JCOMM MANAGEMENT COMMITTEE
EIGHTH SESSION

Paris, France, 16-19 November 2010

FINAL REPORT

JCOMM Meeting Report No. 83

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (OF UNESCO)

WORLD METEOROLOGICAL ORGANIZATION

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NOTES

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Chairperson, Publications Board
World Meteorological Organization (WMO)
7 bis, avenue de la Paix
P.O. Box No. 2300
CH-1211 Geneva 2, Switzerland

Tel.: +41 (0)22 730 84 03
Fax: +41 (0)22 730 80 40
E-mail: Publications@wmo.int

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C O N T E N T S

GENERAL SUMMARY OF THE WORK OF THE SESSION

1. OPENING OF THE SESSION

1.1. Opening

1.1.1. The eighth session of the Management Committee of the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM) was opened by the Commission Co-Presidents, Drs Peter Dexter and Alexander Frolov, at 0930 hrs on Tuesday, 16 November 2010, in the Conference Room XV of the Intergovernmental Oceanographic Commission of UNESCO, Paris, France. The Co-Presidents welcomed participants to the session, and introduced the Deputy Executive Secretary of IOC, Dr Ehrlich Desa, to address the session.

1.1.2. Dr Ehrlich Desa welcomed participants in the JCOMM Management Committee session to the IOC of UNESCO. Dr Desa noted the continued strong interest of the IOC in the work of the Commission and the importance that is attached to Management Committee itself. He then noted that JCOMM should continue to collaborate with other related bodies and programmes in order to achieve its goals within the limited resources available, in particular, addressing the gaps in global marine observations and products and services. In doing so, Dr. Desa emphasized the critical importance of a wide range of engagement by Members / Member States. He closed his remarks by wishing participants a successful meeting.

1.1.3. Drs Dexter and Frolov, in responding, noted that some emerging requirements such as enhanced observations and services for the cryosphere may provide new opportunities for JCOMM to identify new areas of priority and associated funding opportunities. In this context, the Co-Presidents emphasized that the Committee should clearly identify JCOMM's role in the prioritized activities of the Organizations, and decide on the Commission's associated strategies.

1.1.4. The list of participants in the session is provided in *Annex I* to this report.

1.2. Adoption of the agenda

1.2.1. The Committee adopted its agenda for the session based on the provisional agenda that had been prepared by the Secretariats. This agenda is provided in *Annex II* to this report. The Co-Presidents noted that the agenda was very comprehensive, but that this was necessary in view of the short intersessional period, and the consequent need to review progress in all aspects of the Commission's work. However, it was now important to keep all reporting to a minimum, focussing on key strategic issues, and activities within the Programme Areas (PAs) where the views and/or decisions of the Management Committee where required to facilitate progress.

1.3. Working arrangements

1.3.1. The Committee agreed its hours of work and other practical arrangements for the session. It was agreed that breakout groups may be established in the course of the session, as and when required, to deal with specific issues. The documentation was introduced by the Secretariats.

2. Reports by Co-Presidents and Secretariats

Reports by Co-Presidents

2.1. The Committee noted with appreciation the report by the Co-Presidents of JCOMM, Dr Peter Dexter and Dr Alexander Frolov, covering in particular their own work in support of the Commission, the meetings of the Governing Bodies of WMO and IOC, some cross-cutting issues not dealt with elsewhere, and other activities and developments likely to impact the Commission during the current intersessional period. In the report, the Co-Presidents put particular stress on

those issues which would require the attention of the Committee during the meeting, and also underlined the importance of all Committee members contributing, both to the debates during the meeting, and also directly to the implementation of specific work assignments during the remainder of the intersessional period. They concluded by thanking the Secretariats for its support, noting that, at the midway point of the current intersessional period, the Commission was in reasonably good shape in implementing the prioritized work programme decided by JCOMM-III.

2.2. Detailed discussion on some of the activities and issues noted by the Co-Presidents is recorded under relevant agenda items in this report (items 3 to 6).

Reports by the Secretariats

2.3. The Secretariats reported on activities undertaken during the year since JCOMM-III in support of the implementation of the work plan of the Commission, as well as other activities in both WMO and IOC in which JCOMM was involved. The report also covered significant events planned during the current intersessional period. These past and planned events are listed at http://www.jcomm.info/calendar.

2.4. The Committee noted that, despite the continuing difficulties in providing regular budget and human resources for the Commission's work, a number of activities had been successfully made through extrabudgetary contributions and in-kind support by Members / Member States. The Secretariats also thanked Member States for their continued support for employment (extrabudgetary posts for JCOMMOPS). The IOC Secretariat informed the Committee that beginning in 2011, in addition to the overhead (10% of total amount) on such extrabudgetary support, support to cover administrative staff support must be included together with any future funding for employment due to the loss of administrative posts available to IOC Ocean Observations and Services section.

2.5. The Committee agreed that additional resources (financial and in-kind) would continuous to be required to carry out the intersessional work plan until JCOMM-IV, and requested the Secretariats to report on the available resources within the regular budget of the Organizations and required extrabudgetary resources for the planned activities **(Action: IOC and WMO Secretariats, immediate)**.

2.6. The Committee was then informed about several planned activities related to the Commission's work, including:

- UN Atlas of the Oceans Technical Committee (TC) 8-9 November 2010 at FAO headquarters in Rome;

- Oceans day at COP 16 (4, December 2010), and;

- Joint conference by WMO, IACS/IMO and "Extreme Seas" project in Geneva, tentatively 3 – 6 October 2011.

2.7. The status of the Commission's work plan (2010-2013), which was decided at JCOMM-III, was reviewed by the PA Coordinators, as reproduced in *Annex III*.

3. Intersessional Activities, Plans, and Deliverables

3.1. Programme Areas (PAs)

Observations Programme Area (OPA)

3.1.1. Ms Candyce Clark, OPA Coordinator, presented activities and plans for OPA. She began her report with a brief remembrance of two individuals who were active members of the OPA and who had passed during the past month: Dr Peter Niiler, father of the Global Drifter

Program; and Mr Robert Luke, VOS expert and organizer of the upcoming PMO workshop. Ms Clark then described the OPA work plan and priorities for the intersessional period, briefly summarized status and issues for each OCG network, and presented issues for MAN consideration.

3.1.2. The Committee endorsed the OceanObs'09 recommendation that completion and sustainability of the initial ocean observing system for the implementation of GCOS remain the priority of OCG teams **(Decision)**, and noted the progress made both in the development of metrics for the observing system, including the contribution of different in situ and satellite platforms to each metric, and their reporting procedure. These metrics complemented the simpler and widely-quoted metric of percentage completion of implementation goals. Implementation of the initial ocean observing system had levelled out at 62% of initial targets. The Committee urged OCG to keep under review the implementation goals for the networks, including an active cross-platform discussion forum on new technologies, strategies for spatial coverage and deployment, and standards and best practices**.** In reviewing/revising the OPA implementation goals, the Committee recommended, among priority activities, that a better communication strategy should be defined and documented with regard to the trends, regional gaps and impacts to Members / Member States, with a view to address this issues to funders (including WMO and IOC Executive bodies) **(Action: OCG in coordination with other PA Coordination Groups, continuous)**.

3.1.3. OceanObs'09 had called for the implementation and international coordination of systematic global biogeochemical and biological observations (see http://www.oceanobs09.net/statement/). The Committee noted that while many of these observations would fall outside the present JCOMM mandate, there were nonetheless areas in which JCOMM capabilities for coordination and monitoring observing systems could be advantageous. A good example was the clear requirement to better co-ordinate the observation of the global ocean carbon cycle, already under discussion and an area where the expertise that resided within the OCG and JCOMMOPS could be brought to bear in a productive way. The Committee therefore asked the OCG to be as proactive as possible in making progress in this area **(Action: OCG with JCOMMOPS support, continuous).**

3.1.4. The OCG and its teams representing observing networks raised concerns about ensuring an adequate level of funding for sustaining the technical coordination work of JCOMMOPS. The Committee re-emphasized the crucial importance of JCOMMOPS in facilitating the implementation of global ocean observing networks, and undertook an active discussion on strategies for the evolution of JCOMMOPS. The Committee endorsed OCG plans to produce a JCOMMOPS strategy with an overall observing systems perspective and recommendations for implementation of new functions **(Decision)**.

Services and Forecasting Systems Programme Area (SFSPA)

3.1.5. Dr Ming Ji, SFSPA Coordinator, reported on the SFSPA activities since JCOMM-III, and introduced the work plans from present until JCOMM-IV in 2012.

3.1.6. The SFSPA has been focusing on; (i) marine weather and sea ice safety information services; (ii) establishing operational ocean forecasting capabilities, and; (iii) reducing risks of weather and oceanographic hazards for coastal communities such as storm surges and inundation. The SFSPA work plan for the current intersessional period (http://www.jcomm.info/SPAWP) includes 24 priority projects which have been led by various expert teams. Major goals include;

(i) expansion of the Global Maritime Distress and Safety System (GMDSS) to include five new Arctic Ocean METAREAs, thus enabling provision of weather and sea ice safety information services;

(ii) advancing marine safety information for e-Navigation;

(iii) developing a guide for operational ocean forecasting, and;

(iv) facilitating coastal storm surge and inundation forecasting capabilities in response to increased risks of these natural hazards associated with global climate change.

3.1.7. Dr. Ji identified several issues that required the Committee's awareness and guidance. The discussion by the Committee, with the decisions and recommendations, were as follows;

(i) Ocean observational requirements for satellite agencies: The Committee noted that there are two paths for providing observing requirements to satellite agencies. They are: (i) the WMO Rolling Review of Requirements (RRR) through the JCOMM Statement of Guidance (SoG) on ocean and marine services, and; (ii) the Global Climate Observing System (GCOS) Implementation Plan and its interaction with the Committee on Earth Observation Satellites (CEOS). The Committee requests the Expert Team on Operational Ocean Forecast Systems (ETOOFS) to work toward a consolidated a set of ocean observing requirements for ocean forecasting systems to address the gap in the WMO database **(Action: ETOOFS in coordination with TT on Satellite Data Requirements, JCOMM-IV in 2012)**. The Committee considered that there was a broad audience for these requirements including WMO, CEOS, and GCOS. Related decision on the responsible team (Task Team on Satellite Data Requirements) is recorded under paragraph 3.1.10, and actions under 3.2.5(i) and 4.1.10;

(ii) Ocean observational requirement stakeholders: The Committee agreed on the need to better define its stakeholders, particularly for ocean observations and services. It requested that ETOOFS provide a list of such stakeholders in the field of ocean forecasting **(Action: ETOOFS Chair in coordination with its members, by MAN-IX in September 2011)**;

(iii) Improve communication in publication of the storm surge guide: The Committee emphasized the necessity of adequate communication in order to ensure the quality, timeliness and publication of the guide. Further discussion and decisions are recorded under agenda item 4.2. The Committee also requested that the Secretariats, in collaboration with Expert Team on Wind Waves and Storm Surges (ETWS), to complete the Storm Surge Guide by February 2011 in order to have it published before the WMO Congress in May 2011 **(Action: WMO Secretariat in coordination with ETWS, by February 2011)**;

(iv) GMDSS review by International Maritime Organization (IMO): The Committee agreed that JCOMM needs to be fully engaged. Further discussion is recorded under agenda item 5.2;

(v) Service improvement track record: The Committee agreed that a long term trend of JCOMM (marine) service quality would be helpful to advance JCOMM implementation. The Committee recommended that the SFSPA consider it as a future task, for example, by undertaking a survey of past user satisfaction, or by developing a new metrics **(Action: SFSPA Teams, continuous)**;

(vi) Training and coordination for the new Arctic METAREAS (for quality and consistency): In addition to the Maritime Safety Services Enhancement Workshop (May 2010, Melbourne, Australia), the Committee considered that other scientific and technical meetings should be used as training opportunities. Further discussion is detailed under agenda item 5.2.

3.1.8. The Committee thanked Dr. Ming Ji and members of the SFSPA teams for their active pursuit of the Commission's intersessional work plans.

Data Management Programme Area (DMPA)

3.1.9. The activities of the DMPA and projections of work through the intersessional period were presented by Ms Sissy Iona, DMPA Coordinator. She gave a comprehensive report on the status and the results of the work that is being carried out by the DMPA and its Task Teams and focused on the priority activities as endorsed by JCOMM-III.

3.1.10. The Committee agreed with the DMPA future plans, as well as the proposal for the establishment of a Cross-cutting Team on Satellite Data Requirements, of which the proposed Terms of Reference (ToR) are reproduced as *Annex V* to this report **(Decision)**. The Committee requested to further clarify the ToR in terms of dealing with the interoperability issues **(Action: DMPA Coordinator with the Cross-cutting Team members, immediate)**.

3.1.11. The Committee noted that the DMPA would proceed with future actions for the integration of SOC/DB, RNODC/DB and VOSClim RTMC under a new organizational framework.

3.1.12. The Committee concurred with the DMPA and WMO-IOC Data Buoy Cooperation Panel (DBCP) recommendation to update the DBCP Terms of References (ToR) and workplan so that the DBCP would become responsible for the Rigs and Platforms, including for the management of relevant metadata **(Action: DBCP to work with Secretariats to prepare a report to JCOMM-IV for ToR Revision, JCOMM-IV).** The Committee strongly recommended that the DBCP and Ship Observations Team (SOT) establish appropriate coordination mechanisms for addressing the best practices for the manned Rigs/Platforms making visual observations **(Action: DBCP and SOT in coordination with the Secretariat, as soon as possible).**

3.1.13. The Committee agreed on the importance of standardizing formats for data and metadata, and recognized that available options for the sharing of data include; (i) the IODE Ocean Data Portal (IODE ODP), which is not a new data system but a system describing data sets and pointing to centres where delayed mode and real-time data are available, including in NetCDF which is a recognized format); (ii) the WMO Information System (WIS), and; (iii) the OpenDAP using NetCDF format. The Committee noted with satisfaction that both IODE ODP and WIS were accepting NetCDF formatted data, and are both contributing to the GEO Portal.

