SERVICE PROGRAMME AREA COORDINATION GROUP (SCG)
Second Session

Toulouse, France, 19-21 May 2004

FINAL REPORT

JCOMM Meeting Report No. 30

WORLD METEOROLOGICAL ORGANIZATION

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (OF UNESCO)

SERVICE PROGRAMME AREA COORDINATION GROUP (SCG)
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N O T E

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C O N T E N T S

GENERAL SUMMARY OF THE WORK OF THE SESSION

1. Opening of the session

1.1. Opening

1.1.1 The second session of the Services Coordination Group of the Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM) was opened at 0900 hours on Wednesday, 19 May 2004, in the Centre International de Conférences of Météo-France, Toulouse, by Mr Phillip Parker, chairman of the Group and Services Programme Area Coordinator. Mr Parker welcomed participants, expressed his appreciation to Météo-France for hosting and supporting the meeting so admirably, and noted the importance of the meeting, in particular in the lead up to and preparation for JCOMM-II.

1.1.2 On behalf of the Secretary-General of WMO, Mr Michel Jarraud, and the Executive Secretary IOC, Dr Patricio Bernal, the JCOMM Secretariat representative also welcomed participants to the meeting, and expressed his sincere appreciation, on behalf of both Organizations, to Météo-France for hosting the meeting and providing such excellent facilities and support. The Secretariat representative concluded by assuring participants of the continuing support of the Secretariat and wishing them an enjoyable stay in Toulouse.

1.1.3 The list of participants in the meeting is given in *Annex I*.

1.2 Adoption of the agenda

1.2.1 The meeting adopted the agenda for the session on the basis of the provisional agenda prepared by the Secretariat. This agenda is given in Annex II.

1.3 Working arrangements

1.3.1 The meeting agreed its hours of work and other practical session arrangements. The documentation for the meeting was introduced by the Secretariat.

2. Report of the chairman and the Secretariat

2.1 The Group noted with interest a report from the chairman and Secretariat on relevant actions taken since the first session of the Group (SCG-I), Geneva, April 2002. He noted that there had been significant progress by the JCOMM Services Programme Area (SPA) and its Expert Teams on Maritime Safety Services (ETMSS), Wind Waves and Storm Surges (ETWS) and Sea Ice (ETSI) and its Rapporteurs on MPERSS and the JCOMM Electronic Products Bulletin (JEB) since SCG-I. While the various teams had been especially effective in addressing their work plans and further additional tasks which had required attention since then, there remain several items which needed to be resolved before JCOMM-II. The recently held Ocean Ops 04 and first meeting of the ad hoc Task Team on MPERSS (Toulouse, 10-15 and 17-18 May 2004) had provided valuable opportunities for consideration of the further development of new oceanographic products and services in support of maritime safety and environmental management, the redesign of the JEB and development of the approach to implementation of MPERSS on a widespread basis.

2.2 The Group expressed its appreciation to the chairman for his report and for the substantial work accomplished during the past two years. Substantive issues raised in the report are addressed under relevant agenda items.

3. Review of the work of the expert teams

3.1 The Group recalled that all the component Expert Teams of the SPA had met since SCG-I. The Group briefly reviewed the results of these meetings, in particular to identify any follow-up actions which might be required of the SCG or the SPA Coordinator in the lead up to JCOMM-II.

Expert Team on Maritime Safety Services

3.2 In his report to SCG-II the Chairman of the ETMSS, Mr Henri Savina (France) gave a comprehensive review of the work of the ET since ETMS-I (Lisbon, Portugal, 11-15 September 2002). He reminded the Group that there are issues which are either of a long term nature or are of the sort for which quick and ready answers are difficult to obtain. For example the current status of good health of the GMDSS was the result of prolonged effort by the ET and its predecessor (the CMM ad hoc Group on the GMDSS) and participating meteorological services. The initiative to improve the GMDSS through expansion of services to provide products in graphical format via the Inmarsat SafetyNet service had been active in one way or another for many years, but despite that has yet to fulfil any of the objectives or expectations placed upon it. On the other hand the establishment of the GMDSS web site (http://weather.gmdss.org) was undertaken swiftly and very successfully by Météo-France, largely as a result of the independence of the developers in applying their skills and creativity without the need of recourse to regulators, other stakeholder bodies, etc.

3.3 Regarding the GMDSS website, feedback from the Maritime Community indicates that there is a growing demand for Radio Navigational Warnings to be reproduced on the Web so that they may be accessed at any time. The IMO International NAVTEX and SafetyNET Co-ordinating Panels, during its 8th session in May 2003, had a similar analysis as the one made by ETMSS for the GMDSS website: it is not envisaged that this would replace the standard services i.e .SafetyNET and NAVTEX, but would provide a valuable additional service, as there is no doubt that any additional method of dissemination of safety information is welcomed. As the address “gmdss.org” had been reserved by WMO, the Group agreed that JCOMM should propose to cooperate with IHO and IMO if they decide to create a similar global service for navigational warnings. Names such as “navwarnings.gmdss.org”, “navigation.gmdss.org” or “nav.gmdss.org” were suggested as possibilities.

3.4 In terms of strategic issues affecting the development of MSS and their impact on the work of ETMSS, the directions for a future work plan were likely to be coloured by:

- Saturation of available spectrum/severely limited bandwidth for additional SafetyNet satellite weather and NAVTEX broadcasts;
- Mounting pressure on HF radio services (voice and fax) world wide due to cost pressures, leading to withdrawal of services while replacement services and arrangements have not been developed;
- Difficulties with development of non-radio broadcast services for graphical products while there is an explosion of the range of potential new products and decision support, based on digital forecast production techniques using high resolution numerical modelling systems;
- Increasing needs by industry for more detailed and focused maritime safety information reflecting increasing pressure on economic performance of shipping and the intention to operate in marginal conditions to gain advantage;
- Growth in private sector suppliers of marine environmental information services probably supplying shipping through ECDIS-like services which may or may not be coordinated through intergovernmental mechanisms.

3.5 There are external factors over which JCOMM will have little option but to adapt. As reported by the ETMSS Chair, projects are already showing signs of a certain degree of intractability (like the Inmarsat satellite graphics project) as a result of these forces at play, and will need to be rethought: Can they in fact be resolved successfully even if technical solutions can be obtained? Problems with the format of NAVTEX messages being too long have been addressed through introduction of abbreviations; but is it only a matter of time before volume problems again become apparent? What will be the benefit if JCOMM manages to “save” a small number of HF radio services for shipping and non-SOLAS craft,

but the larger part of the global maritime community loses out because more governments decide to withdraw funding than those who retain ongoing commitments?

Progress against the ETMSS Work Plan

3.6 Projects in the pipeline or projected to be undertaken in the remaining intersessional period were identified to be:

High priority

- Develop facility for transmitting SafetyNet graphical products via Inmarsat C. This item will need another intersessional period to be achieved
- Review proposed designation of Kenya Meteorological Department as a GMDSS Preparation Service
- Add complementary guidelines in the Manual on Marine Meteorological Services for NMS issuing marine weather forecasts for NAVTEX broadcast
- Keep under review the proposal of the SCG group on the future of the publication of WMO No. 9, Vol. D Information for Shipping

High-Medium Priority

- Prepare detailed guidelines for inclusion in the Manual on Marine Meteorological Services for visibility and sea state description including, if feasible, rogue/freak waves
- Ascertain ongoing requirements for HF radio broadcasts and liaise with CBS and WMO RA II

Moderate Priority

- Consider dissemination of the MMS monitoring survey directly to ships via SafetyNet. Definition of a system of indicator(s) for monitoring user responses and satisfaction with the quality of marine services

Expert Team on Wind Waves and Storm Surges

3.7 The Group noted with appreciation the report of the chairman of the Expert Team on Wind Waves and Storm Surges (ETWS), Mr Val Swail (Canada), which gave a very comprehensive overview of the work undertaken by his Expert Team since SCG-I and ETWS-I (Halifax, Canada, 11-14 June 2003).

3.8 The ETWS agreed to prepare a new Guide to Storm Surge Forecasting. A draft table of contents had been prepared and draft contents were anticipated to be ready for peer review before the end of 2004. The Group agreed that a proposal on the publication of this new Guide and its draft contents should be submitted to JCOMM-II for its endorsement.

3.9 The ETWS agreed not to prepare an updated hard-copy version of the Guide to Wind Wave Analysis and Forecasting (WMO-No. 702), but to prepare updated inventories of hindcast wind wave climatologies and measure wind wave and storm surge data bases; and to prepare and update catalogues of operational wind wave and storm surge models and products. These updated inventories and catalogues were planned to be available on the WMO web site. The Group noted that the questionnaire surveys for the inventories and catalogues would be conducted shortly. The Group also noted with appreciation that the Guide was now available on the JCOMM web site in pdf format.

3.10 The ETWS noted the importance of the verification activities and expressed its support on continuing and enhancing the activities. In this regard, the Expert Team had made specific recommendations addressed to the project and its participating bodies, and agreed to prepare a JCOMM Technical Report on this issue. For the purpose of the development of technical advice, the Expert Team agreed to prepare JCOMM Technical Reports on three topics, namely, (1) review of boundary layer fields; (2) data assimilation in

wind and wave forecasting; (3) long-term trends in long return period estimates of winds and waves, in addition to the Technical Report on the verification activities.

3.11 The Group noted that there had been strong interaction between the ETWS and the MAXWAVE project, which was a healthy sign for the future operationalization of any useful results/techniques for predicting rogue waves that may flow from the project. The Group also noted that ETWS members had been actively participating and/or organizing workshops relevant to the activities of the Expert Team, including the organization of the 8th International Workshop on Wave Hindcasting and Forecasting (Hawaii, November 2004), for which JCOMM is a co-sponsor.

3.12 The Group noted with appreciation that ETWS was also active in cross-cutting issues. The ETWS had identified the requirements for, and subsequent pursuit of additional wave time series measurements in the tropics and Southern Ocean, and the ETWS chair attended the eighth session of the GCOS/GOOS/WCRP Ocean Observations Panel for Climate (OOPC) (OOPC-VIII) (Ottawa, Canada, September 2004) to convey this message.

3.13 The ETWS chair was invited to participate in a meeting of the CCl/CLIVAR Expert Team on Climate Change Monitoring Detection and Indices (ETCCMDI) (UK, November 2003). ETCCMDI considered that marine climate indices fell within the domain of JCOMM, and encouraged JCOMM to undertake their development. The Group requested the Task Team on JCOMM Ocean Product Development to provide advice on this issue.

3.14 The Group noted with appreciation that the chairman and members of the ETWS substantially supported the Workshop on Wind Wave and Storm Surge Analysis and Forecasting in Caribbean Countries, which took place immediately after the ETWS-I in Dartmouth, Canada.

Expert Team on Sea Ice

3.15 In his report to SCG-II the Chairman of the ETSI, Dr Vasily Smolyanitsky (Russian Federation) gave a comprehensive review of the work of the Expert Team, including ETSI-I (Buenos Aires, Argentina, October 2002) and ETSI-II (Hamburg, Germany, April 2004), the sessions combined with the ninth and tenth sessions of the Global Digital Sea Ice Data Bank (GDSIDB). The Group noted that substantial progress had been made by ETSI in the implementation of the previous work plan, which included revision and development of the WMO technical publications related to sea ice, productive collaboration and cross-linking with the GDSIDB, International Ice Charting Working Group (IICWG) and the Baltic Sea Ice Meeting (BSIM).

3.16 The Group noted the substantial progress in the work on the Sea Ice Nomenclature. ETSI activities on the topic comprised amendments to WMO-No. 259, corrections to national English/French/Russian/Spanish equivalents, development of electronic and XML versions of the nomenclature, which are now available on the web, and, lastly, development of a new, completely updated, Sea Ice Nomenclature, including an Illustrated Glossary of Sea Ice Terms. For implementation of the latter document, ETSI-II agreed on a number of steps including a review of the nomenclature, section by section, by correspondence during 2004-2006; submission of a report on the progress of the review to JCOMM-II; and its discussion in a final form at ETSI-III. It is intended that the final version of the nomenclature be a valuable ETSI contribution to the coming International Polar Year (IPY) 2007/2008.

3.17 The Group noted with appreciation that two publications -- “SIGRID-3 format for sea ice data operational and climatological exchange” and “Ice chart colour standard” -- were submitted in final form to the Secretariat and are now in the process of being produced. ETSI agreed to revise another publication “Sea Ice Information Services in the World” (WMO-No. 574, 2000) on an annual basis; and issued by the Secretariat in electronic form in the JCOMM Technical Report Series.

3.18 The Group noted that ETSI-II, in collaboration with IICWG, provided draft requirements for sea ice observations. ETSI-II/GDSIDB-X also recommended that, to ensure that future assessments of sea ice observations for GCOS are complete and accurate, the ETSI should request the Secretariat to ensure close coordination between ETSI and GOOS with respect to sea ice observations. ETSI-II agreed that ETSI should be designated the responsible body for information and assessment of sea ice as an Essential Climate Variable (ECV). The Group noted that the Task Team on JCOMM Ocean Products Development should also take this issue into consideration.

3.19 The Group noted that, addressing recommendations of WMO and MAN-III, ETSI had discussed the implication of the forthcoming IPY 2007/2008 on ETSI, GDSIDB and national ice services in general, and had agreed on specific recommendations, including provision of tailored support for the IPY from GDSIDB centres on ice climate normals and data archival during the IPY.

3.20 The Group was informed that the ETSI-II had discussed its role in developing standards for ice object presentation within Electronic Chart Display and Information Systems (ECDIS). The ETSI, recognizing itself as the international body responsible for ice information standards, recommended to establish itself as the owner for an Ice Objects register and to contact the International Hydrographic Organization (IHO) regarding this activity. Some problems with the long-term implementation of Arctic buoy deployments under the International Arctic Buoy Programme (IABP) had also been noted by the ETSI. New action items developed by the ETSI are included in the work plan in Annex X, in paragraph 9.

