were used from Oct. 1999-May 2007). Any potential ramifications of this procedural switch on the output ICOADS wind monthly summaries have not been thoroughly investigated (ref. Figure 3).

<i>Wind speed (ms<sup>-1</sup>)</i>	<i>1° ≤ D ≤ 360°</i>	<i>361 (calm)</i>	<i>362 (variable)</i>	<i>Missing</i>
<i>W=0</i>	D=361 (calm)		D=361 (calm)	D=361 (calm)
<i>0.1 ≤ W ≤ 3.1</i>		D=362 (variable)		D=362 (variable)
<i>3.2 ≤ W ≤ 102.2</i>		D=360°		
<i>Missing</i>		W=0 ms <sup>-1</sup>		

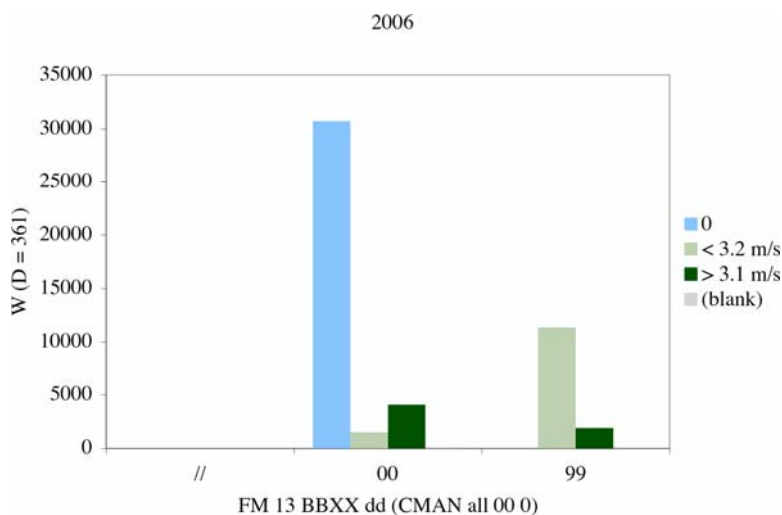


Figure 2. FM 13 (i.e., BBXX) wind direction (dd) special codes 00 (calm) and 99 (variable), with bars indicating whether the corresponding wind speed (ff) value was zero (blue), or < or ≥ 3.2 ms<sup>-1</sup> (light or dark green). Note that cases of dd=00 with ff>0 are outside the BUFR wind reporting standards, as might be cases of dd=99 with ff ≥ 3.2 ms<sup>-1</sup> (depending on the precise definition of "light" and variable). NOTES: As in Fig. 1, ICOADS decoding was limited to the first or only attached message. The numbers of missing (blank) dd/ff="// are too small to be visible on this plot. NDBC Coastal-Marine Automated Network (C-MAN) data (which are circulated over GTS in a variant of FM 13) all had dd=00 with ff=0, and compose a significant fraction of the blue bar.

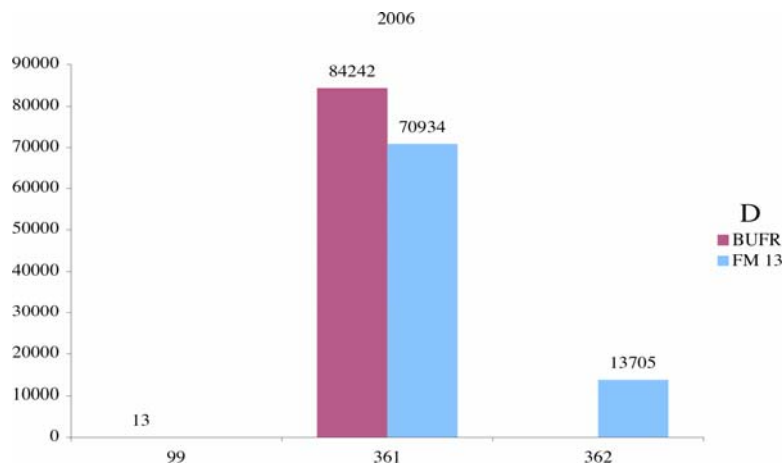


Figure 3. NCEP BUFR (red bars) and original FM 13 (blue bars) calm and variable wind directions as translated into IMMA field D values for “calm” (361) and “variable” (362). NOTES: As in Fig. 1, ICOADS decoding was limited to the first or only attached message. The numbers do not match up precisely (13705 + 70934 = 84639 - 84242 = 397). Also, 13 anomalous values of 99° appeared in BUFR, and were interpreted as such (almost certainly erroneously) in the ICOADS translation to D (in FM 13, code 99 indicates “variable”). For ICOADS Release 2.4, a correction was applied to partly mitigate these differences.

### References:

JCOMM, 2004: *Expert Team on Marine Climatology, First Session, Gdynia, Poland, 7-10 July 2004, Final Report*. JCOMM Meeting Report No. 32.

List, R.J., 1966: *Smithsonian Meteorological Tables*. Smithsonian Institution, Washington, DC, 527 pp.

Slutz, R.J., S.J. Lubker, J.D. Hiscox, S.D. Woodruff, R.L. Jenne, D.H. Joseph, P.M. Steurer, and J.D. Elms, 1985: *Comprehensive Ocean-Atmosphere Data Set; Release 1*. NOAA Environmental Research Laboratories, Climate Research Program, Boulder, CO, 268 pp. (NTIS PB86-105723) [[http://icoads.noaa.gov/Release\\_1/coads.html](http://icoads.noaa.gov/Release_1/coads.html)].

WMO, 1966: *International Meteorological Tables*, WMO-No.188.TP.94.

WMO, 1995a: *Manual on Codes*. WMO–No.306, Vol. I.1 Part A, Alphanumeric Codes [[http://www.wmo.int/pages/prog/www/WMOCodes/ManualCodes/WMO-306\\_Vol.I.1\\_Part.A.pdf](http://www.wmo.int/pages/prog/www/WMOCodes/ManualCodes/WMO-306_Vol.I.1_Part.A.pdf)].

WMO, 1995b: *Manual on Codes*. WMO–No.306, Vol. I.2 Part B, Binary Codes [<http://www.wmo.int/pages/prog/www/WMOCodes/Operational/BUFR/TableB-2005nov.pdf>].



## ANNEX VII

### RECOMMENDATION IODE-XIX.4: THE IODE OCEAN DATA PORTAL PROJECT

The IOC Committee on International Oceanographic Data and Information Exchange,

**Noting with satisfaction** the submission of the IODE Ocean Data Portal Concept Paper that is aimed to provide the integration of marine data and information from a network of distributed IODE data centres as well as the resources from other participating systems and that will be based upon modern web technologies,

**Taking into account** that a number of similar initiatives are planned or have started such as IODE/JCOMM E2EDM Pilot Project, SeaDataNet, DMAC, WIS and others,

**Recommends** the establishment of the IODE Ocean Data Portal Project with the Terms of Reference as attached in the Annex of this recommendation;

**Invites** the IOC Executive Secretary, in consultation with the Co-Chairs of IODE and the Chair of the JCOMM-DMCG, to establish a Steering Group (SG-ODP) to implement and monitor the progress of the Project;

**Invites** IODE Member States and other interested countries and organizations, to participate in, and support the activities of the Project

#### Annex to Recommendation IODE-XIX.4

##### Terms of Reference of the IODE Ocean Data Portal Project

##### Objectives of the Project:

- (i) facilitate and promote the exchange and dissemination of marine data and services hosted by NODCs;
- (ii) provide seamless access to marine data to NODCs across the IODE network through the discovery, evaluation and access to data via web services;
- (iii) identify and recommend standards to provide interoperability with IODE data centres to allow shared use of metadata, data and products.

##### The Participants in the Pilot Project:

The Project will be carried out by a Steering Group composed of, *inter alia*, representatives of IODE/JCOMM ETDMP, SG-MEDI, SG-MarineXML, WMO ICG-WIS, and other appropriate experts as required for each work package.

##### Work Plan and Timing:

The Project Steering group will implement 3 work packages (Project coordination and management; Standards and development package; Portal implementation package) during the inter-sessional period (2007-2009) and submit a detailed report on the work achieved at the Twentieth Session of IODE (2009).

##### Financial implications:

2007:	US\$ 20,000	(extra-budgetary sources (obtained from USA))
2008-2009	US\$ 100,000	(extra-budgetary sources (to be identified))

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## ANNEX VIII

### GODAE ACTIVITIES AND FUTURE DEVELOPMENTS

The Global Ocean Data Assimilation Experiment (GODAE) is conducted its main demonstration phase from 2003 to 2006. Operational and research institutions from Australia, Japan, United States, United Kingdom, France and Norway will be performing global oceanic data assimilation and ocean forecast in order to provide regular and comprehensive descriptions of ocean fields such as temperature, salinity and currents at high temporal and spatial resolution. This demonstration phase will be followed by a consolidation and transition phase from 2005 to 2008 where synthesis and transition to operational systems will take place.