3.1.14. The Committee expressed the need to ensure effective management of operational data and the need for a long term plan for these data. It was noted that the DMPA, through its Expert Team on Data Management Practices (ETDMP), is cooperating with the IODE to develop the IODE ODP, which will provide access to real-time data as well as delayed-mode data, and will become interoperable with the WIS. The ETDMP Task Team for Ocean Data Standards is responsible for the Ocean Data Standards process which will endorse standards and common vocabularies for data discovery, access and retrieval.

3.1.15. While noting that DMPA has been addressing the migration to table driven codes for the real-time distribution of ocean data through the GTS (essentially BUFR), and had made good progress, the Committee recommended that appropriate training activities be planned for the migration, and the development and sharing of standard encoding/decoding software be promoted **(Action, DMPA Coordinator in coordination with the Activity Leaders on Capacity Building and IODE, continuous)**.

3.1.16. The Committee thanked Ms Iona and the DMPA Teams, as well as the collaborative teams of IODE, for their active work in implementing JCOMM intersessional work plans.

3.2. Cross-cutting activities within JCOMM

Satellite Data Requirements

3.2.1. The Activity Leader on Satellite Data Requirements for OPA, Dr David Halpern gave a presentation on his role as the representative of the IOC at the 38th meeting of the Coordination

Group for Meteorological Satellites (CGMS-38, 8-12 November 2010). JCOMM is not a member of the CGMS. CGMS was largely focused on the operations and utilization of data recorded by operational meteorological satellites in low-Earth orbit and in geostationary orbit.. He suggested that there was an opportunity through IOC input to CGMS to educate the meteorological satellite community on the needs of satellite-based ocean services and ocean science. Two suggestions for IOC input into CGMS were: (i) comply with the CGMS request to provide a short paper, about 2-4 pages in length, on an integrated satellite and in-situ data product at the annual CGMS meeting, with sea surface temperature chosen to be the topic at CGMS-39, and; (ii) contribute to the International Wind Working Group through the introduction of ocean surface vector wind data to an activity focused primarily on cloud motion winds and water vapour motion.

3.2.2. Dr. Halpern proposed that JCOMM investigate the role of satellite-based observations to improve data products of interest to JCOMM, and he used significant wave height (SWH) to illustrate the concept. Several NWP centres forecast SWH. NWP 5-day forecasts of SWH over a long period like 20 years would show improvements of the forecast systems and the important role played by satellite observations. Other variables were discussed.

3.2.3. The Committee recalled that there were already two paths for expressing requirements to the satellite operators;

(i) The WMO RRR process and in particular the JCOMM SoG on ocean and marine services;

(ii) The GCOS Implementation Plan and its interaction with the CEOS which had led to the development of Virtual Constellations for Essential Climate Variables (ECVs).

3.2.4. The Committee discussed the possibility that an expert be asked to report to the next CGMS based on the RRR and focusing on an example of one particular variable of relevance and interest to the CGMS and the impact of satellite data on a service or application relevant to the interests of the CGMS, as a way of increasing awareness of the importance of sustained ocean observations from space.

3.2.5. Discussion then centred on the question of how much priority to give to this action, and on how to deliver the requirements for ocean services to the ongoing process. The Committee finally agreed on the following:

(i) To support WMO and IOC with the continued development of satellite data requirements for JCOMM (see also para 3.1.7(ii)): the Committee re-established a Task Team on Satellite Data Requirements as proposed by DMPA (see para 3.1.10), and;

(ii) To support IOC in providing guidance to CGMS on ocean activities through preparation of an annual report on a topic of relevance to JCOMM **(Action: OCG Activity Leader on Satellite Data Requirements, continuous)**.

Capacity Building

3.2.6. The Committee was presented with a brief report by Mr Hassan Bouksim, Activity Leader on Capacity Building, on activities for capacity development. It was noted that the activities in general were undertaken in the form of workshops and training seminars, aiming to stimulate extension of marine meteorological and oceanographic observing systems and marine forecasting services.

3.2.7. The Committee was informed of the results of the pilot project on MARINE METeorology in West Africa (MARINEMET), funded by the Spanish Meteorological Agency (AEMET) in the framework of the Conference of Directors of West Africa and other initiatives in West Africa, in order to improve marine meteorological forecasting, reinforce maritime security, optimize fishery management, and encourage and support this type of project at the regional level.

3.2.8. The Committee recalled that the JCOMM-III (2009) had adopted a statement of principles for JCOMM Capacity Building (Annex 1 to the summary report of JCOMM-III). The Committee also recalled the decision at JCOMM-III that capacity building activities would take place as part of the work programmes of each PA, and agreed to continue with this approach. Adding to this guidance, the Committee felt that there was a need to regularly compile the ongoing/planned activities for capacity building within all Programme Areas in a coherent manner, in order to ensure that these activities be implemented in line with the Commission's goals and objectives. The Committee therefore requested that Activity Leaders for Capacity Building draft a procedure and template, appropriate for web publication, for regular reporting of the Commission's Capacity Building activities, in order to submit the first report to the next Management Committee **(Action: Activity Leaders for Capacity Building, by MAN-IX in September 2011)**.

Quality Management

3.2.9. Mr Bryan Boase, Activity Leader on QMF/QMS, reported on the ongoing activities, achievements and priorities of the WMO Quality Management Framework (QMF), and on a Pilot Project being conducted by Australian Bureau of Meteorology for Marine Weather and Ocean Services that has been undertaken on behalf of JCOMM.

3.2.10. The Committee noted that a "lessons learned" paper would result from the pilot that would include a template for the development and implementation of a Quality Management System (QMS) and the associated documentation. A number of QMS documentation templates had been included in the paper submitted for the meeting.

3.2.11. The Committee noted with appreciation that the pilot project was going relatively smoothly, but noted also that there would be significant challenges for National Meteorological and Hydrological Services (NMHSs) at the commencement of their quality management journey that included but were not restricted to;

(i) Bringing about organisational cultural change to facilitate the adoption of a QM approach to management;

(ii) Demystifying ISO and removing any perceived threat from the adoption of a QMS for the delivery of marine weather and ocean services;

(iii) Effectively marketing and promoting quality management to NMHS staff and the maritime industry;

(iv) Articulating the cost-benefit ratio for the marine weather and ocean service key stakeholders;

(v) Ensuring a sound resource base in terms of financial and human resources to support the adoption of a QMS approach;

(vi) Identifying in-country "quality champions" as focal points for the development and implementation of a QMS, and;

(vii) Avoiding predatory consultants offering a "quick fix" that would lack the depth of organisational penetration required for the sustainable and successful adoption of a QMS.

3.2.12. However, it was noted that NMHSs that were adopting a QMS to meet International Civil Aviation Organization (ICAO) regulatory requirements may take the opportunity to use the momentum generated by that activity to extend the QM approach to their marine weather and ocean services programmes.

3.2.13. It was also noted that a meeting on formulating a way forward for the WMO-QMF was to be conducted after the present Committee meeting, from the 23-26 November 2010, and that this may have a significant bearing on JCOMM's approach.

3.2.14. As such, the Committee considered it premature to decide on any action at this time except to note its ongoing appreciation and support for the Australian Bureau of Meteorology pilot project. Once that project had been realised and a lessons learned paper published, JCOMM MAN would be in a position to provide informed comment in terms of the adoption of a quality management approach to the delivery of marine weather and ocean services.

4. Scientific and Technical Support

4.1. Scientific and operational requirements

Ocean Observation Panel for Climate (OOPC)

4.1.1. The chair of the Ocean Observations Panel for Climate (OOPC), Dr Eric Lindstrom, provided a report on the OOPC actions. The 14th OOPC session took place in Miami 19-22 January 2010. Key actions and decisions from this meeting were as following;

(i) To improve societal relevance of OOPC ocean climate indices as seen at http://ioc-goos-oopc.org. Initial results are discussed under the "Climate Impacts" menu;

(ii) To become actively involved in the development of an integrated framework for sustained ocean observations including biogeochemistry and ecosystems (post-OceanObs'09) – item discussed further below;

(iii) To review deep ocean observation requirements. A workshop with this objective was planned to be held from 28 March to 2 April 2011, in Paris, and;

(iv) To conduct later (2011/2012) review of Ocean Thermal observation requirements.

4.1.2. The Committee thanked Dr. Lindstrom for his report and expressed appreciation particularly for the work on ocean climate indices. The Committee was also appreciative of new work on deep-ocean observing requirements. It was decided that the OPA participate in the workshop (item (iii) above), taking into account the deep ocean as a possible growth area for JCOMM over the coming years **(Action: OPA Coordinator to coordinate with OOPC Chair/Secretariats, April 2011)**.

4.1.3. A primary occupation of the OOPC Chair during 2010 was leading the OceanObs'09 Task Team on an Integrated Framework for Sustained Ocean Observations (IFSOO-TT). The Team has prepared a document entitled "A Framework for Ocean Observing" as a rational framework for investment in a coordinated suite of sustained global ocean observations for optimal benefit to both science and society. This document was planned to be completed and briefed to the meeting of the Board of the Intergovernmental Committee for GOOS (I-GOOS) in December 2010.

4.1.4. The Committee noted that the proposed framework would be a conceptual structure based on systems engineering approaches that encouraged consistent handling of observing requirements, technical capacity, and information flow among different, largely autonomous, observing units. It would increase adherence to a well-defined approach for establishing ocean observing systems, focus on the linkages among ocean variables, and enhance coordination and data sharing across multiple observing systems. The framework would provide a common language for requirements, observations, and information outputs. Essential Ocean Variables (EOVs) would be used as an organizing approach, as this would align with both natural phenomena and with established observing strategies. The framework will guide proponents of a specific EOV through concept, pilot, and mature development phases by applying consistent

standards to gauge the readiness of requirements, observation technology, and data/information products for any new observing proposal. The Committee agreed that this proposed framework would provide a mechanism – through oversight panels and/or expert teams -- for balancing innovation with the need for a stable, sustained global ocean observing system.

4.1.5. The Committee noted the recommended approaches in the framework, as follows:

(i) Use common terminology to articulate requirements in the framework;

(ii) Use "Essential Ocean Variables (EOVs)" as an organizing structure for the framework;

(iii) Use consistent standards for assessing EOV requirements, technologies and products;

(iv) Reduce duplication of ocean measurements;

(v) Measure once/use many times, and;

(vi) Encourage data standards and broad accessibility.

4.1.6. Dr. Lindstrom noted that the impacts of implementing the proposed framework were multifaceted: data sharing standards across the broad framework community would allow new discoveries through new combinations of disparate data types. It would enable clearer thinking on issues driving ocean observing, and an optimized design geared to societal issues. It would also be a source of ocean community unity by eliminating artificial distinctions among different observing communities. It would provide synthesized data to support the general public and public policymakers, including information to support climate change risk mitigation.

4.1.7. The Committee considered that JCOMM is largely compliant with the framework and is a model for many of the practices expected of those aspiring to implement new sustained ocean observing systems. It agreed to support further development of the framework over the coming year, as it briefed to other sponsors and evolved from its "Consultative Draft" to final form **(Decision)**. The Committee supported the idea of briefing the framework and its implications to JCOMM-IV in 2012 **(Action: Secretariats in consultation with JCOMM Co-Presidents and OOPC Chair, JCMM-IV)**.

4.1.8. The Committee expressed its caution about expanding the role of JCOMM to a larger number of ocean variables, considering the given mandates of the Commission by the parent organizations. Nevertheless, the Committee encouraged OPA to remain open to coordination and cooperation with emerging groups on carbon, chemical, biological, and ecosystem variables **(Action: OCG, continuous)**.

4.1.9. Finally, Dr. Lindstrom reported on the WCRP Open Science Conference scheduled for 24-28 October 2011 in Denver, USA (see http://conference2011.wcrp-climate.org), which more than 2000 climate scientists are expected to attend. He encouraged a strong JCOMM presence at this event, particularly contributions to one daily theme: "Observation and Analysis of the Climate System", including a poster session entitled: "Maintaining and enhancing ocean observations, including sea ice". The Committee supported the plan and requested that all PAs contribute material for the WCRP Open Science Conference **(Action: PA Coordinators to lead, October 2011)**.

WMO/CBS Rolling Review of Requirements (RRR)

4.1.10. The Committee noted that the Implementation Plan for the Evolution of the Global Observing System (EGOS-IP) provides guidance for WMO Members to decide on funding for the observing systems supporting WMO application areas. In this context, the Committee agreed that JCOMM should use the WMO Rolling Review of Requirements (RRR) as a mechanism to address relevant JCOMM requirements (climate, ocean applications, numerical weather prediction (NWP) –

feeding into marine services -, etc.) through the EGOS-IP, with a view to secure resources for ocean observing systems by WMO Members.

4.1.11. The Committee expressed its appreciation to Mr Ali Mafimbo for coordinating JCOMM efforts in this regard, and compiling input from the Expert Teams under SFSPA to feed the database of user requirements regarding requirements for ocean applications under JCOMM. Mr Mafimbo was also coordinating within the SFPSA and OPA for revising the Statement of Guidance for Ocean Applications. Noting that the CBS Expert Team on the Evolution of the Global Observing System (ET-EGOS) will meet in early 2011, the Committee urged the SFPSA and its Expert Teams to collaborate and provide updates on observing requirements available to date to Mr Mafimbo as soon as possible and no later than the end of 2010 **(Action: SFSPA Coordinator and ET Chairs, 31 Dec 2010).** The Committee also requested the OPA and its Panels to provide appropriate input to Mr Mafimbo as soon as possible with a view to identifying the gaps when comparing instrument performance with user requirements **(Action: OPA Coordinator, 31 Dec 2010)**.

