

**JCOMM MANAGEMENT COMMITTEE
SEVENTH SESSION**

Melbourne, Australia, 8-12 December 2008

FINAL REPORT

JCOMM Meeting Report No. 62

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NOTES

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GENERAL SUMMARY OF THE WORK OF THE SESSION

1. OPENING OF THE SESSION

1.1 Opening

1.1.1 The seventh session of the Management Committee of the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM) was opened by the Commission Co-president, Dr Peter Dexter, at 0930 hrs on Monday, 8 December 2008, in the Conference Room of the Bureau of Meteorology (BoM), Melbourne, Australia. Dr Dexter welcomed participants to the session, and introduced the acting Director of the BoM, and vice-chairman of IOC, Dr Neville Smith, to address the session.

1.1.2 Dr Neville Smith welcomed participants in the JCOMM Management Committee session and the scientific and technical workshop to the Bureau of Meteorology and to Australia. Dr Smith noted the continued strong interest of the Bureau in the work of the Commission and the importance that is attached to Management Committee itself.

1.1.3 Dr Smith recalled that the seeds for JCOMM were sown within WMO and at a meeting of the GCOS JSTC in 1996. At the time, there was little encouragement that a commission dedicated to ocean observations and services could be realised. However, during 1997 and 1998 a number of people patiently pursued the concept and reached in-principle agreement that both IOC and WMO could support a joint technical body, building from the basis provided by the WMO Commission for Marine Meteorology. Around 4 years was required to go from concept to a formally endorsed set of recommendations from IOC and WMO to support this new intergovernmental body we now know as JCOMM.

1.1.4 Dr Smith noted that much had been advanced over the intervening 8 years. He recalled that the first Management Committee meeting in 2002 was dominated by questions of requirements and possible solutions, and the shaping of JCOMM. For ocean observations, the OceanObs'99 Conference provided a substantial basis, a basis that endures on the work plan today. He noted that the agenda for the present session reflected a more mature JCOMM, with the body having considerable influence and impact.

1.1.5 Dr Smith noted the presence of colleagues from earlier years who were continuing to contribute to the work of JCOMM and recognized the importance of this role. He wished the Management Committee success with its meeting and with the associated Workshop.

1.1.6 After the formal opening, the remainder of the first day was devoted to agenda item 2, with some external participation.

1.1.7 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.

1.3 Working arrangements

1.3.1 The Committee agreed its hours of work and other practical arrangements for the session, including the establishment of three Breakout Groups (JCOMM structure: officers and groups' Terms of Reference; designation of marine Data Collection and Production Centres (DCPC) for WIS; and Technical Conference), which would meet on Thursday, 11 December 2008. An additional Breakout Group to address climate services was established during the course of the

session. The documentation was introduced by Dr Dexter, who also informed the Committee on the way the co-presidents agreed to chair the various agenda items of the session.

2. Scientific and technical workshop

2.1 The workshop comprised two parts:

a) the first half day on operational ocean forecast systems, with particular reference to the Australian BLUElink System, developed jointly by the Bureau of Meteorology, CSIRO and the Royal Australian Navy, and run operationally by the Bureau;

b) the second half day included extended presentations by the JCOMM Programme Area Coordinators on the work and achievements within their respective Programme Areas, and a presentation on the status of the implementation of OOPC (Ocean Observations Panel for Climate) requirements and recommendations, which highlighted science issues and opportunities of interest to JCOMM.

2.2 An executive summary is presented in Annex III to this report. All presentations in PDF format are available at the workshop web site at: <http://www.jcomm.info/man7>.

3. Impact on JCOMM Activities and Priorities of Decisions, Guidance and Requirements from WMO Congress, Executive Council, Regional Associations and Presidents of Technical Commissions Sessions; and IOC Assembly and Executive Council sessions

3.1 The Committee was informed of issues relevant to JCOMM raised during last sessions of the WMO Congress and Executive Council, IOC Assembly and Executive Council, among others. The Committee noted that some issues have already been undertaken by JCOMM, however, there were a few requests still not addressed by the Commission. The Committee identified three major activities aligned with the Expected Results' process within both WMO and IOC, which needed to be initiated or kept going under JCOMM. It therefore set up task teams, led by a member of the Committee, to develop roadmaps for these activities (**Action: Task team leaders to develop roadmaps for developing activities related to Quality Management Framework, coastal inundation, and methods for Transmission of Graphical Products to Marine Users; by 31 May 2009**), as follows:

- a) Task Team on Quality Management Framework (led by Dr Philippe Dandin) – the Committee noted that JCOMM has already engaged on QMF activities related to observations and data management best practices and standards, and that the Inter-Commission Task Team on Quality Management Framework (ICTT-QMF), in its meeting in October 2008, agreed that Quality Management Systems for marine services would be required. The Committee stressed that this task would require substantial resources, and that guidelines on the development and implementation process, in particular those developed for aeronautic meteorology, would be extremely useful. It therefore requested the Secretariat to make available existing documentation on this issue (**Action: Secretariats to make available existing documentation on Quality Management Framework, including those documents developed for aeronautic meteorology; ASAP**);
- b) Task Team on Coastal Inundation (led by Dr Regina Folorunsho) – the Committee noted that discussions between the JCOMM co-presidents, the Secretariats and the president of CHy have been initiated in order to start implementing the scientific/technical recommendations from the First JCOMM Scientific and Technical Symposium on Storm Surges (Seoul, October 2007), including coastal inundation and linkages to storm surge forecast and warning operations in all relevant regions;
- c) Task Team on Methods for Transmission of Graphical Products to Marine Users (led by Mr Robert Keeley) – the Committee noted that both the ETMSS and ETSI have been

working on this issue and that the ETSI has already developed the Sea Ice Objects Catalogue in accordance with IHO standards.

3.2 The Committee noted that the WMO Executive Council endorsed the recommendations arising from the first meeting of its Working Group on Strategic and Operating Planning (Geneva, February 2008) on how to advance delivery of the Madrid Action Plan (MAP), whose overall objective was to achieve, within five years, a major enhancement of the value to society of weather, climate and water information and services in response to the critical challenges represented by rapid urbanization, economic globalization, environmental degradation, natural hazards and the threats from climate change. Concerning its implementation, the Committee noted that many socio-economic benefit studies have been carried out by entities associated with environmental observing systems and services. It therefore agreed that there was no need to undertake any specific action, apart from compiling what has been done or is being done with respect to socio-economic benefits. A preliminary inventory of such studies would be compiled by Ms Candyce Clark, in coordination with Dr Ralph Rayner (GOOS), and presented to the Committee as soon as possible **(Action: Ms Candyce Clark to prepare an inventory of socio-economic benefits' studies, in coordination with Dr Ralph Rayner, and present it to MAN; ASAP).**

3.3 The Committee noted that the WMO Executive Council (June 2008) adopted a resolution on the Role and Terms of Reference of the Presidents of Technical Commissions (PTC), where the reduced availability of experts to conduct work on a voluntary basis was recognized. It expressed some concerns about the risks in establishing formal rules as regards volunteerism in the work of Technical Commissions and recommended the JCOMM co-presidents to take these concerns into account when this topic would be discussed at the next meeting of the PTC (February 2009).

3.4 The Committee was informed that both WMO and IOC Executive Councils supported the proposed review of JCOMM, considering it timely at this stage in the Joint Commission's lifetime. They noted that: (i) the review process should reside in, and be carried out by, the Governing Bodies of the two co-sponsoring organizations of JCOMM, and not by JCOMM itself; (ii) the review should reflect the views of IOC Member States and WMO Members; (iii) that carrying out such a review would require extra-budgetary support. The Committee was also informed that IOC has mobilized some extra-budgetary funds from U.S. NOAA to provide support to the former NOAA Administrator Dr James Baker to undertake a broad review of IOC-WMO interactions, including JCOMM, and that a joint circular letter to Members/Member States informing about the review process and seeking for additional funds, would be sent out soon. The Committee noted that WMO and IOC Secretariats had agreed on the Terms of Reference for Dr Baker's consultancy contract. However, these ToR are broader than, those required for a full review of JCOMM, as requested by both MAN-VI, and the WMO and IOC Executive Councils. The Committee therefore strongly recommended that, should additional funds be provided by Members/Member States in response to the circular letter, these should be used to undertake this full review.

3.5 The Committee agreed that the review process would be an opportunity to recognize the value of ongoing activities and the benefit of the Intergovernmental Framework (joint Commission) to support/sustain the practical work, as well as to examine the effectiveness of JCOMM in addressing the requirements of its parent Organizations; it also recognized that the WMO and IOC Governing Bodies should lead this process, along with the Organizations' Secretariats, in a timely manner, in order to present the results and recommendations to the forthcoming sessions of the WMO Executive Council and IOC Assembly. The Committee noted that it would be very helpful for the incoming co-presidents and PA coordinators at JCOMM-III to have personal assessments of what was successful and what was not, ("lessons learn from experience"). These assessments would be prepared by the outgoing co-presidents and PA coordinators, and provided to the incoming officers at JCOMM-III **(Action: Co-presidents and PA coordinators to prepare assessments of what was successful and what was not, ("lessons learn from experience") and provide them to the incoming officers at JCOMM-III).**

4. Programme preparations for JCOMM-III

4.1 JCOMM Programme and Priorities (aligned with the WMO Strategic and Operating Plans; and the IOC Medium-Term Strategy) – JCOMM Operating Plan

4.1.1 The Committee noted proposals for aligning the JCOMM Operating Plan with the WMO and IOC Strategic Planning in terms of the high-level deliverables and/or achievements planned for presentation to JCOMM-III. These were presented in tabular form, providing a broad, high level mapping of the major JCOMM programme priorities onto the Expected Results in the Strategic Plans of both WMO and IOC. It recognized that details of implementation activities were given in the tabulations presented for the three Programme Areas and two cross-cutting activities. From this tabulation, it was recognized that the major JCOMM lines of action contribute to 9 of the 11 WMO Expected Results, and 10 of the 11 IOC Expected Results. The Committee proposed a small number of minor modifications to the tabulation.

4.1.2 The Committee recognized that the analysis presented under this agenda sub-item, together with those under items 4.2 and 4.3, constituted a consolidated response from JCOMM to the requirements of WMO and IOC for reporting the implementation plans of their major subsidiary bodies against the expected results under the respective Organizational strategies. In addition, they constituted an expression of an overall JCOMM implementation plan, and the basis for a management plan. Nevertheless, the Committee agreed that it was necessary to complete the process of preparing the Implementation, Operating and Management Plans, which it had begun at MAN-VI (Paris, December 2007), with a view to presenting these documents in an accessible form to JCOMM-III. It recalled that drafts of these documents had been compiled before, during and after MAN-VI, in particular by Dr James Baker in his role as an IOC consultant. It requested the co-presidents to contact Dr Baker, to obtain the latest versions of the available documents, and accepted with appreciation the offer of Dr Worth Nowlin to complete the preparation of the overall Operating Plan by mid-January 2009. **(Actions: (i) Co-presidents to contact Dr James Baker to obtain the most recent drafts of the documents begun at MAN-VI (Done). (ii) Dr Worth Nowlin to complete the Operating Plan by mid-January 2009)**

4.1.3 The Committee also recognized the urgent need to revise and update the JCOMM Strategy document, for presentation to JCOMM-III. This new document should include a clear statement of the JCOMM mission and goals, be relatively short, and serve as a broad roadmap for the Commission for the coming intersessional period. When completed, the strategy could also serve as the basis for a new JCOMM brochure. The Committee requested the co-presidents and Secretariat to arrange for the preparation of this new strategy document, and accepted with appreciation the offer of Dr Worth Nowlin to provide input. **(Action: Co-presidents and Secretariats to arrange for the preparation of this new JCOMM strategy document; ASAP)**

4.1.4 Finally on this item, the Committee requested the Secretariat to prepare and issue a new JCOMM Newsletter during the first quarter of 2009, to include a message from the co-presidents outlining to members the mission and strategy of JCOMM, major issues and priorities for the coming intersessional period, as well as comments on the importance of volunteerism in the work of JCOMM and funding issues. The announcement of the forthcoming session of the Commission and a message encouraging members to attend JCOMM-III would also be included in the next JCOMM Newsletter. **(Action: Secretariats and co-presidents to prepare and issue a new JCOMM Newsletter; by 31 January 2009)**

4.2 Programme Areas (aligned with the JCOMM Operating Plan)

- **Deliverables, recommendations, future actions**

Observations Programme Area (OPA)

4.2.1 Ms Candyce Clark, the Observations Programme Area (OPA) coordinator, presented activities and plans for OPA. Ms Clark gave an extended presentation on the status of the global ocean observing system during the 8 December 2008 workshop, and the Management Committee

discussions focused on issues for the remaining intersessional period and preparations for JCOMM-III. These issues, as well as system-updates, new activities and cross-array integration challenges, would be discussed during the scheduled 9-11 March 2009 Observations Coordination Group (OCG) meeting, in Paris, and updated recommendations would be made at that time.