Climate and seasonal forecasting, navy applications, marine safety, fisheries, the offshore industry and management of shelf/coastal areas are among the expected beneficiaries of GODAE. The integrated description of the ocean that GODAE will provide will also be highly beneficial to the research community. JCOMM must work together with GODAE and in association with intermediate and end users, to identify, standardize and operationally implement new ocean products and public good services that have emerged over the past 6 years. Of particular importance is the need to help GODAE transition appropriate capability from a demonstration project into an operational system environment.

In collaboration with GODAE and other relevant organizations, the SCG, ET-Chairpersons and ET members will promote Ocean Product Development. The main tasks include:

- Collect and present documentation describing of ocean product data processing and assimilation system characteristics as an electronic catalogue;
- Monitor and harmonize using appropriate ocean product and product service metrics where appropriate, distribution systems for ocean products through web servers and by ftp, in addition to the GTS, that are now required to broaden the range of organizations that can access data;
- Coordinate the application of standardized, modern formats for ocean products and associated data;
- Promote systems that assess the accuracy and timeliness of coherent, consistent ocean product streams and archives including open and detailed inter-comparison activities;
- Promote the wide dissemination and accessibility of ocean products and work with data providers to encourage feedback on their value;
- Develop, with appropriate international groups, ocean product user/producer feedback/response systems and material;
- Participate in appropriate capacity building activities for better understanding and application of Met-Ocean data, products and services.

The SPA should prepare a comprehensive *JCOMM Catalogue of operational ocean products and Services* including quasi-operational products, including those of GODAE, and a draft document *Standard Data and Metadata Formats for Ocean Products* in collaboration with IODE, DMPA and GODAE.

## ***Developing on from the Task Team for Ocean Product Development***

Following the restructure of the Task Team for Ocean Product Development (TT-OPD) endorsed at MAN-V (October 2006, Geneva) and at SCG-III (November 2006, Exeter), the SPA coordinator has worked closely with the Rapporteur for Operational Ocean Forecasting Systems (OOFs) and the Secretariat to develop a more palatable approach to developing an appropriate team to help coordinate ocean products and their development. Following a review into why the community was not ready to take up the challenge to coordinate ocean forecast products, it was clear that two things had stalled the team:

1. The TT-OPD remit was far too large and off-putting to even the most supportive groups (too many documents to develop); and
2. The GODAE community was in a relatively dormant phase as new Chairs took up responsibilities from Neville Smith.

It was quickly agreed at MAN-V and SCG-III that problem (1) could be solved by reducing the number of technical documents to produce to a minimum and to spread the workload across each ET within the SPA. In fact, the SPA coordinator and ET Chairpersons agreed to provide first version of the JCOMM guide to ocean products, symbology and nomenclature (see below) as this was considered a more rational approach in which the ET's themselves could be brought onto the onerous task of assembling this document.

However, what was really required was an overhaul of the way in which JCOMM and the SPA is attempting to develop services. What is a service? The provision of an observational data point? The sustained provision of an operational ocean forecast model output in NRT? The coordination of satellite SST observations for operational use? The delivery of web map servers that amalgamate complementary data sources (e.g., Live Access Servers)? The negotiation and management of new MetAreas? The provision of marine climatological information? All of these examples constitute marine meteorological services amongst many others. What is clear is that many agencies, groups, companies and institutions require products based on ocean forecast systems that assimilate both satellite and in situ data AND the satellite and in situ data themselves. Satellite and ocean model data are not well catered for in the current JCOMM structure despite the realization that in situ data form only a part of the JCOMM user requirements. These are issues tackled by the Global Ocean Data Assimilation Experiment (GODAE).

### ***Guide to Ocean Products Formats, Symbology and Nomenclature ToC & structure***

The Guide to Ocean Product Formats, Symbology and Nomenclature (OpForSyN) has been discussed and a draft table of contents is proposed as follows:

#### **1. Introduction**

- Discussion of the need for a guide (Review of current guides and information)
- Purpose and scope of this guide
- Format of this guide
- Update schedule and contact information

#### **2. Overview of the guide**

- Introduction to Formats and conventions
- Introduction to symbology and nomenclature used within Oceanography and Marine Meteorology

#### **3. Guide to Ocean Product Formats (model systems, satellite systems, in situ observations and gridded analyses)**

- Format type 1 (e.g. NetCDF and CF-1.0 convention)
  - Summary description
  - Strengths and weakness of the format (interoperability)
  - Estimated user base and status of format development community
  - Links to actively maintained documentation

Role within JCOMM (e.g., WIS, GOOS...)  
 Typical example  
 Format type 2...

#### 4. Guide to Ocean Product Symbology an Nomenclature

Suggest a large table e.g.

Symbol	Name	Meaning	Scope	Explanation	Example
=	equality	is equal to; equals	Everywhere, universal	x = y means x and y represent the same thing or value.	1 + 1 = 2

Note that a vast amount of information is already available (e.g., MANICE, the Manual of Standard Procedures for Observing and Reporting Ice Conditions. It describes the procedures for observing, recording, and reporting ice conditions at Environment Canada web site:

<http://ice-glaces.ec.gc.ca/WsvPageDsp.cfm?Lang=eng&lnid=78&ScndLvl=no&ID=11040>.

#### 5. Issues demanding further work and discussion.

#### 6. Links and contacts

#### 7. References

In order for this document to be developed in the most efficient and effective manner it is recommended that an on-line dynamic document (wiki page?) is developed that can be managed as a shared resource as part of the JCOMM SPA-Web site. It is clear that the guide will require a detailed dialog with many groups working in what is essentially an unregulated space at present.

#### *The importance of providing structures to sustain the GODAE legacy*

GODAE continues to develop coordination of ocean forecasting systems across the world and is progressing well. The creation of a dedicated project office and appointment of a full-time staff member has had a tremendous impact on the progression of GODAE. A new web site has been developed (<http://www.godae.org>) which contains a wealth of information about ocean forecast systems (excluding waves), products and systems. Three key areas within the current GODAE workplan priorities include JCOMM:

- **GODAE Products:** Products will be subject to strict quality control. The importance of error characterization is fully recognized. GODAE groups collaborate closely to consolidate work on metrics and intercomparison to make sure a minimum set of metrics is internationally implemented. In collaboration with JCOMM, product standardization will be developed and interoperability between systems ensured.
- **Transition from demonstration to operational systems:** GODAE will work with JCOMM to define its role for operational oceanography. Examples of transition to operations for the different nations will be promoted. MERCATOR in France, NCOF in the UK, MERSEA in Europe, NOPP projects in the US (e.g. HYCOM, ECCO), BlueLink in Australia and Compass-K in Japan are now preparing the transition to operational status.
- **Observing Systems:** The most critical issue for GODAE is the sustainability of the global observing system - especially satellite components. GODAE strongly supports the improvement of the global ocean observing system (altimetry, Argo and SST). Data products generated for GODAE will have added value and impact positive on applications.

Note that the GODAE Pilot Projects are now self-sustaining entities that will continue to govern ARGO and operational SST data sets (GHRSSST-PP) on a self funding basis (as they have throughout their lifetimes).

The SPA Coordinator and the Secretariat have been consulting with the International GODAE Steering Team (IGST) on JCOMM SPA plans. The IGST supported the proposal for the establishment of an ET-OOFS, noting that a strong dialogue between SPA and GODAE groups should be maintained. The ongoing research and development effort required to maintain operational ocean forecast systems would need to continue beyond GODAE, and this effort would need to maintain a close link to the ET-OOFS to ensure that work is complementary, and that science developments feed the operational systems.

Noting the rapid development of operational ocean forecasting systems and the need for information on and coordination of these systems, the co-presidents decided, with the endorsement of the Management Committee, at its 6<sup>th</sup> session (Paris, December 2007), to establish an Expert Team on Operational Ocean Forecast Systems in the Services Programme Area, with the Terms of Reference given below. The Management Committee encouraged the Rapporteur for Operational Ocean Forecasting Systems (OOFS) to take up the chairmanship of the ET-OOFS for this intersessional period.