3.21 With regard to the question of meteorological and oceanographic objects in general in ECDIS, the Group recognized that this was an important ongoing topic, in particular for the definition and standardization of such objects, which concerned at least the ETMSS as well as ETSI. It therefore requested the Secretariat to write to IHO, to express the continuing desire of JCOMM to collaborate in the definition and standardization of relevant objects for ECDIS, and to inform IHO of an appropriate focal point in each JCOMM Expert Team. (**Action**: Secretariat)

4. Actions arising from the Management Committee

4.1 The Group reviewed and updated as necessary actions for the SPA arising from the three sessions of the JCOMM Management Committee which had taken place since JCOMM-I. A summary of these actions and their status is given in *Annex III*.

5. Review of the results of and actions arising from Ocean Ops 04

5.1 The Group recalled that Ocean Ops 04 – Operational metocean products and services in support of maritime safety and environmental management – had taken place in Toulouse, 10-15 May 2004. The symposium was attended by some 150 participants from 30 countries. The programme included 30 keynote and 65 contributed papers, covering topics such as user requirements, observing systems, environmental management, climate forecasting, ocean modeling and forecasting, and various aspects of marine pollution emergencies. The objectives of the symposium covered three basic themes: users' needs, implementation of products, and the future of the JEB. In addition, as noted above, the symposium also covered issues relevant to MPERSS, and these issues will be addressed in a separate document under item 6.

5.2. The Group was informed that many issues of direct relevance to JCOMM, operational ocean products and services, the integrated observing system, and the future of the JEB, were raised in the papers presented to Ocean Ops 04, and these had been summarized in the session rapporteur reports, which are given in *Annex IV*. In the discussion session which concluded the symposium, and at which the rapporteur reports were presented, the following broad framework for follow-up by JCOMM was recommended:

(a) It should be recognized that, in general, what might be classified as JCOMM products are really intermediate products being made available for secondary users, not end users, except in clear cases of public good products (e.g. Maritime Safety Services).

(b) In the light of the large number of operational or quasi operational real time ocean products now becoming available, and with a view to eventually developing formal guidance material under JCOMM for operational ocean products and services, prepare for JCOMM-II a draft proposal relating to:

(i) standardization of presentation and delivery formats, nomenclature, etc.
(ii) classification according to users
(iii) detailed specifications for such user requirements
(iv) criteria for selection as "JCOMM products"
(v) consideration of multi-disciplinary and non-physical products under JCOMM
(vi) data, products and services for developing countries
(vii) possible TOR for the future designation of specialized oceanographic centres under JCOMM

(c) The JEB concept is valuable, but the bulletin is not sustainable in its present form. Consideration should therefore be given to its being developed in the future as a user-friendly web portal to existing operational products classified as JCOMM products, in particular in the light of the large number of new products now available on the web. To this end, the following needs to be developed or identified:

(i) identification of a user or target community
(ii) portal design, user driven, categorized, structured
(iii) portal host (operational agency, existing web portal, …)
(iv) criteria for selecting products/sites to be accessible through the portal (see (b) above)
(v) metadata catalogue
(vi) user feedback mechanism
(vii) Addressing the types of questions raised by Neville Smith (see *Annex IV*).

(d) In developing services, users of routine observational data systems have identified requirements for:

(i) expanded capabilities (e.g. wave direction and period) and higher resolution (e.g. wide-swath altimetry) for satellite data products, and their sustainability;
(ii) global, full implementation of the composite suite of scientifically designed in situ data networks, recognizing the necessity for maintenance of the complementarity of the components (e.g. Argo and XBTs);
(iii) extending the collection of physical data to include ecosystem parameters (e.g. chlorophyll-A among others) to support ocean and human health applications (e.g. algal blooms, marine pollution);
(iv) timely and easy access by all countries to low cost data and products, possibly through dedicated operational processing centres.

(e) It is recommended that JCOMM note these latter identified user requirements for extended and enhanced data systems for the provision of services, and facilitate implementation through the in situ observation panels, in coordination with the Services Programme Area and international satellite programmes (through the Task Team on JCOMM Satellite Data Requirements).

5.3 The Group reviewed and agreed with this proposed framework. It established a new Task Team on JCOMM Ocean Product Development, with Terms of Reference and proposed Membership given in *Annex V*. The team should prepare a first draft proposal for review by the JCOMM Management Committee in February 2005, prior to submission to JCOMM-II in September 2005. (**Action**: Task Team on JCOMM Ocean Product Development and Secretariat)

5.4 Finally under this agenda item, and relevant to the work of this Task Team, the Group reviewed a proposed template for an oceanographic service provider under JCOMM, prepared by the co-president of JCOMM, Johannes Guddal. It noted that services and products which could be classified operational oceanographic and marine meteorological had been provided at the national/regional level long before the establishment of JCOMM. Beyond the more traditional shipping forecasts under GMDSS, these also embraced forecasts/hindcasts of waves and currents, sea ice, drift of oil spill and subjects etc. Initially it was convenient to include these services in NMS's forecast divisions. However, as they grew and developed, clearer requirements for efficiency and specifications appeared. The inclusion of oceanographic services in traditional marine forecasting services added new forms of infrastructure and expertise in different ways. Many marine users/customers have quite demanding requirements to products due to the importance to safety and regularity, as well as to environmental concerns. For JCOMM Member States, large or small, it therefore had become crucial to comply with some kind of international minimum standard for performance. Further, there is a possibility that some future JCOMM type national service providers may decide to include also 'non-physical' products, such as Habitat Assessments.

5.5 In this context, the Group supported in broad terms the outline of the draft oceanographic services template, which is given in *Annex VI*. It requested the Task Team on JCOMM Ocean Product Development to take this into account in the preparation of its detailed proposal, with a view to their possible inclusion, in an appropriately modified and agreed form, in formal JCOMM guidance material on products and services. (**Action**: Task Team on JCOMM Ocean Product Development)

6. Marine pollution related services and the implementation of MPERSS

6.1 The Group recalled that two days of Ocean Ops 04 were devoted to marine pollution related products and services. This was then followed, on 17-18 May, by a session of the ad hoc Task Team on MPERSS established by SCG-I. A number of issues/recommendations relating to MPERSS were raised at Ocean Ops 04. These included an improved understanding and modeling of metocean variables, in particular surface current, and the maintenance and enhancement of metocean monitoring systems relevant to the implementation of MPERSS, etc. Details are in Annex IV (Ocean Ops 04 rapporteur reports), as well as in the final report of the ad hoc Task Team (JCOMM Meeting Report No. 29)

6.2 Mr Pierre Daniel, JCOMM Rapporteur on MPERSS, chairman of the ad hoc Task Team, reported on the recent development of MPERSS and the results of the meeting. The ad hoc Task Team reviewed the status of implementation of MPERSS based on the reports presented by participants (representatives of the Area Meteorological and Oceanographic Coordinators (AMOCs)) and the results of the questionnaire survey on the AMOCs conducted on April 2004 as a follow-up to the survey conducted in March 2001. While the ad hoc Task Team noted the important progress in implementation of MPERSS, in particular Areas V and XV, it recognized some AMOCs continued to experience difficulties. Recognizing that the core information to be provided by AMOCs was basic meteorological information such as wind, wave and air temperature and that contacts with supporting services and marine pollution authorities had been strengthened, the ad hoc Task Team agreed that MPERSS had already been substantially implemented as far as meteorological components were concerned.

6.3 The Group noted that the Task Team had thoroughly reviewed the MPERSS system plan (Annex to Rec. 2 (CMM-XI)), taking into account the recommendations raised at the MARPOLSER98 workshop (Townsville, July 1998), JCOMM-I and Ocean Ops 04, and that it had developed a revised version. The Group endorsed the revised version as proposed, with some additional modifications, as well as with certain amendments based on the input to be given by the International Maritime Organization (IMO). The agreed version, apart from the expected input from IMO, is in Annex VII. The Group agreed that the operational status

of MPERSS should be reported to the WMO and IOC Executive Councils and to the IMO Marine Environment Protection Committee (MEPC), as well as to JCOMM-II, and that the revised system plan should now be recommended for inclusion in the Guide to Marine Meteorological Services (WMO-No. 471). In addition, the Group agreed that the operational MPERSS should in the future be monitored and managed by an Expert Team of the SPA, similar to the ETMSS. In view of the growing requirements for meteorological and oceanographic information and services to support search and rescue at sea, and the similarity of much of this information to that required for MPERSS, the Group further agreed that the terms of reference for the new expert team should also cover search and rescue support. The draft terms of reference and composition of the new expert team are included in Annex XI. (**Action**: Co-presidents will report on this at WMO EC-LVI and IOC EC-XXXVII; SPA Coordinator together with the Secretariat will prepare submissions to JCOMM-II and IMO/MEPC)

6.4 Finally on this issue, the Group noted with appreciation that a web site dedicated to MPERSS would be developed and hosted by Météo-France. The web site would include basic information such as what is MPERSS, what is available under MPERSS, contact points in AMOCs, together with a specific example such as the case with the operations of the incident of the "Prestige". The Group encouraged AMOCs to make available detailed information on their MPERSS operations, and specifications of available models, in an appropriate manner, such as on their own web sites where possible. (**Action**: Météo-France and AMOCs)

7. JCOMM Electronic Products Bulletin

7.1 The Group recalled that one of the objectives of Ocean Ops 04 was to provide material and ideas for the further development of the JCOMM Electronic Products Bulletin (JEB) and for its long-term maintenance. In this context, it noted and supported the recommendations of both the Management Committee and Ocean Ops 04, that the JEB was valuable, but that the bulletin was not sustainable any longer in its existing form. A plan must therefore be prepared for its development in the future, as a user-friendly web portal to existing operational products classified as JCOMM products. This is particularly true in the light of the large number of new products now available on the web. This plan should also take into account the proposals for overall JCOMM ocean product development as outlined under agenda item 5 above. To this end, the Group established a Task Team on Restructuring the JEB, with Terms of Reference and proposed membership as given in Annex VIII. The TT should work in close coordination with the TT on JCOMM Ocean Product Development, to prepare a draft plan for consideration by MAN-IV in February 2005, before submission to JCOMM-II. The Group strongly recommended that particular attention be paid in the plan to the criteria for identification and inclusion of products with the JCOMM label under the new JEB, with such criteria being developed in coordination with the TT on JCOMM Ocean Products Development (see also Annex VI). (**Action**: TT on Restructuring the JEB)

7.2 At the same time, the group also recognized the potential of modern web-based technologies to facilitate the preparation and delivery of JCOMM-related data sets and products, in standard formats, through some facility along the lines of the original JEB concept. It therefore requested Yves Tourre, and colleagues from the TT on Restructuring the JEB and elsewhere as appropriate, to continue to investigate the future development of such a facility and its access via the JEB portal. (**Action**: Yves Tourre and TT on Restructuring the JEB)

8. Operational Information Publications

8.1 The Group recalled that WMO published *Weather Reporting (WMO-No. 9)*, which was the reference publication on the existing facilities and services available in the operation of the World Weather Watch. Volume D - *Information for shipping* of this publication included Meteorological Broadcast Schedules for Shipping and other Marine Activities, Coastal Radio

Stations Accepting Ships' Weather Reports and Oceanographic Reports, Specialized Meteorological Services, etc. This publication was now available on CD-ROM, and also on the WMO web site, and updated information was disseminated by the Operational Newsletter, which was now published on a monthly basis and distributed to WMO Members electronically. The Group noted that a related publication, Sea Ice Information Services of the World (WMO-No. 574) will be revised in the future on an annual basis and will be cross-referenced from Vol. D. The Group recalled that an ad hoc Task Team on the Review of WMO No. 9 Vol. D had been established by SCG-I and that a questionnaire survey had been conducted on this issue. The Group noted that the Task Team had received a modest number of replies and was now compiling the results of this survey, with a view to making a formal proposal for modifications to the publication.

8.2 The Group recognized that maintenance and updating of the operational information including Vol. D was being implemented by the WMO Secretariat with limited financial and personnel resources. As the same time, it was informed that there was an ongoing and urgent requirement on JCOMM to thoroughly review the contents and structure of the publication in the light of the expected target audience, the relevance of the information provided, and capabilities for regular updating. In this context, the Group agreed that the publication was of value to many potential users outside National Meteorological Services, provided the information contained in it was relevant, up to date, and easily accessible.

8.3 The Group therefore agreed that Vol. D should be maintained in essentially its existing format, but with a revised contents as given in *Annex IX*. It requested that:

(i) Vol. D should immediately be revised/restructured, based on this revised table of contents but with the existing available information; (**Action**: Secretariat, following advice from SOT on Chapter 4)
(ii) The Secretariat should then write to NMS and other agencies and organizations concerned, requesting updates to the publication on the basis of the revised contents and structure; the letter should also formally request at least annual updates in the future; (**Action**: Secretariat)
(iii) At the same time, the Secretariat was requested to investigate the feasibility of preparing country-specific extracts of the publication, in a suitable electronic format; (**Action**: Secretariat)
(iv) If this proved practicable, the Secretariat was further requested to prepare such extracts and to forward them to the chair of ETMSS, who would in turn distribute them to relevant individuals in national agencies, through the Issuing Services for the GMDSS, with a request for their updating and return to the Secretariat, through the chair ETMSS. This exercise could then be repeated on an annual basis. (**Action**: Secretariat and chair ETMSS)

9. Preparations for JCOMM-II

9.1 Work plan until JCOMM-II

9.1.1 The Group reviewed the status of its intersessional work plan, and agreed on specific actions still required to be completed in the lead-up to JCOMM-II. These are summarized in *Annex X* as part of the revised SPA work plan.