4.2.2 The Committee noted the slow but still positive progress in extending and sustaining observing networks during the intersessional period, currently at 60% of the initial goals as specified in the GCOS Implementation Plan. Progress has been made both in the development of metrics for the observing system and their reporting procedure. The deliverables and/or achievements were being documented for presentation to JCOMM-III, as contribution to each expected result of the WMO strategic plan and the IOC high-level objectives. This document would be discussed during the upcoming OCG meeting (March 2009, Paris). The OCG meeting would also discuss other major issues including:

- essential integration of satellite and *in situ* observations;
- consideration of non-climate requirements for the global ocean observing system;
- desirability of incorporating the observations made from marine mammals (“animal oceanographers”) into the work of the OPA, and;
- role of JCOMMOPS and the OPSC in future support of the observing system.

4.2.3 The Committee discussed and provided advice on these issues under relevant agenda items (including item 5.7 and 6). The Committee encouraged the OPA to take up these issues, and thanked Ms Clark for her presentation.

4.2.4 A Catalogue on Standards and Best Practices was highlighted as a major deliverable for JCOMM-III, which would also serve as a major contribution to the WIGOS pilot project (see agenda item 5.2). The Committee was pleased to note that extra-budgetary resources have been found for this work.

4.2.5 The Committee reviewed the draft table of OPA deliverables/achievements as well as the workplan, and approved the continued efforts as specified in the workplan and updated with new activities. The Committee then recommended future reporting of ECV-based (Essential Climate Variables) metrics and indices for satellite and *in situ* data and metadata.

4.2.6 Recommendations on JCOMM-III restructuring of the OPA were discussed and reported under agenda item 6.

4.2.7 The Observations Programme Support Centre (OPSC) was discussed and reported under agenda item 5.7.

Data Management Programme Area (DMPA)

4.2.8 The activities of the DMPA, the planned deliverables to JCOMM-III and projections of work into the next intersessional were presented by Mr Bob Keeley, DMPA Coordinator. He noted a number of accomplishments including the completion of a data management plan that served as a guide to all actions undertaken by DMPA. In addition, progress had been made on the ODAS and Meta-T projects, such that both will be able to demonstrate results at JCOMM-III. The DMPA project proposed to WIGOS was accepted by WMO. This was combined with an activity started in IODE, the Ocean Data Portal, to present a composite project that is underway. There was a substantial degree of cooperation with IODE in coordinating data management and capacity building activities.

4.2.9 Significant reorganization in DMPA was proposed. Two new task teams, one on table driven codes, and one for ODAS/Meta-T were proposed. The ETDMP was proposed to alter focus to be a standards review body. The activity directed to develop end-to-end technology becomes a task team, which supports WIGOS activity. ETMC has developed a modernization of the Marine Climatological Summaries Scheme. This has been done by splitting away the data assembly

components to a new task team to concentrate on assembly and coordination of real-time and delayed mode data management. The climatological part was proposed to be managed by another task team. ToRs for all of these task teams and changed activities of ETs would be presented to JCOMM-III. The Committee agreed to establish an additional breakout group to address 'climate services' (see agenda item 6) for this session.

4.2.10 Many of the activities described would be carried over into the next intersessional period. Additionally, it is expected that Meta-T would extend its consideration to other variables and build on the initial developments for ocean temperature. Work would continue to improve BUFR templates for all of the variables reported by JCOMM activities on the GTS.

4.2.11 The Committee noted the joint OPA-DMPA effort in developing the "Data and Information Exchange Cookbook" for oceanographers and marine meteorologists, planned to be presented at JCOMM-III, for submitting data in real time and in delayed mode. The Committee agreed that it would be a valuable contribution to upgrading the documentation of best practices.

4.2.12 The Committee reviewed and agreed on the DMPA document on deliverables and/or achievements planned for presentation to JCOMM-III, together with the work plans.

4.2.13 The Committee noted that OceanObs'09 would review a plenary paper that would address data management targets for the next decade, and recommended to include these considerations in an updated data management plan.

4.2.14 The Committee stressed that it was important to ensure that the ETDMP not just wait for proposals for standards but play a more active role in encouraging submissions for consideration.

4.2.15 The Committee also noted that there were a number of activities done and proposed by DMPA and recommended that some prioritization would be required.

Services Programme Area (SPA)

4.2.16 Dr Craig Donlon, SPA Coordinator, reported on the SPA activities and a proposal on future SPA structure /workplan. He noted that activities initiated at MAN-VI had largely been fulfilled in spite of the lack of resources; however, many activities have experienced difficulties to conclude. Dr. Donlon suggested that, prior to JCOMM-III, the Committee should take steps to remind delegations that resources must accompany requests and recommendations. He also raised the issue of volunteerism and the need to establish new ways of resourcing SPA activities as the current approach was limiting the implementation of the workplan.

4.2.17 Dr Donlon explained that the ET-OOFS has successfully initiated a set of activities in collaboration with an emerging GODAE follow on group of practitioners, which met together to discuss and agree a way forward in terms of sharing activities and responsibilities. ET-OOFS would ensure that mature GODAE activities were continued and coordinated and would provide a means to integrate the activities of JCOMM in terms of quality control of observations (through data pre-processing and data assimilation) and for data management in terms of standardization of data products. The Committee endorsed the approach being taken in the SPA. Dr Donlon highlighted the need for a definition of Nomenclature, Standards and Symbology for ocean forecast systems noting that the creation of such a document would be a large task and requested supporting funds to undertake a 6 month contract activity (**Action: Secretariats to seek for funds to hire a consultant to develop the Guide on Nomenclature, Standards and Symbology for ocean forecast systems; ASAP**). The Committee recognized that there were no funds allocated for the activity.

4.2.18 Dr Donlon noted that there was a need to provide basic training materials for the application of satellite and ocean forecasting data sets. Dr Donlon explained that the IOC Bilko programme (see <http://www.bilko.org>) had developed very useful material, including an extensive modern data processing system that runs on the Windows operating system. Lessons were also available that

teach students what an ocean forecast data set consists of, including lessons in the application of ocean forecast data sets in synergy with satellite observations. The Committee agreed that a coordinated efforts between Bilko and JCOMM would be valuable to develop capacity in the application of such data sets, and requested Dr Donlon and Secretariats to set up a plan for training opportunities in close coordination with IOC Project Office for IODE in Ostend, Belgium. **(Action: SPA coordinator and Secretariats to set up a plan for training opportunities in close coordination with IOC Project Office for IODE in Ostend, Belgium; ASAP)**

4.2.19 Noting the resources available and the current size of the SPA (now 5 expert teams), Dr Donlon explained that there is now a need to focus on a more streamlined set of SPA prioritized activities, including integration across all PAs. Options were presented, which were deferred until Agenda Item 6.

4.2.20 The SPA International Met-ocean Safety Conference (IMSC) was discussed noting that despite several meetings to scope the conference, unfortunately no final conclusion had been reached in terms of initiating the conference. Noting the upcoming OceanObs'09 conference, Dr Donlon asked if the IMSC was still relevant. Following discussions, the Committee agreed that, given the limited resources currently available and limited time prior to JCOMM-III, a session linking JCOMM activities and ocean observations at the OceanObs'09 conference would be an optimal way forward.

4.2.21 Recognising the importance of specialised ocean satellite data sets and the plans of space agencies to launch dedicated ocean missions in the near future, and the limited capacity of the current Satellite Rapporteurs, Dr Donlon suggested a need for a dedicated team on Ocean-focussed Satellite observations within the OPA was required in order to ensure that the needs of both the satellite and in situ ocean communities are met in terms of sustained capability. The Committee deferred the discussion of this item to Agenda item 6.

4.2.22 Dr Donlon noted that it was not possible to provide estimates of required meetings for the SPA for the intersessional period following JCOMM-III due to the restructuring of the SPA.

4.2.23 Noting that the JCOMM Programme Areas activities would be contributing to the OceanObs'09, the Committee recommended to prepare and submit a community white paper to the OceanObs'09 organizing committee on Maritime Safety.

4.2.24 The Committee reviewed and agreed on the SPA document on deliverables and/or achievements planned for presentation to JCOMM-III, together with the work plans.

4.3 Cross-cutting activities within JCOMM: satellites, CB and outreach (aligned with the JCOMM Operating Plan)

- **Deliverables, recommendations, future actions**

Satellites

4.3.1 The Cross-cutting Task Team on Satellite Data Requirements Leader, Dr Eric Lindstrom briefly reported on the state of satellite observing systems and work since the last session of the Management Committee (Paris, December 2007). He highlighted that the community was currently emerging from a "Golden Decade" of Earth Observing with an aging fleet of satellites but had made much progress. The key system is satellite altimetry that enables near-real-time ocean forecasting. This system was reported extensively at the Final GODAE Symposium, in November 2008, in Nice, France. Scatterometry enables better tropical and extra-tropical high-wind warnings for mariners. GHRSSST products (Sea Surface Temperature) enable better ocean/NWP forecasts and flux products for ocean research. Dr Lindstrom also pointed out that society was being made aware regularly of changes in polar sea ice cover and beginning to comprehend the magnitude and import of these observations. Despite the recent lull in funding for Earth observing satellite programs, the outlook is promising for the next decade.

4.3.2 The Committee recalled that, at its last session, Dr Lindstrom was charged with drafting a document entitled: "Observing the Global Ocean for JCOMM - The Integrated Space-based and *in situ* Strategy." It aims to articulate a singular set of observing requirements for JCOMM for key ocean variables that space the applications from near-real time marine operations, NWP, climate monitoring, and research. Its scope will include: Sea Surface Temperature, Sea Surface Salinity, Sea Surface Height (including sea state), Surface Vector Winds (including wind stress), Ocean Colour (chlorophyll-a), Sea Ice (Extent).

4.3.3 The Committee agreed that the document mentioned above would cover the current use of space and in situ observations in existing products and services (derived from known sources), including tables of current requirements by variable. It would highlight similarity and differences in operational and research requirements. The key content would be the JCOMM Strategy – a *unified set of requirements* for each variable, and consequences for an idealized observing system, where such requirements are fully realized. The Committee agreed on a timetable leading to completion for JCOMM-III. **(Action: Dr Eric Lindstrom to complete the document entitled: "Observing the Global Ocean for JCOMM - The Integrated Space-based and *in situ* Strategy"; prior to JCOMM-III)**

Capacity Building and Outreach

4.3.4 The chair of the Cross-cutting Task Team on Capacity Building, Ms Miriam Andrioli, briefly reported on the outcomes of the meeting of the JCOMM Capacity Building Rapporteurs, held in Paris, in October 2008. The Committee noted that, taking into consideration the existing capacity building strategies of WMO and IOC, the CB Rapporteurs agreed that a supplementary capacity building strategy for JCOMM was not required and a statement of principles for JCOMM Capacity Building would better represent the JCOMM requirements on CB and describe the implementation mechanism and activities to be undertaken by JCOMM in this area, including training, transfer of technology, and development of projects. The Committee endorsed this approach. It reviewed and endorsed the CB principles, and accepted with appreciation the offer of Dr Worth Nowlin to review and complete the preparation of the full document by early 2009 **(Action: Dr Worth Nowlin to review and complete the preparation of the full document on the CB principles; Done)**. The agreed CB principles are presented in Annex IV to this report.

4.3.5 The Committee agreed that JCOMM capacity building activities should be the responsibility of the respective Programme Areas, being coordinated by a member of the Committee. It requested the PA coordinators to each nominate an expert to coordinate CB activities within their PAs **(Action: PA coordinators to each nominate an expert to coordinate CB activities within their PAs; at JCOMM-III)**.

4.3.6 The Committee noted that the Rapporteurs had pointed out that, while a number of CB activities have been achieved for Oceanography during the intersessional period, there has been a lack of capacity building for Marine Meteorology, and called on all Programme Areas to consider this issue when developing their work programmes for the next intersessional period.