4.2. Standards, best practices and guides

4.2.1. The Committee noted the latest developments with regard to the JCOMM-IODE Ocean Data Standards (ODS) Process, of which the main goal is to allow the easy exchange and interoperability of ocean data collected worldwide. This provides for an internationally recognised process for submitting proposed standards and their acceptance by the ocean community. The Committee noted with appreciation that one standard had been submitted, reviewed, and published (http://www.oceandatastandards.org/). Two other standards have been submitted for review. Two more are being considered for submission. The Committee concurred with the DMPA approach to coordinate the ODS process through the IODE-JCOMM Expert Team on Data Management Practices (ETDMP) and a dedicated ODS Task Team, as described at the web page above. **(Decision)**.

4.2.2. The Committee stressed again the importance of collecting and sharing instrument/platform metadata and praised the efforts of the DMPA and the JCOMM Water Temperature Metadata Pilot Project (META-T) in this regard. The Committee noted the limited success of the META-T Pilot Project where good progress was made in terms of defining and updating appropriate BUFR templates for ocean data but limited success was realized in terms of collecting metadata through the META-T servers. The Committee noted that the Chair of the META-T Pilot Project, Mr Derrick Snowden (USA) had reported at the recent meeting of the Joint Steering Group for the IOC/IODE Ocean Data Portal (ODP) and the JCOMM Pilot Project for WIGOS that: (i) the goal of creating a single service for all JCOMM platform metadata is unlikely to be successful, and; (ii) a strategy of developing metadata servers in close cooperation with platform operators should be pursued. The Committee concurred with these recommendations. The Committee also agreed to the recommendation from the JCOMM Pilot Project for WIGOS that the META-T Pilot Project should document its lessons learned, propose legacy recommendations, and finally wind up its activities **(Action: META-T PP chair with Secretariats, as soon as possible)**. The Committee tasked the DMCG to follow up on these recommendations **(Action: DMCG in coordination with META-T PP chair, 31 May 2011)**.

4.2.3. Regarding the JCOMM Catalogue of Best Practices and Standards, the Committee, while recognizing the value of the Catalogue, emphasized that it should be kept under continuous review and that the information available from the corresponding web site be routinely updated. The Committee requested the DMCG to nominate a responsible person for the Catalogue **(Action: DMCG, 31 December 2010)**.

4.2.4. The Committee noted and approved the process for adopting a WMO-IOC Regional Marine Instrument Centre (RMIC), as described in *Annex VI* **(Decision)**. The Committee then reviewed the application submitted by the National Centre of Ocean Standards and Metrology (NCOSM), Tianjin, China, including its statement of compliance. It noted that the joint Steering Group for the IODE Ocean Data Portal and the JCOMM Pilot Project for WIGOS had reviewed this application and acted for the Observations Coordination Group (OCG) according to the adoption

process. The Committee thanked China for its offer, and endorsed its application for the NCOSM in Tianjin to act as an RMIC for the Asia-Pacific region. It requested the JCOMM Co-President to draft a Resolution to be submitted to the WMO and IOC Executive Bodies in 2011, to reflect the adoption process for the RMICs and recognition of the RMIC in Tianjin **(Action: Co-Presidents, January 2011)**. The Committee requested the Co-President to ensure that the Resolution would emphasize the need to avoid duplication of efforts and to permit the sharing of responsibility, in case two or more RMICs operated within one region.

4.2.5. The Committee praised the efforts of the JCOMM Pilot Project for WIGOS to promote the updating of relevant WMO and IOC publications, and concurred with the strategy proposed by the Pilot Project. In particular, The Committee noted the ongoing and planned efforts including; (i) review of the marine chapter of the WMO Guide on Meteorological Instruments and Methods of Observation (WMO No. 8, CIMO Guide), by the SOT and the DBCP, and; (ii) by the decision at JCOMM-III, changes to the WMO Guide to Marine Meteorological Services (WMO No. 471) to formalize the integration of the Volunteer Observing Ship Climate Project (VOSClim) into the wider VOS. A strategy for updating appropriate WMO and IOC publications dealing with instrument best practices and standards had been proposed by the Pilot Project, and the DBCP and the WMO have provided resources to recruit a consultant (Mr David Meldrum, UK) to review and update key WMO and IOC Publications from a marine/ocean observations perspective in order to make them consistent with each other and to reflect latest technological progress.

Procedure for publishing Guides

4.2.6. Given the experience of ETWS in the Storm Surge Guide revision/publication, the Management Committee requested the WMO Secretariat to provide a draft "process/procedure" for future publication/revision of Guides/Manuals. **(Action: WMO Secretariat in coordination with the ETWS Chair, December 2010).**

5. Priority Issues for the Intersessional Period

5.1. WMO Integrated Global Observing System (WIGOS), WMO Information System (WIS) and IOC/IODE Ocean Data Portal (ODP)

5.1.1. The Committee recalled that the WMO Executive Council at its 62nd session (June 2010) had endorsed the WIGOS Development and Implementation Strategy (WDIS), including the three WIGOS phases for (i) test of concept (2007-2011), (ii) implementation (2012-2015), and (iii) operational (2016 and beyond). WDIS describes the steps to be followed by WMO to improve governance, management, and integration of observing systems. WDIS also includes capacity-building requirements and clearly specifies responsibilities across the WMO system for the further development and implementation of WIGOS, addressing coordination and technical challenges of the implementation process. The Committee agreed that JCOMM should commit itself to realize the goals of the WDIS concerning the integration of ocean observations into WIGOS **(Decision)**.

5.1.2. The Committee reviewed the status of the JCOMM Pilot Project for WIGOS that aimed at testing concepts for the integration of marine meteorological and other appropriate oceanographic observations into WIGOS. The completion of the Pilot Project with a Project Report (to be published as JCOMM Technical Report No. 48) was noted. The report would include information on the achievements of the Pilot Project, test of concept, pending issues, lessons learned, benefits and impacts on Members/Member States regarding the integration of marine meteorological and other appropriate oceanographic observations into WIGOS, as well as Pilot Project legacy recommendations. The Committee was pleased to note that the JCOMM Pilot Project was recognized by the sub-group of the WMO Executive Council Working Group on WIGOS and WIS as the most successful case, thanks mainly to the appropriate governance existing through JCOMM that permitted an excellent cooperation between the WMO and IOC (IODE) partners. The Committee invited its members to review the project report (at present in draft) and to provide feedback and comments to the Co-Chairs of the Joint Steering Group for the Pilot Project, Mr Greg Reed (Australia) and Dr Jitze van der Meulen (the Netherlands), as well as

to the WMO Secretariat no later than 31 December 2010 **(Action, MAN members, 31 December 2010)**.

5.1.3. The Committee concurred with the legacy recommendations of the Pilot Project, and recommended that the OCG and DMCG coordinate their efforts to propose a consolidated work plan addressing the legacy recommendations relevant to their respective responsibilities **(Action: OCG and DMCG, as soon as possible)**. The work plan should address implementation issues at the national and regional level, with a view to its submission to JCOMM-IV for approval as a contribution of JCOMM towards the WIGOS Implementation Phase (2012-2015). The Committee also requested the Co-Presidents to address the funding issue for this implementation phase of the integration of ocean observations into WIGOS, and to seek support from the 16th WMO Congress in 2011 (Cg-XVI) including the allocation of appropriate resources within the WMO Regular Budget, as well as from voluntary contributions during the WIGOS Implementation Phase **(Action: Co-Presidents in coordination with the WMO Secretariat, WMO CG-XVI)**.

5.1.4. The Committee then reviewed the current list of Candidate Data Collection and Production Centres (DCPCs) from JCOMM, and agreed that it was appropriate for the time being while noting that some additions might be recommended at a later stage.

5.1.5. The Committee agreed with the DMPA approach with regard to the development of interoperability between the IODE ODP and the WIS, including JCOMM's representation in the CBS Expert Team on WIS Global Information System Centres (GISCs) and DCPCs (ET-WISC) **(Decision)**. Related discussion also occurred under agenda item 3.1.3.

5.1.6. The Committee recalled the discussion at JCOMM-III on the Association of Hydro-Meteorological Equipment Industry (HMEI), that HMEI could possibly be given a certain status within the UNESCO/IOC as a non-governmental organization similar to its status within WMO. The Committee, considering also the related recommendation from the JCOMM Pilot Project for WIGOS, agreed that this would help strengthening coordination with the manufacturers in terms of standards setting and technical development. The Committee also considered that Organizations' recognition of HMEI would encourage marine instrument manufacturers to be better coordinated through the HMEI. The Committee requested the OCG to set up a plan to provide input to the IOC Assembly in this regard **(Action: OCG in coordination with the IOC Secretariat, March 2011).**

5.2. Maritime Safety Services

5.2.1. The Committee recalled that a major objective for JCOMM Services during the intersessional period had been to implement operational GMDSS for the Arctic Ocean. As part of this effort, the Maritime Safety Services Enhancement Workshop was held in May 2010 with participation from issuing services of all five new Arctic Ocean METAREAs. The workshop also included a training session for Quality Management System. The three issuing services, Russia, Canada and Norway are on schedule to achieve full operational capability for Arctic METAREAs by July 2011. It was noted that there was a potential challenge to ensure consistency in maritime safety information (MSI) across common boundaries of adjacent METAREAs.

5.2.2. As for the MSI for new Arctic METAREAS, the Committee noted the working progress by ETMSS to develop a MSI suite for Arctic Ocean. The Committee, noting the importance of training in parallel with developing new services, recommended taking the opportunity afforded by a number of planned workshops and meeting on polar issues, such as the Sea Ice Analysis Workshop in June 2011, in Denmark **(Action: ETMSS in coordination with Activity Leaders on Capacity Building, continuous)**.

5.2.3. The Committee also noted SFSPA plans to conduct a joint WMO-IMO-IHO survey for Maritime Safety Information (MSI) users in 2011. The results will be reported at the JCOMM-IV.

5.2.4. The Committee noted with pleasure significant progress in the development of graphical sea ice and met-ocean information for display in Electronic Nautical Chart (ENC) form. This effort

was regarded as timely given the ongoing IMO planning on future e-Navigation that would significantly increase capability for MSI. The Committee, on a related note, considered the IMO proposal on conducting a technical review for GMDSS. Considering the relevance/impact of these initiatives on MSI, the Committee recommended that the WMO Secretariat be fully engaged in both of IMO initiatives with support by the Expert Teams **(Action: WMO Secretariat in coordination with ETMSS and ETSI, continuous)**.

5.2.5. The Committee considered that the user requirements for polar services would increase considerably over the coming years, not only from a wider range of Arctic industries (e.g. oil and gas industries, tourism) but also for the Southern Hemispheric high latitude activities (tourism, fisheries and research). The Committee recommended that the ETMSS and ETSI take into account the potential discussion in this context, as a future action **(Action: ETMSS and ETSI, continuous)**.

5.3. Marine/Oceanographic Hazards

Joint JCOMM/CHy Coastal Inundation Forecasting Demonstration Project (CIFDP);

5.3.1. The Committee recalled that the WMO Executive council at its 62nd session (Geneva, June 2010) emphasized the importance of a comprehensive and integrated approach for marine multi-hazard forecasting and warning systems, for improved coastal risk management. The WMO Council also noted the importance of an integrated effort for developing and improving forecasting capabilities and service delivery in coastal risk reduction by strengthening the cooperation among relevant programmes and technical commissions, and making use of existing frameworks or projects, including the WMO Severe Weather Forecasting Demonstration Project (SWFDP), especially in coastal inundation-prone regions.

5.3.2. In this context, the JCOMM/CHy Coastal Inundation Forecast Demonstration Project (CIFDP) had been initiated for building improved operational forecast and warning capability for coastal inundation from combined extreme waves, surges and river flooding events. Additionally, in the context of cross-cutting capacities, the CIFDP aimed at establishing collaboration and constant communication between scientists, forecasters, NMHSs and institutional end-users to meet users' requirements and enhance response to coastal inundation risks.

5.3.3. The Committee noted that this demonstration project would be initially implemented in the Bay of Bengal (Bangladesh) and in the Caribbean regions (Dominican Republic). The Committee noted the outcomes of the CIFDP Steering Group Meeting (Geneva, 20 – 22 September 2010), and endorse the concept of the project plan and the phased approach as following:

(i) Phase 0, Project preparation phase: national agency(ies) agreement and commitment to the development of a long-term sustainable forecasting system;

(ii) Phase 1, Information gathering: infrastructure (organization and responsibilities); user requirements; data inventory; model inventory; hazard and vulnerability maps; system specification; revision of the organic Project Plan; endorsement of the specified project from the national government;

(iii) Phase 2, Project implementation: forecasting system integration (model adapters, hardware infrastructure), output communication plan, test of historical storms and verification, initial capacity building, ongoing review and evaluation by forecast producers;

(iv) Phase 3, Pre-operational testing and technical capacity building: capacity building among forecasters during the tropical cyclone season, simulated multi-agency exercise with involvement of pilot communities;

(v) Phase 4, Operational evaluation: way forward; enhancements of the forecasting system; capacity building on developed products; development of hazard and vulnerability maps towards implementation of risk mapping; evaluation of the end-to-end system and demonstration workshop for stakeholders and media partners.

5.3.4. The Committee, noting the importance and potential benefit of this project, emphasized that the success of this project would depend on the completion of the phase 0 (making national agreement and commitment) for both Indian Ocean and Caribbean regions. The Committee therefore requested That the WMO Secretariat seek a general agreement at the national level between the relevant institutions in Dominican Republic and Bangladesh respectively **(Action: WMO Secretariat, immediate)**.

5.3.5. The Committee also noted that the project should establish collaboration and regular communication between scientists, forecasters, NMHSs and institutional end-users, in cooperation with other ongoing activities with common objectives/goals. In this context, the Committee requested WMO and IOC Secretariats to continue building linkages with the IOC Project on Enhancing Regional Capabilities for Coastal Hazards Forecasting (discussed under this agenda item), IOC Integrated Coastal Area Management (ICAM), and related activities under Regional Tsunami Warning Systems **(Action: WMO and IOC Secretariats, continuous).**

5.3.6. The Committee, in reviewing the project implementation plan, expressed concerns on the proposed timelines and available resources. The Committee requested the project steering group (PSG) and WMO Secretariat to revise the timeline for phases 2 to 4 for both for the Indian Ocean and for Caribbean region, and complete the document with a more realistic plan **(Action: CIFDP PSG and WMO Secretariat, immediate)**.