9.2 Monitoring of marine meteorological services

9.2.1 The Group recognized that direct interaction with and feedback from users was an essential part of the provision of high quality and valuable marine services. A marine meteorological services monitoring programme was initiated by CMM-VIII in 1981 and user surveys had been conducted regularly since then. JCOMM-I agreed on the continuation of this programme of user surveys, and requested the Expert Team on MSS to review the survey format and to consider the possibilities for disseminating the survey in the future to

ships' masters via SafetyNET, to ensure a wide receipt. The Group noted and approved the following recommendations of ETMSS with regard to the monitoring survey:

(i) The existing paper survey form, as modified by ETMSS-I, should be distributed as previously to ship masters, by the Secretariat, through the international PMO network. The Secretariat was requested to arrange, if possible, for Captain Gordon Mackie to again prepare an analysis of the survey results, to be made available at JCOMM-II; (**Action**: Secretariat)
(ii) A distribution of this survey via SafetyNET was not a feasible option at the present time, but may be reconsidered in the future;
(iii) ETMSS should continue with its preparation of a web-based survey form, for eventual use on an ongoing basis and in parallel with the existing paper survey. (**Action**: ETMSS)

9.3 Documentation for the session, including draft recommendations

9.3.1 The Group recognized that the present session of the Services Coordination Group would be the last before JCOMM-II, scheduled for Halifax, Canada, 19-28 September 2005. The Group therefore had to use the occasion to agree on the documentation required to be presented to the session under the SPA. The Group also had to agree on any recommended changes to the structure of the SPA, for consideration by the fourth session of the JCOMM Management Committee (Paris, 23-26 February 2005).

9.3.2 With regard to the documentation relating to the SPA, based on the agenda for the session and overall documentation plan which had been approved by the Management Committee at its third session, the Group noted that this had to include, inter alia, draft recommendations on issues such as: amendments to existing manuals and guides as other WMO mandatory publications, as well as possible proposals for new publications of this type; the JEB; possible designation of JCOMM ocean products centres; other topics requiring specific actions by Members/Member States or the governing bodies of WMO and IOC.

9.3.3 The Group noted from the provisional agenda for JCOMM-II that the agenda sub-items for all the programme areas were now structured somewhat differently than those for JCOMM-I, to focus on what are simply reports, or alternatively where decisions would be required. Briefly:

(i) Item 5.1 will be essentially reporting, centred on the report of the SPA Coordinator, and incorporating also the reports of the chairs of the expert teams and the rapporteur;
(ii) Item 5.2 will incorporate a discussion based primarily on the results of Ocean Ops 04 and the work of the TT on JCOMM Ocean Product Development, to seek direction from the Commission on what is required for new products and services;
(iii) Item 5.3 will include the MMS monitoring results and any other service issues which may be introduced by Member States;
(iv) Finally, the draft text for the final report, plus draft recommendations relating to the SPA, will be reviewed under item 5.4.

9.3.4 On this basis, the Group agreed the documentation plan and associated timetable for the SPA for JCOMM-II as given in *Annex XI*. It also prepared a tentative list of draft recommendations for JCOMM-I relating to the SPA, which is again included in *Annex XI*. The SPA coordinator and chairs were requested to adhere to the document submission deadlines as given in *Annex XI*. (**Action**: SPA coordinator, chairs and Secretariat)

9.4 Recommendations concerning the future structure of the SPA

9.4.1 The Group reviewed the current structure of the SPA, including the terms of reference of the SCG and the component Expert Teams. It considered that this structure had worked well during the current intersessional period, and therefore agreed that no major

modifications were required, apart from the transformation of the MPERSS Task team into an Expert Team on Marine Pollution Response and Search and Rescue Support (MAPSAR), as noted above under Item 6. However, some amendments to the terms of reference were suggested to the Management Committee, as detailed in *Annex XII*. (**Action**: SPA coordinator and Secretariat to bring to the attention of MAN-IV and eventually prepare relevant documentation for JCOMM-II.)

10. Closure of the session

10.1 Under this item, the Group reviewed, modified and approved the final report of the meeting, including action items and recommendations.

10.2 In closing the session, the chairman and Services Programme Area Coordinator, Phil Parker, expressed his appreciation to all participants for their contributions to what had been a very successful meeting. He noted that much remained to be done within the SPA in the lead up to JCOMM-II, but at the same time much had been achieved within the Programme Area during the intersessional period, with very concrete results to be presented to the Commission. He concluded by thanking the Secretariat for their ongoing support, and once again expressed his appreciation to Météo-France for hosting all the meetings and providing such excellent facilities and support.

10.2 The second session of the JCOMM Services Coordination Group closed at 1205 hours on Friday, 21 May 2004.

Annex I

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Annex II

AGENDA

1. Opening of the session

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

2. Report of the chairman and the Secretariat

3. Review of the work of the expert teams

4. Actions arising from the Management Committee

5. Review of the results of and actions arising from Ocean Ops 04

6. Marine pollution related services and the implementation of MPERSS

7. JCOMM Electronic Products Bulletin

8. Operational Information Publications

9. Preparations for JCOMM-II

9.1 Work plan until JCOMM-II
9.2 Monitoring of marine meteorological services
9.3 Documentation for the session, including draft recommendations
9.4 Recommendations concerning the future structure of the SPA

10. Closure of the session

Annex III

WORK PLAN FOR THE MANAGEMENT COMMITTEE
(from MAN-I, II & III decisions)
SPA Actions

Ref.	Action	By whom	When	Status
MAN-I 4.2.1 (iv)	To prepare for MPERSS and JEB workshops in 2004	France, Y. Tourre, SPA Coord., Secr.	2003	Done
MAN-II 4.2.1.3	To finalize and implement the agreed design for WMO-No. 9, Vol. D	SPA coord., WMO Secr.	April 2003	Still underway
MAN-II 4.2.1.5	To prepare prospectus for the JEB, including maintenance costing, to be addressed to relevant op. agencies, seeking support for maintenance. If necessary, to make alternative proposals	Y. Tourre, SCG & Secr.	ASAP	Will not re-activate in present form (see later actions)
MAN-II 4.2.1.6	To invite GSC to co-sponsor the ad hoc TT on Development of Ocean Services & finalize membership	co-pres., SPA coord., Secr.	GSC-VI, then ASAP	Done
MAN-II 4.2.1.7	To seek additional nominations to the TT/MPERSS and update the list of MPERSS focal points	Secr.	ASAP	Underway
MAN-III 4.1.7	To contact Dr. Ralph Rayner for the presentation at Ocean Ops 04 and to advise the organizing committee of his availability	Worth Nowlin	ASAP	Done
MAN-III 4.1.8	To develop a proposal for the establishment of the ad hoc Task Team on JEB	SCG	OceanOps04/ SCG 2	Done
MAN-III 4.1.9	To re-establish a Task Team on Ocean Products and Services	Task Team on Ocean Products and Services members	OceanOps04/ SCG 2	Done
MAN-III 4.1.9	To submit a draft strategy for the development of new ocean products and services	Task Team on Ocean Products and Services	MAN-IV	Underway. New TT
MAN-III 4.4.4	To provide the other PAs with information on relevant regional CB requirements from the regional CB surveys	CBCG coordinator	continuous	Underway
MAN-III 4.4.4	To designate the rapporteurs on Marine Meteorological and Oceanographic Services as corresponding members of the new merged CB Panel	Secretariat	ASAP	Pending
MAN-III 5.1.2	To proceed to make a preliminary assessment and set of recommendations regarding the existing SOCs	SPA coord., Task Team on Ocean Products and Services	MAN-IV	Underway. With new TT.
MAN-II 5.6.1 (viii)	To designate Kenya as an interim Preparation Service for the GMDSS, subject to successful trials	SPA coord., Secr.	JCOMM-II	Pending

Ref.	Action	By whom	When	Status
MAN-III 2.4 5.4.1	To make efforts to enhance coordination and communications amongst themselves on relevant issues in the lead up to JCOMM-II	PA coordinators	ASAP	Underway
MAN-III 5.5.2	To draft a JCOMM Strategy Document and circulate to members of the Committee for comment	Co-presidents, Secr.	September 2004	Underway

Annex IV

OCEAN OPS 04 - RAPPORTEUR REPORTS

Session 2 – Savi Narayanan

There were three scene setting presentations.

First one was by Neville Smith who used GODAE as a basis to discuss the many different elements of data assimilation and prediction process and their implications, for JCOMM. GODAE is a pilot project to help us move forward from an observational mode to an operational predictive mode using data from the global observational programs and by applying data assimilation/modelling techniques. JCOMM has and will continue to have in future important roles to play. GODAE replies on timely access to data from many platforms. The JCOMM observational systems provide data to input into the system as well as to validate the output. Maintenance and adherence of instrument standards, sampling protocols and data and metadata standards are expected tasks from JCOMM. Upon operationalization of GODAE, there will be requirements for generating and disseminating products and services, tasks to be undertaken by JCOMM. Many countries require capacity enhancements in order to meaningfully contribute to and benefit from GODAE. This should be a major concern for JCOMM.

There are a number of factors to consider in transitioning GODAE. First of all, one has to ensure that the correct approach to taking account of user requirements is followed. The requirements of the WHOLE user community have to be kept in mind, not just one narrow sector. That implication is that one may have to choose sell/buy some particular element against a particular use, but the system should be designed and operated with the broad community in mind.

Education and outreach has to be part of the transition process. This should include all users, as the technology and the products could be just as new for many in the developed world as in the developing world. The GODAE summer school program is only one of the ways of addressing this requirement. Other approaches are under consideration.

The governance is another challenge. Unlike the weather world, the oceans group does not have an agreed-upon structure to provide a global service. Agreements have to be put in place to provide sustained support for generating and disseminating the required products and services. This will have to done jointly by GODAE and JCOMM through a focused transition team.

Second presentation was on “Observing the Ocean, A changing Paradigm: A vision for Operational Oceanography” by Jean-François Minster. He highlighted some of the recent developments allowing more useful operational oceanography programs, such as new technologies that are being used or tested and demonstrations of pre-operational systems, There is also an increased awareness and acceptance on the importance of earth observations for societal benefits: improved security and efficiency of uses of coastal oceans; Mitigation of natural hazards; Detecting and monitoring – Impacts of climate change; Reduction of risks for human health (HAB, virus); Protection and restoration of marine ecosystems; Sustainable exploitation of marine resources; Military operations; and others. He then showed some of the products from Coriolis and Mercator to highlight the multi-platform aspect of the global system, and the global, regional and local dimensions in support of a variety of clients. Because of this multi-dimensional and multi-institutional/agency aspect of operational oceanography, one of the key challenges for the implementation of a global operational oceanography system will be to set up an agreed-upon and effective governance structure with political ownership that will support all clients, allow phased- in implementation, and enable re-alignments of the programs as necessary.

The third presentation was by Tourre (Medias France) and W. White (SIO, USA) Real-time oceanography – No longer a fiction, which described the evolution of real-time data transmission, product generation and dissemination and the genesis of JCOMM Electronic Products Bulletin.

Session 3 – Peter Dexter

Three keynote papers were presented to the session relating to user requirements:

(i) Meteorology and maritime safety: A perspective for the future (Eric Berder)

The paper reviewed issues such as the causes and consequences of ship disasters, the requirements for risk reduction, and initial measures which can and are being taken to reduce the risks to shipping from all potential sources of disasters. Specifically, risk reduction to shipping requires good met/ocean forecasts, a good ship, good decisions and good seamanship. *Specifically for JCOMM and metocean service providers, the requirements for reduced risk reduction and enhanced maritime safety included improved predictability of metocean conditions, with longer lead times and better reliability; services targeted to specific ship/voyage requirements; predictions of specific types of abnormal phenomena; and forecasts of surface currents and ship drift, particularly in confined waterways.*

(ii) The importance of metocean data and services to effective maritime emergency response in MPERSS region X (Trevor Gilbert)

After a general review of international shipping and its continuing dependence on metocean information and services, the paper focussed on specific metocean information required to support response operations for oil spills and other major marine pollution emergencies. Such requirements covered most standard metocean variables, but the importance of sea surface current predictions, for both spill response and SAR was stressed. *Specific recommendations for JCOMM included: improved understanding and modeling of metocean variables, in particular surface currents; strengthened coordination between the providers and users of metocean information and services; the maintenance and enhancement of metocean monitoring systems; better data sharing; and the establishment of coordinated systems for emergency response in developing regions.*

(iii) Requirements for integrated management of the oceans (Rick Spinrad)

The paper reviewed issues such as the definition and principles of integrated ocean management, and the goals and objectives of and requirements for such an integrated management approach. *In the context of the overall JCOMM objective of enhancing integration in observing systems, data management and product and service provision, specific points for consideration included:*

(a) an integrated observing system should encompass the monitoring, communications, data management, modelling and applications; it should also be cost-effective, accessible, timely, have broad applications, and encompass research;
(b) an integrated system required cooperation and collaboration at all levels, including enhanced public-private partnerships;
(c) the system should be efficient in design, conform to international standards, and focus on specific core variables;
(d) the system should also facilitate the transition from research to operations in all components.

Session 4 – Phil Parker

Falkingham

Decrease in summer sea ice cover in the Arctic Ocean over coming decades will drive significant changes in demand for metocean services. Demands include increasing capability of ships to operate in ice prone seas, and increasing pressure to exploit Arctic resources. Better data resolution than currently available from conventional passive microwave sensors needed for routing ships.

Requirements for developing ice services are:

- development of arctic Argo buoys.
- Observations to 5km resolution of:
  - Ice distribution (hemispheric and regional)
  - " concentration
  - " motion
  - " roughness
  - " strength
  - " thickness

Critical sensors/platforms will include:

- passive microwave
- scatterometer
- optical/IR
- SAR (critical)
- altimeter.

Other issues:

- Data continuity
  - Multiple and asynchronous real time data assimilation needed, for coupled ocean-ice-atmosphere prediction systems.
- Predictions required for short term (1-5 D), medium term (1-2 W) and long term (3-12 M).
  - Communications e.g. poor reception of geostationary satellites in high latitudes. Alternative polar orbiting communications satellite providers will need to be sourced and encouraged.