4.4 Science issues and opportunities (aligned with the JCOMM Operating Plan)

- **Deliverables, recommendations, future actions**

4.4.1 The chair of OOPC, Dr Ed Harrison, was invited to offer comments to the Committee, and presented a number of personal observations for consideration and discussion. The Committee noted that the fundamental challenge to the sustained ocean observing community is to identify the activities required to permit delivery of ocean information to its national customers. It is also necessary to convince the nations of the world to establish mechanisms to carry out these activities in a coordinated fashion. The GCOS Implementation Plan (GCOS-92) remains the statement of requirements for the sustained global ocean observing system from the Ocean Observations Panel for Climate (on behalf of its co-sponsors, the WCRP, GOOS and GCOS programmes) and is primarily driven by climate assessment, forecasting and research needs to serve the climate observation needs of the UNFCCC and the GEOSS. To accomplish these

requires the continuing enlargement of the community of institutions and individuals concerned with ocean observations, analysis and forecasting, and a willingness to agree standards and best practices. The Committee pointed out that JCOMM efforts have assisted in this community enlargement as well as in progressing standards and best practices.

4.4.2 For the observing and analysis efforts to serve best the various national interests, the Committee agreed that it is important that uncertainties, in the result of every activity, be estimated and communicated to the users. Dr Harrison presented some examples based on time series of Arctic sea ice coverage, global and local sea level rise and upper ocean heat content; in each case differences between analyses are sufficient to affect interpretation of these quantities yet this information is not widely available.

4.4.3 The Committee noted that progress in implementation of the GCOS-IP, through national efforts, is being documented for presentation to the UNFCCC in late 2009. The global ocean plan is being revisited via community activities that would come together at the OceanObs09 conference in Venice, Italy, in September 2009, and lead to a consensus vision for the second decade of the sustained ocean observing system. The Committee also noted that the JCOMM Programme Areas would be contributing to OceanObs'09. Plans from the marine ecosystem, biogeochemistry, carbon and fisheries communities have been solicited, in addition to the physical and chemical communities whose efforts are already underway. A refreshed GCOS-IP (v.2) would be developed and presented to the UNFCCC.

4.4.4 The Committee noted that JCOMM and other coordinating elements of the ocean observing system have created a real-time system based on the GTS and internet protocols and data servers, but there remain substantial issues concerning the agreement of metadata and quality control standards. It encouraged DMPA and OPA to expand the observing system to include non-physical variables, including data sharing issues, in cooperation with the scientific communities involved. In particular, the Committee recommended that DMPA establish contact with CEOS/WGCV and endorsed the participation of the JCOMM co-president and the OPA coordinator in the Argo International Steering Team meeting that would be held in March 2009, in China. **(Action: JCOMM co-president and the OPA coordinator to participate in the Argo International Steering Team meeting; March 2009)**

5. JCOMM Collaboration with Specific International Programmes and Projects

5.1 International Polar Year (IPY) – legacy (e.g., SOOS, IAOOS)

5.1.1 The Committee noted with appreciation the report on the development of IPY legacy systems. Following the discussion in MAN 6 (Paris, December 2007), JCOMM has continued to be involved in the development and implementation of the IPY legacy systems in both polar oceans. The Committee was pleased to note major achievements and activities, as following:

- At the request of the IPY community, JCOMMOPS has been regularly providing status maps of observations from both polar oceans that were available on the GTS, since late 2007.
- The increasing number of instrumented marine mammals reporting data onto the GTS, including from under the sea ice sheet, in the Southern Hemisphere map.
- The number of reports from traditional oceanic observing networks in the Polar Regions was significantly increased, as the result of successful IPY implementation: According to results of WWW monitoring from 1 to 15 July 2007 (compared with the same period of 2006), the number of BUOY reports has increased by 1096 in the Arctic basin and by 18 150 (five times more) in the Southern Ocean. The number of TESAC reports has increased by 39 in the Southern Ocean in particular due to deployment of Argo floats.

- Many international multidisciplinary marine expeditions were successfully carried out within IPY projects such as DAMOCLES, SEARCH, ARCTICA-2007, OASIC, etc. One of the main achievements of these activities was the deployment (for the first time in history of the Arctic Ocean studies) of 156 oceanographic moorings and arrays as well as a large number of new underwater and under-ice mobile observing facilities across the Arctic Ocean.
- In the Southern Ocean, the first phase of the IPY project “Climate of Antarctica and the Southern Ocean (CASO)” was successfully carried out in the Antarctic in January-March 2008 and the second phase is planned to be implemented during the austral summer of 2009.
- The IPY Ice Logistics Portal, a joint initiative of ETSI and Polar View, aimed at creating a convenient point of access to operational sea ice information produced by the world's ice services.

5.1.2 The Committee noted that the IPY has significantly enhanced the research observations in both polar oceans, and emphasized that the most valuable elements of them should be converted into sustainable long-term observing components. In this context, the Committee agreed that JCOMM should continue to build the partnership with planned IPY observing networks, such as Sustaining Arctic Observing Networks (SAON) and Southern Ocean Observing System (SOOS). The Committee also encouraged further efforts to develop regional observing systems in both Polar Regions.

5.1.3 The Committee recommended that the sea-ice activities under GOOS and JCOMM should continue to be involved in the development of SAON, SOOS, and the Global Cryosphere Watch (GCW) for synergizing common activities within these initiatives.

5.1.4 The Committee expressed concerns on the current data management activities in various IPY programmes, which were mainly conducted by individual programme level as parts of research activities. As a result, only a small part of the observed data within IPY framework was currently available on GTS in real time. The Committee encouraged the SOOS and other arctic observing networks to ensure that the data management procedure would be consistent with the internally agreed data policy, and recommended that JCOMM and IODE would continue to interact with the arctic networks to provide necessary support.

5.2 WIGOS

5.2.1 Mr Greg Reed introduced the document on the implementation of WIGOS Pilot Project for JCOMM. The Committee noted that the WIGOS Pilot Project for Marine Observations would be implemented jointly, by WMO and IOC through JCOMM, and has identified three key deliverables:

- Documenting and integrating instrument best practices and related standards;
- Build marine data systems that are interoperable with the WIS; and
- Promoting quality management and standards.

5.2.2 The Committee further noted that the Pilot Project would address instrument best practices and traceability to agreed standards through enhanced cooperation with CIMO. Efforts have been made to update the WMO No. 8 Guide and other appropriate WMO and IOC documentation, establishing regional marine instrument centres, and conducting instrument intercomparison. The Pilot Project would make appropriate datasets available in real-time and delayed mode to WMO and IOC applications through interoperability arrangements with the WMO Information System (WIS) and the IOC Ocean Data Portal (ODP).

5.2.3 The Committee recognized that the cooperation with the ocean community is a key to the success of the Pilot Project, in particular with the IOC's International Oceanographic Data and Information Exchange (IODE) programme and its system of National Oceanographic Data Centres

(NODC). The Committee noted that access to ocean datasets would be facilitated through ODP connectivity to the WIS. Due to the strong potential synergies between the ODP and the Pilot Project, The Committee noted with appreciation that a joint Steering Group has been established with balanced representation from the IOC and WMO communities.

5.2.4 In terms of quality management, the Committee noted that the Pilot Project would assist in the production of the JCOMM Catalogue of Best Practices and Standards for those standards of interest to WIGOS, and would also promote the joint IODE-JCOMM Standards process.

5.2.5 Mr Reed informed the Committee that details of the work expected to be carried out to meet these deliverables and a proposed schedule and actions can be found in the Project and Implementation Plans available at http://www.wmo.int/pages/prog/www/wigos/marine_pp.html.

5.2.6 The Committee noted that Capacity Building, an important component of the Pilot Project, would focus on the cooperation of developing countries in the Ocean Data Portal project, the promotion of WIGOS at the national level, and the organization of training courses in topics relevant to the WIGOS Pilot Project for JCOMM.

5.2.7 The Committee further noted that a number of organizations and programmes have been identified as potential partners, which would be formally approached to confirm their commitment to the Pilot Project. Even noting that the development and implementation costs would be met by the participating partners, the Committee stressed that the Pilot Project cannot achieve success without appropriate funding for coordination. The Committee recommended that both WMO and IOC commit resources to support the management of the Pilot Project. In this context, the Committee expressed its appreciation to US NOAA for providing funds to IOC to hire a consultant to produce the JCOMM Catalogue of Best Practices and Standards.

5.2.8 The Committee noted with appreciation that the Subgroup on the WMO Integrated Global Observing System (EC-WG/SG-WIGOS-1) of the Executive Council Working Group on WMO Integrated Global Observing System (WIGOS) and WMO Information System (WIS), at its first session held in November 2008, recognized that the WIGOS Pilot Project for JCOMM was the most mature in terms of planning and of establishing collaborative links between different agencies and the Pilot Project team was commended on the excellent progress. The Committee thanked and congratulated the PP Steering Group and its co-chairs for these achievements and recommended that a demonstration of the Ocean Data Portal would be convened at JCOMM-III.

5.3 Severe Weather Forecast Demonstration Project – extension to include marine forecasting aspects

5.3.1 The Committee noted that the Commission for Basic Systems (CBS) has initiated the Severe Weather Forecasting Demonstration Project (SWFDP) to contribute to capacity building and to help developing countries to be able to access and make the best possible use of existing NWP products to improve forecasts and warnings of hazardous weather conditions. The SWFDP is implemented through a “Cascading” concept of the forecasting process. The Committee further noted that participating National Meteorological Centres of the region have expressed interest to expand the project to include met-ocean forecasting services, in particular, wave forecast products. Noting that this concept is a successful demonstration of how developing countries can be assisted to reduce the technology gap in operational forecasting, the Committee endorsed the proposed extension of the SWFDP to include met-ocean forecasting products. It recommended identifying bodies that might be able to act at the regional level in order to fill the potential gaps. The Committee also recommended applying this concept in the development of the Storm Surge Watch Scheme.

5.4 Maritime Safety Services

5.4.1 The Committee noted that there are a rising number of new requirements requiring contribution from ETMSS, such as the expansion of the GMDSS into the whole Arctic Ocean, the

development and implementation of Quality Management Systems for maritime services, and development of user-focussed services for vessels not covered by the SOLAS Convention. It further noted that the ongoing requirement for the definition and implementation of graphical/numerical MSI broadcasts within the GMDSS has not been properly addressed by the team due to the non-existent core membership and lack of expertise. The Committee therefore agreed to consider the proposed core membership for the ETMSS, its scope and frequency of the meetings during the discussion of agenda item 6. It requested the Secretariat to provide all documentation available on the status of the studies being undertaken by JCOMM Teams to the DMPA coordinator, who is leading the Task Team on Methods for Transmission of Graphical Products to Marine Users, established under agenda item 3 **(Action: Secretariats to provide all documentation available on the status of the studies on methods of transmission of graphical products to mariners, being undertaken by JCOMM Teams to the DMPA coordinator; Done)**

5.5 Storm Surge Watch Scheme

5.5.1 The Committee noted that WMO Executive Council (Geneva, June 2008) addressed the need for the provision of storm surge guidance information to Members in developing countries exposed to these risks as a matter of priority, and requested the WMO Secretary-General, in consultation with UNESCO/IOC, to facilitate the development and inclusion of storm surge watch schemes into the tropical cyclone advisory arrangements and in the Tropical Cyclone Operating Plans. It further noted that Regional Association V Tropical Cyclone Committee, in its twelfth session (Niue, July 2008), established an Action Team to address the issue of coastal flooding in the RA V region and that the first meeting would be held from 15 to 16 December 2008, at the Bureau of Meteorology in Melbourne, Australia. Noting that there are scientific and technical activities being undertaken by ETWS, the Committee requested the RA V Action Team to identify potential JCOMM contributions to the development and establishment of the Storm Surge Watch Scheme **(Action: RA V Action Team to identify potential JCOMM contributions to the development and establishment of the Storm Surge Watch Scheme; mid-December 2008 (Done))**. It further recommended that a workshop to address the technical and scientific issues of coastal inundation be held with participation of experts from different communities, such as the hydrological community.

5.6 Designation of Marine Data Collection and Production Centres (DCPCs) for WIS

5.6.1 The Committee noted that the WMO Information System (WIS) has been designed as an overarching, integrated system meeting the requirements for data exchange of all WMO Programmes, affiliated international organizations and programmes, as well as relevant national non-NMHS users such as disaster prevention and mitigation agencies and research facilities. The WIS provides for: (i) routine collection and automated dissemination of operation-critical data; (ii) timely delivery of high-volume data and processed products ("push"); (iii) discovery, access, retrieval services for data from WMO Programmes and Co-sponsored programmes ("pull"); and (iv) common procedures for real- and non-real-time data exchange and standardized data formats and metadata.

5.6.2 The Committee further noted that the main functional components of WIS are the National Centres (NC), Data Collection or Product Centres (DCPC), Global Information System Centres (GISC) and data communication networks connecting the components. The most appropriate component of the WIS structure applicable to JCOMM is the DCPC. One of the key deliverables of the WIGOS Pilot Project for JCOMM is to build marine data systems that are interoperability that would provide access to marine meteorological and oceanographic data via the WIS.