UNESCO Pilot Project on Enhancing Regional Capabilities for Coastal Hazard Forecasting

5.3.7. The Committee was briefly informed on the progress of the UNESCO Pilot Project on Enhancing Regional Capabilities for Coastal Hazard Forecasting, which was initiated following the recommendations of the First JCOMM Scientific and Technical Symposium on Storm Surges (September 2007, Seoul, Korea: http://www.surgesymposium.org). This project to; (i) support scientific and technical development for enhancing regional capabilities for coastal hazards forecasting, by using a community model that is operated by NMHSs in North Indian Ocean region, and; (ii) link regional community/activity with global framework.

5.3.8. The Committee noted that key members of ETWS have led the process in line with the SFSPA intersessional workplan, with extrabudgetary support from the Republic of Korea and India. The first phase was launched in 2009 for the North Indian Ocean, which is the most surge prone region in the world. The implementation has been made with institutional partnership with the government of India (including the IIT Delhi modelling team, Indian Meteorological Department, and Indian National Centre for Ocean Information Services). The first advisory workshop (July 2009, Delhi, India, http://www.jcomm.info/SSindia) reviewed the performance of the currently operating storm surge model in the Region (IIT D model), and agreed on the 3 year workplans to upgrade the model predictability. The progress was to be reviewed at the second workshop planned for 11-15 February 2011 (http://www.jcomm.info/SSIndia2). The Committee noted with satisfaction that the second workshop would extend the regional participation in order to share developed technologies and to provide a training opportunity, as necessary.

5.3.9. The Committee agreed that this project was highly relevant and could provide benefit to the CIFDP, and that two projects should continue interacting throughout the process. It was agreed that the outcome of this project should be considered in the implementation of the CIFDP, particularly for the demonstration in Indian Ocean as the Bangladesh Meteorological Department adopted the IIT D model as the operational storm surge forecasting tool (see also para 5.3.5). The Committee requested that progress with this project be reported to the SPA and to the Committee, as necessary, as part of the implementation of the recommendations by the JCOMM Storm Surge

Symposium **(Action: IOC Secretariat in coordination with the Project advisory group, MAN-IX and continuous)**.

5.4. Global Framework for Climate Services (GFCS)

5.4.1. Dr. Buruhani Nyensi, Manage of the High-Level Taskforce on Global Framework for Climate Services Secretariat in WMO, informed the Committee of the progress of the work of the High Level Task Force on the Global Framework for Climate Services (GFCS).

5.4.2. The Committee expressed its concern for the GFCS to provide clear guidance regarding the expected contributions from the various WMO Technical Commissions. In this regard a formal request to the WMO Technical Commissions on potential contributions to the GFCS would be necessary **(Action: WMO Secretariat, in coordination with Co-Presidents, carry out related discussion with GFCS High Level Task Force secretariat in order to identify necessary actions, as soon as possible)**.

5.4.3. The Committee observed that the GFCS report should address clearly areas of high priority such as filling the gaps on climate related observations, as these form the bases for better climate information and prediction. The Committee further emphasised that there is need for the GFCS to be explicit on how climate information and knowledge will be delivered at local levels, meeting users' expectations and requirements, and how the given information would be used, as this is where such information is needed but currently not available. The Committee also emphasized the importance of the involvement of a wide range of different players, including the private sector, in the development and governance of the GFCS.

5.4.4. The Committee cautioned that new initiatives of GFCS might affect the available resources for existing activities that address climate issues, which might cause difficulties for those programmes. The Committee considered that the ongoing successful activities should be continuously supported by the Organizations and Members / Member States, as they would continue to play a role as core mechanisms to contribute to the GFCS process. Finally, the Committee expressed the hope that the report of the High Level Task Force would also provide some clarification on the working approach and expected results from the eventual GFCS governance mechanisms to be established by the sponsoring Organizations.

5.5. Legacy of the International Polar Year (IPY) and polar observations/services

5.5.1. The Committee recalled that the Executive Council Panel of Experts on Polar Observations, Research and Services (EC-PORS) is the body within the WMO that is responsible for the overall coordination of polar activities amongst WMO Members. It was formed in 2009 in recognition by the WMO Congress and Executive Council of the need to globally coordinate the exchange of meteorological and other environmental data from the Polar Regions to research, monitor and predict the state of the polar atmosphere. IOC and other partner Organizations of WMO are invited to participate in the work of EC-PORS.

5.5.2. The second session of EC-PORS took place in Hobart, Australia, 18-20 October 2010. A JCOMM document was provided to the session by Co-President Dr Peter Dexter, who also participated personally and provided a presentation on JCOMM. Additional relevant documentation for the session was provided in the form of status reports from the International Arctic Buoy Programme (IABP) and International Programme for Antarctic Buoys (IPAB), by Dr Tim Goos, and from the Southern Ocean Observing System (SOOS) by Dr Steve Rintoul). Particular emphasis in the JCOMM document was placed on the current status of the ocean observing system in both high latitude regions, as well as the status of implementation of the new Arctic METAREAS. The assistance of EC-PORS was sought in encouraging the further enhancement of the observing system in high latitudes, including through SOOS.

5.5.3. Outcomes of PORS-II of interest to JCOMM included;

(i) Establishment of a Global Integrated Polar Prediction System (GIPPS), involving integrated atmosphere, ocean, ice modelling and prediction, following on from
- A concept paper for Congress outlining a proposed development plan, with associated information document describing global benefits
- A white paper describing service requirements and the service value from GIPPS;

(ii) Establishment of a Global Cryosphere Watch (GCW);

(iii) Support for SOOS;

(iv) Membership of the Panel in future will include ocean expertise;

(v) Future IOC participation was strongly encouraged.

5.5.4. The Committee agreed that, dependant on the outcomes of the consideration of the proposals from EC-PORS by Cg-XVI (2011), JCOMM should investigate a potential role for itself in these proposed activities, and in the work of EC-PORS, in a number of areas:

(i) GIPPS
- Input to developing service requirements through ETMSS and ETSI
- Ocean and sea ice modelling through ETOOFS

(ii) GCW
- ETSI participation
- Observations and data management

(iii) Observing system
- All teams under OPA
- Support for SOOS and the Sustaining Arctic Observing Networks (SAON)
- Development of the role of JCOMMOPS in supporting polar marine activities

(iv) Service delivery, including but not confined to the operation of the new Arctic METAREAs.

5.5.5. The Committee recognized that the growing emphasis on polar regions, stimulated by the IPY and its legacy, and now being progressed through EC-PORS, would benefit from input from JCOMM. It therefore agreed that JCOMM should review the possibilities for such input as outlined in the previous paragraph, based on any agreements and guidance to be provided by WMO CG-XVI **(Action: Co-Presidents and WMO Secretariat, following WMO Cg-XVI)**. The Committee agreed with the proposal that future JCOMM input to and liaison with EC-PORS should be coordinated by David Meldrum, vice-chair of the OCG **(Action: David Meldrum, ongoing)**.

5.5.6. The Committee noted that additional resources must be made available in order for JCOMM to expand its mandates, including EC-PORS and WIGOS/WIS. In this regard, the Committee requests that the Co-Presidents and WMO Secretariat to make it clear to the WMO Congress that resources must be provided with any new mission requirements given to the Commission **(Action: WMO Secretariat and Co-Presidents, WMO PTC in February 2011)**

5.5.7. In anticipation of appropriate new resources and new mandates from the outcome of the CG-16, the Committee requested the PA Coordinators, to coordinate with EC-PORS as appropriate, to prepare for their potential contribution to EC-PORS activities. This might include, in particular, the work plans to be presented to JCOMM-IV for the next intersessional period **(Action: PA Coordinators, following Cg-XVI)**. In addition, it requested the OCG to address the potential role of JCOMMOPS in supporting polar regions and the work of EC-PORS, and how the additional resources for this support might be secured **(Action: OCG and JCOMMOPS, following CG-16)**.

6. Strategic and Structural Issues

6.1. JCOMM Collaboration with IOC-WMO and External Programmes and Projects

6.1.1. The Committee recognized that fisheries represent a significant component of food supply globally. It noted that both the Food and Agriculture Organization (FAO, 2008) and the Intergovernmental Panel on Climate Change the Fourth Assessment Report (AR4) of the Intergovernmental Panel on Climate Change (IPCC) had recognized that climate variability and change are likely to impact fisheries in a substantially negative way, including higher water temperatures, changing weather regimes, changes in ocean salinity patterns, etc. This impacted on the productivity and distribution of both oceanic and coastal fisheries. It agreed that JCOMM (and previously Commission for Marine Meteorology) had been somewhat neglectful of fisheries in the past, with fisheries not covered under the International Convention for the Safety of Life at Sea (SOLAS) requirements, and with any services provided nationally, but not supported at the international level. Fisheries vessels also represented a potentially important untapped source of metocean data. Nevertheless, the JCOMM ToRs include "*support for Members/Member States in the preparation and delivery of marine operational and climate services, to support maritime safety, decision making and the development of impact and adaptation strategies".* Similar considerations applied to the WMO Commission on Agrometeorology (CAgM).

6.1.2. To address such issues, CAgM-15 (Brazil, July 2010) proposed to establish a joint CAgM/JCOMM Expert Team on Weather, Climate and Fisheries and developed initial ToRs. The Committee recognized that there were some potential advantages for JCOMM in such an ET:

- To provide a mechanism to address marine service requirements of fisheries
- As an important source of metocean data
- To provide a direct contribution to GFCS, with associated potential for new funding
- As an important cross-cutting activity in WMO
- To also provide a contribution to broader IOC work in fisheries and fishery management

6.1.3. At the same time, the Committee was very conscious of a number of potentially limiting factors, from a JCOMM perspective, in the co-sponsorship of such a new team. These included the lack of easily identified relevant expertise within the existing JCOMM community; dangers related to focussing an expert team on a specific user community or issue; the "mandate creep" inherent in moving, even partially, into non-physical ocean issues; and the resources limitations generally, given the existing number of high priority activities requiring resourcing. The Committee therefore decided that, at the present time, it was not in a position to endorse a commitment by JCOMM to become a co-sponsor of the proposed expert team.

6.1.4. The Committee noted that a Workshop on "Climate and Oceanic Fisheries" was being planned by WMO, through CAgM, to take place in Rarotonga, Cook Islands, in October 2011. The workshop was being designed to address issues related to enhanced understanding of climate and its impacts on oceanic fisheries, with particular focus on Pacific Island Countries (PICs), where fisheries, both subsistence and market based, are a significant part of local economies. Confirmed sponsorship to date included from the Cook Islands Government, the Secretariat of the Pacific Commission, NOAA, and the University of Auckland. Likely sponsors also included the Australian Bureau of Meteorology, Australian Government Overseas Aid Program (AusAID), and CSIRO Australia. Participation was expected from some 50 invited experts as well as nominations from the PICs.

6.1.5. The Committee agreed on the value of JCOMM co-sponsorship of the workshop, stressing at the same time that such JCOMM co-sponsorship must not involve any funding demand on the regular budget. It requested the Co-Presidents and the Secretariats to support

planning for and the implementation of the workshop on this basis (**Action: Co-Presidents and Secretariats with CAgM, as soon as possible**). In addition, the Committee was informed of the interest within the IOC Ocean Science Section in the workshop, and also potentially in a joint expert team. It therefore recommended to IOC to consider becoming a direct workshop sponsor, alongside WMO **(Action: IOC Ocean Science Section, as soon as possible).**

6.1.6. The Committee further recognized that the workshop would provide an excellent forum to better assess the feasibility and potential value for JCOMM in joining CAgM in a joint expert team as discussed above in paragraph 6.1.3. It therefore agreed further that JCOMM should identify 3-4 experts from the existing JCOMM community to participate in the workshop, and at the same time to propose to CAgM that these experts should meet with the relevant CAgM experts in the margins of the workshop, to develop a more detailed rationale and proposal for the joint expert team. This could then be taken forward to JCOMM-IV, for a decision by the Commission as a whole (**Action: Co-Presidents, PA Coordinators and Secretariats to identify experts and arrange workshop participation, as soon as possible**).

6.2. JCOMM Strategy and Operating Plan

6.2.1. The Committee recalled that the revised executive summary of the JCOMM Strategy 2010-2013 was adopted by JCOMM-III (2009), and the Strategy was amended accordingly. The current version of this document is available at http://www.jcomm.info/Strategy. The Committee recognized that the JCOMM strategy would continue to be a dynamic document, and requested the Co-Presidents to submit an updated Strategy document with proposed revision, where necessary, to the next session of the Committee **(Action: Co-Presidents, by MAN-IX in September 2011)**.

6.2.2. The Committee took note of the progress in preparing the JCOMM review, following the decision of IOC and WMO governing bodies. It was noted with concern that only a few Members / Member States responded to the call for contribution to JCOMM review by nominating national experts, with only one offer for extrabudgetary contribution. The Committee agreed that further advice was required from the IOC and WMO governing bodies regarding the JCOMM review **(Action: Secretariats to report to the governing bodies for guidance, June 2011).**

6.3. Structural preparation for JCOMM-IV

6.3.1. The Committee agreed that the current structure and composition of the teams were appropriate to make progress in the implementation of the Commission's intersessional work plan, at present. It considered that this issue should be discussed at the next session (MAN-IX) in 2011 as a main item, in order to prepare a proposal to JCOMM-IV **(Action: Co-Presidents and PA Coordinators to draft a structure after JCOMM-IV, for consideration at MAN-IX)**.

7. Logistical preparation for JCOMM-IV

7.1. The Committee recalled that the 4th session of JCOMM (JCOMM-IV) would be held in Yeosu, Korea, from 23 to 31 May 2012. (Wed-Thu). The Committee requested the Secretariats to take necessary measures to advance the organization of the session in time **(Action: Secretariats, as soon as possible)**.