### ***Terms of Reference of the Expert Team on Operational Ocean Forecast Systems (ET-OOFS)***

The Expert Team on Operational Ocean Forecast Systems shall:

- a. Develop and maintain a 'Guide to Operational Oceanographic Forecasting systems';
- b. Develop, for other JCOMM teams and Members/Member States, guidance on the nomenclature, symbology and related standards to be used by operational ocean forecasting systems, as well as the applications of the output from these systems;
- c. Develop and operate an intercomparison framework for near-real-time monitoring of OOFS outputs, building on the legacy of GODAE;
- d. Coordinate closely with the scientific community developing and maintaining OOFS (e.g., GODAE and GODAE follow-on) on the further development and operational implementation of the systems;
- e. Provide recommendations on observational data requirements for OOFS to the JCOMM Observations Programme Area (OPA);
- f. Maintain liaison with the JCOMM Data Management Programme Area (DMPA) on data management issues related to OOFS;
- g. Provide advice to Members/Member States on operational ocean forecast systems.

General Membership:

The core membership is selected to include the chairperson and up to five core members, ensuring an appropriate range of expertise in ocean forecast systems, data assimilation using ocean models, satellite and *in situ* data requirements for ocean models, and operational model intercomparisons. Additional experts may be invited as appropriate to represent ocean forecasting systems/groups, with the concurrence of the co-presidents of the Commission and with no resource implications to the Joint Secretariat.

### ***The Global High Resolution Sea Surface temperature Pilot Project (GHRSSST-PP)***

The GHRSSST-PP International Science Team met at the Bureau of Meteorology Research Centre (BMRC), Melbourne, May 12-17<sup>th</sup> 2007. The Meeting was well attended by over 60 international scientists on self funded basis. Unfortunately, the JCOMM Secretariat could not attend this meeting due to the WMO Congress. The project continues to gain strength and is entering a mature phase as the basic Regional/Global Task Sharing Framework (R/GTS) that enables agencies to exchange satellite SST data sets in a common format is now in place. Over 10Gb of SST data are exchanged within the system each day in NRT (within 6 hours of reception at the

Satellite platform in many cases). Several NMH's are now using GHRST-PP data streams and services in NRT as part of daily operations. There is a clear need for JCOMM to work more closely with the GHRST-PP in order to help guide the project into sustained operations in the best possible manner. In particular, a better association with the WMO Satellite teams would be beneficial.

The current focus of the GHRSSST-PP is to sustain the system through National/Regional projects that includes supporting R&D required to monitor and specify on a regular basis uncertainty estimates for each satellite data stream. The GHRSSST-PP has a dedicated GEO action to develop ensemble techniques to explore uncertainties in the SST analysis system outputs. A new subgroup, the GHRSSST-PP Multi-Product Ensemble (GMPE) has been established that has developed an operational 'poor-mans' ensemble of global daily high resolution SST products. Participation currently includes USA, UK, China, Australia (Chair), Denmark, France and Japan. Several NMH's use the GMPE outputs (see <http://www.ghrsst-pp.org/Todays-global-SST.html>) as part of their QA systems for their own SST analysis. Using the GMPE system, significant shortfalls in product quality were revealed in the Arctic Ocean this summer where QC system limits were exceeded due to extreme ice melt and strong thermal stratification of the surface ocean leading to high SST's in the region. Several operational changes resulted as a direct result of this activity (Met Office fast tracked GHRST-PP into daily operations, NOAA revised QC procedures).

The GHRSSST-PP continues to develop SST reanalysis at a NOAA Long Term Stewardship and Reanalysis Facility (NODC, Maryland). The GHRSSST-PP Science Team is also working on a new data processing specification, has an active working group on Diurnal variability, continues to work on new SST data products (so called L1P [radiance] and L3P [gridded & ranked observations]) in response to user led requirements articulated at the Science Team meeting. It is expected that in 2007-9 new initiatives will emerge with China as a GHRSSST-PPP supporting partner (the meeting was attended by Chinese representatives for the first time) by developing a new project under ESA DRAGON-II program.

The next GHRSSST-PP Science Team Workshop will be held at the Conference Centre, Perros-Guirrec, Brittany, France 9-14<sup>th</sup> June 2008.

The Management Committee, at its 6<sup>th</sup> session (Paris, December 2007), recognized the important developments made by the GHRSSST-PP in developing a new generation of operational satellite SST data products and services and endorsed the proposal to strengthen the relationship between JCOMM and the GHRSSST-PP project office and science team (e.g., satellite coordination activities, end-to-end technologies, operational standards and services, WIGOS/WIS).

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## ANNEX IX

### LINKS BETWEEN THE ETMC AND THE ETWS

Waves and storm surges are a cross-cutting activity with important ramifications for other JCOMM activities and also other intergovernmental bodies and industry. The ETWS Chairperson is a member of the OC for CLIMAR-III in Gdynia, Poland May 6-9, 2008, with the goal of ensuring that wave and surge climatology is adequately represented within the marine climatology programme. An abstract has been submitted to CLIMAR-III reporting on the outcomes and recommendations (highlighting those related to climatology) of the Storm Surge Symposium. The CLIMAR-III website is at <http://icoads.noaa.gov/climar3/>. Another important cross-cutting activity is the CCI/CLIVAR/JCOMM Expert Team on Climate Change Detection and Indices (ETCCDI). The lead for the JCOMM role in this activity is through the ETMC (as noted on the revised JCOMM organization chart), but the Chair of ETWS is represented on the ET to reflect the requirements of the wave and surge community in this regard. The Chair of ETSI, although not a member of ETCCDI, will also provide input on indices related to sea ice. An abstract has been submitted to CLIMAR-III on the marine climate indices, with a breakout session planned to provide input for the ETCCDI-III meeting immediately following CLIMAR-III. The International Association of Oil and Gas Producers (OGP) represents one of the most important user groups for the SPA, in both the operational forecasting of waves and surges and also in the climate-related aspects. Three actions directly involving this association have taken place recently: (1) the appointment of the ETWS Chairperson as an Associate Member of the OGP Metocean Committee, (2) the decision to include the OGP Metocean Chairperson on the SPA Coordination Group, (3) the planning of a joint OGP/ JCOMM/WCRP *Workshop on Climate Change and the Offshore Industry* to be held at WMO Headquarters in Geneva, 27-29 May 2008. The objectives of the workshop are to:

- gather evidence on the climate change, its emerging impacts on the offshore activities and review the evolving industry requirements for met-ocean services in a changing climate;
- identify and prioritize key areas for future research and development towards the adaptation of the offshore industry and its met-ocean services to the climate change;
- strengthen coordination of existing and future research and development initiatives for better protection of the marine environment and increased safety and efficiency of offshore operations.

A proposal has been developed between the chairpersons of both the Expert Team on Wind Waves and Storm Surges (ETWS) and the Expert Team on Marine Climatology (ETMC), and the JCOMM Data Management Programme Area (DMPA) Coordinator, for the establishment of a JCOMM Extreme Wave Database for use in model validation and validation of remotely sensed waves, where such models and algorithms suffer from lack of sufficient data. It was also suggested that altimeter data be included as an integrated component of the system. The ETWS agreed to establish this database through the solicitation of additional contributions of *in situ* data (e.g., beyond the Canadian and US data that have been scanned in preliminary fashion), with the likelihood that some complications would also need to be sorted out on open re-distribution and other national or organizational data policies; and with Dr Hendrik Tolman kindly agreeing to arrange for the provision of a selection of appropriate altimeter data.

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## ANNEX X

### JCOMM/IODE EXPERT TEAM FOR DATA MANAGEMENT PRACTICES THE CHECKLIST OF TECHNICAL REQUIREMENTS FOR DATA PROVIDERS FOR E2E TECHNOLOGY IMPLEMENTATION

(By Mr R. Keeley and Mr N. Mikhailov)

*(Document as discussed at IODE-XIX)*

#### 1. INTRODUCTION

##### 1.1. Document overview

This document describes the requirements for IODE data centres to build the E2E Data providers network and contains the following information

- Brief information about E2EDM technology;
- A description of E2E data provider implementation issues;
- Requirements to be met by E2E data providers.

This document has been prepared by Mr Nicolay Mikhailov (ETDMP Chair, RIHMI-WDC/Russian NODC).

##### 1.2. About E2EDM technology

The “end to end” data management (E2E) technology is considered as an “umbrella” that comprises local data systems managed by IODE data centres and provides “transparent” access to the metadata, data and products (resources) generated by these local data systems.

The E2EDM technology includes the following components:

- Technical specifications defining the namespace and structures of metadata and data records, data exchange protocol, etc. for data exchange based on a distributed data sources network;
- Data Provider (software) providing the access to the local data system of participating centres. As soon as the Data Provider is installed as a “wrapper” of the local data system, this system becomes a data source for the E2E-based distributed data system;
- Integration Server (software) provides the management and use of the data sources network via interaction with Data Providers;
- Information about the E2E technology is provided on a web site. Those wishing to use the software are asked to register so that users can be notified when software updates become available. All are welcome.