5.6.3 The Committee stressed that the identification of potential DCPCs at this time was not possible because the obligations for operating a DCPC are not sufficiently clear. In particular, it will be important to have a checklist of the requirements that need to be met by potential DCPCs such as details of the commitments to service provision, and how candidate agencies can demonstrate their ability to meet the requirements. In addition, the compatibility of the DCPC software with

national IT security constraint needs to be determined. As DCPCs begin to provide the wide variety of data, particularly from the ocean, the issue of version control of the data will become increasingly important.

5.6.4 The Committee noted that the marine community has a number of potential candidates already including those from SOC, GHRSS, and the centres providing GMDSS and MPERSS functions. The Committee further noted that the WIGOS PP for JCOMM will be a good testing ground and educational experience for learning what is required for the provision of ocean data. Many of the available data and products may be provided through the Ocean Data Portal, which has already operated as a prototype DCPC for WIS. It is hoped and recommended that the NMHSs and national oceanographic institutions take this as an opportunity for enhancing their collaboration.

5.7 Observing Programme Support Centre (OPSC) Evaluation Process

5.7.1 Dr. Keith Alverson, IOC Secretariat, introduced the report on the evaluation process for the WMO-IOC Observing Programme Support Centre (OPSC). Fifteen Letters of Intent (Lols) for hosting an Observing Programme Support Centre (OPSC) were received by the WMO and IOC by December 2007. An evaluation committee which was led by Dr Jean-Louis Fellous (JCOMM co-president) and comprised of Dr Peter Dexter (JCOMM Co-president), Mr Jean Rolland (DBCP representative), and Dr Breck Owens (Argo representative) met in Paris on 11 April 2008, in order to review and evaluate the Lols. Each Lol was evaluated based on the following points of consideration:

- strong involvement in operational (or quasi-operational) activities with regard to the deployment of ocean observing platforms in the open-ocean (e.g., Argo floats, drifters, VOS ships, SOO);
- close connection to the international WMO and IOC communities;
- capability to provide full 24-hour operational IT support and GTS access;
- strong involvement in scientific activities related to ocean observations;
- willingness to provide sustainable financial support for future center, as necessary.

5.7.2 The Lol review committee finally selected five Lols out of the fifteen, for a short list to undergo further evaluation. As the next step, two questionnaires to obtain more details on technical and administrative support were sent to those short-listed institutions for further evaluation. Through this process, three questionnaires were completed and returned to the Secretariat (IFREMER-CLS of France, NOAA of USA, and INCOIS of India).

5.7.3 Under the guidance of both Organizations, the review committee agreed to expand its membership in evaluating the short listed candidate institutions. The expanded committee should include the representatives of observing programmes that potentially would contribute to and benefit from the future OPSC. The draft Terms of Reference of the review committee with proposed membership are reproduced in Annex V.

5.7.4 The Committee noted the procedure and timeline of the evaluation/selection procedure.

5.7.5 Regarding the membership of the Lol review committee, the Committee recommended to invite external member(s) in order to obtain objective external opinion, and requested the Joint Secretariat to seek suitable person(s) to be invited for the membership.

5.7.6 The Committee noted that several items in the technical and administrative questionnaires needed further clarification (e.g. procedures for IS network security, 24/7 monitoring system for the OPSC Information System components), and requested the evaluation committee to take them into

account in evaluating short-listed institutions. **(Action: OPSC Evaluation Committee to take into account that these are several items in the technical and administrative questionnaires needed further clarification in evaluating short-listed institutions; during the evaluation process)**

5.7.7 The Committee also noted that, considering the increasing requirements from the user community, the future OPSC would need to consider enhancing links to the satellite information services, and suggested drafting/updating the ToR of a future OPSC in this regard (by JCOMM-III).

6. Structural preparations for JCOMM-III

6.1 Programme Areas structure and sub-structure

6.1.1 The Committee recalled that the present subsidiary structure for the Commission adopted by JCOMM-II was essentially developed following the formal establishment of JCOMM by WMO and IOC in May/June 1999, with minor changes to reflect new or modified priorities. The Committee recognized that the major implementation problems related to the availability of individual team members to implement the tasks assigned to them and budgetary constraints.

6.1.2 Noting relevant changes that have taken place over the 10 years in the parent organizations and governing bodies, as well as within JCOMM, the Committee recognized the need for reviewing and possibly changing the overall structure of JCOMM. Following extended discussions, and recognizing that there remained several possible approaches to the overall structure of JCOMM to address its objectives and work priorities, the Committee nevertheless finally agreed to retain the Programme Area structure which had been the basis of JCOMM since its formation in 1999.

6.1.3 Recommendations on JCOMM-III restructuring of the OPA were discussed. The Committee agreed that the current structure of the OPA was working well for *in situ* observations, but that it was now time to integrate satellite observations through the addition of a satellite expert team to ensure integration of *in situ* and satellite observations, as well as the addition of sea ice, wind, wave and storm surge observations. In addition, in light of the maturity of the Argo program as well as the importance for its long-term maintenance, the Committee strongly recommended the Argo Steering Team (AST) be invited to become an official OPA component, acknowledging that the existing AST terms of reference would stand. This recommendation will be presented to the upcoming AST meeting (22-23 March 2009, Hangzhou). The Committee also encouraged OceanSITES and IOCCP to remain strongly linked with OPA coordination, become official components when appropriate, and suggested to invite groups involved in ocean measurements using marine mammals as observing platforms to become associated with the OPA. The Committee also encouraged a greater cross-array focus on ECVs. A new ET-SAT was agreed that would focus on the coordination of ocean variables where a viable integrating participation group was available. A TT will be established for each variable with a member from each PA and from the integrating participation group. The table below identifies the agreed ocean variables and potential integrating group for that variable.

Scope of ET-SAT

Ocean variable	OBS.PS rep	Participating Integrating group	DPMA rep	Services PA rep
TT SST	(name)	GHRSSST (Group for High Resolution SST) (International)	(name)	(name)
TT S.S Salinity	(name)	SSS Sci. Team (NASA in 2009 others) (name)	(name)	(name)
TT sea level	(name)	OSTST (Ocean Surface Topography Science Team) (International)	(name)	(name)
TT winds/stress	(name)	OVWST (Ocean Vector	(name)	(name)

		Winds Science Team) (international)		
TT Colour	(name)	International Ocean Colour Coordination Group (IOCCG)	(name)	(name)
TT sea ice	(name)	International Ice Chart Coordination Group (IICWG)	(name)	(name)
TT waves	(name)	Globwave (ESA)	(name)	(name)
TT currents	(name)	OSCAR (www.oscar.noaa.gov)	(name)	(name)

6.1.4 The Committee noted that the DMPA is already well advanced on the process of internal restructuring, to the extent that the existing ETs (MC and DMP) are redefining their roles, terms of reference and membership. Overall, the DMPA is already effectively integrated with IODE and ETDMP is cosponsored, with a new membership now being established. Regarding marine climatology and climate services, the Committee decided to establish a Breakout Group.

6.1.5 The Breakout Group on JCOMM's role on Climate Services reported on their discussion to the Committee, as summarized in Annex VI. It agreed that JCOMM's role in climate services is to provide the intergovernmental coordination that is needed to ensure that the marine climate observations (in situ and satellite) and information required for the provision of climate services by governmental and non-governmental service providers are obtained and made available in the most useable form.

6.1.6 The Committee generally agreed that the primary role of JCOMM in climate and climate services is to monitor ECVs in coordinated and consistent manners, and to help further understanding/analyzing the obtained information. In terms of the future direction, the Committee agreed that the JCOMM should clearly recognize the requirements of the user community on JCOMM's role in supporting climate services, in particular, coordination of underpinning datasets and mechanisms for product delivery.

6.1.7 Taking into account these aspects, the Committee recommended that the ToRs and work plans of Programme Areas and Teams/Groups for the next intersessional period should consider the climate aspects. It also recommended that these activities should be planned and conducted in close coordination with existing bodies, such as CCI and the GCOS working groups on SST and Sea Ice. However, it agreed not to establish a separate team on this issue at the present time, as ECV issues are relevant and part of the activities in all PAs.

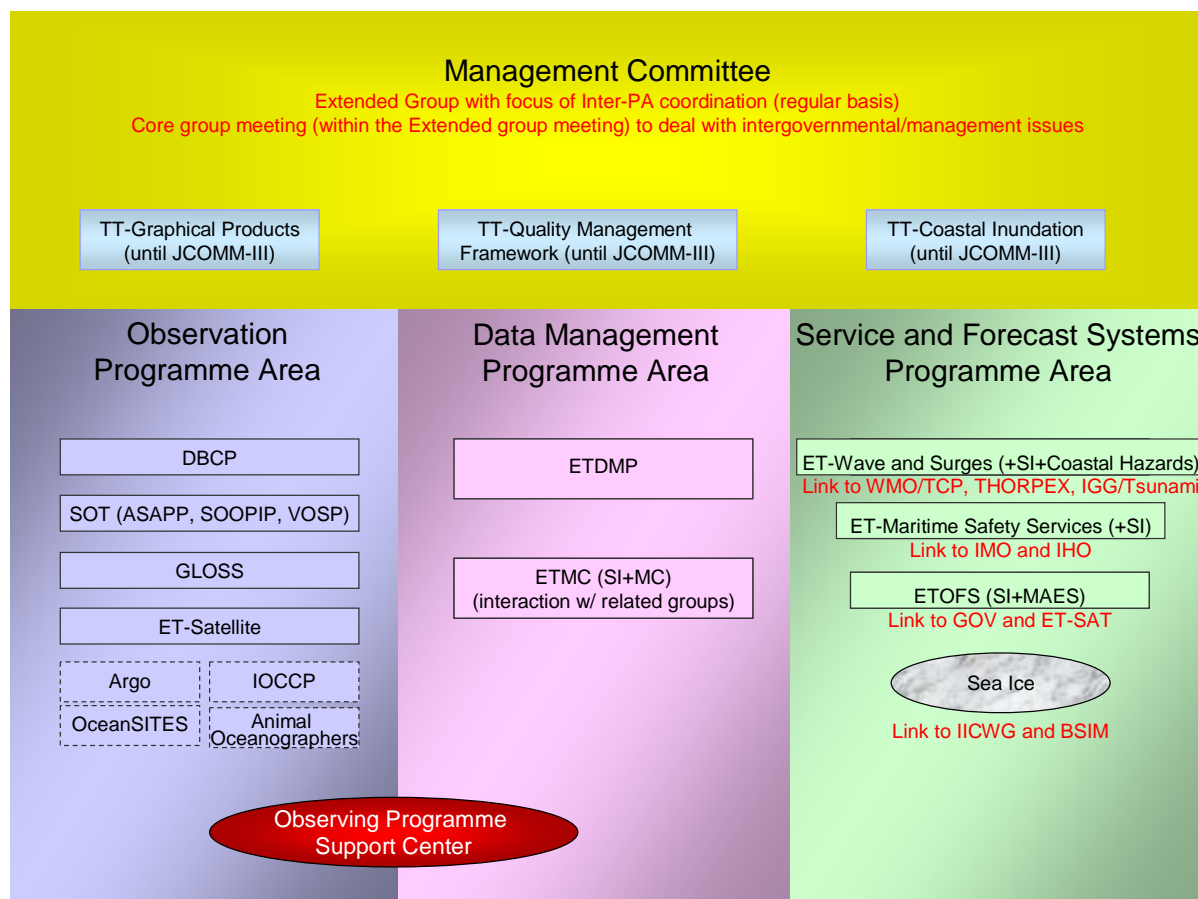
6.1.8 The Committee also noted that World Climate Conference 3 will put its focus on the integrated climate information initiatives, and considered that JCOMM should find ways to be involved in the preparation process.

6.1.9 In accordance with views of the SPA coordinator, the structure of the SPA should be adapted to current requirements and priorities. Some of the current expert teams have been effective, others less so, while ET/OOFS has just begun its work but will be a priority activity for JCOMM in the coming intersessional period. There is also an important integrating role for the SPA, in providing requirements for observational data and data delivery, in support of met-ocean services, to the DMPA and OPA. With these considerations in mind, the Committee agreed on the new structure for the SPA, as follows:

- (i) An expert team on Maritime Safety Services. Its role would encompass much of what is now undertaken by the ETMSS, but in a more focussed way and with substantially reduced team membership. Essentially it will be responsible for maintaining the WMO regulations relating to the delivery of maritime safety services under the GMDSS (content, format, communications), and for the formal liaison with IMO/IHO in this

- activity. The team would also cover the service delivery and communications aspects of both the existing MAES and SI teams;
- (ii) An expert team on Ocean Forecast Systems (OFS), constituted as now with similar terms of reference, but expanded to cover modelling/product development aspects of the existing ETMAES and ETSI;
 - (iii) An expert team on Waves and Surges (WS), largely covering the key priority work areas of the existing ETWS. The team would also cover marine and coastal hazards aspects and sea ice interactions.