Desa

Developing countries possess high human resources but low capital resources. These countries can obtain maximum leverage from sophisticated metocean decision support systems developed elsewhere by concentrating on localization using local know-how. A paradigm of self sufficiency using a locally focused opportunistic approach. Key aspects include:

- Evidence that pre-advice leads to significant human savings
  - Involvement of local scientists with leading international scientists leads to positive outcomes locally
- Multi-user, multi-agency locally/community based paradigms work best
  - Changes in infrastructure don't necessarily need to be large when locally derived decision support is developed
- DIY concept works – "let hem do it by/for themselves"
- Issues:
- The long chain from products to usage must be addressed
  - Continuity of free availability of information/data as a common good (eg. via GOOS, Argo)
- Resolution of data/downscaling to coastal locations

O'Toole

Key needs for sustainable management and utilization of LMR:

- Development of early warning systems
- Definition of baselines
- Improvements to predictability
- HABs
- Climate change

Need:

- a needs-driven cost effective regional system for early warning of major events such as Benguela Current incursions
- cross links with and building upon existing programs/projects

- Biological activity indicators eg. Nutrients, Phytoplankton, Oxygen
- Advice about major changes in ambient environment likely to affect fish stock levels eg.: intrusion of Oxygen deficient warm water into Benguela system; Modeling the key to rapid development of decision support.

Issues:

- Further improvements to observations, maybe thru extension of Pirata network?
- Continued provision of bio-geo-chem and physical observations/data, required for systems being developed
- Need for ocean colour (chlorophyll, productivity, plankton blooms) data
- Ongoing capacity building and training
- Need to maintain/build partnerships with other agencies etc.
- Future under some operational framework post-project?

Weeks

Importance of elements outside the “usual” physical or bio-chem variables, in a significant regional feedback mechanism - phenomenon of H_2S release from bottom sludge.

Issues:

- Connections with mesoscale meteorology esp. winds
- Local upwelling dominates (modeling?)
- Ocean colour observations very useful to identify, classify occurrence and history etc.
- Main issue is ongoing requirement for access to operational ocean colour satellite observations.

Aside: There may be climate change connections through discharge of methane which is also associated with the phenomenon.

Sessions 5 and 6 – Neville Smith

The seasonal climate prediction community continues to heavily rely on the observational network coordinated through JCOMM. No new data requirements have emerged. The tropical moored buoy network continues to be the central element, particularly within the Pacific. SOOP and sea level data are also important and the community is presently trying to gauge the impact of *Argo*, though this is limited by inexperience in assimilating salinity data. Satellite data remains important. The importance of surface flux and MLD estimates is emerging somewhat more strongly relative to the situation several years ago and the role of high-quality data (reference stations, hydrographic sections) was emphasized.

Increasingly, we are relying on models for synthesis and interpretation (e.g., ITF). There were also several examples of products/studies that were derived from ocean (climate) re-analyses (see also Harrison paper). Such products need to be within JCOMM strategy, including developing a framework that will allow the products to be presented to same standard.

There are many climate studies and prototype operational systems that have only loose dependence on JCOMM, yet they are an extremely important aspect of the JCOMM user community. They provide an example of where the users “reside” beyond JCOMM (e.g., within the CCl of WMO, and within other climate communities). JCOMM needs a data service model with the flexibility to meet ad hoc and changing requirements.

A strong theme from ocean prediction through to climate change is the need to have data on freshwater inputs, from precipitation and run-off, and perhaps from groundwater. None of these data are directly within the remit of JCOMM and JCOMM may need to articulate its needs more clearly.

The McGee presentation provided an image of the prominence of operational oceanography within the US Navy. Among other things, he emphasized the continuing need for demonstrations of cost and effectiveness and to pursue cheaper and better systems. The presentation also showed the

importance of extending the impact and effect, through efficient data exchange among other things. There is a call for adaptability and dynamicism in both the provision of information and the provision of services. Not all services and applications will be regular and routine – must be able to respond to severe events and disasters for example. Buch's presentation highlighted that JCOMM needs an architecture that accommodates a hierarchy (sub-systems from J-F Minster) of applications and ensures robustness in the way people describe and test models. Validation and testing was a common theme and clearly JCOMM needs to take a lead role in developing methodologies for this, across a whole range of activities.

The wave modeling and forecasting community continues to evaluate the quality of operational systems through intercomparisons and other testing. Models are certainly improving. Resolution appears to be a factor and though the quality of wind forcing has improved, it remains a significant source of error. The ET-WS is promoting the intercomparison and testing of analyses and forecasts. New studies have provided better representation of the covariance structures used in data assimilation wave models. The scientific community will continue to be important for progress and, in the absence of a primary mechanism for coordinating research, JCOMM should support the various ad hoc opportunities for such activities,

There are many activities in wave services that fall into the "value adding category" – almost autonomous relative to JCOMM. Innovation, including in technology for observations, is a strength. An issue here is what JCOMM can do to enhance the effectiveness of such value-adding operations, which are geared to specific industry problems

Sessions 7 and 8 – Trevor Gilbert

- A backdrop of the regulatory requirements for met-ocean data information provision to ships at sea was provided. As part GMDSS the international agreements for the format and content of this information is stipulated.
- The JCOMM website (http://weather.gmdss.org) was highlighted as a source of information being provided globally by met offices.
- More information is becoming available in ECDIS (GIS) formats but currently transmission rates to vessels have limited capacities. With improved communication satellites this should improve with time.
- Examples of some of the met-ocean data sets for different maritime purposes were highlighted.
- The provision of routine met-ocean information is still a problem in developing countries due to costs and resources.
- Non SOLAS vessels (i.e. <300 tonnes) vessels are most sensitive and vulnerable to weather events, there should be increased focus on these customers.
- Developments in wave models have now progressed into second-generation models which is helping the oil industry in exploration, construction and operations.
- Integrated wave circulation model was discussed showing the value for the French Navy applications.
- A summary of the met-ocean services provided in Met Area 6 by the Argentine authorities were provided showing the range of services and information and its importance to maritime safety.
- Met-ocean data is being used to monitor toxic algae blooms (cyanobacteria) which affects fish, aquaculture and recreational users. Now there is a harmonised reporting system but unfortunately it only records these incidents but does not predict them. A predictive system would be extremely useful.
- Currently there is a handbook on Marine Forecasting for the North Sea published in the late 1990's. It sets the product formats and services both text and graphical provided to the oil and gas industry.
- The information provided to the oil and gas industry assists in the carrying out of major construction applications such as heavy lift and in predicting severe weather events.

- The importance of the human element (on-site weather forecaster) should not be under rated as it provides an interactive assessment of the information for the user.
- Exchange of marine data using XML was encouraged as well as the use of enhanced ECDIS display of ocean met data.
- Two types of met-ocean data clients were identified (ie. 'thick' and 'thin' clients). The 'thick' are those with resident applications that pull large data into local applications with specific requirements. 'Thin' clients pull low volume data via the web to display on Internet maps.
- GIS based download applications were demonstrated for the North Sea area. This included wind, temperature, currents, rain, SST, etc being overlaid on nautical charts (ie. ECDIS).

Sessions 9 and 10 – Rick Bailey

- ***Overview of existing satellite systems and their applications***:
    - Surface winds (scatterometers), waves (SAR), sea ice concentration (SAR), ocean circulation (altimeters), ocean colour
    - ***Operational oceanography has arrived*** with the advent of global satellite observations of ocean circulation, coupled with reductions in sensor and orbit noise, leading to assimilation into eddy resolving models.
    - ***Climate applications still strong focus***
        - Seasonal prediction & climate change monitoring (e.g. sea level rise)
    - ***Observations now helping to address coastal issues***
        - Extension from physical aspects to include ecosystem parameters (e.g. chlorophyll), with priority in oceans and human health applications growing (e.g. algal blooms, pollution monitoring, etc)
- ***Overview of prospective satellite systems and their potential applications***:
    - Sea surface salinity (SMOS and Aquarius)
    - Resolution of wide-scale eddy field (wide swath altimeters)
    - Opportunities now to identify new sensors for inclusion on future missions
- ***User recommended priorities and requirements that will impact on services***:
    - SSH for ocean circulation – increased quality and resolution for assimilating into models (need wide swath capability, multiple satellite constellations)
    - Sea State – improved space & temporal sampling, include wave direction & period
    - Continuation of existing time series (e.g. Topex/Poseidon, Jason-1).
    - As learnt in meteorology, utility of a given observation is a function of improved forecast skill, ability to bring down errors, plus ability to see other features.
- ***Operational implementation of research systems***:
    - NASA and CNES looking to NOAA and EUMETSAT to assume lead on follow-up operational systems.
    - Trend is for more and more commercial satellites working on cost-recovery basis.
    - Demands from satellite based data collections for data from *in situ* platforms for validation, calibration only continue to increase.
- ***Challenges and issues for JCOMM:***
    - Operational implementation of research satellite systems
        - Demonstrate the utility of satellites observations to ensure follow-on, sustained missions (e.g. JASON-1 altimeter).
        - Coordinate international effort to ensure high-resolution systems for operational oceanography are both developed and implemented
        - Help engage satellite agencies from other countries
        - Bridge the gap in business models for commercial and public good satellites.
            - Facilitate use of data to increase uptake
            - Coordinate blocks of users to attract competitive price
    - Ensure "Operational Satellite Systems" include:
        - Adequate capabilities for sensor calibration, algorithm development, reprocessing and archival

        - Independent user groups to oversee performance
        - Adequate attention to quality, especially for climate requirements
    - Ensure easy and timely access to low cost data and products, possibly through dedicated operation/processing centres
    - Engage in Earth Observation Summit (EOS) process to maximise integration of existing observing systems into conceptual planning.

Overview of existing *in situ* observing systems:

    - Growing consensus that oceans need to observed systematically
    - Over the last 10 years, GOOS for climate has been well defined.
        - Supported by scientific network design studies
        - Although climate focused, data also provided in real-time to support a variety of users
    - ***Implementation of in situ observations being coordinated*** by JCOMM panels
    - JCOMMOPS helping to optimise deployment of resources by monitoring data collection system performance and providing feedbacks to operators
    - ***Presently 45% of in situ observations implemented*** for defined networks
    -

- ***Data and products generally freely available to all***; now successfully working beyond old paradigm of not sharing data
- ***New technologies are being developed***, which will support more flexible deployment of resources (e.g. "smart buoy", coastal autonomous profilers) and collection of non-physical information
- ***Challenges and issues for JCOMM:***
    - Continually evolve the system to be cost-effective and responsive to needs
        - Obtain global *in situ* data coverage
        - Maintain integrated/composite nature of scientifically designed networks (e.g. Argo and XBT serving complementary roles)
        - Maintain role of *in situ* observations in model and satellite validation and calibration
        - Identify data needs for coastal/near-shore and sea-ice services
        - Identify general needs and include collection of non-physical variables (e.g. phytoplankton, nutrients, etc) in data collection programmes
        - Further develop data management system and data sharing
    - Develop mechanisms to ensure strong feedback between observations and services, as well as between services and users, to ensure optimal system.
    - Coordinate *in situ* and satellite observation activities, including development and provision of data products.

Sessions11, 12 and 13 – Craig Donlon

Session 12 was dedicated to a review of Global/Regional scale operational MetOcean products and services. Presentations were diverse raising many issues associated with space segment services, operational support to military/civilian customers, in situ observation systems at basin and local scales, operational ocean modelling systems and user integration/requirements.

The following common observations emerged from the session:

1. There are too many options and directions for JCOMM to follow effectively and a prioritisation exercise ought to be conducted. Clearly the strategic impact of JCOMM should be thought about very seriously. What are the metrics for assessing JCOMM itself? One suggestion is to commission an external review of JCOMM although this might have limited success as the Metocean area is in the full flow of innovation. The emphasis should be such that innovation is not stifled and directions chosen that are built on solid projects/services/programs that have some vision for transition into sustainable and useful services.

2. There are a wide variety of in situ observing systems that are poorly federated. Many regional database and data archive facilities are in place although it is unclear how interoperable these are. The [internationally] distributed data base approach should be promoted as this preserves regional autonomy and leverages the development of regional expertise. In order to federate, an centralised data discovery metadata index is required. Data management appears to be independent of agreed standards terminology and data format specifications are diverse. Best practices derived from local experience have been adopted in many cases raising issues for interoperability especially in the framework of distributed data systems Several template systems are available (e.g. GCMD etc) to provide such a service which again would help to federate the community. JCOMM should encourage the implementation of international protocols and standards where applicable to data and to the metadata that are used to wrap and serve the data. The CORIOLIS (and MEDS) data centre provide good examples of integrated approaches and could provide guidance and advice to emerging systems. In the case of CORIOLIS, the system is changing to accept both ocean and atmospheric data sets. This is an excellent development and one that should be encouraged. Value added Metocean products and climatological data sets can and should be generated at such centres. Web-service technology could play a major role in data/QC processing efforts across a distributed framework. The emphasis should be on promotion and sharing information so that as systems developed the lessons learned are passed on to other emerging communities.
3. Special attention is required in the context of bio-geo-chemical in situ observations which will be increasingly required for the development and validation of new biological model components.
4. There are a variety of large operational ocean model systems that are providing various products and services although direct access to data and products is often difficult. There are clearly opportunities to derive considerable benefits from a significant number of these systems but an appropriate data/product access framework is required to solve the data access barriers.
5. There is great concern for the sustained future of satellite altimeter missions that are prerequisite for accurate ocean model outputs. Altimetry fundamental to deep ocean data products (ship routing currents etc). JCOMM should consolidate and promote these requirements as a united voice to space agencies.
6. In situ data are required to constrain satellite data in optimal bias correction methodologies. Integrated systems in which in situ data are collated, quality controlled and used together with satellite and model systems (e.g., JMA, CORIOLIS) are leading the development of an integrated satellite/in situ products. This approach should be encouraged.
7. Large scale modelling systems have a direct and important role to play in the coastal zone. They serve the boundary conditions and forcing parameters for the high resolution nested model systems and in effect provide the ‘operating system’ within which high resolution nested application specific models are used. Nesting can be taken to extreme levels of detail from several tens of km scales to metre scales in port harbours and estuarine systems. Understanding the optimal mechanism to obtain and apply multiple model outputs remains a challenge and examples show that a different result is to be expected if different system data (e.g., MERCATOR or FOAM) is used to provide background and forcing conditions to oil spill tracking models. More work on combining output from independent model systems as ‘ensembles’ is required to understand how to optimise the simultaneous application of complementary/competing systems and gain synergy benefits.
8. Model inter-comparison exercises are an important component for further development of ocean model systems and outputs having the additional benefit of greatly facilitating dialog between the system teams. The EU MERSEA project has invested significant effort in this area resulting in a well documented and now tested framework for model inter-comparison in the Atlantic Ocean. This could form a framework for JCOMM to promote in order to develop a more federated ocean model community in the international arena.
9. There is a notable shift from Metocean data collection to knowledge provision but it is not clear that the user community has the capacity to make good use of the knowledge outputs. Users need to be educated about what is available and what the expected impacts of choosing to use such information really are. How do I use current information? What do I

need? Where and how often do I need this? What are the real costs to me as a user? Who to contact for advice? The need is a practical one. A basic suite of user interaction metrics could be established that would help to shape discussions between data/service providers and user requirements. Techniques and protocols are required to capture and catalogue user interactions to determine the success or failure of user-provider interactions. These must be carefully audited and refined based on experience.