The E2EDM documentation\* is available at:

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\* Note: E2EDM documentation includes the following:

1. E2EDM overview (Updated 15 Jan 2007)
2. The implementation of E2EDM technology (Updated 15 Jan 2007)
3. The checklist of technical requirements for data providers for E2E technology implementation (Updated 09 March 2007)
4. E2EDM technical specification v.1.0 (Updated 15.01.2007)
5. E2EDM User's Manual (Updated 15.01.2007)
6. E2EDM Ocean Data Portal.User Guide v1.0 (Updated 05.03.2007)
7. Data Provider User Guide - Installation and setup (v.1.1.0 Updated September 2007)
8. Data Provider User Guide - Registration and maintenance of resources (v.1.1.0 Updated September 2007)
9. E2EDM Concept XML Schema (Updated 16.11.2007)
10. E2EDM Global XML Schema (Updated 14.05.2007)

<http://data.meteo.ru/e2edm/index.php?section=19>

The IODE Ocean Data Portal prototype based on E2E technology is available at:

<http://data.meteo.ru/e2edm/index.php?section=19>

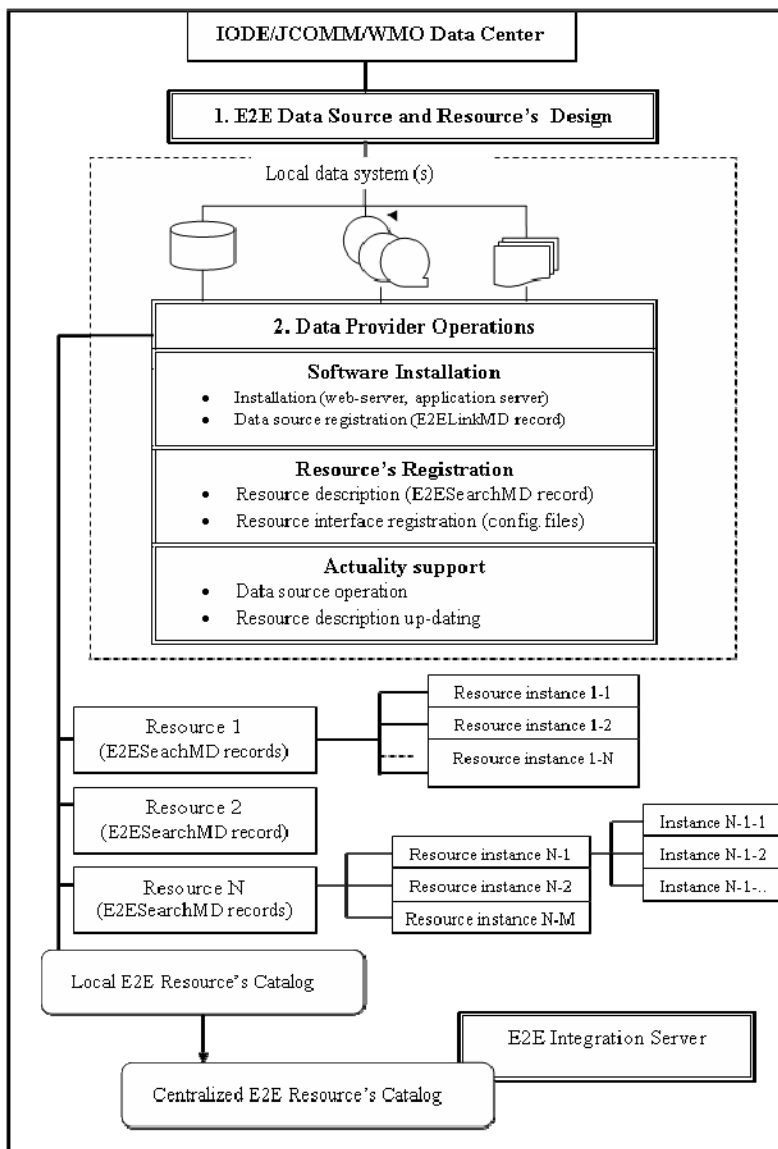
## 2. THE E2E DATA PROVIDER IMPLEMENTATION

### 2.1. Data providers

The data center which agrees to be the E2E data provider should provide:

- The appropriate middleware for communications: web server and application server;
- Installation of the E2E Data Provider software to connect the local data system with E2E Integration Server;
- Registration of the data source and its resources;
- Support of the local data system.

The overall scheme of the E2E data provider implementation is shown in fig.1.



## **2.2. The E2E data sources**

The data centre source is made available to the E2E system by the Data Provider software which is placed in the data center telecommunication node and generates the resources of the E2E distributed data system interacting with the local data system(s). The data source operates on the basis of the following rules:

- Local data system(s) of a data centre can have various storage types: DBMS or (and) data files (structured/formatted) or (and) object files (non-structured - jpeg, shape-files, png, etc. or software applications);
- A local system administrator at the data centre installs the Data Provider software which provides access of E2E technology services to all local data irrespective of number of local data systems and their storage types. The ratio “one data centre - one (or many) local data systems - one E2E data source” is supported;
- A local system administrator provides the registration of a data source (identifier, physical addresses and etc.) using the Data Provider web-form (E2ELinkMD record);
- A local system administrator provides the technical support of the Data Provider operations in contact with E2E developers if it is needed.

## **2.3. The E2E resource and resource instances**

The E2E resource is a data (metadata) set (or software application) submitted by the data centre to E2E distributed data system.

2.3.1. To provide effective search, access and delivery processes the resource must contain data with homogeneous properties according to the following rules:

- The resource must contain data of one category: observation data, derived (climatic) data, forecast data, analysis data, etc.;
- The resource must contain data with unique space-time resolution (irregular observation data, fixed point data, monthly data, etc.);
- The resource must belong to one type of local system storage (DBMS or data files or object data files).

To reflect all of the above-mentioned data properties there are appropriate elements in the resource description structure (E2ESearchMD).

2.3.2. The resource can be presented as a single unit (called a single resource) or as a set of resource instances (called a serial resource) reflecting the local data granularity of the local data system.

## **2.4. The resource's registration**

The resource's registration is provided by the local data system administrator and the registration process includes two stages:

- Resource design;
- Resource registration.

### **2.4.1. Resource design**

The resource design is carried out taking account of the specifics of the local data system (contents, data ordering, coding used, etc.) including:

- Decisions concerning the resource type (single or serial), resource content and granularity for splitting the resource into resource instances (for serial resource) are accepted for the local data system being made available to the E2E distributed data system;

- Decisions about needs for conversions of the local codes to system codes are determined.

#### 2.4.2. Resource registration

This is provided through the special web-form, given by Data Provider and having the following sections:

- Identification and reference information;
- Time, space and vertical data extent;
- Data content and granularity;
- Processing and quality level;
- Platforms, instruments and methods;
- Data distribution information.

The single resource registration is carried out once through the Data Provider web-forms. The serial resource registration is fulfilled in the following way:

- Local data administrator provides the root resource description using web-forms;
- For local system storage types: DBMS and data files – the descriptions of the resource instances are created automatically by the Data Provider service based on the granularity of the data described in the section “Data content and granularity” of the root resource description;
- For local system storage type: object files – the description of resource instances are provided in a similar fashion to the root resource description, i.e. using web-forms of Data Provider service.

The Data Provider realizes:

- Automatic use of the controlled code-lists and dictionaries through the interaction with the Integration Server which provides the management and use of the metadata (E2ECodeMD record);
- Quality control of the resource (or resource instances) elements as described in metadata input.

Physically the resource descriptions are stored in XML-files in the format of the E2ESeachMD record. Depending on the chosen granularity scheme the resource description can be presented in one or several E2ESeachMD records:

- a single resource description is stored in one E2ESeachMD record;
- serial resource descriptions are stored in several E2ESeachMD records (N+1, where N is the number of resource instances).

During resource registration the description of the resource interface with the local data system is also provided:

- DBMS type - assignment of table and attribute names of the database which will be used for resource generation;
- Data file types - the description of data file elements which will be submitted in a resource (in current version E2E – only with flat (non-hierarchical) structures).

The description of the resource interface includes also filling a cross-mapping table for conversions of local codes to system codes.

All of the above-mentioned operations for setting the resource interfaces are provided by special Data Provider web-form and services.