6.1.10 Based on the advice from the PA coordinators and discussions under the current and previous agenda items, the Committee reviewed this subsidiary structure in the light of its achievements and agreed on the broad structure presented in the following diagram:



6.2 Management Committee and Bureau

6.2.1 The Committee recognized that the Management Committee as established through Res 1 (JCOMM-II) is relatively large, with 13 regular members and 4 liaison members (representing GOOS, GCOS, IODE and OOPC) and agreed to a new Management Committee, which should comprise no more than 10 regular members.

6.2.2 Recognizing the importance of inter-PA coordination in implementing the workplan of the commission, the Committee agreed that the future MAN should put more emphasis on communication and cross-collaboration among PAs. In this context, it was agreed that the future MAN meetings would focus on coordinating activities among PAs in response to cross-cutting requirements. The MAN membership would comprise two co-presidents, three PA coordinators and up to five additional members, who are identified as experts on priority issues, including CB. A core group including co-presidents and PA coordinators would convene a meeting during the extended MAN session to deal with intergovernmental/management issues.

6.3 Meetings – structure, frequency, attendees (aligned with the JCOMM Operating Plan)

6.3.1 The Committee recognized that it is essentially the responsibility of the co-presidents and Secretariat to agree a meeting programme for JCOMM subsidiary bodies in the coming intersessional period, in consultation with the PA coordinators and consistent with the agreed substructure and JCOMM Operating Plan, and within the resources available.

6.3.2 Alternative methods of communication such as teleconferences are strongly **recommended**.

7. Logistics for JCOMM-III

7.1 Agenda, annotated agenda and documentation plan

7.1.1 The Committee reviewed, revised and adopted the Provisional Agenda for JCOMM-III. This is given in Annex VII. The Secretariat was requested to complete the explanatory memorandum and document plan based on this agreed provisional agenda and circulate these documents among the members of the Committee for endorsement by mid-January 2009. **(Action: Secretariats to finalize the explanatory memorandum and documentation plan; mid-January 2009)**

7.2 Structure of the session

7.2.1 The Committee was informed that the third session of JCOMM (JCOMM-III) is scheduled to take place in Marrakech, Morocco, 4-11 November 2009, immediately after the Technical Conference (2-3 November 2009).

7.2.2 The Committee noted that logistics planning for the session had already begun in the Secretariat and with the local organizers. Other preparations and planning for JCOMM-III were addressed in detail by the Committee. In particular, the Committee:

- agreed that the structure of the session would include “information sessions” on PAs activities, scientific and operational requirements, and integrated in situ and satellite observing systems. This would then allow the Working Committees and plenary sessions which followed to concentrate on reviewing, debating and adopting programmes, plans and decisions, rather than spending time on often lengthy reporting;
- decided that the theme for the Scientific Lecture would be *Socio-economic benefits of Met-Ocean information and services*. Preferable timing: an evening lecture on Thursday, 5 November 2009. Possible speakers were canvassed, without any final decision. The co-presidents and Secretariat were requested to finalize this issue as soon as possible; **(Action: Co-presidents and Secretariats to finalize arrangements for the Scientific Lecture to be convened at JCOMM-III; ASAP)**
- agreed with the ETSI proposal that an Outstanding Service Certificate should be awarded to Mr John Falkingham (Canada) at JCOMM-III. The Committee requested its members to consider other possible nominations with a view to making a final decision by end of May 2009 during a teleconference with Committee members. **(Action: Committee members to identify possible candidates with a view to making a final decision during a teleconference with Committee members; by end of May 2009)**

7.3 Documentation and timetable – structure of the documents

7.3.1 The Committee noted that document preparation should commence immediately after the current session of the Management Committee, and should continue at regular intervals until end

of May 2009. This would allow for translation into six languages and distribution to participants well in advance of the session. The Committee was also informed that there would be a limited hard copy distribution of documents to registered delegates at the session, and all documents would be made available for download from the JCOMM website with a link from both WMO and IOC websites.

7.3.2 The Committee noted that documents for JCOMM-III will consist of a single Report (REP) on the activities carried out during the preceding intersessional period and various short documents (DOCs) concentrating on decisions expected to be made during JCOMM-III. The REP would be treated as an information document (INFO), which will be provided in two languages (English and French). The Committee agreed that there would be INFO dedicated to the following issues: report by the Co-presidents of the Commission (with reference to the liaison with external bodies and programmes), reports on PAs activities, scientific and operational requirements, and integrated in situ and satellite observing systems.

7.3.3 The Committee noted that documents (DOCs) would consist of a draft text for inclusion in the general summary of JCOMM-III (decisions and actions), draft recommendations and/or resolutions, and a background information report containing only relevant topics (when required to understand the context of the draft text for inclusion in the general summary of JCOMM-III). The Committee further noted that number of words were allocated to each document, however these might slightly change in the course of the preparation of documents. In this context, the Committee requested the Secretariats to keep the PA coordinators and other experts submitting documents for the session informed of any changes in the number of words for each document. **(Action: Secretariats to keep the PA coordinators and other experts submitting documents for the session informed of any changes in the number of words for each document; Continuing from now to end of May 2009)**

7.3.4 The Committee recommended that the activities would be scheduled in an orderly manner to ensure that the reporting is concentrated at the commencement of the session, when most or all of the reporting by the subsidiary bodies takes place (INFO documents), while the second half would focus on discussions and decision making (DOCs/WP/PINKs). In this context, the Committee requested the Secretariats to finalize the timetable based on this agreed provisional agenda and structure of the session, and circulate it among the members of the Committee for endorsement by mid-January 2009. **(Action: Secretariats to finalize the timetable for JCOMM-III; mid-January 2009)**

8. Technical Conference in conjunction with JCOMM-III

8.1 Based on proposals and discussions during the Breakout group session on the definition of the theme and scope of the Technical Conference to be held in conjunction with JCOMM-III, the Committee agreed that the main goal of this Technical Conference would be education of the Commission, JCOMM players, observers and stakeholders regarding issues and requirements in NW Africa that might be mitigated by monitoring climate effects and/or by met-ocean forecasting, and well as potential solutions.. The Committee also agreed on the title for the Technical Conference: *Ocean information for societal benefits*.

8.2 The Committee also agreed on the following structure for and content of the Technical Conference: **(Action: Co-presidents and Secretariats to finalize the programme for the Technical Conference; end of May 2009)**

- **Day 1:** Climate change adaptation and disaster risk reduction in the marine and coastal environment – specific case studies. Speakers to be drawn from among managers and scientists in countries concerned, including NW Africa. Advice to be sought on such speakers from Regina Folorunsho, Moroccan Met Service and other Moroccan agencies (personal interest by the King of Morocco?), Peter Pissierssens, Justin Ahanhanzo, Edgard Cabrera, Julien Barbiere...Invite oil companies to attend – contact include Feeley, Minster, Grant...

- **Day 2 a.m.:** Marine meteorological and oceanographic services and benefits for DRR. Marine meteorological and oceanographic services and benefits for climate change adaptation (possibly to include output from WCC3). Speakers to be drawn largely from JCOMM members/participants and possibly WCC3 speakers.
- **Day 2 p.m.:** Projects and activities in DRR and climate change adaptation in NW Africa; e.g. coastal erosion, climate adaptation, hazards forecasting... Speakers to be provided through representatives of relevant projects (funded by the projects).

9. Personnel for next intersessional period

9.1 Officers

9.1.1 The Committee reviewed the report of its Breakout Group on Structure (see agenda item 6), on possible candidates for JCOMM Officers for the next intersessional period. It generally agreed on the principles in recommending and selecting the Officers (as described in the WMO Executive Council Resolution on Volunteerism in the Work of Technical Commissions and Regional Associations, given in Annex VIII), as following:

- to ensure that the expertise of candidates would be appropriate to the implementation of the work plans of JCOMM and its teams/groups;
- to consider the related regulations of WMO and IOC; and
- to make due consideration on geographical and gender balance.

9.1.2 The Committee requested the Co-Presidents and Secretariats to contact the recommended experts, informally, in order to ascertain their willingness and possibilities of their national support **(Action Co-presidents and Secretariats to contact the recommended experts, informally, to become JCOMM Officers in order to ascertain their willingness and possibilities of their national support; by January 2009)**. Considering that nomination for leadership was open until JCOMM-III, the Committee encouraged its members would actively seek any potential leaders and members to be a part of new JCOMM structure.

9.2 Expert Teams' ToR and membership

9.2.1 Regarding the Terms of Reference and memberships of Expert Teams and Groups, the Committee agreed that the Programme Area Coordinators should consolidate draft ToRs, with proposed qualifications for membership, and submit them to the Secretariats by mid-January 2009. It also requested the Co-Presidents to draft new ToR for the future Management Committee. **(Action: Co-Presidents and PA Coordinators to draft new ToRs for the future Groups and Teams; by mid-January 2009)**

10. Any other business

10.1 No other business items were raised for consideration.

11. Closure of the Session

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

11.2 Dr Worth Nowlin offered his sincere appreciation, on behalf of all participants, to the JCOMM co-presidents and the Secretariats for their excellent work in preparation and during the meeting. On behalf of all participants, Dr Peter Dexter thanked especially Ms Alice Soares for the ongoing support, the work done in preparation for, during and after the meeting. He also thanked Ms Amanda Amjadali for all the arrangements in providing such excellent facilities and hospitality.

11.3 In closing the meeting, the JCOMM co-president, Dr Jean-Louis Fellous, expressed its appreciation to Dr Peter Dexter, JCOMM co-president and local organizer, and to all participants for their very positive and valuable input to the discussions, to what had been a very successful meeting, with clear outcomes, such as the agreement on the future structure of the Commission, the preparations for JCOMM-III in Morocco, and the integration of in situ and satellite observations. He looked forward to seeing all participants in Marrakech.

11.4 The seventh session of the JCOMM Management Committee closed at 1300 on Friday, 12 December 2008.

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AGENDA

1. Organization of the Session

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

2. Scientific and technical workshop

3. Impact on JCOMM Activities and Priorities of Decisions, Guidance and Requirements from WMO Congress, Executive Council, Regional Associations and Presidents of Technical Commissions Sessions; and IOC Assembly and Executive Council sessions

4. Programme preparations for JCOMM-III

- 4.1 JCOMM Programme and Priorities (aligned with the WMO Strategic and Operating Plans; and the IOC Medium-Term Strategy) – JCOMM Operating Plan
- 4.2 Programme Areas (aligned with the JCOMM Operating Plan)
 - Deliverables, recommendations, future actions
- 4.3 Cross-cutting activities within JCOMM: satellites, CB and outreach (aligned with the JCOMM Operating Plan)
 - Deliverables, recommendations, future actions
- 4.4 Science issues and opportunities (aligned with the JCOMM Operating Plan)
 - Deliverables, recommendations, future actions

5. JCOMM Collaboration with Specific International Programmes and Projects

- 5.1 International Polar Year (IPY) – legacy (e.g., SOOS, IAOOS)
- 5.2 WIGOS
- 5.3 Severe Weather Forecast Demonstration Project – extension to include marine forecasting aspects
- 5.4 Maritime Safety Services
- 5.5 Storm Surge Watch Scheme
- 5.6 Designation of Marine Data Collection and Production Centres (DCPCs) for WIS
- 5.7 Observing Programme Support Centre (OPSC) Evaluation Process

6. Structural preparations for JCOMM-III

- 6.1 Programme Areas structure and sub-structure
- 6.2 Management Committee and Bureau
- 6.3 Meetings – structure, frequency, attendees (aligned with the JCOMM Operating Plan)

7. Logistics for JCOMM-III

- 7.2 Agenda, annotated agenda and documentation plan
- 7.2 Structure of the session
- 7.3 Documentation and timetable – structure of the documents

8. Technical Conference in conjunction with JCOMM-III

9. Personnel for next intersessional period

- 9.1 Officers
- 9.2 Expert Teams' ToR and membership

10. Any other business

11. Closure of the Session

Executive Summary of the Technical and Scientific Workshop

Peter Dexter gave a short introductory talk about the Bureau of Meteorology and its major activities of relevance to JCOMM. These are coordinated under the Bureau's Oceanographic Services Programme, with staff working in several different functional units. The activities include a suite of operational marine meteorological and oceanographic forecast models, operated through the National Meteorology and Oceanography Centre; the National Tidal Centre in Adelaide delivering tidal predictions and other sea level services; management of major projects (Bluelink and the South Pacific Sea Level and Climate Project); outreach in the delivery of ocean services; and national, regional and international ocean policy coordination. The model being developed for ocean services involves a significant reliance on the private sector to deliver tailored end-user services.