10. Many operational model and observing systems generate diagnostic reports and output assessments that could feed into the JCOMM CB process. MERCATOR provides a good example and IOOS may also provide significant inputs in the near future. The JCOMM Capacity Building (CB) panel should make use of the educational and promotional resources already available as part of this process. This type of information should form a part of the JCOMM WWW service.
11. Defining the moving target of user requirements remains a major challenge. Feedback is sought by many modelling groups but little evidence of actual feedback is evident. Many groups are connected to key customers but outreach and tailoring output/feedback to very specific applications remains a challenge. Certainly there are no clearly defined feedback systems other than 'helpdesk' type approaches. The European MFSTEP project presented a notable exception in which a concerned fishing population is actively engaged in the development of an integrated observing/forecasting system. A detailed dialog with customers is required and should be built into the system approach; there should be a recognition that as we derive new products at new resolutions using new approaches the target requirements will also be 'new'. There is scope to learn from business techniques on this issue and to understand how each system addresses these problems.
12. Information delivery. Clearly there is a preference for Web based delivery systems and e-mail based communications in the civilian sector. Navy systems are consolidating distributed services using web based technologies to exchange information. Many different tools are available. Dynamic on-the-fly web based data interrogation applications are emerging as a method to link distributed data systems for classic applications such as oil spill response, ship routing, SOLAS operations. Users should be able to consider merging data and generating useful outputs based on scenario specific applications (port services, ship routing, wave/wind forecasts, storm tracking etc). Web based services within a distributed database system provide regional leverage for local centres that are best placed to administer the data sources they hold. In particular, the application of GIS based systems (e.g., SYNERGIE, HORACE) are central to the optimal utility of Metocean products and services and should be promoted at all levels. Data, services and products should be developed for use within GIS systems in mind.

Sessions 14 and 15 Bob Keeley

These sessions concentrated on regional and coastal issues and products. Some of the products discussed covered many hundreds of square kilometers, such as the Baltic or Gulf of St. Lawrence, while others were very focused on ports and small estuaries. There were a range of products presented including those that are being planned, those in development to those that are mature and generated on a routine basis. The range of variables of interest was wide, from predictions of seiching in ports, waves, currents, to biological variables such as chlorophyll and algal blooms, to sea ice, coastal erosion and ecosystems. The means of delivering these products were typically through Internet pages or applications, but other mechanisms are also used or needed.

In terms of the objectives of the workshop, there were few specific answers, but the factors that must shape the JCOMM strategy became clearer.

- JCOMM must consider how it will respond to the broad set of requirements for products that are multidisciplinary in nature. There is an obvious need for products from models of meteorology and physical oceanography. In turn, these models are beginning to be coupled to some relatively simple biological models. These models, combined with in-situ observations of nutrients, sediment and pollution loading of rivers and bays are starting to

be combined to produce a greater breadth of modeled systems. The physical models are also very important in projecting the trajectory of oil from intentional or accidental spills.

- The JEB should consider what role it can play in exposing the range of products or methods that can be applied to local problems. For example, the products may be model outputs of oceanographic or meteorological fields that can be used as boundary conditions to higher resolution, coastal models or simply used directly against a regional problem. It could provide a direct link from the people with the smaller scale issues to the large scale model results.
- There are a wide variety of developed and developing products. It seems impossible for the JEB to track them all, nor can it function by downloading the relevant data and forcing the standardization of the display of information as it did in the past. The JEB must consider how to select the products that it will reference. Likewise it could be advantageous to try to standardize the diverse ways that oceanographic and meteorological data are delivered or displayed.
- It seems important that the JEB know its clients. This meeting has discussed many products, and some client groups. Every time this has come up, the need to know your clients has been stressed. The JEB should have a mechanism for linking its clients to the products offered.

Sessions 16 and 17 – Rod Stainer

Monfils

Pollution from WW 2 shipwrecks may be the largest risk to the marine environment from shipping. There is an advanced database for wrecks in the Pacific, with 3855 identified vessels including more than 300 tankers:

- assessment of likelihood of severe weather events affecting these wrecks is required;
- good metocean data required so that risks on sensitive resources of future spills can be assessed;
- “not if but when”

Ramiandrisoa/Ratomahenina

Large risk of marine pollution in Madagascar due to sewage and chemicals.

Concern in Madagascar of the effects of oil tankers passing through the Mozambique Straits. Tanks and engines are illegally washed. They have grave concerns of a major oil spill and need a marine pollution emergency response support system. They require international support in the event of a major spill.

Madagascar also concerned over impacts of climate change, with likely increases in storm surges, salinity in estuaries and coastal flooding.

Cabioc’h

French authorities learned some major lessons from the “Erica”. Processes were recommended and put into place. These processes and procedures were tested and found to be mostly successful during the “Prestige” spill.

Girin

Comparison of “Erica” and “Prestige” events showed the latter to be much more successful, having learned from the previous event. New procedures developed after “Erica” tested in small events.

In the “Prestige” event, there was very close cooperation between France and Spain, with the challenge being to bring the best experts together.

During the “Prestige” event, non real time information was available to the public on the internet. In the future, need to provide easily accessed real time information to all. Very important also to deliver information quickly to decision makers.

Gilbert

Unscrupulous ship operators release more oil into the oceans than through shipping accidents. Major challenge is to identify the culprits. An effective means of doing this is to run a spill model backwards, i.e. reverse modelling. Metocean data is vital to assist with this. Remote sensing is also an effective way of identifying ships, but requires not cloud masking.

Sugimoto

JMA was requested to develop systems for predicting oil pollution transport following the “Nakhodka” incident in 1997. They subsequently developed a prediction model. In addition to transport prediction, JMA can provide synoptic charts, ocean wave analysis, sea ice charts and SST.

Stanovoy

Ice can be a major transporter of oil pollution in polar regions. Both drifting and melting of ice contribute to the redistribution of the concentration of pollutants. Special attention should be given to the pollution of the ice cover by oil.

Sessions 18 and 19 – Phil Parker

Daniel

Improvements to MF MPERSS modeling system: direct use of currents from operational models: Operational models presently don’t calculate appropriate currents – need forcing every 6 hrs, different structure to models to give surface current

-> outcomes v sensitive to current specification: specialized problem for JCOMM
->model plus remotely sensed plus climatology gives improved results

hyper refinement of current
high resolution wind forecasts
hi resolution grid near coast
need current at base of mixed layer?

Dahlin

Inter-country oil spill modeling system in Baltic
Simple GUI, supported by state of art models and infrastructure
Other users out of area welcome to use it, passworded
Human failings e.g. phone lists not up to date etc.
-> integrate systems models know how to give economy of scale and synergy
-> make GUI easy
-> be aware of human errors

Bailly-du-Bois

Wind data/forecasts critical as is access to it
Uncertainty re parameters specific to species
Coupling to real time wind data? Needs strong link and operational to succeed.

Hackett

FOAM/Mercator can deliver types of data needed (T,S, u, v)
Present available products not optimal
Improved resolution
Data delivery not especially good
Not sufficient real time sat data
Need integrated chain for operational success
Need to be able downscale from global to local scale
Validation essential
Interpolation errors (related to downscaling)
Nesting / improved geolocation bw oil and ocean models
Need to deal with moving source
Need SAR

Moldestadt

Oil properties essential for oil fate calculations/weathering
Implication for oil tracking: behaviour of emulsified or solidified oil
Depending on type of emulsion may need differentiated currents at depth for tracking
Knowledge of oil properties and behaviour required for risk analysis, contingency planning, national environmental benefit analysis and response operations.

Comerma

Oil weathering linked dynamically to modeling incl. met - Wind stress, SST involved, vertical turbulent in ocean mixing layer
Breaking waves affects dispersion of droplets

Accurate currents needed in surf layer
Ocean turbulence for slick fragmentation
Need accurate wind/temps for evaporation/emulsification

Whittier

Using CHEMMAP
Dispersion changes with met conditions e.g.. via evaporation (wind, temps, turbulence, ….)

de Roeck

mixing, drift, turbulence due waves
residual tidal current
wind effects, density driven currents
*tides, currents, winds, surf heat flux?, temps
range of metocean products needed from –1 to 7 days met, wind stress….sea state, atmospheric pressure, heat fluxes, rainfall….

Djiman

Cotonou Lagoon modeling
Tides most important
Winds, thermodynamic structure

Sessions 20 and 21 – Peter Dexter

Hara

An optimal towing support system (OTSS) is being developed in Japan. The system involves data input, execution and results/analysis. Input data includes target ship details, towing ship and towline details, metocean information, drift resistance, etc. There is collaboration in testing the system with the Japan Coast Guard, which still requires evaluation in operational conditions.

Breivik

Norway has developed and is now using a system for forecasting the drift of objects in the ocean, for use in, inter alia, SAR. The model is forced by an atmospheric model (HIRLAM at 20 km resolution) and an ocean model (POL at 4 km resolution). Drift simulations can be implemented via a web request with a 5 minute response time. In situ exercises have demonstrated the value of the system in reducing the potential search area significantly. Conclusions are that the model is realistic, though more assessment is required, and also more object categories, adapted to European situations. Surface current predictions are also critical. There was also an evident scope to collaborate internationally in Europe and elsewhere.

Trieschmann

The EU is implementing a project, Oceanides, to harmonise the reporting of spills, nomenclature, etc.; produce statistics on spills; and undertake a trend analysis. The project involves a mix od aircraft and satellite RS data, which increases the detection rate. Then conclusions of the project to date are that:

(i) Permanent airborne operations, with associated communications, are required;
(ii) The system should be operational and user driven;
(iii) International cooperation is essential.

Li

The Chinese government has recognized the need for a monitoring system for oil pollution, and that international cooperation is required to achieve this. The monitoring system envisaged involves a mix of airborne and satellite remote sensing.

General Remarks from Neville Smith

a) users needs
b) implementation of products
c) impact on JEB

Questions Arising

- User needs are diverse but the same requirements emerge from developing and developed countries. The main difference is that developing countries need education and training to use the existing products. Can JEB provide the connections to these products and let the CBPA deal with the education and training? It the Internet the universal solution to this?
- Need to attach some confidence estimates to products so that users can assess the applicability of the product to their needs
- coastal regions are small in area but large in impact. Is this a niche for the JEB?
- Are climate change products a niche for JEB? There is wide spread interest, and this constitutes a subset of the wider range of information and products available.
- Do we need a GIS kind of presentation of information (or a web map server) to allow overlay with other data such as electronic charts
- Polar regions are poorly displayed by usual Mercator map projections of products. Some other projection is a better choice for products from this region.
- Should we put model results or ensembles on JEB?
- Is there a place for oil spills and mitigation on JEB?

- Who are the customers for JEB? What facility should JEB have to capture user feedback?
- What place in general do model results have for JEB? There are all sorts of results for different variables. They do have differences and so we would need to ensemble average or simply "indicate" the variations between results. Can JEB encourage the standardization of products and their presentation?
- How will JEB manage the issues of some products being distributed freely and others having a fee attached?
- There are products related to HABs. Should JEB include or perhaps concentrate on biological products that have important coastal interest?
- Even though JCOMM deals in real-time, what about products that are generated not in real-time? Examples are climatologies, QBO and ENSO indices, and such like.
- Because JEB needs to provide information to people with different languages, how can it deal with this?
- Should JEB include or point to manuals such as the Baltic Early Warning Event Recording System?
- What is the place of satellite "products" in the JEB? Can we do this for free? Do we just point to select ones?
- What place should the JEB have in demonstrating to members that money to support JCOMM is well spent?
- What is / should be the relationship between JCOMMOPS and JEB?

Annex V

TERMS OF REFERENCE FOR THE TASK TEAM ON JCOMM OCEAN PRODUCT EVELOPMENT

Introduction

The JCOMM ocean products symposium, Ocean Ops 04, made a number of recommendations relating to the future development of operational ocean products and services within the context of JCOMM, and also provided a framework for this development. These were endorsed by the second session of the Services Coordination Group, and provide the basis for the work of the Task Team on the Development of Operational Ocean Products under JCOMM. It was also recognized that, in general, what are classified as JCOMM products are really intermediate products being made available for secondary users, not end users, except in clear cases of public good products (e.g. Maritime Safety Services).