## **2.5. Operational provision of resource descriptions**

It is important to have resource descriptions available on-line (if local data system was changed) to permit data search and access. This process is dependent on the system storage type:

- DBMS/data files - resource (single or serial) metadata updating is provided automatically by the data centre according to a schedule set by the local data administrator or on a harvesting request from the Integration Server;
- Object files – resource metadata (or adding new resource instances) is supported by the local data administrator who must update the resource (resource instances) descriptions using the Data Provider web-forms.

The update schedule (one time in minute, hour, day, month, year and etc.) of the resource description is controlled by local data administrator by means of assessment of the appropriate web-form element in the process of resource registration. The specification of this element depends on the update frequency of the local data system and it can be changed at any time.

## **3. REQUIREMENTS FOR DATA CENTERS TO BE E2E DATA PROVIDERS**

### **3.1. Technical requirements**

The software and hardware requirements to install and use the E2E Data Provider software are listed here.

#### **3.1.1. The hardware.**

To install and operate the E2E Data Provider, it is recommended to use a computer with the following minimum characteristics: Pentium III 500 MHz or compatible, 512 RAM, 100 Mb hard disk space. At this stage of the E2EDM prototype implementation it is recommended to use a dedicated computer for Data Provider installation.

#### **3.1.2. The middleware.**

The following is required to install and operate the E2E Data Provider:

- Operational system – Windows or Unix-based (Windows server is preferred).
- Web server. It can be any web server that supports PHP. Apache or Microsoft's IIS (this is preferable to Apache 2.x).
- PHP is a cross-platform web scripting language. Centres providing data should have a PHP interpreter (version 4.2.3 or later).
- Domain name for server. It is recommended that the machine running the Data Provider service should have a fully qualified domain name (FQDN). One of the free services that has proven to be particularly stable is DynDNS.

The PHP and Apache software can be obtained from the E2E developer along with the Data Provider software.

A description of the Data Provider installation process is given in the E2E document “Data Provider - User Guide v1.0” that is available at:

<http://data.meteo.ru/e2edm/index.php?section=23>

### **3.2. Functional requirements**

The local data administrator should provide:

- Design of resources;
- Data source registration;
- Resource's registration;
- Provision of data.

### 3.2.1 The design of resources

This work can be done before or at once after the Data Provider installation and includes the following actions:

- Analysis of local data system(s) structure, data ordering, key elements, data storage type and other specifications and resolving:
  - assessment of resource contents (in other words deciding which part of the data of the local system will be presented as a resource);
  - resources type (single or serial);
  - key elements to provide the data granularity if resource is serial;
  - resource titles and other reference information according the sections of E2ESearchMD;
- Analysis and comparing the concept XML-schema (accessible from ETDMP web-site) with parameter list of local data system and expanding the concept XML-schema by additional parameters (if it is needed) in contact with E2E developers;
- Preparation of the code lists used in local data and the comparing this lists with E2ECodeMD (accessible from Data Provider user interface), making decisions on code conversions from local code to system code.

### 3.2.2 The Data Provider installation and the data source registration

This work is carried out by the local system administrator according to the “Data Provider - User Guide v1.0”.

During installation the registration of the data source is provided using the Data Provider web-form and recommendations of the above mentioned user guide.

The estimated time for the Data Provider installation is one working day. The ETDMP plans to make the Data Provider installation easier by providing software for a controlled installation process.

### 3.2.3 The registration of resources

This work should be based on results of the resource design using the Data Provider user interfaces (web-forms). For each resource the following should be provided:

- Description of the resource;
- Registration of the resource interface with local data system and local codes.

The all work is controlled by the Data Provider web-forms or services. The estimated time for one resource registration is 2-3 hours for first user session and is usually about 1 hour for subsequent ones.

The preparation of the description of the resource instances with DBMS/data files types is provided automatically by the special function of the Data Provider starting from the registration web-form.

To prepare the description of resource instances with object file types the Data Provider

web-form provides the possibility to copy the existing description to use as a template for describing other instances (with appropriate editing).

(Nick: same question here. Do you mean the operational provision of the resource?)

#### 3.2.4 The provision of the resource operation

To provide the resource operation the local data administrator should:

- Define the schedule for updating of the resource description (time in seconds reflecting update period – minute, hour, day, month and etc) in the appropriate string of the web-form for resource registration;
- Check the local data (connection and actual description) from time-to-time using the report (appropriated screen table) submitted by the Data Provider;
- Take the needed actions to provide the resource actuality – check the physical data source address etc according the recommendations of “Data Provider - User Guide v1.0”.

### 3.3. The support requirements

To test and operate the Data Providers it is recommended to designate a person who will be responsible for the E2EDM technology use at data centre and coordinate communication with E2E.

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**ANNEX XI**

**ACTION LIST / WORKPLAN**

<b>Agenda/para</b>	<b>Action</b>	<b>Who</b>	<b>When</b>
2.1/ 2.1.1	Continue providing updates on implementation of the work plan	Members	mid- May 2008
2.1/ 2.1.2	para 7.1.4 (prepare a short list and share it with the members of the DMCG)	Keeley + chairs ETs	Sep 2008
2.1/2.1.2	Para 7.2.6: a replacement will need to be found (for David Thomas <i>for ongoing JCOMM representation on ICG/WIS</i> )	Keeley+WMO Secretariat	July 2008
2.1/2.1.2	Para 11.5.17: recommended that training material on the application of data management to marine hazards be included in OceanTeacher.	Keeley to coordinate with SPA Chair and OT Editor	Sep 2008
2.1/2.1.4	MAN-V:3.3.8: the Group noted with regret that no IODE NODC had volunteered to establish a DCPC and called on the IODE Officers to better promote this matter in the IODE community	IODE Co-Chairs and DMCG chair	Sep 2008
2.1/ 2.1.4	MAN-V:3.3.9: closer cooperation and coordination with the OPA and SPA.	DMPA, OPA, SPA Coordinators	2008
2.2/ 2.2.2	<i>Develop proposal for an Extreme Wave Event Archive: lead person will be needed to continue the work towards a final and formal proposal</i>	chair ETMC	Nov 2009
2.2/2.2.2	<i>Agenda Item 2.4 Capacity Building – b: Identify missing digital library material and course material for OceanTeacher related to JCOMM subject areas: The Group expressed concern about the lack of clarity regarding future cooperation of WMO and IOC regarding OceanTeacher and called on the Management Committee to address this</i>	Keeley	Sep 2008
2.2/2.2.2	<i>Agenda Item 3.6 Tsunami Warning and Mitigation Systems: contribution of JCOMM – d: consider including</i>	Keeley	ASAP

	<i>the African Sea Level Data Facility in the JCOMM OPA scope of activities and address data sharing policy and monitoring aspects: Contact chair OPA to determine role of DMPA in inclusion of the African Sea Level Data Facility in OPA scope of activities and address data sharing policy and monitoring aspects</i>		
2.3/2.3.2	Draft Resolutions for JCOMM-III	Secretariat/ Keeley	1 Dec 2008
2.3/2.3.2	Prepare DMPA report for JCOMM-III + ppt including resolutions, recommendations, and work plan after JCOMM-III	Keeley	1 Dec 2008
2.3/2.3.3	Prepare ETMC report for JCOMM-III + ppt and send to Keeley	Woodruff	21 Nov 2008
2.3/2.3.3	Prepare ETDMP report for JCOMM-III + ppt and send to Keeley	Mikhailov	21 Nov 2008
2.3/2.3.4	propose/submit presentations on Ocean Data Portal (ODP), ODAS, and META-T to the JCOMM-III scientific and technology workshop	Members	Mid 2009
2.3/2.3.4	Prepare presentation of ODP to JCOMM-III. Ensure that it explains where ODP is OGC compliant and where it is not	Mikhailov/ Thomas	Mid 2009
2.3/2.3.5	Prepare "JCOMM Pilot Project for WIGOS" report for JCOMM-III	Keeley & secretariat	End 2008
2.3/2.3.7	JCOMM Members to consider proposing candidates for the position of Chairperson.	Secretariat	Mid 2009
3.1/3.1.4	3.1.4 The Group requested the completion of the "cookbook" with the final version posted on the DMPA web site and presented to JCOMM-III.	Keeley, Woodruff, Thomas, Clark	Mid 2009
3.1/3.1.6	Scott Woodruff to contact Thomas Loubrieu (IFREMER, Brest, France) and provide some background information (e.g. details of the IMMA/IMMT format) to him regarding his participation at the first meeting of ET-ADRS, Washington, 23-25 April 2008	Woodruff	April 2008
3.2/3.2.7	The Group agreed that experts	Keeley to	April 2008