Gary Brassington presented the Australian operational ocean forecasting system, developed under the "Blue Link" research project, and its ocean data assimilation system, using data from Jason-1, Envisat, AMSR-E, Argo, XBT and CTD observations. He discussed the performance of the current OceanMAPS forecast system, and illustrated some of the applications – e.g., coastal upwelling, trapped waves, barotropic current instabilities, cyclones, etc. He gave an insight on the impact of sea surface salinity measurements expected from SMOS/Aquarius being assimilated into ocean analyses, and described a few recent research results on the validation of coastal eddy dynamics analysis and forecasts through the deployment of buoys. He concluded on a quick glimpse of future developments (major issue: maintain one single model with finer resolution around Australia or use two different models for global and regional forecasts), and mentioned the forthcoming GODAE Summer school to be held in January 2009 in Perth.

Graham Warren reported on Blue Link-related operational issues and product delivery at the national Meteorological and Oceanographic Centre (NMOC). Issues with data access include the lack of common agreed format, the unavailability of data from a single source, and the latency of altimetry data. NMOC uses the Meteorological Archive Retrieval System (MARS) developed by ECMWF. Products delivered (through ftp, http and OPeNDAP) include diagnostic and tailored products for internal users (data monitoring, performance verification and validation) as well as tailored products for registered users (at cost of access) and research partners, plus graphical products freely available for the general public and the media. Data and product storage is becoming a serious volume problem. He concluded on the robustness and reliability of the OceanMAPS system, and its accuracy, obviously dependent on input data, mostly *in situ* and altimetry.

Graham Warren further presented the Bureau of Meteorology wave models and products, using numerical wave models and altimeter wind and wave (SWH) data. **Mikhail Entel** then presented the Storm Surge model, which has not made as much progress as expected in the last twenty years (particularly for surges associated with tropical cyclones). He analyzed a few examples of coastal floods which were not properly predicted by current models, and described the so-called "probabilistic storm surge prediction system" compared to the deterministic prediction system, and concluded on the intrinsic difficulties of this problem.

Helen Beggs presented the operational SST analyses at the Bureau of Meteorology, described the Regional and Global Australian Multi-Sensor SST Analysis (RAMSSA and GAMSSA) systems, and mentioned some directions for future work. She discussed the space-time-depth requirements in terms of "skin", "bulk" and "foundation" temperatures. Sparse buoy and ships *in situ* data (on GTS), HRPT AVHRR (1 km), GAC AVHRR (9x4 km), AATSR (17 km) and AMSR-E (25 km) data are being used and filtered with respect to mean hourly surface wind speed (daily or nightly) to produce regional (daily, 1/12°, pre-dawn foundation temperature) and global (daily, 1/4°) SST analyses. Comparisons with other products (Ifremer, UKMO, and NOAA) show fairly good agreement. A new regional skin SST analysis product is currently on trial, and other innovations are being planned, including improved ship SST observations (IMOS project) in terms of enhanced

quantity, quality and timeliness. Issues for operational SST analyses include the non-operational character of currently available satellite data streams (AATSR, AMSR-E, and TMI), lack of accuracy of current geostationary SST data over the Australian region, existing satellite data biases, and level of confidence in “independent” validation data sets.

After the break, **Peter Dexter** gave a short overview of JCOMM. He recalled the concept, origins and objectives of the Commission, and outlined its interactions and links, including with both requirements setting bodies and programmes (GOOS, GCOS, WWW, OOPC, etc), as well as other implementation bodies and programmes within and outside its parent Organizations, WMO and IOC. He then described the basic structure and mode of operation of the Commission, which acts as an intergovernmental mechanism to coordinate and regulate the implementation of marine meteorology and oceanography at the global and regional levels. He concluded by noting some of the ongoing and future priority activities of the Commission, which would be described in more detail in the following presentations.

Ed Harrison presented views on the challenges for an operational met-ocean observing system. The fundamental issues are to determine what systems are needed and to convince our nations to pay for them. The third challenge is to establish a community to support these. He recalled the OceanObs'99, the GCOS Adequacy Reports and Implementation Plan, the IPCC, CEOS and GEO roles, and the need for the system plan to evolve as we learned more and some elements become feasible. The approach goes from R&D to pilot projects to sustained efforts. An updated plan will be developed by OceanObs'09. The current status includes some progress in accomplishing the GCOS-IP, but most of it has come from research projects, and the present system looks good but is fragile and resources have nearly flat-lined in most countries. The challenge of convincing nations to sustain these actions and to understand that the observing system is a public good is still there. A form of regulatory basis may be needed. The issue of “community development” is also largely there. Sharing data, working on agreed standards and best practices, etc. are still in need of progress. The word “operational” has many connotations. Further to this discussion, he expressed the view that uncertainty estimation is not sufficiently addressed in marine and climate research, and that JCOMM has a role to play therein. Coming to examples, he pointed out that seasonal and decadal climate anomalies are going to affect most of the planet much more strongly on political timescales than will global warming. However, predictability on these scales remains low and ocean data are critical in that respect, provided that coupled models are good enough. Low-frequency ocean conditions are poorly known, as is the deep ocean. Trend estimates are simply not useful for projecting long-term trends. Ocean carbon and acidification is out of reach, and the issue of fisheries far too complicated. Historical ocean data set shortcomings cannot all be fixed. The changing observing system shows how biased are our measurements. He discussed ocean thermal content and thermosteric sea level uncertainties, based on data deficiencies and questioned uncertainty estimates, visibly underestimated. He concluded his talk with listing a number of specific challenges for JCOMM.

Candyce Clark gave an overview of the Observations Program Area. Fifteen ocean surface and subsurface ECVs are listed in the GCOS-IP. Observing systems are integrated and composite altogether. Ocean observations support eight out of nine GEO SBAs. 60% of the overall *in situ* system is implemented as of February 2008. She gave an update on the status of each of the ocean observing system elements: tropical moored buoys – RAMA system getting started in the Indian Ocean; OceanSITES – 43 stations now in service out of 89 planned; tsunami buoys integration into GOOS; tide gauges near-real time reporting and GPS/DORIS collocation improvement; ocean carbon sources and sinks measurement; sustained full array of surface drifters – progressive addition of barometers; sustained full array of Argo profiling floats; volunteer observing ships – over 900 VOS reporting at least 25 weather observations per month, 215 VOSclim registered; decline in XBT deployment (in connection with the deployment of Argo floats); and, “animal oceanographers”. She described activities related to observing program monitoring and support: JCOMMOPS (and its evolution into an OPSC); OSMC (version 3 now available). It appears that there are few national institutional commitments to maintain the present level of effort and much less to expand it.

Bob Keeley presented the Data Management Programme Area. JCOMM-II provided a list of 26 instructions derived from the GCOS-IP. The JCOMM data management plan was completed in early 2008 and is now published. The plan covers issues related to data exchange, processing, access, coordination and linkages, and communications. Details were given on these various aspects. For instance, concerning data and information exchange, a “cookbook” has been assembled providing the recipes for, e.g., submitting real-time data. He highlighted the strong and important linkages, which have been established with IODE over recent years.

Craig Donlon gave a presentation of the Services Programme Area. He stressed the new context favourable to the development of operational ocean and marine services, which one can perceive, e.g., in Europe, in Australia and to a large extent in the USA. He described the structure of the SPA and the mandate and activities of its various Expert Teams – on Maritime Safety Systems, Marine Accident and Emergency Support, Wind Waves and Storm Surges, Sea Ice, and Operational Ocean Forecast Systems. He insisted strongly on the importance of the satellite segment of the ocean observing system, particularly of altimetry. He concluded on the role of SPA as the front end of JCOMM, the integrator of JCOMM activities.

JCOMM Capacity Building Principles

1. INTRODUCTION

The WMO-IOC Joint Technical Commission for Oceanography and Marine Meteorology (JCOMM) was established in 1999 to coordinate worldwide marine meteorological and oceanographic services and their supporting observational, data management and capacity building programmes.

As formally constituted, JCOMM is an intergovernmental body of experts, and is the major advisory body to the two parent Organizations (consisting of their Members/Member States, Governing Bodies and other subsidiary bodies and programmes) on all technical aspects of operational marine meteorology and oceanography. JCOMM coordinates, and develops and recommends standards and procedures for, a fully integrated marine observing, data management and services system that uses state-of-the-art technologies and capabilities; is responsive to the evolving needs of all users of marine data and products; and includes an outreach programme to enhance the national capacity of all maritime countries.

The purpose of this document is to lay down the guiding principles on which JCOMM capacity building activities in marine meteorology and oceanography should be based. The document has been prepared taking into account previous documents and initiatives on capacity development undertaken by JCOMM. A member of the JCOMM Management Committee will be charged with coordinating capacity building activities.

JCOMM's Mission is to coordinate and facilitate the activities of Members/Member States to describe the marine environment for:

- Improved understanding (research and education),
- Provision of maritime services, and
- Monitoring climate and its variability.

JCOMM's vision is to benefit the global community by maximizing the benefits for its Members/Member States in the projects, programmes and activities that it undertakes in their interest and that of the global community in general.

2. CAPACITY BUILDING PRINCIPLES

WMO and IOC Capacity Building Programs

The JCOMM is jointly sponsored by the WMO and the IOC and therefore its Capacity Building activities must operate within, and draw upon, the overall principles of its governing bodies. The WMO and IOC should also assist with the development of partnerships with potential donor agencies and with links with other UN and other relevant regional and global organizations. The activities also must be compatible and work with similar efforts in other WMO and IOC programmes. In addition, the JCOMM should seek partnerships to pursue mutual objectives in the development of capability. Finally, capacity building requirements of the GOOS Regional Alliances (GRAs) and WMO Regional Associations must be considered.

It is generally agreed that a separate capacity building programme for JCOMM was not required, taking into consideration the existing capacity building strategies of WMO and IOC.

Rationale for JCOMM Capacity Principles

- JCOMM represents the first time where operational oceanography and marine meteorology have been combined on an intergovernmental basis. There is the need to entrain the

oceanographic and meteorological communities and to enhance mutual understanding of JCOMM among the members of these communities.

- There is the need for sustainable capacity development efforts to build joint atmosphere-ocean capabilities. These include building capabilities for the use of JCOMM data and products, enhancing advocacy for JCOMM, and improving the JCOMM system itself.
- JCOMM should support capacity development elements that are not fully included in other ocean or atmosphere programs, and draw attention specifically to other Capacity building programs of the WMO or IOC. Examples include specialized observations and resulting products, e.g., those of some satellite missions, the Argo profiling float program, or the Data Buoy Cooperation Program, and other applications.
- The three JCOMM Program Areas each should include Capacity Building activities for a more integrated, focused and proactive approach.

There are many examples of JCOMM capacity development needs of specific regions or nations. As one example, the following may be needed by low-lying coastal regions or islands:

- (a) Enhanced wind forecasts
- (b) Improved forecasts of waves and surge
- (c) Improved forecasts of storm intensity and track
- (d) Improved storm surge models
- (e) Improved fields of topography and bathymetry
- (f) Uncertainty estimates in sea level rise

The JCOMM Capacity Building Mission

To provide to nations, sub-regions, and regions capacity development related to JCOMM data, products, and services, and to understand their needs for operational systems and information and to assist them to address deficiencies, working in partnership with the capacity building programs of the WMO and IOC.

The JCOMM Capacity Building Vision

JCOMM contributing effectively to assist regions, sub-regions, and nations through training, transfer of technology and development of programmes and projects that will jointly develop capacity for operational oceanography and marine meteorology.

The JCOMM Capacity Building Principles

Note that there is no priority implied by the order of these principles.

- (i) The primary objective of JCOMM Capacity Building is to enhance the implementation of the overall JCOMM Programme through enhancing capacity in all JCOMM Members/Member States to contribute to and benefit from the programme.
- (ii) JCOMM capacity building activities should be the responsibility of the respective Programme Areas and included in their work plans.
- (iii) JCOMM Capacity Building activities should aim to fill-in gaps and avoid overlapping at national, regional and international levels. It is highly desirable that national partners from both JCOMM themes (i.e., oceanography and marine meteorology) be involved so the complementary and “symbiotic” benefits of JCOMM are clearly demonstrated.
- (iv) JOMMM Capacity Building will include continuous professional development.