7.2. The Commission also noted that the 2nd international symposium on "Effects of climate change on the world's oceans" was planned for 12-16 May 2012. In the meantime, the Committee suggested consider a scientific and technical symposium to be organized within the session during the JCOMM-IV session, in order to stimulate discussion on key science issues and to encourage participation of experts from developing countries. It was agreed that the Committee would continue discussion with OOPC, Secretariats, and the host country (Republic of Korea) for further planning **(Action: Secretariats, OOPC Chair and Co-Presidents, as soon as possible)**.

8. Any other business

8.1. The Committee briefly reviewed the progress in updating the JCOMM website (http://www.jcomm.info), including the rearrangement of the JCOMM publication lists, members lists for JCOMM Teams and Groups, and supplement of metadata information for each document/meeting to assist the advanced search within the website. The Committee expressed satisfaction for the work of the Secretariats, and encouraged the community to extend using the web site for the work of the Commission.

8.2. The Committee noted that, since JCOMM-III (2009), the JCOMM Newsletter had been issued every 6 months through the JCOMM website and email communication. The Committee encouraged its members and any interested person in the community to submit an article for the 8th issue of JCOMM Newsletter (to be published in December 2010) and later issues **(Action: all, continuous).**

8.3 The Committee was briefed by the Secretariats on the status of the regular budget support for JCOMM in WMO and IOC, both for the remainder of the current biennium (to end 2011) and expected for the following financial periods, based on Programme and Budget documents to be presented to Congress and the Assembly respectively. Recognizing that this regular budget support was likely to remain inadequate to implement the full JCOMM work programme for the foreseeable future, the Committee urged the Co-Presidents and PA Coordinators to continue to work with the Secretariats in managing available funds to address the most urgent priorities for the Commission and its parent Organizations, and also in identifying extrabudgetary funds to support key activities wherever possible (**Action: Co-Presidents, PA Coordinators and Secretariats, continuous**).

9. Closure of the Session

9.1. The Committee decided to hold its 9th session (MAN-IX) at WMO Headquarters, Geneva, Switzerland, with tentative dates for 6 to 9 September 2011 **(Action: WMO Secretariat to prepare for the session hosting, immediate)**. The Committee would focus at this session on preparing for and organizing JCOMM-IV, including the documentation, future work programme, internal structure, and key positions in the Commission.

9.2. Dr Wendy Watson-Wright, the IOC Executive Secretary, expressed her appreciation for the work of the Commission. She noted that the IOC Member States recognize JCOMM as an exemplary mechanism for joint intergovernmental coordination by IOC and WMO. With IOC's continuing support for the Global Ocean Observing System (GOOS) as priority, Dr Watson-Wright emphasized JCOMM's role in coordinating global ocean observing systems to realize GOOS, and furthermore, in developing the operational marine services for society.

9.3. The Committee reviewed and approved the final report of the meeting and action items for the remaining intersessional period.

9.4. In closing the meeting, the JCOMM Co-Presidents, Dr Peter Dexter and Dr Alexander Frolov, expressed their appreciation to all participants for their very positive and valuable input to the discussions, and to the Secretariats for its ongoing support, which was vital to implementing the mandate and achieving the goals of JCOMM.

9.5. The eighth session of the JCOMM Management Committee closed at 1400 on Friday, 19 November 2010.

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Annex I

LIST OF PARTICIPANTS

JCOMM Management Committee

Mr Bryan BOASE
National Manager Weather Services Quality
Australian Bureau of Meteorology
GPO Box 1289
Melbourne VIC 3001
Australia
Tel: +61 3 9669 4719
Fax: +61 3 9669 4695
Email: b.boase@bom.gov.au

Ms Candyce CLARK
Climate Observation Division
NOAA/Climate Program Office (CPO)
1100 Wayne Avenue, suite 1202
Silver Spring MD 20910
UnitedStates
Tel: +1 301 427 2463
Fax: +1 301 427 0033
Email: candyce.clark@noaa.gov

Dr Peter DEXTER
Co-President of JCOMM
International Oceans Policy Advisor
Australian Bureau of Meteorology
GPO Box 1289
Melbourne VIC 3001
Australia
Tel: +61 3 9669 4870
Fax: +61 3 9669 4725
Email: p.dexter@bom.gov.au

Dr. Alexander FROLOV
Co-President of JCOMM
Head, Russian Federal Service for
Hydrometeorology & Environmental
Monitoring (ROSGIDROMET)
12, Novovagankovsky Street 123995
MOSCOW
Russian Federation
Tel: +7 499 252 13 89
Fax: +7 499 795 22 16
Email: afrolov@mecom.ru

Ms Sissy IONA
Head HNODC
Hellenic Centre for Marine Research,
Anavyssos
Institute of Oceanography
46.7 Km, Athens-Sounio Ave.
PO BOX 712 Anavyssos
190 13 Attica
Greece
Tel: +30 22910 76367
Fax: +30 22910 76347
Email: sissy@hnodc.hcmr.gr

Dr Ming JI
Director, Ocean Prediction Center
NOAA/NCEP
5200 Auth Road, Room 410
CAMP SPRING MD 20746-4304
United States
Tel: +1 301 763 8000 x 7400
Fax: +1 301 763 8085
Email: Ming.Ji@noaa.gov

Dr Eric LINDSTROM
Physical Oceanography Program Scientist
NASA Headquarters
Earth Science Division, Room 3D74
Science Mission Directorate
NASA Headquarters
Mail Suite 3B74
300 E Street SW
Washington DC 20546
United States
Tel: +1 202 358 4540
Fax: +1 202 358 2770
Email: eric.j.lindstrom@nasa.gov

Mr Ali MAFIMBO
Senior Assistant Director
Kenya Meteorological Department
P.O. Box 30259
Nairobi 00100
Kenya
Tel: +254 20 386 7880
Fax: +254 20 387 6955
Email: mafimbo@yahoo.com

Mr David MELDRUM
Research Fellow, Technology Development
Scottish Association for Marine Science
Scottish Marine Institute
Oban, Scotland
PA37 1QA
United Kingdom
Tel: +44 1631 559 273
Fax: +44 1631 559 001
Email: dtm@sams.ac.uk

Invited Experts

Dr Jean-Louis FELLOUS
Past Co-President JCOMM
Executive Director, Committee on Space Research (COSPAR)
c/o CNES
2 Place Maurice-Quentin
75039 Paris Cedex 01
France
Tel: +33 1 44 76 75 10
Fax: +33 1 44 76 74 37
Email: Jean-Louis.Fellous@cosparhq.cnes.fr

Dr. David HALPERN
Senior Advisor, NASA Earth Science Research
NASA Headquarters
Earth Science Division, 3B74
NASA Headquarters
300 E Street SW
Washington DC 20546
United States
Tel: +1 202 358 1109
Email: david.halpern@nasa.gov

Dr D. E. HARRISON
NOAA Pacific Marine Environmental Laboratory
7600 Sand Point Way NE
Seattle WA 98115
United States
Tel: +1 206 526 6225
Fax: +1 206 526 6744
Email: d.e.harrison@noaa.gov

Prof Shao Hua LIN
Director Honorary
National Marine Data and Information Service
No. 93, Liuwei Road
300171 Tainjin
Hedong District
China
Tel: +86 22 2401 0803
Fax: +86 22 240 10926 / +86-22-24010820
Email: shlin@mail.nmdis.gov.cn

Mr Greg REED
Australian Ocean Data Centre Joint Facility
Fleet Headquarters Wylde Street Building 89
Garden Island Potts Point NSW 2011
Australia
Tel: +61 2 9359 3141
Fax: +61 2 9359 3120
Email: greg@metoc.gov.au

Secretariats

Dr Thorkild AARUP
Technical Secretary of GLOSS
Intergovernmental Oceanographic Commission of UNESCO
1 rue Miollis
75732 Paris cedex 15
France
Tel: +33 1 45 68 40 19
Fax: +33 1 45 68 58 12
Email: t.aarup@unesco.org

Dr Keith ALVERSON
Head of Section, Ocean Observations and Services
Intergovernmental Oceanographic Commission of UNESCO
1 rue Miollis
75732 Paris cedex 15
France
Tel: +33 1 45 68 40 42
Fax: +33 1 45 68 58 13
Email: k.alverson@unesco.org

Mr Edgard CABRERA
Chief, Ocean Affairs Division
World Meteorological Organization
7bis, avenue de la Paix
Case Postale 2300
1211 Geneva
Switzerland
Tel: +41 22 730 82 37
Fax: +41 22 730 81 28
Email: ecabrera@wmo.int

Mr Etienne CHARPENTIER
Scientific Officer
World Meteorological Organization
Observing and Information Systems Department
Observing Systems Division
World Meteorological Organization
7bis, av. de la Paix
Case Postale 2300
1211 Genève 2
Switzerland
Tel: +41 22 730 82 23
Fax: +41 22 730 81 28
Email: ECharpentier@wmo.int

Dr Ehrlich DESA
Head of Section, Capacity Development
Intergovernmental Oceanographic Commission of UNESCO
1 rue Miollis
75732 Paris cedex 15

France
Tel: +33 1 45 68 40 16
Fax: +33 1 45 68 58 12
Email: e.desa@unesco.org

Dr Albert FISCHER
Programme Specialist
Intergovernmental Oceanographic
Commission of UNESCO
1 rue Miollis
75732 Paris cedex 15
France
Tel: +33 1 45 68 40 40
Fax: +33 1 45 68 58 13
Email: a.fischer@unesco.org

Dr Boram LEE
Programme Specialist
Intergovernmental Oceanographic
Commission of UNESCO
1 rue Miollis
75732 Paris cedex 15
France
Tel: +33 1 45 68 39 88
Fax: +33 1 45 68 58 12
Email: b.lee@unesco.org

Mr Peter PISSIERSSENS
Head, IOC Project Office for IODE
UNESCO/IOC Project Office for IODE
Wandelaarkaai 7 - Pakhuis 61
B-8400 Oostende
Belgium
Tel: +32 59 340158
Fax: +32 59 79 5220
Email: p.pissierssens@unesco.org

Dr Buruhani S. NYENZI
Manager
High-Level Taskforce on Global Framework
for Climate Services Secretariat
Weather and Disaster Risk Reduction
Department
World Meteorological Organization
7 bis, avenue de la Paix
CH-1211 GENEVE 2,
SWITZERLAND
Tel: +41-22-730-8273
Fax: +41-22-730-8128
Email: BNyenzi@wmo.int

Dr Luis VALDES
Chief of Section for Ocean Science
Intergovernmental Oceanographic
Commission of UNESCO
1 rue Miollis
75732 Paris cedex 15
France
Tel: +33 1 45 68 40 11
Fax: +33 1 45 68 58 12
Email: jl.valdes@unesco.org

Dr Wendy WATSON-WRIGHT
Executive Secretary IOC
Assistant Director General of UNESCO for IOC
Intergovernmental Oceanographic
Commission of UNESCO
1 rue Miollis
75732 Paris cedex 15
France
Tel: +33 1 45 68 39 83
Fax: +33 1 45 68 58 10
Email: w.watson-wright@unesco.org

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Annex II

AGENDA

1 Organization of the Session
1.1 Opening
1.2 Adoption of the agenda
1.3 Working arrangements

2 Reports by Co-Presidents and Secretariats

3 Intersessional Activities, Plans, and Deliverables
3.1 Programme Areas (PAs)
3.2 Cross-cutting activities within JCOMM

4 Scientific and Technical Support
4.1 Scientific and operational requirements
4.2 Standards, best practices and guides

5 Priority Issues for the Intersessional Period
5.1 WMO Integrated Global Observing System (WIGOS), WMO Information System (WIS) and IOC/IODE Ocean Data Portal (ODP)
5.2 Maritime Safety Services
5.3 Marine/Oceanographic Hazards
5.4 Global Framework for Climate Services (GFCS)
5.5 Legacy of the International Polar Year (IPY) and polar observations/services

6 Strategic and Structural Issues
6.1 JCOMM Collaboration with IOC-WMO and External Programmes and Projects
6.2 JCOMM Strategy
6.3 Structural and related management issues

7 Logistical Preparation for JCOMM-IV

8 Any Other Business

9 Closure of the Session

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Annex III

STATUS OF JCOMM WORKPLAN 2010-2013 (decided at JCOMM-III)
As of November 2010

Reference (JCOMM-III report)	*Task*	*By whom*	*Target*	*Status / reference*
Organizational				
Para 5.2.4	Coordinate the implementation of any actions referred to JCOMM by the OceanObs'09 and the post-conference Working Group on the integration of the ocean observing system	Management Committee, relevant Programme Areas	Ongoing	Ongoing (MAN-VIII, item 4.1)
Para 6.1.17 & 6.1.19	Liaise with the WMO Space Programme and address the UNESCO/IOC Strategy for the use of Remote Sensing in oceanography, and other international groups dealing with satellite issues	Observations, Data Management, and Services and Forecasting Systems Programme Area	Ongoing	Pending & to pursue (MAN-VIII, item 3.2)
Para 6.2.3 & Recommendation 1 (JCOMM-III)	Establish a network of Regional Marine Instrument Centres (RMIC) and a mechanism for the formal WMO and UNESCO/IOC designation of a RMIC	Observations Programme Area and Management Committee	Continuing	Initiated &implemented (MAN-VIII, item 3.1.1)
Para 6.3.6	Review new observing technology developments and liaise with relevant coordination groups with a view to incorporating them in the work programme	Observations Programme Area and Management Committee	Continuing	Initiated &implemented (MAN-VIII, item 3.1.1)
Para 6.4.3	Expand the activities of the JCOMMOPS	Observations Programme Area and Management Committee	Intersessional period	Pending & to pursue (MAN-VIII, item 3.1.1)
Para 8.2.1	Assess and categorize Members/Member States needs to facilitate their inclusion in its capacity building work programmes	Co-Presidents and Management Committee	Before JCOMM-IV	Pending & to pursue (MAN-VIII, item 3.2)
Para 9.1.3 & 9.1.8	Keep the JCOMM Capacity Building principles under review and revise the JCOMM Capacity Building strategy	Activity leader on Capacity Building, Management Committee	ASAP	ongoing & to review (MAN-VIII, item 3.2, 6.2)
Para 9.1.6	Develop an expanded partnership with COMET	Management Committee	ASAP	Pending & to pursue (MAN-VIII, item 3.2)