	from other JCOMM Programme Areas and IODE should be involved in the standards process	discuss with OPA, SPA coordinators and IODE Officers	
3.2/3.2.8	The Group agreed to include in the Terms of Reference of the Pilot Project how to address the broader interests when a new standard is being proposed so that a consolidated proposal can eventually be made	ETDMP Chair	May 2008
3.2/3.2.7	The Group invited the IODE Co-Chair, Greg Reed, to contact the IODE officers to seek agreement regarding the new ETDMP work plan, the creation of the Pilot Project on the IODE/JCOMM Standards Process as well as its membership	Reed	May 2008
3.2/3.2.9	To draft a recommendation for JCOMM-III for the ETDMP to take on the role of standards development, including managing the standards process and documenting, updating and publishing recommended standards. It also asked the chairperson to draft new Terms of Reference for the ETDMP to be submitted to JCOMM-III.	Keeley, Reed, Mikhailov	End 2008
3.3/3.3.5	The Group requested to develop the changes needed to bring MT10 into conformance with present WMO rules for TDCs and to present this to the CBS ET/DRC.	Keeley, Donlon, Charpentier	Mid 2009
3.3/3.3.9	Inform new TDC group of ETMC-II recommendations regarding BUFR/TDC's (Background, Table 2). (from rec 5.4.2)	Keeley	Prior to next ETDRC
3.3/3.3.9	Consult with OPA, SPA on how to manage coordinated developments of TDC forms for JCOMM (rec 5.4.3 & 4, Action 5.4.1)	Keeley	Prior to next ETDRC
3.3/3.3.9	The JCOMM Representative in the CBS ET-ADRS (presently Mr Thomas Loubrieu) should also de facto become a member of the TT if/once established. The Group asked Robert Keeley to contact Mr Loubrieu in this regard. Group members are also	Keeley	May 2008

	invited to propose candidates		
3.3/3.3.9	Proceed with proposals for SHIP BUFR templates in liaison with the META-T, ETMC, and the SOT (5.5.2)	TDC group	Prior to next ETDRC
3.4/3.4.4	Define the structure for the DMPA web pages at jcomm.info	Keeley, Woodruff, Mikhailov, Charpentier, Pissierssens	mid 2008
3.4/3.4.4	Work on populating the data management section of <a href="http://www.jcomm.info">www.jcomm.info</a> during the next few months. The IODE Project Office will give permissions to the above to enter content, and the IODE Project Office (or JCOMM Secretariat) may migrate the existing content.	Keeley, Woodruff, Mikhailov, Charpentier, Pissierssens	mid-end 2008
3.5/3.5.6	Ad hoc WIGOS meeting (29 March 2008) will be asked for their agreement with the joint Steering Group for the IODE ODP Project and WIGOS Pilot Project.	chair WIGOS meeting	Mar 2008
3.5/3.5.8	Meeting for the Pilot Project to be organized towards the end of 2008.	Mikhailov, chair WIGOS PP/ Secretariat	Late 2008
6.1.2	Contact the participants of the E2E course that was organized at the IODE project office and seek their interest in participation in WIGOS	Keeley to contact chair WIGOS	September 2008
6.1.2	Encourage development of the end-to-end technology by inviting members to implement the technology at data centres providing ocean data to meet the objectives of WMO and IOC in the JCOMM, IODE, and WIGOS frameworks. (rec 6.1.2)	Keeley at relevant occasions	n/a
3.6.4	Recommend inclusion of some model results in the WIGOS project (from agenda 3.6.4)	Keeley	1st WIGOS meeting (29/3/08)
3.6/3.6.2	Make proposals for including action items in the DM implementation plan regarding computer models	Group members	June-2008
3.6/3.6.3	Initiate interaction with GODAE and gain on its experience regarding how to distribute and make available model output, how to target their distribution, how to manage intercomparisons, and propose	Pouliquen	Sep-2008

	required standards (file naming conventions, vocabularies, parameters).		
4.1/4.1.6	Contact C. Donlon to get more information on data sources for GHR SST. Inform members. (to respond to rec 4.1.1: To consider <i>in situ</i> SST sources with higher temporal resolution and higher vertical resolution in the near-surface layer for continuous intercomparison/validation	Keeley	June 2008
4.1.7	To update user requirements of new SSTs with the higher temporal resolution identifying new users (See Appendix A for the old requirements)	Secretariat to refer to SPA	ASAP
4.1.7	To identify the <i>in-situ</i> SST sources and to clarify their temporal resolution and vertical resolution in the surface layer (a few meters from the surface)	Secretariat to refer to SPA	ASAP
4.2/4.2.2	In consultation with CB rapporteurs): set up survey on JCOMM related CB needs in developing country JCOMM member states.	Rommens	Sep 2008
4.2/4.2.3	Make arrangements to organize (and pay for) meeting of JCOMM CB rapporteurs in September or October 2008	Pissierssens	Sep/Oct 2008
4.2/4.2.4	Provide name to Peter Pissierssens of relevant (marine) meteorology expert (who can speak for Africa) to invite for ODINAFRICA-IV drafting meeting (Oostende, 20-23 May 2008)	Charpentier	end April 2008
4.2/4.2.5	Inform DMCG chair of how to contribute to review of IODE PO	Herman	As appropriate
4.2.6	Arrange for Murray Brown and Eliot Christian to meet at the IODE Project Office to discuss how to reference OT training material in WMO search	Secretariat	Jun 2008
5.1/5.1.2	Explore possibility of US NODC to host extreme wave archive and decide on the next steps (in coordination with SPA) to advance the JCOMM Extreme Waves Database	Tielking	June 2008
5.1/5.1.2	That wave summaries be developed as part of ICOADS, and if possible be discussed at CLIMAR-III	Woodruff	CLIMAR-III and ongoing

5.1/5.1.4	Elizabeth Kent to liaise with the UK Metoffice, ETWS, ETMC, and ETSI for finalizing the paper	Keeley to contact Elizabeth Kent	Jun 2008
5.1/5.1.5	Thank Germany/DWD for provision of portions of the DWD archive and encourage them to making remainder available	Woodruff	At CLIMAR-III
5.1/5.1.8	Promote further enhanced linkages between CCI and ETMC, in areas including historical data and metadata rescue	Woodruff	CLIMAR-III/ TT-MOCS
5.1/5.1.9	The Group recommended that the TT-MOCS address the blending of surface observations from the World Ocean Database into ICOADS.	Scott Woodruff, TT-MOCS	End 2008
5.1/5.1.10	Make proposals to the Chairperson of the ETMC regarding additional documents to be considered by the NOAA Climate Database Modernization Programme	Group members	Sep 2008
Rec 5.1.11	Contact the SOT Chair and suggest that it makes the recommendation to JCOMM-III regarding rigs and platforms, manual observing-systems to be treated as a "ship" and their metadata included in the Pub. 47"	Charpentier	April 2008
5.1.8	Ask Bill Wright to propose a representative of CCI at CLIMAR-III and the planned TT-MOCS planning meeting (10 May 2008, Gdynia, Poland) to bridge the gap between marine meteorological and ocean climatologies	Woodruff	April 2008
5.1.11	Look at the ODAS metadata format and make recommendation to JCOMM-III in case changes had to be proposed	ETMC	end 2008
5.2/5.2.5	Check who would be attending the TT-MOCS CLIMAR-III side meeting on 10 May and to report back to the Chairperson of the DMCG.	Woodruff	30 April 2008
5.2/5.2.6	To monitor the installation of a chair and development of a workplan for the TT-MOCS	Woodruff	May 2008
5.2/5.2.7	Include IODE representation in the TT-MOCS.	Woodruff to inform TT-MOCS Chair	May 2008

5.2/5.2.8	TT-DMVOS and TT-MOCS coordinate their actions in liaison with other appropriate JCOMM Expert Teams (ETMC, ETSI, ETWS), the joint JCOMM/CCI/CLIVAR ETCCDI, the CCI, the DMCG Chairperson, and the Secretariat) to propose and document a restructured MCSS for JCOMM-III	TT-MOCS TT-DMVOS	Early 2009
5.3/5.3.3	Provide Standards process doc to authors of marine QC doc and invite submission to standards process	Keeley	June 2008
5.3/5.3.2	Explore possible broadened involvement in the report authorship (e.g., Liz Kent). and finalize report. Invite R. Reynold's involvement	Chairs ETMC, DMCG, SAMOS, GOSUD	JCOMM-III
5.3.3	Explore possible linkages with the GHRSSST-PP quality monitoring approach and databases (ref. ETMC-II action item 2.4.1.6)	ETMC	End 2008
5.4/5.4.5	Inform SOT of concerns about ship masking (table 1 of doc)	Woodruff	April 2008
5.4/5.4.8	Make recommendations via the proposed JCOMM Table Driven Codes Task Team regarding the formal review role for the ETMC in assessing the impacts of the implementation of TDC's/BUFR on marine climatology	ETMC	June 2008
5.5/5.5.1.5	Contact the SOT and DMCG codes groups and to suggest they consider ship metadata proposed by META-T in the development of proposals for ship BUFR templates	Secretariat	April 2008
5.5.1.10	JCOMMOPS to update its buoy metadata for the period after July 2007 and to keep it up to date	Secretariat/ JCOMMOPS	April 2008
5.5.1.8	ODAS / Meta-T to prepare presentation for JCOMM-III on results and recommendations	J. Chen	Mid 2009
5.5/5.5.1.6	Request WMO allocate sufficient resources to ensure timely availability of Pub 47 metadata	Keeley to write to Director Obs&Info System Dept	September 2008
5.5/5.5.1.8	Prepare a presentation of	NMDIS and	JCOMM-III