- (v) JCOMM Capacity Building will aim, where possible, for a “train the trainer” approach to help ensure continuity by countering staff turnover/brain drain problems and to promote the wide spread of knowledge and practices.
- (vi) At the regional level, JCOMM Capacity Building will develop programmes and projects that follow WMO and IOC strategies (e.g. the **ODIN strategy**, developed by IOC/IODE).
- (vii) At the regional level, JCOMM Capacity Building will develop, preferably, medium to long-term programmes and projects that will result in national structural and embedded capacity that can be sustained by national funding sources.
- (viii) Creating awareness in the minds of the public and policy makers is essential for raising national and international support.
- (ix) JCOMM Capacity Building activities will include assessment of feedback regarding the satisfaction and requirements of users of JCOMM observations, products and services.
- (x) One member of the JCOMM Management Committee will be responsible for liaison with the three Programme Areas regarding Capacity Building activities.
- (xi) JCOMM Capacity Building activities should endeavour to utilize existing methods, courses, tools and other capacity building aids, particularly those of the WMO and UNESCO/IOC.

3. TYPES OF EDUCATION AND TRAINING ACTIVITIES AND IMPLEMENTATION

Methods and Tools

Capacity Building activities will be implemented using a wide variety of methods, tools and resources that are currently available within IOC (IODE) and WMO (including its 23 Regional Training Centres (RTCs)), or which will need to be developed by JCOMM and its parent bodies.

Training Courses

A traditional mechanism for transfer of capacity is the training course. This will also be the case for JCOMM's capacity building activities. Each JCOMM capacity building activity (programme, project) should include a training component. The project document should contain a clear statement on what expertise needs to be built. Based upon this information training activities will be planned.

Training Tools

At the 5th session of the Management Committee (Geneva, Switzerland, October 2006) OceanTeacher (<http://www.oceanteacher.org>), a training tool that was developed by the IOC/IODE, has been identified as one of the suitable tools for the management of JCOMM-related knowledge and training materials. Other tools also were identified and should be explored. WMO/ETR e-learning modules have been used for the management of educational and training materials on meteorology, including for marine meteorology.

It is important to maintain the highest possible standards for the quality of materials entered into OceanTeacher and Met e-learning, and interoperability between these tools should be ensured. It will also be desirable to establish and agree upon standard curricula for all topics. This can be achieved through close coordination between the resource persons and between the resource persons and the Chief Editors. It may be necessary to identify multiple Chief Editors, e.g. one per Programme Area.

E-learning modules use dynamic content management technology. As such, materials can be entered by resource persons from their usual place of work. In principle, the number of resource persons who can enter materials is unlimited.

Bilko is a complete data analysis system developed primarily for learning and teaching remote sensing image analysis skills, providing a powerful application capable of handling ocean model data. Current lessons teach the application of remote sensing to oceanography and coastal management, but Bilko routines may be applied to the analysis of any image in an appropriate format, and include a wide range of standard image processing functions. Supported by UNESCO, Bilko is available to users absolutely free including a wide variety of satellite and ocean model outputs with associated self-study lessons that are ideally suited for 'off the shelf' training courses in oceanography. See <http://www.bilko.org/>.

A Bilko lesson on ocean forecasting system outputs was developed for the COSPAR Regional Workshop for African Oceanographers, Rabat, Morocco, 19-30th September 2005, titled 'Exploring output from the National Centre for Ocean Forecasting (NCOF) Forecasting Ocean Assimilation Model (FOAM)'.

In many cases material in the Digital Library and Training Curriculum materials make extensive use of hyperlinks to other content both within and outside OceanTeacher and WMO Digital Library. An important quality control task for the Joint Secretariat is therefore, to regularly check whether links are still valid.

It is noted that the use of these e-learning modules is free and open to all. Access to the Digital Library is open and does not require registration. Access to the training Curriculum also is free, but registration is required for full functionality.

Workshops

Workshops are useful tools to promote the sharing of expertise and experience at the national, regional and global levels.

Travel and Study Grants

Travel and Study Grants allow national experts to benefit from the expertise acquired in other institutions. They also are effective in promoting long-term informal professional relations between experts.

As an example, the WMO Fellowship Programme enables fellowship holders to derive from their training the knowledge and professional competence, which will increase their ability to make essential contribution to enhancing the capabilities of the National Meteorological and Hydrological Services (NMHS) and enable them to participate more actively in the economic and social development of their countries. The fellowships granted by WMO are for studies or training in meteorology, including marine meteorology and hydrology, at universities or training institutes with appropriate facilities. Fellowships are awarded only at the request of the candidate's government and the candidates must be endorsed by the Permanent Representative of the candidate's country with WMO. (More information is available on:

http://www.wmo.int/pages/prog/etr/fellowship_en.html).

Communication and Outreach Tools

As a way of documenting and monitoring JCOMM Capacity Building activities, the use of the IOC/IODE Alumni database to record all JCOMM CB events and alumni is recommended. This will assist in tracking JCOMM training course participants and in assessing the long-term impact of the training provided.

Draft Terms of Reference of the review committee with proposed membership

The review committee for OPSC candidates shall:

1. Work by email;
2. Review all 3 OPSC remaining candidates from the short list who replied to the questionnaires;
3. Request additional/complementary information about the candidates from the WMO and IOC secretariat contact members if required;
4. Objectively evaluate each candidate according to the following criteria and quantify this evaluation accordingly:
 - a) Scientific activities related to the use of ocean observations
 - b) Significant involvement in implementation of ocean observing systems
 - c) Operational 24H IT support and GTS access
 - d) Cost effectiveness for Members voluntarily contributing financially to the OPSC
 - e) Commitment to long-term support for the OPSC
 - f) Risks
5. Will excuse themselves from this committee if there is any danger of a perceived conflict of interest regarding one or more candidates
6. Will not contact any of the candidates directly on an individual basis.
7. Rank each candidate on each of the following six factors with a 1-10 scale to provide a synthesis of their relative strengths and weaknesses.
8. Submit an evaluation report to the WMO and IOC Secretariats each before 15 January 2009 for final decision.

Membership (to be confirmed by proposed members):

JCOMM Co-President (Jean-Louis Fellous, Lead)
JCOMM Co-President (Peter Dexter)
DBCP Chair (David Meldrum)
Argo ST Co-chair (Howard Freeland)
SOT Chair (Graeme Ball)
OceanSITES Co-Chair (Uwe Send)
IOCCP SSG (Chris Sabine)
GLOSS GE Chair (Mark Merrifield)
WIGOS (Nicola Scott)
OOPC Chair (Ed Harrison)
IOC Secretariat (Keith Alverson)
WMO Secretariat (Etienne Charpentier)

Breakout Group on JCOMM's role on Climate Services – Summary of the discussions

1. What kind of climate services?

- Based on ocean observation
- Describing ocean climate
- Examples:
 - Time series in regions struck by extreme events
 - Storm tracks, intensity, return frequency, etc.
 - Carbon monitoring based on ocean data
 - Etc.

2. What for?

- Information to support seasonal forecasting
- Information to support decadal forecasting
- Production of new climatologies
- Information to support adaptation – CCI, IPCC, UNFCCC, etc.
- Value-added back to the research community

3. JCOMM role: How?

- Coordination of marine ECVs (e.g., NOAA, ESA climate initiatives):
 - Coordination of the underpinning data sets
 - Coordination of the mechanisms for delivery
 - Coordination of instrument and platform metadata
- Connecting communities together
 - E.g., altimetry and sea state
- Good practices, “guide”, quality of ocean climate data/products, climate indices
- Strengthen coordination between the ocean components of GCOS and other international organizations and programmes
- GCOS SC looks to JCOMM to provide full intergovernmental coordination of all relevant ocean ECVs within its purview

4. Way forward

- Establish a Task team under the ET-SAT in the next intersessional period to define the issue.
-

PROVISIONAL AGENDA FOR JCOMM-III

- 1. OPENING OF THE SESSION**
- 2. ORGANIZATION OF THE SESSION**
 - 2.1 Consideration of the report on credentials
 - 2.2 Adoption of the agenda
 - 2.3 Establishment of committees
 - 2.4 Other organizational matters
- 3. REPORT BY THE CO-PRESIDENTS OF THE COMMISSION**
- 4. KEY OUTCOMES AND RECOMMENDATIONS OF THE TECHNICAL CONFERENCE**
- 5. REVIEW OF DECISIONS OF THE GOVERNING BODIES OF WMO AND UNESCO/IOC RELATED TO THE COMMISSION**
- 6. ASSESS SCIENTIFIC AND OPERATIONAL REQUIREMENTS**
 - 6.1 Met-ocean applications
 - 6.2 GOOS and GCOS
 - 6.3 Global and regional NWP, and synoptic meteorology
 - 6.4 Other
- 7. IN-SITU AND SATELLITE OBSERVING SYSTEMS**
 - 7.1 JCOMM OPA Strategic work plan
 - 7.2 In-situ observing systems
 - 7.2.1 Status and future developments
 - 7.2.2 Observing system performance metrics
 - 7.3 Remote sensing
 - 7.3.1 Status and future developments
 - 7.3.2 Observing system performance metrics
 - 7.4 Integrated in situ and satellite observing systems
 - 7.5 Instrumentation issues
 - 7.6 Scientific and Technical Developments for Ocean Observations
 - 7.7 Observing Programme Support Centre (OPSC)
- 8. INFORMATION SYSTEMS AND SERVICES (DATA MANAGEMENT)**
 - 8.1 Data Management
 - 8.1.1 JCOMM Data Management Plan
 - 8.1.2 Platform/instrument metadata
 - 8.1.4 Migration to table driven codes
 - 8.2 Marine climatology
 - 8.2.1 CLIMAR-III
 - 8.2.2 Modernization of the MCSS
 - 8.2.3 Extreme wave database
 - 8.2.4 Marine indices
 - 8.2.5 Links with the WMO Commission on Climatology (CCI)
 - 8.3 Data Management Practices (DMP)
 - 8.3.1 End-to-end data management and interoperability issues
 - 8.3.2 Best practices and standards

9. MARINE METEOROLOGICAL AND OCEANOGRAPHIC FORECASTING SYSTEMS AND SERVICES

- 9.1 Forecasting systems and products
 - 9.1.1 Marine Meteorology
 - 9.1.2 Oceanography
- 9.2 Disaster Risk Reduction
 - 9.2.1 Marine multi-hazard forecasting and warning system
 - 9.2.2 Emergency response activities
- 9.3 Service delivery

10. EDUCATION AND TRAINING, TECHNOLOGY TRANSFER AND IMPLEMENTATION SUPPORT

- 10.1 Specialized education and training
- 10.2 Technology transfer and implementation support
- 10.3 Regional activities

11. WMO INTEGRATED SYSTEMS

- 11.1 WIS
- 11.2 WIGOS Pilot Project for JCOMM
- 11.3 Governance issues

12. QUALITY MANAGEMENT

- 12.1 Quality Management Systems (QMS) for services and WMO Quality Management Framework (QMF)
- 12.2 Best practices and standards

13. REVIEW OF TECHNICAL REGULATIONS OF INTEREST TO THE COMMISSION, INCLUDING GUIDES AND OTHER TECHNICAL PUBLICATIONS

14. RELATIONSHIP WITH OTHER

- 14.1 Programmes and Bodies of WMO and IOC
 - 14.1.1 GCOS
 - 14.1.2 GOOS
 - 14.1.3 IPY
 - 14.1.4 IOC Intergovernmental Coordination Groups for the Tsunami Warning and Mitigation System
 - 14.1.5 Other WMO and IOC Programmes
- 14.2 Organizations and Bodies
 - 14.2.1 UN System Agencies
 - 14.2.2 Non-UN System organizations and programmes
 - 14.2.3 CEOS
 - 14.2.4 GEO
 - 14.2.5 Industry and commerce
 - 14.2.6 Other

15. JCOMM PROGRAMME AND PLANNING

- 15.1 WMO and IOC Strategic Planning and the JCOMM strategy
- 15.2 Future work programme and operating plan
- 15.3 Review of previous resolutions and recommendations of the Commission and of relevant resolutions of the Governing Bodies of WMO and IOC
- 15.4 Establishment of Groups and Expert Teams and nomination of Rapporteurs
- 15.5 Data and place of the Fourth Session

16. SCIENTIFIC LECTURE: *SOCIO-ECONOMIC BENEFITS OF MET-OCEAN INFORMATION AND SERVICES*

17. ELECTION OF OFFICERS

18. CLOSURE OF THE SESSION

WMO Executive Council Resolution on Volunteerism in the Work of Technical Commissions and Regional Associations

General

It is recognized that volunteerism plays an important role in the Technical Commissions (TCs) and Regional Associations (RAs) subsidiary bodies.