Terms of Reference

In the light of the large number of operational or quasi operational real time ocean products now becoming available, and with a view to eventually developing formal guidance material under JCOMM for operational ocean products and services, prepare for JCOMM 2 a draft proposal relating to:

(i) standardisation of presentation and delivery formats, nomenclature, etc
(ii) classification according to users
(iii) detailed specifications for such user requirements
(iv) criteria for selection as “JCOMM products”
(v) data and metadata directories related to products
(vi) consideration of multi-disciplinary and non-physical products (chemical, biological, ecosystem) under JCOMM
(vii) data, products and services for developing countries
(viii) possible TOR for the future designation of specialized oceanographic centres under JCOMM

Proposed Membership

Services Programme Area Coordinator (chairman)
Observations Programme Area Coordinator
Capacity Building Programme Area Coordinator
Expert in data and metadata management (designated by Savi Narayanan)
…….representing GODAE (designated by the GODAE Project leader)
Julie Hall (GOOS/COOP)
Eric Lindstrom (TT satellite data requirements)
Ed Harrison (OOPC)
Polar product expert (designated by chair ETSI)
Craig Donlon (U.K.)
Takashi Yoshida (Japan)
Blue Link (Australia)
Ed Johnson (NAVOCEANO, USA)
Yves Tourre (JEB representative)
JCOMM Secretariat representative

Timescale

First draft proposal for MAN-IV, February 2005, final proposal for JCOMM-II.

Annex VI

DRAFT TEMPLATE FOR A JCOMM PROVIDER OF OPERATIONAL OCEANOGRAPHIC SERVICES AND PRODUCTS

1. **Modus Operandi.** The service shall be based on a coherent Modus Operandi (Production Line) connecting (i) collected observational data, (ii) numerical prognostic and hindcast models, (iii) an expert based value adding linked to a system for information distribution and warnings, and (iv) a dynamic feedback system connected to the customers.
2. **Staff qualifications.** All services shall be delivered with the presumption that it has been guaranteed by qualified experts, and can be subject to QA audits as required by a customer.
3. **Data flow.** Observational data must flow continuously into the service on a 24 hourly basis, both from the WMO conducted global network, as well as from national and locally dedicated networks. Networks and sensors must be adequately documented.
4. **Tools.** Numerical model tools embrace atmosphere, waves, sea level, ocean circulation and stratification, sea ice and transport of substances and objects. All numerical models shall be documented in open literature. Expertise of staff shall follow WMO recommendations for training and education and be documented.
5. **Deliveries.** Systems of warnings and bulletins should follow standard requirements to the extent possible, in order to avoid misinterpretations. Included herein should be a requirement for 24 hour services all days of the year, and arrangements for emergency situations. Recommended emergency response (such as in the case of an oil spill) should be within 30 minutes at any time day or night.
6. **User contacts.** The contact with the end user must be interactive and dynamic, with arrangements for swift follow up of new or amended user requirements.
7. **Quality Control and Assurance.** The service must follow a framework for Quality Management in close compliance with WMO recommendations, eventually supplemented by ISO standards. Included herein are requirements for forecast validation, user response, adaptation to audits, and connections to the international system conducted by WMO.
8. **Organization.** The service must be organized in a transparent and open-ended fashion in order to comply with new user requirements (new products), new methodologies, new technologies i.e. for product dissemination, and in particular with flexibilities to arrange partnerships with other services for optimal performance to obtain user satisfaction.
9. **Sustainability.** As a prime provider of information to ensure marine safety, operations, and environmental protection, all efforts must be taken to ensure its sustainability and unrestricted access to data and resources needed for its performance.
10. **Data policy.** Data flows and their QA functions for the safety purposes must not be hampered unnecessarily by restrictive data policies and inadequate data exchange mechanisms. The service provider must advocate IOC and WMO data policies.

Annex VII

DRAFT REVISED SYSTEM PLAN TO REPLACE ANNEX TO RECOMMENDATION 2 (CMM-XI)

Marine meteorological support for marine pollution emergency response operations on the high seas

1. **PRINCIPLES**

The principles for marine meteorological and oceanographic support for marine pollution emergency response operations are as follows:

Principle 1

For the purpose of the efficient and effective provision of meteorological and oceanographic information for marine pollution emergency response operations on the high seas and in view of the international character of these operations, there is a requirement to provide an internationally coordinated system of meteorological and oceanographic support for such operations. For this purpose the oceans and seas are divided into areas for which National Meteorological and Oceanographic Services ~~assume~~ have accepted responsibility. These areas, termed Marine Pollution Incident (MPI) areas, are the same areas as the METAREAs of the Global Maritime Distress and Safety System (GMDSS) but exclude waters under national jurisdiction.

Principle 2

The areas of responsibility together provide complete coverage of oceans and seas by meteorological and oceanographic information contained in the products prepared and issued by the participating National Meteorological and Oceanographic Services.

Principle 3

The preparation and issue of meteorological and oceanographic information for areas of responsibility is coordinated in accordance with the procedures mentioned in section 2.

Principle 4

The efficiency and effectiveness of the provision of meteorological and oceanographic information in support of marine pollution emergency response operations is monitored by obtaining opinions and reports from the users.

2. **PROCEDURES**

2.1 **Definitions**

2.1.1 An *Area Meteorological and Oceanographic Coordinator (AMOC)* is a ~~National~~ national ~~Meteorological~~ sService which may be

- National Meteorological Service, or
- National Meteorological Service which also operates oceanographic services, or
- National Meteorological Service liaising with Oceanographic Service(s) where these are in operation

which has accepted responsibility for ~~ensuring that~~ coordinating the provision of regional meteorological information and oceanographic information as appropriate, which is issued to support marine pollution emergency response operations in the designated area for which the Service (or Services) has accepted responsibility. The AMOC is also available to provide relevant suppot and advice for waters under national jurisdiction within its area if so requested by the countries concerned. [These ~~National~~ national ~~Meteorological~~ Services may eventually become designated Regional Specialized ~~Meteorological~~ Centres ~~(RSMC)~~ for Marine Pollution Emergency Support.] The support supplied by an AMOC (or a Supporting Service) ~~may~~ shall include ~~some or all of the following~~:

(a) Basic meteorological forecasts and warnings tailored for the area(s) concerned;

The support supplied by an AMOC (or a Supportung Service) ma also include

(b) Basic oceanographic forecasts for the area(s) concerned

(~~b~~c) The observation, analysis and forecasting of the values of specific meteorological and oceano-graphic variables required as input to models describing the movement, dispersion, dissipation and dissolution of marine pollution;

(~~c~~d) In some cases, the operation of these models;

(~~d~~e) In some cases, access to national and international telecommunications facilities;

(~~e~~f) Other operational support.

The issued information may have been prepared solely by the AMOC, or by another Supporting Service(s), or a combination of both, on the basis of an agreement between the Services concerned. The location and contact (telephone, e-mail, telex, telefax, etc.) details of any marine pollution emergency response operations authority (or authorities) responsible within the designated Marine Pollution Incident (MPI) are should be maintained on the MPERSS web site. National information for this site should be maintained by AMOCs or Supporting Services. ~~It is also the responsibility of the AMC to ascertain the location and contact (telex, telefax, etc.) details of any marine pollution emergency response operations authority (or authorities) responsible within the designated Marine Pollution Incident (MPI) area. This information should be made available by the AMC to Supporting Service(s) for the area.~~

2.1.2 A *Supporting Service* is a National Meteorological or Oceanographic Service which has accepted responsibility to provide on request, either directly or to the AMOC, meteorological (basic or enhanced) support for parts of, or an entire, designated MPI area. Depending on the location of the incident, Supporting Services may be requested by the emergency authority to provide the meteorological and/or oceanographic support directly to that authority. In such cases, the AMC should be so advised by the Supporting Service. A Supporting Service should advise the AMOC of the facilities it has available to fulfill its role.

2.2 **Areas of responsibility**

2.2.1 Areas of responsibility (Marine Pollution Incident (MPI) areas) and the responsible Services for AMOCs and Supporting Service(s) shall be as given in Appendix I.

NOTES: (1) The areas of responsibility given in Appendix I are reviewed by ~~the Commission for Marine Meteorology~~JCOMM to ensure complete area coverage and adequacy of services.

(2) An MPI area has, in some cases, been subdivided to meet the requirements of National Meteorological or Oceanographic Services.

(3) The areas of responsibility defined in Appendix I represent a minimum requirement for AMOC and Supporting Services. Both AMOCs and Supporting Services may extend the area of coverage for the issue of meteorological and oceanographic support information beyond these areas of responsibility, if they so wish, to meet national requirements. In this case, the area of coverage should be specified in the text of each communication to the marine pollution emergency response operations authority.

2.2.2 Any amendments to the area of responsibility or proposal for the introduction of a change in participating n~~N~~ational ~~Meteorological~~ Services' responsibilities for an area, shall have the approval of the Executive Council based on a recommendation by ~~the Commission for Marine Meteorology~~JCOMM.

2.2.2.1 Before drawing up any recommendation on the proposed amendment for submission to the Executive Council, ~~the Commission for Marine Meteorology~~JCOMM shall receive the comments of the ~~National~~ national ~~Meteorological~~ Services directly concerned with the proposed amendment as well as the comments of the president(s) of the regional association(s) concerned.

NOTE: All correspondence relating to the areas of responsibility is addressed to the Secretary-General.

2.2.3 Whenever ~~a National Meteorological Service responsible for the issue of meteorological support data to an MPI area~~ an AMOC is no longer able to provide this service~~, the National Meteorological Service~~it should inform the Secretary-General of WMO at least six months in advance of the intended termination date. Whenever a Supporting Service is no longer available to provide this service, it should inform the relevant AMOC at least six months in advance of the intended termination date.

2.3 **Meteorological support to marine pollution emergency response operations on the high seas**

2.3.1 Support to these emergency operations may, as stated in paragraph 2.1.1, include a variety of elements, such as:

(a) Basic meteorological forecasts and warnings tailored for the area(s) concerned. Special attention should be given to the early provision of actual and forecast surface conditions in the area of the pollution incident. This may be the initial requirement following a pollution incident;

(b) Basic oceanographic forecasts for the area(s) concerned. Special attention should be given to the early provision of actual and forecast oceanographic conditions, both surface and subsurface, in and downstream of the area of the pollution incident. this may be the initial requirement following a pollution incident;

(~~b~~c) The observation, analysis and forecasting of the values of specific meteorological and/or oceanographic variables required as input to models describing the movement, dispersion, dissipation and dissolution of marine pollution. AMOC and Supporting Service should, if possible, ascertain from the relevant marine pollution emergency response operations authority the specific meteorological and oceanographic variables required for a particular model, also the location of the model operator and access details. ~~If information regarding specific required variables for a model is not available, general~~ General guidelines for the type of data which will be required are given in Appendix II, if information regarding specific required variables for a model is not available;

(~~c~~d) The operation of the models by the n~~N~~ational Meteor-logical or Oceanographic Service. If an AMOC or Supporting Service has this facility and it can be used in the MPI area, the existence of this facility should be made known to the relevant marine pollution emergency response operations authority at an early stage, and ideally prior to an actual pollution incident in the MPI area. [AMOCs should give consideration to conducting periodic trials of their pollution models and cooperating with the pollution emergency authoritiesn their MPI area to assess the efficiency and effectiveness of the output data from their models.]

(~~d~~e) Access to national and international telecommunications facilities. Effective and efficient communications is an essential element in an emergency situation and AMOCs and Supporting Services must ensure that they have access to reliable communication links between all parties involved in a marine pollution incident within their MPI area.The AMOC should ascertain from the marine pollution emergency response operations authority the method by which the transfer of the required meteorological support shall be effected. This information shall be relayed to the Supporting Service(s) for the MPI area concerned. The use of the ~~International SafetyNET service (of INMARSAT)~~ most appropriate communications methods should be considered ~~if~~to ensure the meteorological an oceanographic support is ~~required at~~delivered to the location of the pollution incident as required, e.g. by the on-scene dispersal craft. Similarly, use of the Global Telecommunication

System (GTS) by a marine pollution emergency response operations authority via a regional telecommunication hub (RTH) of the Global Telecommunication System (GTS) may also be a consideration in cases of a major pollution incident;

(e) *Other operational support. AMOCs shall, at an early stage of a marine pollution incident affecting their area of responsibility, ascertain from the relevant marine pollution emergency response operations authority details of the incident and the nature of the support required. It shall be the responsibility of the AMOC to advise the marine pollution emergency response operations authority of the support facilities which the AMOC and/or the Supporting Service(s) can provide. [This shall be undertaken whether or not a pollution incident occurs in an MPI area, and this information shall be updated to the marine pollution emergency response operations authorities at regular intervals, and immediately should there be a change in the support facilities available from the AMC or Supporting Service. It is the responsibility of the Supporting Service(s) to advise the AMC of any change to its support facilities.] It should be noted that operations at sea in response to marine pollution emergencies are fundamentally dependent on the support of Meteorological and Oceanographic Services. It is thus essential that AMOCs and Supporting Services offer as full a range of operational support as possible and practicable to marine pollution emergency response operations.*

2.3.2 A ~~permanent~~ record of all communications should be maintained, showing the times of origin, transmission and reception of the information provided.

2.4 **IMO regional marine pollution combatting centres. Marine pollution research and monitoring programmes of IOC/UNEP** *<This section will be updated.>*

2.4.1 IMO and UNEP have established regional marine pollution combatting centres in a few locations throughout the world. These centres have been incorporated in the coordinated meteorological support plan in Appendix I. Full details of these centres are given in Appendix III. The majority of these centres are non-operational and have an advisory capacity only. The nature of the centre, whether advisory or operational, is indicated in Appendix III. It should be noted that it is the responsibility of the participating National Meteorological and/or Oceanographic Service(s) to ascertain the location of any marine pollution emergency response operations authority relevant to the MPI area and/or to each marine pollution incident.

2.4.2 The objectives and activities of the Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea and its role in the case of emergency are given in Appendix IV.