	META-T and META-T server for JCOMM-III	NDBC	
5.5/5.5.1.9	Discuss and implement the real-time receiving and updating mechanism for META-T	NMDIS & NDBC	May 2008
5.5/5.5.1.10	Draft a Resolution for JCOMM-III urging Members to submit metadata to the ODASMS... The Resolution should also request JCOMMOPS and/or future OPSC to routinely contact platform operators so that the metadata are being submitted, including for operational platforms and for historical ones	Keeley	Mid 2009
5.5/5.5.1.10	The Group recommended that JCOMMOPS should establish links with the Instrument Engineer Association (HMEI) regarding the metadata issue to see how the manufacturers can cooperate in collecting the metadata	Keeley to contact JCOMMOPS	June 2008
5.5/5.5.1.11	ODAS / Meta-T to record the history of changes to platform metadata (instrument change, platforms stopping operation, etc., and the dates on which these occur)	ODAS / Meta-T	End 2008
5.5/5.5.2.4	The Group proposed to extend the ODAS metadata to address all kinds of platform types - The Group recommended that NMDIS and NDBC exchange views on the issues in order to make a consolidated proposal.	NMDIS, NDBC	May 2008
5.5/5.5.2.5	NMDIS to develop a web form for uploading the metadata on a case by case basis	NMDIS	End 2008
5.5/5.5.2.6	Draft resolution for JCOMM-III asking members to submit metadata to NMDIS/NDBC and requesting JCOMMOPS to pursue such information in collaboration with ODASM and instrument manufacturers association	Keeley/Scott/ NMDIS	JCOMM-III
5.5/5.5.2.6	NMDIS to update the ODAS Metadata Service to reflect recommendations by the DMCG and permit proper submission of metadata by Members/Member states. NMDIS to document the procedures for members/Member states to apply for FTP access and submit the metadata.	NMDIS	Mid 2008



5.5/5.5.2.7	Consider extending the ODAS metadata format to address all types of marine and oceanographic observing platforms	ETMC	End 2008
5.5/5.5.2.8	Check status of ETMC recommendation to assess potential impacts (both positive and negative) on the climate record of any BUFR format changes proposed by META-T in liaison with other appropriate JCOMM Expert Teams (e.g. ETMC).	Woodruff	End 2008
5.6/5.6.6	Provide suggestions for discussion topics to Woodruff for plenary discussion at CLIMAR-III	Members	mid Apr 2008
6.1/6.1.7	(i) E2E documentation will be distributed to Bob Keeley, Scott Woodruff and Greg Reed for (language) (ii) review and to identify step-by-step installation instructions for the software.	Mikhailov Keeley, Woodruff etc	immediate End 2008
6.1/6.1.8	Ensure that ODP is interoperable with existing data systems and WIS	E2E and ODP Pilot Project team	Ongoing
6.1/6.1.9	Involve the IODE Ocean Data and Information Networks (ODINs) in ODP implementation, e.g. as data providers, as well as in WIGOS. In this regard the Group also called for closer collaboration with SeaDataNet	ODP Pilot Project team	2008-2009
6.2/6.2.3	Establishment of a "Joint Steering Group for the IODE Ocean Data Portal Project and JCOMM Pilot Project for WIGOS".	IODE Officers/IODE Committee and WMO Executive Council working Group on WIGOS-WIS	As soon as possible
6.2.5	Prepare document on ODP vision, overall architecture and practical aspects	Mikhailov	June 2008
6.3/6.3.3	Draft new Terms of Reference for the ETDMP as well as recommended expertise requirements for potential members, so that these can be submitted to IODE-XX (March/April 2009) and JCOMM-III (November 2009) for adoption.	Keeley, Mikhailov	End 2008
7.1/7.1.3	Request briefing from ET-ADRS meeting and circulate to members for information and	Keeley	May 2008

	consideration of next steps		
7.2/7.2.2	The Group agreed that some coordination was required in the use of XML and recommended that the MarineXML WG of IODE be contacted	Keeley	2008-2009
8.1.1/8.1.1.3	Draft new Terms of Reference for the DMCG and to circulate them to the Group members	Keeley	Early 2009
8.1.2/8.1.2.2	Explore collaboration with SPA and report to DMCG on the development of a <i>JCOMM Catalogue of Operational Ocean Products and Services</i> , and in drafting a document <i>Standard Data and Metadata Formats for Ocean Products</i> .	Pouliquen	Jun 2008
8.1.2/8.1.2.3	Explore collaborate with the SPA and report to DMCG on the development of the <i>Guide to Ocean Products' Formats, Symbology and Nomenclature (OpForSyn)</i>	Pouliquen	Jun 2008
8.1.2/8.1.2.6	Ensure that marine climatology is adequately represented at the OGP/JCOMM/WCRP Workshop on <i>Climate Change and the Offshore Industry</i>	Woodruff	May 2008
8.2.1/8.2.1.4	The Group therefore recommended that the consolidation of vocabularies ought to be investigated: (i) Between the WMO Core Profile, the Marine Community Profile (MCP) and the SeaDataNet Common Data Index (CDI); (ii) Ontologies between the WMO Core Metadata Profile and the MCP.	Reed	End 2008
8.2.1/8.2.1.5	Make recommendations to the IPET-MI regarding the development of future version of the WMO profile	ETDMP	Mid-2008
8.2.2/8.2.2.2	Contribute as appropriate to a Volume IV of WMO Technical Regulations. It requested the Secretariat to circulate the outline of Volume-IV to Robert Keeley, Greg Reed, and Peter Pissierssens in order to ascertain what contributions are appropriate.	WMO Secretariat	June 2008
8.2.2/8.2.2.5	The JCOMM Technical Report No. 13 (Advances in the Applications of Marine	WMO Secretariat	30 April 2008

	Climatology, the Dynamic Part of the WMO Guide to the Applications of Marine Climatology) should be deleted from the list of JCOMM Publications. However, the static part, i.e. WMO/TD-No. 781 - Guide to the Applications of Marine Climatology - should remain in the list		
8.2.2/8.2.2.6	Look at the list of documentation and propose which ones should be updated, consolidated, merged, or declared obsolete	DMCG and IODE Officers	End 2008
8.2.2/8.2.2.6	Provide Robert Keeley with comments regarding the list	Group members	June 2008
8.2.2/8.2.2.6	provide the WMO Secretariat with up to date information (e.g. publications being updated, who is responsible for updating any publications, etc.) in order to update the JCOMM list of publications	Keeley	May 2008
8.2.2/8.2.2.7	Identify an expert to look at one or more quality management related documents in order to make recommendations regarding required updating of documentation to comply with the QM terminology.	Keeley, Reed, Secretariat	June 2008
8.2.2/8.2.2.8	Assist the consultant in its work once/if recruited and to contribute to the production of the catalogue as appropriate.	Group members	End 2008
8.2.3/8.2.3.3	Establish the links with CIMO in the WIGOS framework and invited OPA to consider starting this collaboration with regard to the XBT fall rate evaluation activity	JCOMM WIGOS PP chair and OPA Chair	July 2008
8.2.3/8.2.3.3	The Group invited CIMO to provide resources in assisting JCOMM in intercomparison work, e.g. XBT fall rate	CIMO	As soon as possible
8.2.6/8.2.6.2	Make recommendations to the IPET-MI regarding the development of future version of the WMO profile	Reed/ Mikhailov	Mid-2008
8.2.6/8.2.6.3	Observations and Data Management Programme Areas document and integrate best practices and standards being used amongst the marine meteorological and oceanographic communities	OPA Chair, SPA Chair	Sept 2008

	through the development of the JCOMM Pilot Project for WIGOS		
8.3/8.3.13	JCOMM experts should participate in the joint IODE/JCOMM training course in storm surge modelling for the Caribbean.	As relevant	2009
8.4/8.4.2	Interaction with GEO/GEOSS should take place through WIGOS/WIS and related projects such as the "Pilot Project on the IODE/JCOMM Standards Process", the "IODE Ocean Data Portal Project" and the "JCOMM Pilot Project for WIGOS".	JCOMM Pilot Project for WIGOS; ODP Project; Standards Process	As needed
8.4/8.4.2	progress with the Standards Process should also be reported to GEOSS for inclusion in the GEOSS standards registry	Standards Process	As needed