Recommendations

The following is recommended as per nominations, performance monitoring and recognition in order to improve the current situation with volunteerism, especially the declining number of volunteers:

Nominations:

- That WMO work be better advertised and promoted within NMHSs and other Weather - Climate - Water - Environment communities, in order to ensure contributions from a wide spectra of expertise, and appropriate geographic coverage;
- That prospective candidate experts and their PRs should be aware of responsibilities and commitments, especially as far as coordination and participation is concerned;
- That in seeking nomination for membership in TC and RA subsidiary bodies, especially prior to a constituent body session, for the procedure to ensure that the commitment of the PRs and the proposed experts are confirmed, as well as the availability of the professional profile, through a brief CV of the latter, to help ascertain their specific expertise, and willingness to contribute; and that Nomination Committees are established early enough to have time to look at all experts' personal information prior to constituent body session;
- That team members should be chosen in such a way that their volunteer work corresponds to their daily activities in their home institutions;
- That if time and opportunity allow, the list of proposed names has been agreed at regional level by the president of the RA prior to submission to the Nomination Committees, when possible;
- That an indication of time commitment (e.g. in terms of minimum percentage of overall activity or time slots) might be useful for the agreement of the PR to secure the necessary time for WMO work;
- That PRs should provide complete and up-to-date expert details, especially working e-mail addresses, to facilitate establishing subsidiary bodies;
- That candidate experts not selected by Nomination Committees should be informed, thanked, and encouraged to apply again to some other WMO work.

Performance monitoring:

- That WMO Secretariat manage the organization of subsidiary body meetings as early as possible within the intersessional period, in order to finalize action plans drafted following e-mail communication or teleconferences, and that the budget is setup accordingly, and in order to have work assigned appropriately;

- That evaluation of each subsidiary body and involved experts is conducted by the appropriate Chairs according to the rules of results-based management, in particular to decide on the continuation of an entity or the membership of an expert, taking into consideration the need for a balance between continuity and new activities and experts. This evaluation is also important for experts involved, especially for the recognition of their work by their PR;
- That should an expert not contribute on the expected level, or in case of a totally silent expert, there should be a mechanism (e.g. led by Management Groups or relevant OPAGs) known to all appointed experts allowing for their replacement, e.g. after 1 year of insufficient contribution;
- That peer-reviewed reports produced should be published as soon as possible, at least at subsidiary body websites, preferably in appropriate publication series with names of contributors, for monitoring purposes in order to recognize the work of the authors.

Recognition:

- That PRs should give recognition of conducted work for WMO activities. As in most NMHSs, an individual evaluation procedure is in place for rating staff members. The contribution to WMO work should be included in the list of criteria used;
 - That other incentives are needed, such as issuing certificates or addressing letters of appreciation to experts concerned, with copy to their PR. This should be made generally at TC or RA president level, following proposals by OPAG or WG Chairs. Applicable rules should be established by WMO, and templates should be designed.
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LIST OF ACTIONS

Para	Action	By whom	When/target
3.1	To develop roadmaps for developing activities related to Quality Management Framework, coastal inundation, and methods for Transmission of Graphical Products to Marine Users	Task team leaders	31 May 2009
3.1 a)	To make available existing documentation on Quality Management Framework, including those documents developed for aeronautic meteorology	Secretariats	Done
3.2	To prepare an inventory of socio-economic benefits' studies, in coordination with Dr Ralph Rayner, and present it to MAN	Ms Candyce Clark	ASAP
3.5	To prepare assessments of what was successful and what was not ("lessons learn from experience") and provide them to the incoming officers at JCOMM-III	Co-presidents and PA coordinators	JCOMM-III
4.1.2	To contact Dr James Baker to obtain the most recent drafts of the documents begun at MAN-VI	Co-presidents	Done
4.1.2	To complete the Operating Plan	Dr Worth Nowlin	mid-January 2009
4.1.3	To arrange for the preparation of this new JCOMM strategy document	Co-presidents and Secretariats	ASAP
4.1.4	To prepare and issue a new JCOMM Newsletter	Secretariats and co-presidents	31 January 2009
4.2.17	To seek for funds to hire a consultant to develop the Guide on Nomenclature, Standards and Symbology for ocean forecast systems	Secretariats	ASAP
4.1.18	To set up a plan for training opportunities in close coordination with IOC Project Office for IODE in Ostend, Belgium	SPA coordinator and Secretariats	ASAP
4.3.3	To complete the document entitled: "Observing the Global Ocean for JCOMM - The Integrated Space-based and <i>in situ</i> Strategy"	Dr Eric Lindstrom	prior to JCOMM-III
4.3.4	To review and complete the preparation of the full document on the CB principles	Dr Worth Nowlin	Done
4.3.5	To each PA coordinator nominate an expert to coordinate CB activities within their PAs	PA coordinators	JCOMM-III
4.4.4	To participate in the Argo International Steering Team meeting	JCOMM co-president and the OPA coordinator	March 2009
5.4.1	To provide all documentation available on the status of the studies on methods of transmission of graphical products to mariners, being undertaken by JCOMM Teams to the DMPA coordinator	Secretariats	Done
5.5.1	To identify potential JCOMM contributions to the development and establishment of the Storm Surge Watch Scheme	RA V Action Team	Done

Para	Action	By whom	When/target
5.7.6	To take into account that these are several items in the technical and administrative questionnaires needed further clarification in evaluating short-listed institutions	OPSC Evaluation Committee	during the evaluation process
7.1.1	To finalize the explanatory memorandum and documentation plan	Secretariats	mid-January 2009
7.2.2	To finalize arrangements for the Scientific Lecture to be convened at JCOMM-III	Co-presidents and Secretariats	ASAP
7.2.2	To identify possible candidates with a view to making a final decision during a teleconference with Committee members	Committee members	end of May 2009
7.3.3	To keep the PA coordinators and other experts submitting documents for the session informed of any changes in the number of words for each document;	Secretariats	Continuing from now to end of May 2009
7.3.4	To finalize the timetable for JCOMM-III	Secretariats	mid-January 2009
8.2	To finalize the programme for the Technical Conference	Co-presidents and Secretariats	end of May 2009
9.1.2	To informally contact the recommended experts to become JCOMM Officers in order to ascertain their willingness and possibilities of their national support	Co-presidents and Secretariats	January 2009
9.2.1	To draft new ToRs for the future Groups and Teams	Co-Presidents and PA Coordinators	mid-January 2009

ACRONYMS AND OTHER ABBREVIATIONS

Argo	Array for Real-time Geostrophic Oceanography programme
ASAP	As Soon As Possible
AST	Argo Steering Team
BoM	Bureau of Meteorology
BUFR	Binary Universal Form for Representation of meteorological data
CASO	Climate of Antarctica and the Southern Ocean
CB	Capacity Building
CBS	Commission for Basic Systems (WMO)
CCI	Commission for Climatology
CEOS	Committee on Earth Observation Satellites
CHY	Commission for Hydrology
CIMO	Commission for Instruments and Methods of Observation
CLS	Collecte Localisation Satellite, France
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DAMOCLES	Developing Arctic Modelling and Observing Capabilities for Long-term Environmental Studies
DBCP	Data Buoy Cooperation Panel (OPA)
DCPC	WIS Data Collection Product Centre
DM	Data Management
DMCG	Data Management Coordination Group (JCOMM)
DMP	Data Management Practices
DMPA	Data Management Programme Area (JCOMM)
DRR	Disaster Risk Reduction
E2EDM	End-to-End Data Management
EC	Executive Council
ECDIS	Electronic Chart Display Information System
ECV	Essential Climate Variables
ER	Expected Results
ESA	European Space Agency
ET	Expert Team
ETDMP	Expert Team on Data Management Practices (DMPA)
ETMAES	Expert Team on Marine Accident Emergency Support (SPA)
ETMC	Expert Team on Marine Climatology (DMPA)
ETMSS	Expert Team on Maritime Safety Services (SPA)
ETOOFS	Expert Team on Operational Ocean Forecast System (SPA)
ET-SAT	Expert Team on Satellites (OPA)
ETSI	Expert Team on Sea Ice (SPA)
ETWS	Expert Team on Wind Waves and Storm Surges (SPA)
EWS	Early Warning System
GCOS	Global Climate Observing System
GCW	Global Cryosphere Watch
GDPFS	Global Data Processing and Forecasting System (CBS)
GEO	Group on Earth Observation
GEOSS	Global Earth Observation System of Systems
GHRSSST	GODAE High Resolution SST
GLOSS	Global Sea-level Observing System
GMDSS	Global Maritime Distress and Safety System (IMO)
GODAE	Global Ocean Data Assimilation Experiment
GOOS	Global Ocean Observing System
GOS	Global Observing System (WWW)
GRA	GOOS Regional Alliance
GTS	Global Telecommunication System (WWW)
IABP	International Arctic Buoy Programme

iAOOS	integrated Arctic Ocean Observing System
ICTT-QMF	Inter-Commission Task Team on Quality Management Framework
IFREMER	Institut français de recherche pour l'exploitation de la mer – French Research Institute for Exploitation of the Sea
IHO	International Hydrographic Organization
IICWG	International Ice Charting Working Group
IMO	International Maritime Organization
IMSC	International Met-ocean Safety Conference
INCOIS	Indian National Centre for Ocean Information Services
IOC	Intergovernmental Oceanographic Commission (of UNESCO)
IOCCP	International Ocean Carbon Coordination Project
IODE	International Oceanographic Data and Information Exchange (IOC)
IP	Implementation Plan
IPAB	International Programme for Antarctic Buoys
IPY	International Polar Year
ITSU	International Coordination Group for the Tsunami Warning System in the Pacific
JCOMM	Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology
JCOMMOPS	JCOMM <i>in situ</i> Observing Platform Support Centre
JSTC	Joint Steering Committee
LOI	Letters of Intend
MAN	Management Committee (JCOMM)
MAES	Marine Accident Emergency Support
MAP	Madrid Action Plan
MC	Marine Climatology
META-T	Water Temperature Metadata Pilot Project
MPERSS	Marine Pollution Emergency Response Support System (JCOMM)
MSI	Maritime Safety Information
MSS	Maritime Safety Services
NASA	National Aeronautics and Space Administration
NMHS	National Meteorological (and Hydrological) Service (WMO)
NOAA	National Oceanic and Atmospheric Administration (US)
NODC	National Oceanographic Data Centre
NW	North-Western
NWP	Numerical Weather Prediction
OASIC	International multidisciplinary Ocean - Atmosphere - Sea Ice - Snowpack program
OceanSITES	Ocean Sustained Interdisciplinary Timeseries Environment observation System
OCG	Observations Coordination Group (JCOMM)
ODAS	Ocean Data Acquisition Systems, Aids and Devices
ODIN	Oceanographic Data and Information Network (IODE)
ODP	IOC Ocean Data Portal
OFS	Ocean Forecast System
OOPC	Ocean Observations Panel for Climate
OPA	Observations Programme Area (JCOMM)
OPAG	Open Programme Area Group
OPSC	Observing Programme Support Centre
OSCAR	Ocean Surface Current Analyses – Real-time
OSTST	Ocean Surface Topography Science Team
OVWST	Ocean Vector Winds Science Team
PA	Programme Area (JCOMM)
PP	Pilot project
PTC	Meeting of the Presidents of Technical Commissions
QC	Quality Control
QMF	Quality Management Framework
RA	Regional Association
RBM	Results-based Management
SAON	Sustaining Arctic Observing Networks
SCG	Services Coordination Group (JCOMM)

SEARCH	U.S Study of Environmental Arctic Change
SG	Steering Group
SI	Sea Ice
SOC	Southampton Oceanographic Centre
SOOS	Southern Ocean Observing System
SOT	Ship Observations Team (OPA)
SOLAS	International Convention for the Safety of Life at Sea
SOO	Ship Of Opportunity
SOOPIP	JCOMM Ship-of-Opportunity Programme Implementation Panel
SPA	Services Programme Area (JCOMM)
SSS	Sea Surface Salinity
SST	Sea Surface Temperature
SWFDP	Severe Weather Forecasting Demonstration Project
TOR	Terms of Reference
TT	Task Team
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
VOS	Voluntary Observing Ship
WCC	World Climate Conference
WCRP	World Climate Research Programme (WMO/IOC/ICSU)
WIGOS	WMO Integrated Global Ocean Observing System
WIS	WMO Information System
WG	Working Group
WGCV	Working Group on ...
WMO	World Meteorological Organization (UN)
WP	Working Paper
WS	Waves and Surges
WWW	World Weather Watch (WMO)
XBT	Expendable Bathy-Thermograph