Reference (JCOMM-III report)	*Task*	*By whom*	*Target*	*Status / reference*
Para 9.2.2	Develop a mechanism to further interact with the WMO Regional Associations and GOOS Regional Alliances (GRAs)	Management Committee	ASAP	Pending & to pursue (MAN-VIII, item 3.2, 6.1)
Para 11.0.1 & 11.2.1	Develop a framework to address quality management aspects in the overall context of developing standards and recommended practices on met-ocean data acquisition and delivery of services and products, and establish a policy for the systematic review of relevant publications	Management Committee	Intersessional period	Ongoing (MAN-VIII, item 3.2, 4.2)
Para 13.1.4	Maintain oversight on DRR-related activities	Management Committee, Services and Forecasting Systems Programme Ares	Intersessional period	Ongoing (MAN-VIII, item 3,4)
Para 13.1.6	Consider the possible recognition of a role of a specialized regional centre might have in the cascading forecasting process for the marine forecasting services aspects, and specify the criteria for the designation of a RSMC with activity specialization in marine meteorology, to be included in the GDPFS	Co-Presidents and Management Committee, in collaboration with CBS/GDPFS	Intersessional period	Pending & to pursue (MAN-VIII, item 6.1)
Para 13.1.7 & 13.1.9	Facilitate and strengthen relationships with WMO Technical Commissions and UNESCO/IOC programmes, taking into account relevant JCOMM team activities and pilot projects	Co-Presidents and Management Committee	Intersessional period	Ongoing (MAN-VIII, item 6.1)
Para 13.1.8	Study the possibility to implement the ocean and marine meteorological services via the WMO Regional Climate Centres	Management Committee	Intersessional period	Pending & to pursue (MAN-VIII, item 5.4,6.1)
Para 13.1.11 & 13.1.12	Collaborate with TOWS-WG wherever possible to the enhancement of TWS as a component of a coordinated and comprehensive marine hazards warning system and keep Members/Member States informed on the progress	Management Committee	Intersessional period	Ongoing (MAN-VIII, item 5.2,6.1)
Para 13.1.30	Consult with WCRP on the themes and modalities for a stronger cooperation with a focus on activities that contribute to the implementation of main outcomes of WCC-3 and OceanObs'09	Management Committee	Intersessional period	Ongoing (MAN-VIII, item 4.1)
Para 13.1.32	Take the lead in implementing the actions to secure the IPY marine observing systems legacy as a contribution to WIGOS development	Management Committee	Intersessional period	Ongoing (MAN-VIII, item 5.5)
Para 13.2.2	Review progress and activities associated with the UN Conventions and take actions as appropriate	Management Committee and Secretariats	Continuing	Pending & to pursue (MAN-VIII, item 6.1)

Reference (JCOMM-III report)	*Task*	*By whom*	*Target*	*Status / reference*
Para 13.2.5	Establish and improve collaboration with organizations and institutions, including aid agencies, to leverage opportunities for enhancing observing systems and services capabilities in the developing world, particularly in coastal areas	Management Committee	Continuing	Ongoing (MAN-VIII, item 6.1)
Para 13.2.6 & 13.2.7	Maintain oversight on WMO and UNESCO/IOC marine-related activities in GEO and activities related to satellite systems for ocean observations	Management Committee	Continuing	Pending & to pursue (MAN-VIII, item 6.1)
Para 13.2.8	Develop an approach for contributing to WMO and UNESCO/IOC activities towards enhanced collaboration with private sector	Management Committee, in collaboration with CBS OPAG on PWS and GSSC	Intersessional period	Pending & to pursue (MAN-VIII, item 6.1)
Para 14.1.2	Finalize the JCOMM Strategy document 2010-2013	Co-Presidents and Management Committee	ASAP	To pursue (MAN-VIII, item 6.2)
Para 14.1.3	Seek for external funding for the implementation of the JCOMM work programme	Co-Presidents, Management Committee and Secretariats, in collaboration with potential donors and stakeholders	Continuing	Ongoing *& to pursue (MAN-VIII, item 2, 6.2)
Para 8.3.14	Maintain oversight on WCC-3's follow-up activities, with a view to determining JCOMM's contribution to the GFCS and to include it in its work programme, when required	Management Committee	Ongoing	To pursue (MAN-VIII, item 5.4)
Observations				
Para 5.1.2	Address the met-ocean observational data requirements as part of the work programmes, in coordination with CBS as appropriate	Observations and Data Management Programme Areas	Ongoing	Ongoing (MAN-VIII, item 3.1.1)
Para 6.1.1	Continue to work towards ECV-based metrics and keep the OPA implementation goals document under review and up-to-date	Observations Coordination Group	Ongoing	Ongoing (MAN-VIII, item 3.1.1)
Para 6.1.1	Develop the OPA work programme according to the need to enhance the partnerships between research institutes and operational services	Observations Coordination Group	ASAP	Ongoing (MAN-VIII, item 3.1.1)
Para 6.1.4	Propose a strategy for the OPA to enhance deployment opportunities	Observations Coordination Group	ASAP	To pursue (MAN-VIII, item 3.1.1)

Reference (JCOMM-III report)	*Task*	*By whom*	*Target*	*Status / reference*
Para 6.1.5	Find a funding mechanism by which JCOMMOPS can partner with other agencies (e.g. space agencies) for the benefit of JCOMM	Observations Coordination Group	ASAP	To pursue (MAN-VIII, item 3.1.1)
Para 6.1.6	Complete the oceanographer's and marine meteorologist's cookbook for submitting data in real time and in deployed mode	Observations Coordination Group	ASAP	Ongoing (MAN-VIII, item 3.1.1)
Para 6.1.9	Translate the outcome and recommendations of OceanObs'09 into an updated version of the JCOMM OPA implementation goals	Observations Programme Area	ASAP	To pursue (MAN-VIII, item 3.1.1)
Para 6.1.10	Consider coastal requirements in the OPA work programme, taking into account the need of developing/least developed coastal countries	Observations Programme Area	ASAP	To pursue (MAN-VIII, item 3.1.1)
Para 6.1.11.4	Secure the support necessary to maintain and if possible expand the existing VOS fleet	Observations Coordination Group, Ship Observations Team and OOPC	Ongoing	To pursue (MAN-VIII, item 3.1.1)
Para 6.1.11.5	Coordinate the development of a universally accepted solution for the ship call-sign masking for consideration by the WMO Executive Council	Ship Observations Team	ASAP	Ongoing (MAN-VIII, item 3.1.1)
Para 6.1.11.7	Further develop the guidelines on standards for instruments and high quality best practices for the Voluntary Observing Fleet and publish them as a JCOMM Technical Report	Ship Observations Team	ASAP	Ongoing (MAN-VIII, item 3.1.1)
Para 6.1.11.7	Document VOS best practices to include the ocean variables managed under the SOT Ship Of Opportunity Implementation Panel (SOOPIP)	Ship Observations Team	ASAP	Ongoing (MAN-VIII, item 3.1.1)
Para 6.1.11.10	Evaluate the technical implications related to the compatibility between AIS equipments and observation stations	Ship Observations Team	Ongoing	To pursue (MAN-VIII, item 3.1.1)
Para 6.1.12.1	Assist the Argo programme in deploying floats to achieve and maintain the array's design requirements	Observations Coordination Group, Data Buoy Cooperation Panel and Ship Observations Te	Ongoing	Ongoing (MAN-VIII, item 3.1.1)
Para 6.1.13 & 6.1.14	Continue to be involved in the developments of observing systems in Polar Regions	Observations Programme Area	Ongoing	Ongoing (MAN-VIII, item 3.1.1)
Para 6.1.16	Add wave observations as a key variable to be derived from satellite observations	Observations Coordination Group	ASAP	Ongoing (MAN-VIII, item 3.1.1)

Reference (JCOMM-III report)	*Task*	*By whom*	*Target*	*Status / reference*
Para 6.1.20	Produce a document that provides an integrated (space and *in situ*) observing strategy for a number of geophysical variables	Observations Coordination Group, in consultation with Data Management, and Services and Forecasting Systems Programme Areas	ASAP	To pursue (MAN-VIII, item 3.1.1)
Para 6.1.21	Coordinate the collection of information on satellite data requirements and planning, and make it available via the JCOMMOPS website	JCOMMOPS	ASAP	To pursue (MAN-VIII, item 3.1.1)
Para 6.2.1, 6.2.7 & 12.7	Update the content of relevant publications taking into account the increasing need to enhance the quality of data through appropriate standards in order to address the climate requirements	Observations Programme Area	Intersessional period	To pursue (MAN-VIII, item 3.1.1)
Para 6.2.2	Develop high quality best practices for the Voluntary Observing Fleet with the goal of publishing them as a JCOMM Technical Report	Ship Observations Team	Intersessional period	To pursue (MAN-VIII, item 3.1.1)
Para 6.2.2	Identify ways for enhance JCOMM linkage with manufacturers	Observations Programme Area and its Panels and Groups	Continuing	Ongoing (MAN-VIII, item 3.1.1)
Para 6.3.3	Compile and synthesize activities related to satellite data telecommunication systems and data collection options under all programmes and panels of OPA	Observations Coordination Group	Intersessional period	Ongoing (MAN-VIII, item 3.1.1)
Para 6.5.1	Implement the priority activities for the OPA defined by the Commission	Observations Programme Area	Intersessional period	Ongoing (MAN-VIII, item 3.1.1)
Para 8.2.6	Continue supporting activities for extending the network of sea level measuring gauges, as well as increasing the number of those reporting in real-time, and other sea-level observing techniques	GLOSS Group of Experts	Continuing	To pursue (MAN-VIII, item 3.1.1)
Para 13.1.16	Take the appropriate steps, including establishing partnerships between ocean research and operational communities, to facilitate the implementation of the actions to improve ocean observing systems arose from the Progress Report on the implementation of GCOS in support of the UNFCCC 2004-2008	Observations Programme Area	Intersessional period	To pursue (MAN-VIII, item 3.1.1)
Data Management				
Para 7.1.1	Routinely review and update the Data Management Plan	Data Management Coordination Group	Intersessional period	Ongoing (MAN-VIII, item 3.1.3)

Reference (JCOMM-III report)	*Task*	*By whom*	*Target*	*Status / reference*
Para 7.1.2 & 7.3.1	Continue and further strengthen the collaboration with the IODE of UNESCO/IOC based upon complementarity of strengths and expertise	Data Management Programme Area	Continuing	Ongoing (MAN-VIII, item 3.1.3)
Para 7.1.3	Develop an appropriate documentation that describes the template for the Marine Community Profile	Data Management Programme Area	ASAP	Ongoing (MAN-VIII, item 3.1.3)
Para 7.2.1	Review if the accuracy of the GPS position and time is being reported in coded and climate reports	Expert Team on Marine Climatology, Ship Observations Team and Task Team on Table Driven Codes	Intersessional period	Ongoing (MAN-VIII, item 3.1.3)
Para 7.2.2	Organize CLIMAR-IV and MARCDAT-III	Expert Team on Marine Climatology	Intersessional period	Ongoing (MAN-VIII, item 3.1.3)
Para 7.2.3	Modernize the Marine Climatological Summaries Scheme	Expert Team on Marine Climatology	Intersessional period	Ongoing (MAN-VIII, item 3.1.3)
Para 7.2.5	Decide how the manual observations on “rigs and platforms” should be preserved and archived	Expert Team on Marine Climatology, Ship Observations Team	Intersessional period	Ongoing (MAN-VIII, item 3.1.3)
Para 7.4.1	Implement the priority activities for the DMPA defined by the Commission	Data Management Programme Area	Intersessional period	Ongoing (MAN-VIII, item 3.1.3)
Para 10.1.2	Contribute to the development of a WIS data representation system policy	Data Management Coordination Group	Continuing	Ongoing (MAN-VIII, item 3.1.3)
Para 10.1.5	Assist Members/Member States in the WIS centre designation process	Data Management Coordination Group	Ongoing	Ongoing (MAN-VIII, item 3.1.3)
Para 11.2.2 & Recommendation 4 (JCOMM-III)	Identify the standards that are widely applicable by the marine meteorological and oceanographic communities for inclusion in the WMO and UNESCO/IOC publications and/or submission to appropriate standards bodies such as ISO	JCOMM-IODE Expert Team on Data Management Practices	Intersessional period	Ongoing (MAN-VIII, item 3.1.3)
Para 13.1.34	Assist the WMO EC-PORS in facilitating acquisition, exchange and archiving of observational data from Polar Regions	Data Management Programme Area	Intersessional period	Ongoing (MAN-VIII, item 3.1.3)
Services and Forecasting Systems				
Para 5.0.1 & 5.1.2	Regularly review of the observational data requirements for met-ocean applications, where feasible through Observing System Experiments, Observing System Simulation Experiments and various test-beds for the verification of impacts in a range of application areas	Services and Forecasting Systems Programme Area	Ongoing	Ongoing (MAN-VIII, item 3.1.2)