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## ANNEX XII

### LIST OF ACRONYMS

ABCD	Access to Biological Collection Data
ADCP	Acoustic Doppler Current Profiler
AODCJF	Australian Ocean Data Centre Joint Facility
BATHY	Report of bathythermal observation (FM 63–XI Ext. BATHY)
BILKO	UNESCO Virtual global faculty for remote sensing
BODC	British Oceanographic Data Centre
BOM	Bureau of Meteorology (Australia)
BUFR	Binary Universal Form for the Representation of meteorological data (FM 94–XI Ext. BUFR)
CADC	China Argo Data Centre
CAS	WMO Commission for Atmospheric Sciences
CB	Capacity Building
CBS	WMO Commission for Basic Systems
CCI	WMO Commission for Climatology
CDMP	NOAA Climate Database Modernization Program
CEOS	Committee on Earth Observation Satellites
CGMS	Coordination Group for Meteorological Satellites
CHMI	Czech Hydrometeorological Institute
Chy	WMO Commission for Hydrology
CLIMAR	JCOMM Workshop on Advances in Marine Climatology
CLIVAR	WCRP Climate Variability and Predictability programme
CM	MCSS Contributing Member
CMM	Commission for Marine Meteorology (superseded by JCOMM)
COOP	Coastal Ocean Observations Panel
COPEPOD	Coastal & Oceanic Plankton Ecology, Production & Observation Database
CREX	Character form for the REpresentation and eXchange of Data (FM 95–XII CREX)
DAR	Data Discovery, Access and Retrieval
DBCP	Data Buoy Cooperation Panel
DCPC	Data Collection and Production Centre (of WIS)
DiGIR	Distributed Generic Information Retrieval
DM	Data Management
DMAC	IOOS Data Management and Communications (USA)
DMCG	JCOMM Data Management Coordination Group
DMPA	JCOMM Data Management Programme Area
DPM	Natural Disaster Prevention and Mitigation Programme of WMO
E2E	End to End Data Management
E2EDM	End to end Data Management Pilot Project
EC	Executive Council
EDMED	European Directory of Marine Environmental Data
ET-CTS	CBS Expert Team on WIS-GTS, Communication Techniques and Structure
ET-DRC	CBS Expert Team on Data Representation and Codes
ET-WISC	CBS Expert Team on WIS GISCS and DCPCs
ET-DMP	JCOMM Expert Team on Data Management Practices
ET-MC	JCOMM Expert Team on Marine Climatology
ET-SI	JCOMM Expert Team on Sea Ice
ET-WS	JCOMM Expert Team on Wind Waves and Storm Surges
FGDC	Federal Geographic Data Committee (USA)
GCC	Global Collecting Centre
GCMD	Global Change Master Directory
GCOS	Global Climate Observing System
GEO	Group on Earth Observations
GEOSS	Global Earth Observation System of Systems

GHSST	GODAE High Resolution SST Pilot Project
GISC	Global Information System Centres (of WIS)
GLOSS	JCOMM Global Sea-level Observing System
GLOSS-GE	GLOSS Group of Experts
GMES	Global Monitoring for Environment and Security
GODAE	Global Ocean Data Assimilation Experiment
GODAR	Global Oceanographic Data Archaeology and Rescue
GOOS	Global Ocean Observing System
GOSUD	Global Ocean Surface Underway Data Pilot Project
GTS	Global Telecommunication System
GTSP	Global Temperature and Salinity Profile Programme
ICES	International Council for the Exploration of the Sea
ICG-IOTWS	Intergovernmental Coordination Group for the Tsunami Warning and Mitigation System in the Indian Ocean
ICOADS	International Comprehensive Ocean-Atmosphere Data Set
ICG-WIS	Inter-commission Coordination Group on the WMO Information System
ICSU	International Council for Science
ICTT-QMF	Inter Commission Task Team on Quality Management Framework
IGDDS	Integrated Global Data Dissemination Service
IGOS	Integrated Global Observing Strategy
IGOSS	WMO-IOC Integrated Global Ocean Services System (superseded by JCOMM)
IOC	Intergovernmental Oceanographic Commission
IODE	International Oceanographic Data and Information Exchange
IOOS	Integrated Ocean Observing System (USA)
IMMA	International Maritime Meteorological Archive
IMMT	International Maritime Meteorological Tape
INSPIRE	Infrastructure for Spatial Information in Europe
IPET-MI	CBS Inter Programme Expert Team on Metadata Implementation
IPY	International Polar Year
ISO	International Organization for Standardization
JCOMM	Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology
JCOMMOPS	JCOMM in situ Observing Platform Support Centre
JMA	Japan Meteorological Agency
LDC	WMO Programme for the Least Developed Countries
MAN	JCOMM Management Committee
MCSS	Marine Climatological Summaries Scheme
MCS	Marine Climatological Summary
MEDI	Marine Environmental Data Information Referral Catalogue
MEDS	Marine Environmental Data Service (Canada)
META-T	Water Temperature metadata Pilot Project
MERSEA	Marine Environment and Security for the European Area
MIM	MERSEA Information Management
MQCS	Minimum Quality Control Standards
MMI	Marine Metadata Interoperability Project
MT10	BUFR Master Table number 10 (Oceanographic Data)
NC	National Centre (of WIS)
NCDC	National Climatic Data Centre
NCDDC	NOAA National Coastal Data Development Center (USA)
NDBC	NOAA National Data Buoy Centre (USA)
NERC	Natural Environment Research Council
NDG	NERC DataGrid
NetCDF	Network Common Data Form
NGO	Non Governmental Organization
NMDIS	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
OBIS	Ocean Biogeographical Information System
OceanSITES	OCEAN Sustained Interdisciplinary Timeseries Environment observation System
OCG	JCOMM Observations Coordination Group
ODAS	Ocean Data Acquisition System
ODASMS	JCOMM ODAS Metadata Service
ODIN	IOC Ocean Data and Information Network
ODINAFRICA	IOC Ocean Data and Information Network for Africa
OGC	Open Geospatial Consortium
OOPC	Ocean Observing Panel for Climate
OPA	JCOMM Observations Programme Area
OPeNDAP	Open-source Project for a Network Data Access Protocol
OT	OceanTeacher
PA	Programme Area (of JCOMM)
PMO	Port Meteorological Officer
QA	Quality Assurance
QARTOD	Quality Assurance of Real-Time Oceanographic Data
QC	Quality Control
QMF	WMO Quality Management Framework
RECLAIM	REcovery of Logbooks And International Marine data project
RM	MCSS Responsible Member
RNODC	Responsible National Oceanographic Data Centre (IODE)
RNODC/DB	Responsible National Oceanographic Data Centre for Drifting Buoys (IODE)
SAMOS	Shipboard Automated Meteorological and Oceanographic System
SDR	Satellite Data Requirements
SeaDataNet	Pan-European infrastructure for Ocean & Marine Data Management
SG-MEDI	IODE Steering Group for MEDI
SOC	Specialized Oceanographic Data Centre (of former IGOSS, now JCOMM)
SOT	JCOMM Ship Observations Team
SSH	Sea surface Height
SSO	Single Sign On
SST	Sea Surface Temperature
TCP	WMO Tropical Cyclone Programme
TECO-WIS	Technical Conference on the WIS
TEP	Thematic Portals
TESAC	Temperature, salinity and current report from a sea station (FM 64–XI Ext. TESAC)
TRACKOB	Report of marine surface observation along a ship's track (FM 62–VIII Ext. TRACKOB)
TT-DMVOS	Task Team on Delayed Mode Voluntary Observing Ship data
UN	United Nations
VOS	Voluntary Observing Ship
VOSClm	Voluntary Observing Ship Climate Project
WDC	ICSU World Data Centre
WIS	WMO Information System
WMO	World Meteorological Organization
WOCE	World Ocean Circulation Experiment
WWW	World Weather Watch
XBT	Expendable Bathythermograph
XCTD	Expandable Conductivity, Temperature and Depth profiling system
XML	Extensible Markup Language