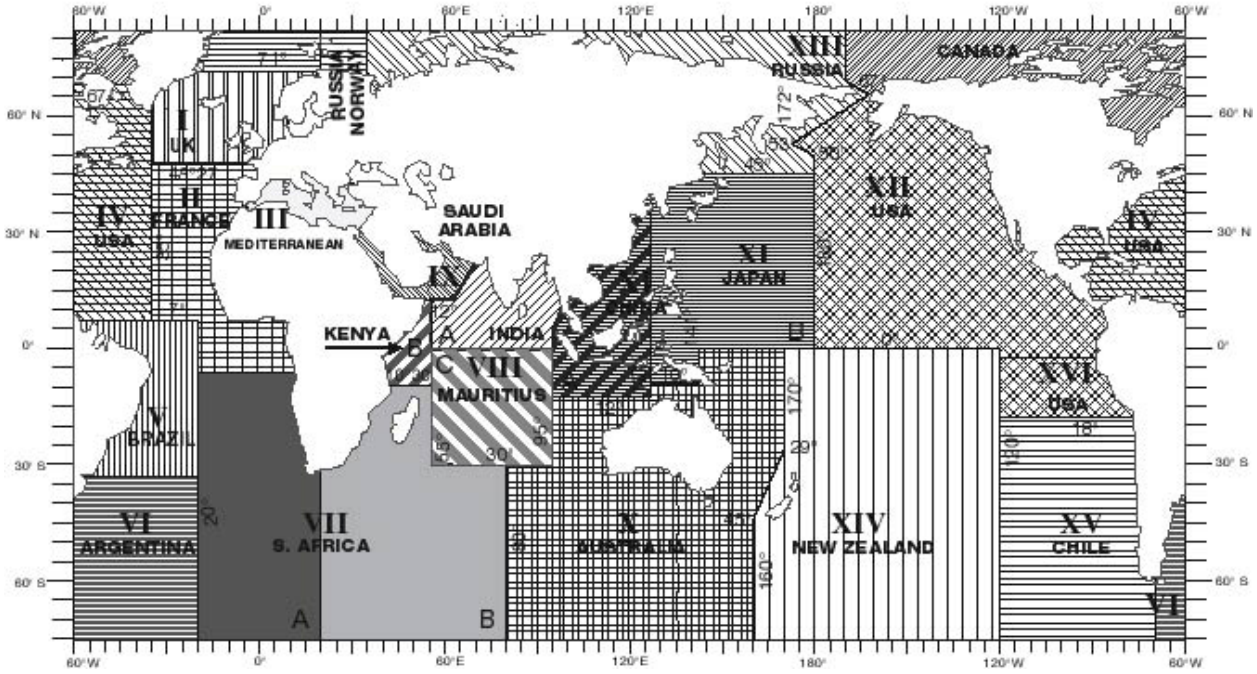
2.4.3 The International Convention on Oil Pollution Preparedness, Response and Cooperation, 1990 (OPRC Convention), in Article 12 — Institutional Arrangements identified the International Maritime Organization Secretariat as having specific responsibilities with regard to the provision of information and technical services under the Convention. Contact information for the IMO Secretariat is also given in Appendix III and information on activities in Appendix V. It is the responsibility of the WMO Secretariat to keep the IMO Secretariat informed of all international dispositions and arrangements made under the WMO meteorological and oceanographic support system. At the same time, AMCs may wish to contact the IMO Secretariat directly to obtain information on specific arrangements which may exist for combatting oil and other pollution incidents in their MPI area(s) of responsibility.

2.4.4 IOC and UNEP co-sponsor the programme on Global Investigation of Pollution in the Marine Environment (GIPME).

Appendix I

~~**AREAS OF RESPONSIBILITY AND NATIONAL METEOROLOGICAL SERVICES DESIGNATED AS AREA METEOROLOGICAL COORDINATORS FOR ISSUING OF METEOROLOGICAL DATA FOR SUPPORT TO MARINE POLLUTION EMERGENCY RESPONSE OPERATIONS**~~

Marine Pollution Incident (MPI) areas showing responsible NMSs



COORDINATED ~~METEOROLOGICAL~~ METOCEAN SUPPORT TO MARINE POLLUTION INCIDENT (MPI) AREA
RECIPIENT OF ~~METEOROLOGICAL~~ METOCEAN DATA

MPI area	***Area meteorological Co-ordinator***	***Supporting Service***	***Remarks***
I	United Kingdom	Norway Iceland Ireland France	Norway responsible for Arctic waters north of 71°N
II	France	Portugal Spain	
III(A)	~~Italy~~France	~~Greece~~ ~~Malta~~ ~~France~~	
III (B)	Greece	Malta France	
IV	USA	Canada	Canada responsible for Arctic waters north of 67°N
V	Brazil		
VI	Argentina		
~~VII(A)~~	~~South Africa~~		~~West of 20°E~~
VII~~(B)~~	South Africa	Réunion	~~East of 20°E~~
VIII(A)	India		Indian Ocean north of the equator, west of 95°E, east of 55°E, excluding Area IX
VIII(B)	Kenya	United Republic of Tanzania	12°N-10°30'S 55°E to East African coast
VIII(C)	Mauritius	Réunion	0° - 30°S 55°E - 95°E
IX	Saudi Arabia	Bahrain	
X	Australia		
XI(A)	China	Hong Kong Malaysia Indonesia Singapore	125°E - Mainland China to west boundary of area IX (95°E) (excluding Philippine waters
XI(B)	Japan	Philippines Indonesia Guam (USA)	
XII & XVI	USA	Canada	Canada responsible for Arctic waters north of 67°N
XIII	Russian Federation		
XIV	New Zealand		
XV	Chile		

Appendix II

METOCEAN INPUT DATA REQUIREMENTS FOR MARINE POLLUTION MONITORING & RESPONSE

~~Two main geographically separate requirements for metocean data:~~

~~. Coastal region includes continental shelf and Economic Exclusive Zone (EEZ)~~
~~. Open and high seas.~~

For maritime vessel incidents and pollution events it is important to ensure that actual and forecast (short and medium term) weather and oceanographic information is available for the incident site.

Regional models should be developed or sourced to ensure coverage of the MPERSS area of responsibility.

Main functions and requirements of marine pollution emergency response operation authorities (MPEROAs)

A. Vessel safety and support:

To ensure safety of life and reduce the potential of further pollution, metocean information will be required for:

. crew safety and evacuation
. drifting of the casualty
. salvage considerations
. cargo removal and lightering.

B. Pollution at sea (oil, chemicals and cargo containers)

This can be achieved by spill and drift trajectory modelling using fixed or dynamic metocean models. These trajectory models vary in complexity, cost of development and the geographic area of need eg open sea (primarily influenced by ocean currents and winds) or near shore (influence of tidal conditions and winds). The primary function is to determine:

. movement direction and speed
. spreading of the pollutant.

For most coastal and continental shelf incidents high accuracy digital bathymetric data sets will also be required for most trajectory models as well as the determination of dominant tidal constants for the location.

The ground truthing of spill models are important to ensure the accuracy and performance and assists in the refinement of algorithms. This can be achieved through the deployment of drifter buoys, use of HF ocean surface radar, satellite sensors, etc.

C. Weathering and fate of oil at sea.

The extent of weathering of oil at sea affects the choice of response procedures to be used to combat the spilt oil. To determine "weathering" characteristics of the oil, present models require inputs for:

. sea surface wind speed (present & predicted)
. wave height (present & predicted)
. water temperature & salinity (present & predicted)
- surface current and at depth in the mixed layer (present and predicted)
- ice properties

D. Response Operations of MPEROAs.

MPEROAs will require metocean information to support the planning and carrying out of field operations, these include:

. planning (scenario development)
. operations (at sea/ on shore)
. logistics/equipment (limitations of use under certain sea states)
. recording of response actions and decision support information for cost recovery.

Metocean parameters likely to be required for the individual MPERSS regions ~~may~~ include:

. Sea surface winds - velocity/direction/directional variations/gust factors
. Wave/swell - height/period/direction
. Tidal - height/timing for incident location
. ~~Ocean currents & eddies~~
. ~~Water properties - temperature/salinity~~
air temperature
. Instability and severe weather events - storms, cyclones, wind squalls etc.
visibility
fog
sunshine hours
rain, hail
lightning strikes.

Tidal-height/timing for incident location
Ocean current and eddies
Water properties - temperature/salinity
Ice properties (concentration, thickness, drift stage of melting, etc.)

~~Other information requirements:~~

~~. visibility~~
~~. fog~~
~~. ice~~
~~. sun up/down~~
~~. air temperature~~
~~. cloud cover~~
~~. rain, hail~~
~~. lightening strikes.~~

Sources of Metocean data:

The collection of metocean data is achieved through many sources and mechanisms including:

. satellite (orbiting/geostationary) ~~eg~~ providing sea surface temperatures, scatterometer winds, sea wave height ~~weather satellites, radar satellites, altimeter~~ etc.
coastal HF radar
. automatic coastal/land stations
. drifting buoys
. moored buoys
Argo floats
. vessel reports/observations and automatic stations
sub surface temperature probes
current profilers
. oil platforms

. aircraft
. weather radar
. weather balloons.

Priorities for metocean collection and modelling

The priorities for metocean data input should initially focus on the high risk areas of coastline, shipping routes, ports, navigation hazards or regions that are known as major problem areas for shipping or oil production/exploration platforms. Special attention should be given to the modelling of ice cover pollution.

Form of Metocean data

The fast communication of metocean data and numerical model outputs is essential for MPEROAs across the MPERSS region. Effective electronic data communications should be established for MPEROAs, also the data must be in a form that meets user requirements in quality, accuracy and presentation needs.

Annex VIII

TASK TEAM ON RESTRUCTURING THE JEB

Terms of Reference

The JEB has been valuable, but the bulletin is no longer sustainable in its present form. As recommended by Ocean Ops 04, it must therefore be redeveloped as a user-friendly web portal to existing operational products classified as JCOMM products, in particular in the light of the large number of new products now available on the web. To this end, the following must be developed or identified:

(i) identification of a user or target community
(ii) portal design, user driven, categorized, structured
(iii) portal host (operational agency, existing web portal, …)
(iv) criteria for selecting products/sites to be accessible through the portal (in coordination with the TT on JCOMM Ocean Product Development)
(v) metadata catalogue
(vi) user feedback mechanism
(vii) addressing the specific questions included in the summary of the rapporteurs reports from Ocean Ops 04
(vii) ongoing portal development.

Proposed Membership

Yves Tourre (chairman)
Craig Donlon (U.K.)
Bob Keeley (Canada)
Janice Trotte (GOOS, Brazil)
Eric Bayler (NOAA/USA)
Vasily Smolynitsky (ETSI and Russian Federation)
Johannes Guddal (JCOMM co-president and GOOS Steering Committee)
Peter Pissierssens (JCOMM Secretariat)

TT members to work with TT ocean products development on selection criteria - eventual Editorial Board

Timescale

First draft proposal for consideration by MAN-IV, February 2005, final for JCOMM-II.

Annex IX

WMO PUBLICATION NO. 9 WEATHER REPORTING

Volume D Information for Shipping

Table of Contents

Chapter 1 – Meteorological Broadcasts by Radiotelegraphy and Radiotelephony
Retain

Chapter 2 – Meteorological Broadcasts by Radio-Facsimile
Retain

Chapter 3 – Global Maritime Distress and Safety System
Retain

Chapter 4 – Coastal Radio Stations Accepting Ships Weather and Oceanographic Reports
Possibly delete, following further advice from JCOMM Ship Observations Team

Chapter 5 – INMARSAT LES Accepting Ships Weather Reports and Oceanographic Reports
Retain

Chapter 6 – Marine Meteorological Services Available for Main Ports
Retain

Chapter 7 – Ship Weather Routing Services
Delete

Chapter 8 – Visual Storm Warning Signals
Retain

Annex X

SERVICES PROGRAMME AREA WORK STRATEGY

1. Introduction

This plan was presented to MAN-I without significant comment. It has since been updated in light of the decisions, recommendations, etc. of MAN-I. The bracketed paragraph references point to relevant text from the JCOMM-I abridged final report.

According to the tasks defined at JCOMM-I for the Services Coordination Group (SCG) and Expert Teams (ETs) on Maritime Safety Services (ETMSS), Wind Waves and Storm Surges (ETWS), and Sea Ice (ETSI), and the rapporteurs on MPERSS and the JCOMM Products Bulletin, the tentative working strategy for the intersessional period of JCOMM-I and JCOMM-II is as follows:

2. Objectives of the JCOMM Services Programme Area (SPA)

Develop the JCOMM services strategy and plans for high priority JCOMM services objectives and projects; accomplish the tasks of services as defined at JCOMM-I; respond to the requirements for services of end user communities, participating organizations and other relevant operational or scientific programmes and activities; support the promotion, coordination, and integration of marine meteorological and operational oceanographic services.

3. The Mission of the SCG

Develop the JCOMM services strategy and submit it to the JCOMM Management Committee for approval; accomplish the services coordination tasks especially those with high priority; discuss and determine the implementation plan for JCOMM services and other services matters which can be addressed during the JCOMM intersessional period; identify areas which require consideration by JCOMM and develop proposals, projects and recommendations to be put to the Management Committee for consideration at the following session of the Commission.

4. Objectives of ETMSS, ETWS and ETSI

MSS: Coordinate, monitor and review arrangements for the provision and dissemination of maritime safety services to shipping;

WS: Review and advise on scientific and operational aspects of wind wave and storm surge forecasting and effectively coordinate with other JCOMM groups, GOOS and other scientific bodies;

SI: Review and advise on scientific, technical and operational aspects of sea ice observations and forecasting, oversee operations of the GDSIDB, coordinate services development and training and linkages with major international programmes.

5. Working Relations between the SCG, the ETs and the rapporteurs

SCG: Through reviewing and analyzing the existing requirements for services, especially in regard to international regulations, those of GOOS and other emerging international programmes and the likely future directions of operational oceanographic science, technologies and systems, determine and develop a cohesive strategy for coordinating, continuously improving and establishing JCOMM services. Essentially the ETs will provide key expertise and advice on the major on-going service components of the SPA. The SCG will provide broad direction for the work of the ETs and the channel for their expertise to be linked to the Management Committee and other PAs. The SCG will also rely on the ETs to provide the interfaces to the user communities and feedback from them about on-going and new requirements, perceptions of relevance and

quality of services and identification of gaps in JCOMM services or technical issues which may require the attention of the Management Committee.