Reference (JCOMM-III report)	*Task*	*By whom*	*Target*	*Status / reference*
Para 5.21.2	Participate in the WMO/CBS Rolling Review of Requirements and update the Statement of Guidance for Met-ocean Applications	Services and Forecasting Systems Programme Area and JCOMMOPS	Ongoing	Ongoing (MAN-VIII, item 3.1.2)
Para 8.1.2, 8.1.3 & Recommendation 5 (JCOMM-III)	Assist in and guide the transition of ocean forecasting systems from research to operations, and develop a JCOMM Guide to Operational Ocean Forecasting Systems	Expert Team on Operational Ocean Forecasting Systems	Continuing	Ongoing (MAN-VIII, item 3.1.2)
Para 8.1.3	Keep under review the ocean observational requirements for operational ocean forecasting systems and ensure that interoperable standards and best practices are developed	Expert Team on Operational Ocean Forecasting Systems; Services and Forecasting Systems, Observations and Data Management Programme Areas	Continuing	Ongoing (MAN-VIII, item 3.1.2)
Para 8.1.5	Expand the wave forecast verification scheme	Expert Team on Wind Waves and Storm Surges	Continuing	Ongoing (MAN-VIII, item 3.1.2)
Para 8.1.6	Address the establishment of a network of moored wave measuring buoys to cover sparse ocean areas where storms are generated and propagated	Expert Team on Wind Waves and Storm Surges, Data Buoy Cooperation Panel	Ongoing	Ongoing (MAN-VIII, item 3.1.2)
Para 8.1.7 & 8.2.1	Continue to co-sponsor and co-organize: (a) International Workshops on Wave Analysis and Forecasting and Coastal Hazard Symposia; (b) Scientific and Technical Symposium on Storm Surge; and (c) training workshops on storm surge and wave forecasting	Expert Team on Wind Waves and Storm Surges	Intersessional period	Ongoing (MAN-VIII, item 3.1.2)
Para 8.1.9	Promote the implementation of operational specialized numerical prediction systems on wave and storm surge, and the use of probabilistic prediction products	Expert Team on Wind Waves and Storm Surges	Ongoing	Ongoing (MAN-VIII, item 3.1.2)
Para 8.1.11	Review the existing guides and manuals, and continue to develop technical guidance material on wave and storm surge forecasting	Expert Team on Wind Waves and Storm Surges	Continuing	Ongoing (MAN-VIII, item 3.1.2)
Para 8.2.3 & 8.2.4, & Recommendation 6 (JCOMM-III)	Provide technical advice, guidance and coordination in the development of Demonstration Projects for building integrated global and regional storm surge watch schemes within a multi-hazard framework	Expert Team on Wind Waves and Storm Surges	Intersessional period	Ongoing (MAN-VIII, item 3.1.2, 5.3)

Reference (JCOMM-III report)	*Task*	*By whom*	*Target*	*Status / reference*
Para 8.2.5	Continue to develop regional and global wave and storm surge climatologies as a measure of risk assessment for marine hazards and assist Members/Member States in developing their own databases and hazard analysis	Expert Team on Wind Waves and Storm Surges	Intersessional period	Ongoing (MAN-VIII, item 3.1.2, 5.3)
Para 8.2.7 & 13.1.5	Assist in the implementation of the marine component of the SWFDP and use the concept to further develop and implement marine forecasting products and services in regions subject to marine hazards	Expert Team on Wind Waves and Storm Surges	Intersessional period	Ongoing (MAN-VIII, item 3.1.2, 5.3)
Para 8.2.9	Consider ocean forecasting systems in support of marine pollution monitoring and response, and maritime search and rescue, in ETOOFS workplan	Expert Team on Operational Ocean Forecasting Systems	Intersessional period	Ongoing (MAN-VIII, item 3.1.2)
Para 8.2.9	Monitor implementation and operations of the Marine Pollution Emergency Response Support System (MPERSS) and assist Members/Member States in implementing their services in support of marine accident emergencies	Expert Team on Maritime Safety Services	Continuing	Ongoing (MAN-VIII, item 3.1.2, 5.2)
Para 8.2.12	Establish collaborating arrangements with the CBS Coordination Group on Nuclear Emergency Response Activities to address common issues related to environmental emergencies	Services and Forecasting Systems Programme Area	ASAP	Ongoing (MAN-VIII, item 3.1.2)
Para 8.3.2 & 8.3.13	Develop product specification for met-ocean variables, in accordance with IHO standards	Expert Team on Maritime Safety Services, Expert Team on Sea Ice, in consultation with IMO and IHO	Intersessional period	Ongoing (MAN-VIII, item 3.1.2, 5.2)
Para 8.3.3 & 11.1.2 & Recommendations 7 (JCOMM-III) & 8 (JCOMM-III)	Organize a training workshop on maritime safety services, focused on Quality Management Systems for the provision of met-ocean services for international maritime navigation	Expert Team on Maritime Safety Services, and WMO Secretariat	Intersessional period	Done (MAN-VIII, item 3.1.2, 5.2)
Para 8.3.4	Assist the METAREA Issuing Services concerned in implementing their operating plans for the provision of marine meteorological and oceanographic services for the Arctic Region	Expert Team on Maritime Safety Services	Before 2011	Ongoing (MAN-VIII, item 3.1.2, 5.2)

Reference (JCOMM-III report)	*Task*	*By whom*	*Target*	*Status / reference*
Para 8.3.6	Develop proposals for inclusion of information on complex sea states in weather and sea bulletins	Expert Team on Maritime Safety Services, Expert Team on Wind Waves and Storm Surges	Intersessional period	Ongoing (MAN-VIII, item 3.1.2, 5.2)
Para 8.3.7	Propose sea ice specifications for Maritime Safety Information to be disseminated via SafetyNET and international NAVTEX services	Expert Team on Sea Ice, Expert Team on Maritime Safety Services	Intersessional period	Ongoing (MAN-VIII, item 3.1.2, 5.2)
Para 8.3.9 & 9.1.4	Continue to co-sponsor and co-organize Ice Analysts Workshops	Expert Team on Sea Ice	Intersessional period	Ongoing (MAN-VIII, item 3.1.2)
Para 8.3.10	Keep under review requirements for sea ice observations and services	Expert Team on Sea Ice	Intersessional period	Ongoing (MAN-VIII, item 3.1.2)
Para 8.3.11	Contribute to the development of coupled sea ice-ocean-atmosphere numerical models and sea ice forecasting and data assimilation techniques	Expert Team on Sea Ice, Expert Team on Operational Ocean Forecasting Systems	Intersessional period	Ongoing (MAN-VIII, item 3.1.2)
Para 8.3.12	Review the GDSIDB and provide guidance to Members/Member States submitting data to this database	Expert Team on Sea Ice	Continuing	Ongoing (MAN-VIII, item 3.1.2)
Para 8.4.1	Implement the priority activities for the SFSPA defined by the Commission	Services and Forecasting Systems Programme Area	Intersessional period	Ongoing (MAN-VIII, item 3.1.2)
Para 13.1.3	Develop technical guidance material on standard methodologies for monitoring, archiving, analysis and mapping of marine-related hazards	Expert Team on Marine Climatology, Expert Team on Wind Waves and Storm Surges	Intersessional period	Ongoing (MAN-VIII, item 3.1.2)

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Annex IV

Revised JCOMM Terms of Reference (ToRs)

The Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM) shall:

(i) Coordinate, develop and recommend standards and procedures for the work of Members/Member States in the overall collection, exchange, access, understanding, application and delivery of marine meteorological and oceanographic data, information, forecasts and warnings upon which marine meteorological and oceanographic services and marine-related decision-making processes are based.

(ii) Coordinate, develop and recommend standards and procedures for the work of Members/Member States in the overall collection, management, exchanges and archival of high-quality marine meteorological and oceanographic data, information and products, on which climate studies, predictions and services, as well as impact and adaptation strategies, are based.

(iii) Promote and facilitate the international sharing of implementing experience, transfer of technology and research uptake, and support relevant education and training to meet the capacity development needs of national agencies and of other organizations that play a role in the provision of marine meteorological and oceanographic services.

In this regard, the Commission will give special attention to education and training, and technology transfer initiatives on marine meteorological and oceanographic data, products and services that respond to the needs of, and build capacity in, the developing countries with particular emphasis on the Least Developed Countries and Small Island Developing States. Additionally, the Commission will support cooperation among WMO, IOC and other Untied Nations agencies that are members of UN-Oceans, the International Hydrographic Organization (IHO), the International Council for Science (ICSU) and other governmental and non-governmental organizations, the private sector as well as user organizations, on matters related to marine meteorology and oceanography.

Within its terms of responsibility as defined above, and consistent with the IOC Statutes, the Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology shall have responsibilities common to all WMO Technical Commissions as defined in WMO General Regulation 179, and shall structure its work to address societal outcomes as envisaged by the planning documents of the parent organizations, by creating an operating plan focusing on the areas identified within its specific terms of reference and addressing appropriate (or applicable) strategic thrusts and expected results.

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Annex V

Proposed Terms of Reference for a JCOMM cross-cutting Task Team on Satellite Data Requirements

JCOMM-III recognized that satellite data are essential for providing global high-resolution surface data from the world oceans, and are the primary, and often only source of information for key ocean areas where *in situ* observations are sparse or absent. *In situ* and satellite observations are complementary for data assimilation in the numerical models for ocean mesoscale forecasting, weather prediction, and reanalyses to support research of both. Some variables cannot presently be easily derived from satellite products (e.g. sea level pressure, surface marine air temperature) while other variables observed by satellites require *in situ* ocean observations for ground (or surface) truth, bias correction, and the validation of satellite products. It is essential that the measurements returned through both *in situ* and space-based systems are properly documented, completely collected, and archived. Both archives must be discoverable and equivalently accessible so the mutual benefits gained from combining their strengths can be easily achieved. In addition, satellite communication capability is essential for modern telecommunication of both *in situ* and satellite remotely sensed environmental data. This capability needs to increase to continually address the demands higher resolution data transmission.

Thus, the establishment of a cross cutting task team on satellite data requirements was recommended to improve the integration of satellite and *in situ* data including real-time systems and the International Comprehensive Ocean-Atmosphere Data Set (ICOADS). Considering that GCOS is already addressing ocean satellite data requirements for climate, the Task Team should specially focus its efforts on the JCOMM specific non-climate requirements (maritime safety, wind waves and storm surges, ocean forecasting, etc.).

The JCOMM cross-cutting Task Team on satellite data requirements shall liaise and collaborate with appropriate JCOMM Expert Teams and other groups or projects as appropriate, and particularly with the CBS Expert Team on Satellite Utilization and Products (ET-SUP), and the Coordination Group for Meteorological Satellites (CGMS), and Committee on Earth Observation Satellites (CEOS), and:

1. assess and document the common JCOMM non-climate requirements for achieving enhanced integration between *in situ* and satellite ocean observing systems; these requirements should begin with current system deployments and look forward toward known forthcoming systems;
2. examine format interoperability and data homogenization issues, and make recommendations for the implementation of a system or standards so that satellite and *in situ* data can be easily incorporated in both research and operational activities;
3. propose mechanisms for the feedback of information relating to data quality derived from satellite products to *in situ* observing platforms operators;
4. prepare a final report for presentation to documenting the findings of the Task Team including recommendations for improving the integration and comparison of satellite and *in situ* data;
5. propose impactful communication processes by which the stakeholders can be informed about the Task Team activities.

Membership:

- Leader: Johnny Johannessen
- Satellite community: Craig Donlon, Jean-Louis Fellous, David Halpern, Olivier Lauret
- *In situ* community: Aida Alvera, David Berry, Val Swail, Scott Woodruff

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Annex VI

FORMAL ADOPTION OF THE RMIC AND INCLUSION IN THE CIMO GUIDE
(as approved by MAN-VIII)

According to the Terms of Reference of a WMO-IOC Regional Marine Instrument Centre (RMIC), the mechanism for formal WMO and UNESCO/IOC designation of RMICs implies the following:

(a) Governance for defining the functions and adoption of an RMIC is proposed by JCOMM and endorsed by the WMO and UNESCO/IOC Executive Councils;
(b) A candidate RMIC is required to produce a statement of compliance, list capabilities of the proposed centre, state the suite of instrument expertise offered, state the formal commitment to voluntarily host the centre, and demonstrate capability to JCOMM.

The approach proposed by JCOMM is the following:

- The RMIC evaluates the extent to which it will be addressing the RMIC requirement in terms of capabilities and functions as described in the RMIC Terms of Reference.
- Once the candidate RMIC believes that it meets the requirements to a sufficient extent, its Director writes to the JCOMM Co-President to formally state the host commitment to voluntarily run and operate the RMIC on behalf of the WMO and IOC, and to request that the RMIC be listed in the list of RMICs through appropriate channels. In doing so, the candidate RMIC also provides for a statement of compliance in terms of RMIC capabilities and corresponding functions as described in the Annex of the RMIC Terms of Reference. The list of variables measured by specific instruments for which expertise will be offered as part of the RMIC activities is also provided. According to the ToR, an RMIC must apply international standards applicable for calibration laboratories, such as ISO/IEC 17025, to the extent possible. The Candidate RMIC will indicate to what extent it will meet these requirements. The letter should be copied to the Permanent Representative of the host country with the WMO, the IOC Action Addressee for the host country, the Secretary General of WMO, the Executive Secretary of IOC, and the President of the WMO Regional Association where the RMIC is located.
- Capability is also demonstrated by means of a training workshop on Marine instrumentation to be organized within 12 months of the request; resources should be committed by the host country for providing financial assistance to participants of developing countries in the region.
- As the JCOMM Observations Coordination Group (OCG) will be the primary advisory body for JCOMM regarding the RMICs, the JCOMM Co-President requests the OCG to evaluate and verify the capabilities of the proposed Centre.
- The OCG evaluates the request and advises whether the candidate RMIC should be endorsed. The OCG may wish to delegate this work to individuals and/or groups acting on its behalf (e.g. one of the component teams, depending on the nature of the proposed centre), but any advice and proposal to JCOMM should still be assessed by and come through the OCG. OCG will also conduct reviews of performance and capabilities at the required intervals.
- If endorsed by the OCG, and depending on timing, the latter makes an informed recommendation to the JCOMM Management Committee (MAN) or the JCOMM Co-Presidents (acting on behalf of the Commission) and invites them to provide further advice to the next JCOMM Session.
- If endorsed by MAN or the JCOMM Co-Presidents as appropriate, a recommendation is passed to the next JCOMM Session, or depending on timing directly to the WMO and IOC Executive Councils.
- If endorsed by the JCOMM Session or the JCOMM Co-Presidents as appropriate, a recommendation is passed to the WMO and IOC Executive Councils for including the candidate in the list of RMICs.

- If the JCOMM recommendations is approved by the WMO Executive Council, the candidate RMIC is listed in the WMO Publication No. 8 (CIMO Guide) and becomes a WMO RMIC;
- If the JCOMM recommendation is approved by the IOC Executive, the candidate becomes an IOC RMIC;
- If the JCOMM recommendation is approved by both WMO and IOC Executive Councils, the candidate becomes a joint WMO-IOC RMIC.

It is expected that this process, from submission of the RMIC proposal to the JCOMM Co-President, to formal approval by either of both the WMO/IOC Executive Councils, may take from 6 to 12 months.

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Annex VII

LIST OF ACTIONS

Para	Action	By whom	When/target
2.4	To report on the available resources within the WMO-IOC regular budget for JCOMM, and on the required EXB resources for JCOMM intersessional activities	Secretariats	immediate
3.1.2	To keep under review the implementation goals for the networks, including an active cross-platform discussion forum on new technologies, strategies for spatial coverage and deployment, and standards and best practices	OCG in coordination with other CGs	continuous
3.1.3	To help international coordination of systematic global biogeochemical and biological observations, including the observation of the global ocean carbon cycle	OCG with JCOMMOPS	continuous
3.1.7 (i) 3.2.5 (i)	To provide ocean observational requirements for satellite agencies, to address the gap in the WMO database	ETOOFS with TT on Satellite Data Requirements	JCOMM-IV
3.1.7 (ii)	To define ocean observational requirement stakeholders	ETOOFS	MAN-IX
3.1.7 (iii)	To complete the Storm Surge Guide publication	WMO Secretariat in coordination with ETWS	February 2011
3.1.7 (iii) 4.2.6	To draft "process/procedure" for future publication/revision of Guides/Manuals	WMO Secretariat with ETWS Chair	December 2010
3.1.7 (iv) 5.2.4	To be fully engaged in the IMO planning on future e-Navigation, and MSI survey	WMO Secretariat with ETMSS and ETSI	continuous
3.1.7 (v)	To develop and undertake actions to track a long term record of service improvement	SFSPA Teams	continuous
3.1.10	To clarify ToR for cross-cutting Team on Satellite Data Requirements	DMPA Coordinator with Team members	immediate
3.1.12	to prepare a report on DBCP ToR Revision to become responsible for the Rigs and Platforms	DBCP EB with Secretariats	JCOMM-IV
3.1.12	To establish coordination mechanisms between DBCP and SOT for Rigs/Platforms issues	DBCP, SOT with Secretariats	As soon as possible
3.1.15	To plan trainings for the migration (to table driven codes for the real time ocean data) and standard encoding/decoding software	DMPA Coordinator, A.L. Capacity Building, IODE	continuous
3.2.5 (ii)	Support IOC by providing guidance to CGMS on ocean activities through preparation of annual report on topic of interest to JCOMM	A.L. Satellite Data Requirements	continuous
3.2.8	To draft a procedure and template (web-publishable) for regular reporting of the Commission's capacity building activities	A.L. Capacity Building	MAN-IX
4.1.2	To participate in and provide input to a workshop on deep ocean observation requirements (28 March-2 April 2011)	OPA Coordinator in coordination with OOPC Chair	March 2011
4.1.7	To submit a report on "A Framework for Ocean Observing" (report on follow-up to OceanObs'09) to JCOMM-IV	Secretariats in consultation with Co-Presidents, OOPC Chair	JCOMM-IV
4.1.8	To continuous coordination/cooperation with groups on carbon/chemical/biological/ecosystem various	OCG	continuous
4.1.9	To contribute material for the WCRP Open Science Conference, for a theme "Maintaining and enhancing ocean observations, including sea ice"	PA Coordinators	October 2011

Para	Action	By whom	When/target
4.2.2	To continue efforts to implement recommendations by META-T Pilot Project	DMCG in coordination with META-T PP Chair	31 May 2011
4.2.3	To document results of the META-T Pilot Project (lessens learned, legacy recommendations, etc.)	META-T PP chair with Secretariats	As soon as possible
4.2.3	To nominate a member responsible for updating JCOMM Catalogue of Best Practices and Standards	DMCG	31 May 2011
4.2.4	To draft a resolution on establishing an RMIC in China, for submission to the WMO and IOC Executive Bodies in 2011	Co-Presidents	January 2011
5.1.2	To review the draft Project Report of JCOMM Pilot Project for WIGOS (JCOMM Technical Report No. 48) and provide comments to WMO and IODE Secretariats	MAN members	31 December 2010
5.1.3	To consolidate a work plan addressing the legacy recommendations of the JCOMM pilot project for WIGOS	OCG and DMCG	As soon as possible
5.1.3	To seek funding for implementation of the integration of ocean observations into WIGOS (recommendations by the JCOMM Pilot Project for WIGOS), at WMO Congress	Co-Presidents with WMO Secretariat	WMO CG-XVI
5.1.6	To setup a plan to provide input to IOC Assembly in 2011, to recognize HMEI as non-governmental organization (observer) at IOC	OCG with IOC Secretariat	March 2011
5.2.2	To find opportunities and plan accordingly for trainings on the MSI for new Arctic METAREAs, in conjunction with related workshops and meetings	ETMSS	continuous
5.2.5	To consider possible extension of the user requirements for Arctic MSI, in establishing future work plans	ETMSS and ETSI	continuous
5.3.4	To arrange a general agreement for CIFDP implementation, at the national level, between the relevant institutions in Dominican Republic and Bangladesh	WMO Secretariat	immediate
5.3.5	To build linkage between CIFDP and the IOC Project on Enhancing Regional Capabilities for Coastal Hazards Forecasting, IOC ICAM, and related activities under Regional Tsunami Warning Systems	WMO and IOC Secretariats	continuous
5.3.6	To revise CIFDP implementation plan with adjusted timeline	CIFDP PSG and WMO Secretariat	immediate
5.3.9	To report on the progress of the IOC Project on Enhancing Regional Capabilities for Coastal Hazards	IOC Secretariat with project advisory group	MAN-IX
5.4.2	To carry out related discussion with GFCS High Level Task Force secretariat, in order to identify necessary actions for GFCS High Level Task Force to request specific contributions from the WMO Technical Commissions including JCOMM	WMO Secretariat and Co-Presidents	As soon as possible
5.5.5	To review the possibilities for JCOMM role in PORS activities, based on guidance by CG-XVI	Co-Presidents and Secretariats	Following WMO Cg-XVI
5.5.5	To coordinate JCOMM input to and liaison with EC-PORS	David Meldrum	ongoing
5.5.6	To address to the WMO Congress on the need for additional resources for additional mandates (PORS, WIGOS/WIS)	Co-Presidents and WMO Secretrariat	WMO PTC (Feb 2010)
5.5.7	To draft intersessional workplans (2012-2016) including E-PORS activities	PA coordinators	Following WMO Cg-XVI
5.5.7	To draft JCOMMOPS role in the work of EC-PORS, with consideration on additional resources in need	OCG	Following WMO Cg-XVI

Para	Action	By whom	When/target
6.1.5	To support the planning for and the implementation of the Workshop on “Climate and Oceanic Fisheries”, October 2011	Co-Presidents and Secretariats, with CAgM	As soon as possible
6.1.5	To consider becoming a direct sponsor for the Workshop on “Climate and Oceanic Fisheries”, October 2011	IOC Ocean Science Section	As soon as possible
6.1.6	To identify 3-4 experts to participate in the workshop on “Climate and Oceanic Fisheries”, to develop a more detailed rationale and proposal for the joint expert team on Climate and Fishery	Co-Presidents, PA Coordinators and Secretariats	As soon as possible
6.2.1	To update JCOMM Strategy	Co-Presidents	MAN-IX
6.2.2	To report to WMO and IOC governing bodies on the progress of JCOMM Review preparation, to ask for their guidance	Secretariats	WMO Cg and IOC Assembly
6.3.1	To prepare a proposal on the JCOMM structure after JCOMM-IV	Co-Presidents and PA Coordinators	MAN-IX
7.1	To advance the organization of JCOMM-IV	Secretariats	As soon as possible
7.2	To investigate the possible organization of a scientific and technical symposium within the JCOMM-IV session	Secretariats, OOPC Chair and Co-Presidents	As soon as possible
8.2	To contribute to / submit articles for the JCOMM Newsletter	all	continuous
9.1	To organize the MAN-IX, 6-9 September 2011	WMO Secretariat	immediate

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Annex VIII

ACRONYMS AND OTHER ABBREVIATIONS

AusAID	Australian Government Overseas Aid Program
BUFR	Binary Universal Form for Representation of meteorological data
CAgM	Commission for Agrometeorology (WMO)
CBS	Commission for Basic Systems (WMO)
CEOS	Committee on Earth Observation Satellites
CGMS	Coordination Group for Meteorological Satellites
CHy	Commission for Hydrology (WMO)
CIFDP	Joint JCOMM/CHy Coastal Inundation Forecasting Demonstration Project (WMO)
CIMO	Commission for Instruments and Methods of Observation (WMO)
CSIRO	Commonwealth Scientific and Industrial Research Organisation (Australia)
DBCP	WMO-IOC Data Buoy Cooperation Panel (JCOMM OPA)
DCPC	WIS Data Collection Product Centre (WMO)
DMCG	Data Management Coordination Group (JCOMM)
DMPA	Data Management Programme Area (JCOMM)
EC	Executive Council (WMO and IOC)
ECMWF	European Centre for Medium-range Weather Forecasts
EC-PORS	Executive Council Panel of Experts on Polar Observations, Research and Services (WMO)
ECV	Essential Climate Variables (GCOS)
EGOS	Evolution of the Global Observing System (WMO CBS)
ENC	Electronic Nautical Chart
EOV	Essential Ocean Variables (OceanObs'09)
ET	Expert Team
ETDMP	Expert Team on Data Management Practices (JCOMM DMPA)
ETMC	Expert Team on Marine Climatology (JCOMM DMPA)
ETMSS	Expert Team on Maritime Safety Services (JCOMM SFSPA)
ETOOFS	Expert Team on Operational Ocean Forecast System (JCOMM SFSPA)
ET-WISC	Expert Team on WIS GISCs and DCPCs (WMO CBS)
ETSI	Expert Team on Sea Ice (JCOMM SFSPA)
ETWS	Expert Team on Wind Waves and Storm Surges (JCOMM SFSPA)
FAO	Food and Agriculture Organization (UN)
GCOS	Global Climate Observing System
GCW	Global Cryosphere Watch
GEO	Group on Earth Observations
GFCS	Global Framework for Climate Services
GISC	Global Information System Centre (WMO WIS)
GIPPS	Global Integrated Polar Prediction System
GMDSS	Global Maritime Distress and Safety System (IMO)
GOOS	Global Ocean Observing System (IOC-WMO-UNEP-ICSU)
GTS	Global Telecommunication System (WWW)
HMEI	Association of Hydro-Meteorological Equipment Industry
I-GOOS	Intergovernmental Committee for GOOS (UNESCO/IOC-WMO-UNEP-ICSU)
IABP	International Arctic Buoy Programme
IFSOO-TT	OceanObs'09 Task Team on an Integrated Framework for Sustained Ocean Observations
ICAO	International Civil Aviation Organization
IMO	International Maritime Organization (UN)
IOC	Intergovernmental Oceanographic Commission (of UNESCO, UN)
IODE	International Oceanographic Data and Information Exchange (IOC)
IPAB	International Programme for Antarctic Buoys
IPCC	Intergovernmental Panel on Climate Change
IPY	International Polar Year
ISO	International Organization for Standardization

JCOMM	Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology
JCOMMOPS	JCOMM *in situ* Observations Programme Support Centre
MAN	Management Committee (JCOMM)
MARINEMET	Pilot project on Marine Meteorology in West Africa (WMO)
META-T	Water Temperature Metadata Pilot Project (JCOMM)
MSI	Maritime Safety Information
NCOSM	National Centre of Ocean Standards and Metrology (China)
NMHS	National Meteorological and Hydrological Service (WMO)
NOAA	National Oceanic and Atmospheric Administration (USA)
NWP	Numerical Weather Prediction
OCG	Observations Coordination Group (JCOMM)
ODP	Ocean Data Portal (IOC/IODE)
ODS	Ocean Data Standards (JCOMM-IODE)
OOPC	Ocean Observations Panel for Climate (GOOS-GCOS-WCRP)
OPA	Observations Programme Area (JCOMM)
PA	Programme Area (JCOMM)
PP	Pilot project
PTC	Meeting of the Presidents of Technical Commissions (WMO)
QMF	Quality Management Framework
QMS	Quality Management System
RMIC	WMO-IOC Regional Marine Instrument Centre
RMTC	Regional Meteorological Training Centre (WMO)
RNODC	Responsible National Oceanographic Data Centre (JCOMM)
RRR	Rolling Review of Requirements (WMO)
SAON	Sustaining Arctic Observing Networks
SCG	Services and Forecasting Systems Coordination Group (JCOMM)
SFSPA	Services and Forecasting Systems Programme Area (JCOMM)
SOC	Specialized Oceanographic Centre (JCOMM)
SoG	Statement of Guidance (WMO RRR)
SOOS	Southern Ocean Observing System
SOT	Ship Observations Team (OPA)
SOLAS	International Convention for the Safety of Life at Sea
SPA	Services and Forecasting Systems Programme Area (JCOMM)
SWFDP	Severe Weather Forecasting Demonstration Project (WMO)
SWH	Significant Wave Height
ToR	Terms of References
TT	Task Team
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization (UN)
UNFCCC	United Nations Framework Convention on Climate Change
VOS	Voluntary Observing Ship
VOSClim	Volunteer Observing Ship Climate Project (JCOMM)
WCC	World Climate Conference
WCRP	World Climate Research Programme (WMO-IOC-ICSU)
WDIS	WIGOS Development and Implementation Strategy (WMO)
WIGOS	WMO Integrated Global Ocean Observing System
WIS	WMO Information System
WG	Working Group
WMO	World Meteorological Organization (UN)
WWW	World Weather Watch (WMO)

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