ETs: The ETs will provide the SCG with advice and technical and practical solutions which will be required to successfully implement the strategies, objectives and operational plans for JCOMM services as developed by the SCG. The chairmen of the ETs will provide leadership to their Teams and will be the primary link from them to the SCG. The Chairmen will devise the detailed work programme for their Teams under guidance from the SCG and its planning and implementation framework.

Rapporteurs: The rapporteurs on MPERSS and the JCOMM Products Bulletin will provide the focus of expertise for their areas. They will develop advice and technical, scientific and practical solutions to issues/problems for the SCG and ETs, as well as the development of services which are relevant to their areas of responsibility.

6. Work Plan for the SCG

6.1 Respond to requests, advice, requirements etc. from the Management Committee, the JCOMM co-presidents and WMO/IOC Secretariats.

6.2 On the basis of the overall work plan as prescribed by JCOMM-I and the JCOMM co-presidents prior to the Management Committee's first meeting in February 2002 (MAN-I), the identified tasks have been prioritized as shown below. The plan can be conveniently organized into three phases: Short-term (up until SCG-I in April 2002); medium-term (May 2002 to December 2003); long-term or the intersessional period as a whole.

6.3 The SCG will undertake or oversee a number of the short term high priority tasks identified by JCOMM-I and MAN-I leading up to and including SCG-I, including:

- Develop arrangements/protocols for the participation of ad hoc or longer term rapporteurs in the activities of the SCG; ***Ongoing***
- Identification of appropriate funding support for a second MPERSS workshop (para 6.4.6); ***OK***
- Resolution of the date for the second MPERSS workshop; ***OK***
- Develop the basis for the proposed ad hoc task team to support the MPERSS rapporteur and implementation and development of MPERSS; ***OK***
- Preliminary evaluation of support and contribution to the proposed workshop on JCOMM products (in support of operational oceanography and marine meteorology); ***OK***
- Resolution of the optimum timeframe for holding the JCOMM products workshop***; OK***
- Progress towards development of a facility within SafetyNet for transmission of graphical information to ships at sea via Inmarsat C and in particular in Polar Regions (para 6.1.5); ***Ongoing***
- The review of the matter concerning the designation of the Kenya Meteorological Department as a GMDSS Preparation Service and make recommendations to the co-presidents and the Management Committee (para 6.1.12); ***Ongoing/pending***
- Develop a discussion paper for SCG-I on the future of the publication WMO No. 9, Vol. D *Information for Shipping* with the view of adopting electronic publishing during the intersessional period and consider the future of other JCOMM publications not specifically discussed at JCOMM-I; ***Underway to be completed before JCOMM-II***
- Establish mechanisms and processes for undertaking a range of tasks dealing with the on-going review of the effectiveness of the work plan and requirements for services including expanded oceanographic services, and further implementation and development of MPERSS; ***Some OK other ongoing***
- Initial response to decisions made at MAN-I in regard to JCOMM support for the Brussels 2003 conference; ***OK***

- Review plans and arrangements for the first sessions of the ETs, to be held in 2002-2003. ***OK***

6.4 For the period May 2002 to December 2003, and in the light of the outcomes of MAN-I and SCG-I, the specific medium-term tasks include:

- Review the effectiveness of the Services work plan (Res. 16/2); ***Ongoing***
- Prepare specific proposals for implementing recommendations from the MARPOLSER98 Workshop and develop a mechanism to deal with related scientific and technical issues (para 6.4.4); ***OK following ad hoc TT***
- Develop plans for the second MPERSS and JCOMM Products Workshop; ***OK***
- Contribute to plans for, and the holding of, the Brussels 2003 conference; ***OK***
- Develop a final report on publishing the WMO No. 9 Vol. D *Information for Shipping* in electronic format; ***OK***
- Assist the ad hoc rapporteur from the Observations Coordination Group (OCG) in the evaluation of the optimum connections between the OCG and SCG viz a viz wave observation activities; ***OK***
- Interact with and assist the rapporteur on the development of non-physical oceanographic observations and services. ***Underway***

6.5 For the intersessional period as a whole the long term components of the Work Plan will entail:

- On-going review of the Services work plan; ***Ongoing***
- Explore the development of draft set of IOC Technical Regulations to govern the provision of oceanographic services (para 9.3); ***Not attempted, guidelines to be developed by TT on OPD***
- Review requirements for modelling, product preparation and service provision for atmosphere-driven ocean processes, and if necessary propose development of relevant operational programmes (para 6.2.17); ***OK - TT OPD***
- On-going review and evaluation of requirements for improved and new services, and discontinuance of services where warranted (para 6.6.9 and Res. 16/2); ***Ongoing***
- Consolidate implementation plans for MPERSS flowing from the MARPOLSER98 Workshop, including the updated system plan, resolution of the outstanding technical and scientific issues and development of appropriate technical guidance (paras 6.4.4 and 6.4.6); ***OK***
- On-going oversight of relevant manuals, guides, handbooks and other relevant continuing or special publications. ***Ongoing***

6.6 Working mechanism of the SCG

The SCG determines and reviews the work plan, and devolves tasks as appropriate to the Expert Teams or other relevant nominated experts. The chairman of the SCG will organize, coordinate and monitor the process of the tasks being accomplished.

The work of the SCG will be mainly organized and coordinated through correspondence. If the budget permits, it is hoped that SCG members can meet once per year in the current intersessional period to promote the establishment of new JCOMM working arrangements, structures and programme activities and oversee the implementation of the tasks. This will be a significant consideration given the scope of JCOMM's work programmes over the next two years.

The SCG will also pay its attention to the development of cooperative relations with relevant bodies outside JCOMM, notably GOOS and related science bodies and panels which will have a significant role in the establishment of the technical bases for the generation of new oceanographic services in the future.

7. Work Plan of ETMSS

Subject to further revision the draft ETMSS work plan entails:

Urgent/High Priority

- Develop facility for transmitting SafetyNet graphical products via Inmarsat C (para 6.1.5); ***Ongoing***
- Review proposed designation of Kenya Meteorological Department as a GMDSS Preparation Service (para 6.1.12); ***Ongoing/Pending***

Medium term/High-Medium Priority

- Ascertain on-going requirements for HF radio broadcasts and liaise with CBS and WMO RA II (para 12.2.6); ***Pending will be completed before JCOMM-II***
- Review the questionnaire for monitoring of MMS prior to its distribution in 2004 (para 6.6.6); ***OK***
- Plan and hold MSS-I in September 2002. ***OK***

Intersessional/Moderate Priority

- Consider designation of additional Metareas for Arctic waters (Rec. 9/1); ***OK after Russia reneged***
- Consider dissemination of the MMS monitoring survey directly to ships via SafetyNet (para 6.6.6); ***Ongoing***

On-going/Moderate Priority

- Keep under review the designation of a further Issuing Service for SafetyNet services in Metarea VIII (para 6.1.13); ***Not to be considered before completion of related action regarding Kenya becoming a preparation service***
- Review, maintain and improve the gathering of user responses to the WMO GMDSS broadcast services (Rec. 9/1) ***OK and ongoing***

8. Work Plan of ETWS

Subject to further revision the draft ETWS work plan entails:

Medium term/High-Medium Priority

- Revise and update the Guide to Wave Forecasting and Analysis (para 10.3) including placing it online by end 2002; ***OK***
- Develop plan for Guide to Storm Surge Forecasting; ***OK –contents page done, Expert Team review by end 2004***
- Plan and hold ETWS in the northern spring 2003. ***OK***

Intersessional/High Priority

- Cooperate with the WMO Tropical Cyclone Programme (TCP) and provide expert assistance to the IOC/IHO/WMO Project on storm surge disaster reduction in the northern Indian Ocean area (para 6.2.14); ***OK, proposal stalled but no support requested so far.***

Intersessional/Medium Priority

- Develop technical advice on WS modelling, forecasting and service provision. Prepare guidance material on storm surge prediction for consideration by the Management Committee (para 6.2.6 and Rec. 16/2); ***Developed a proposal for a new Guide to Storm Surge Forecasting. Review underway.***
- Develop technical advice and provide support to Members on wave and storm surge modelling, forecasting and services, including:
- Review of boundary layer winds; ***Ongoing, Developed a questionnaire for the information of the Report***
- Techniques and benefits of satellite data in wind and wave models; ***Ongoing, a questionnaire for the Technical Report underway***
- Variations of long return period caused by long term climate trends; ***Underway***
- Organize training courses and technical workshops; ***Done (Dartmouth, Canada, June 16-20, 2004), Organizing 8th International Workshop on Wave Hindcasting and Forecasting, 14-19 November 2004, in Hawaii***
- Regular updates of catalogue of wave and surge models; ***Underway, Questionnaires developed***
- Advice to Members on development of wave and surge services; ***Ongoing***
- Inventory hindcast wind wave and surge climatologies. ***Underway***
- Monitor projects for verifying operational wind wave model output and develop procedures to distribute information on the wave forecast verification scheme (para 6.2.10 and Res. 16/2) including:
- Continue exchange of wave verification scores between operational centres and increase number of centres participating; ***Underway, publishing JCOMM Technical Report***
- Expand wave model verification to consider the quality of spectral wave forecasts; ***Ongoing, activity to be taken at individual centres***
- Identify operational storm surge model outputs and monitor verification results. ***Ongoing***

9. Work Plan of ETSI

Subject to further revision the draft ETSI work plan entails:

Urgent/High Priority

- Develop amendments and during the first ET meeting in October 2002 review a draft revision of the WMO Sea Ice Nomenclature, for approval by the co-presidents and publication by WMO (para 6.3.9). ***Draft prepared. New action introduced by ETSI-II***

Medium term/High Priority

- Plan and hold ETSI in October 2002. ***OK***

Intersessional/Moderate Priority

- Develop amendments to the Sea Ice Nomenclature for colour standards of ice charts and coding sea ice decay from remotely sensed data (para 6.3.8); ***OK***
- Develop and revise Sea Ice Nomenclature, terminology, data formats and software codes (para 6.3.15); ***OK. New action introduced by ETSI-II***
- Review and provide guidance on the GDSIDB including QC, error analysis and archiving and recommend action (Res. 16/2); ***OK, ongoing with additional items by ETSI-II***
- Develop techniques and capabilities to systematically measure ice thickness by means of remote sensing (para 6.3.15); ***Ongoing***

- Prepare historical sea ice data sets (para 6.3.15); **On-going with new items by ETSI-II**
- Review and catalogue products and services required in sea ice areas (Rec. 16/2); ***Ongoing***
- Provide support to Southern Hemisphere countries to enhance Antarctic se ice services (para 6.3.15); ***Ongoing***

On-going/Moderate Priority

- Develop technical guidance, software exchange, specialized training and other capacity building support concerning sea ice observations and services (Res. 16/2); ***Ongoing***
- Develop cooperation and coordination with climate oriented programmes such as WCRP, WCP and CLIC (para 6.3.15); ***OK, ongoing with revision by ETSI-II***
- Continue collaboration with BSIM, IICWG and ECDIS (para 6.3.19); ***OK, ongoing with new item by ETSI-II***

✱ New/Revised work plan by ETSI-II (2004)

High Priority

- Implement revision of the new updated version of the Sea Ice Nomenclature to be submitted in final form at ETSI-III and before IPY 2007/2008;

Medium term/High Priority

- Ask Secretariat to ensure close coordination between ETSI and GOOS with respect to sea ice observations and to undertake appropriate steps to be designated as the responsible body for information and assessment of sea ice as an Essential Climate Variable (ECV);
- Undertake appropriate steps to be established as the owner for Ice Objects register, contact IHO on the mentioned subject and advise the TSMAD of JCOMM ETSI intention to adopt and control this register in the part related to sea ice;
- Develop working plan for tailored support of IPY 2007/2008 from ETSI, GDSIDB and national ice services;
- Submit to Secretariat agreed draft of English/French/Russian/Spanish electronic version of WMO Sea Ice Nomenclature for formal approval;
- Revise (once per year) WMO publication No 547 "Sea-Ice Information in the World" to be published in electronic form as JCOMM Technical Report Series;

Intersessional/Moderate Priority

- Develop and revise Sea Ice Nomenclature, terminology, data formats and software codes;
- Begin to work on a new version of the Illustrated Glossary of Sea Ice Terms as part of the updated Nomenclature;
- Develop appropriate sections on Ice Decay/Stages of Melting to the new Sea Ice Nomenclature
- Review and provide guidance on the GDSIDB including QC, error analysis and archiving and recommend action;
- Develop techniques and capabilities to systematically measure ice parameters including thickness by means of remote sensing;
- Prepare historical sea ice data sets;
- Review and catalogue user requirements, products, services required in sea ice areas;

- Cooperate with DBCP in addressing problems in program implementation in the Polar Regions;
- Provide support to Southern Hemisphere countries to enhance Antarctic sea ice services (para 6.3.15)

On-going/Moderate Priority

- Develop technical guidance, software exchange, specialized training and other capacity building support concerning sea ice
- observations and services;
- Develop cooperation and coordination with climate oriented programmes such as WCRP, WCP, CLIC, GCOS;
- Continue collaboration with BSIM, IICWG and ECDIS.

Annex XI

Second Session of the
Joint WMO/IOC Technical Commission for Oceanography and
Marine Meteorology

DRAFT DOCUMENTATION PLAN FOR SPA

Agenda item	Short title	Length	By	Submission date
5.1	Work review , including the report by the SPA coordinator	L	Chairs, Secretariat	October 2004
5.2	Future products and services, including JEB	M	Coordinator, Secretariat	March 2005
5.3	Other issues	M	Secretariat	April 2005
5.4	Formal decisions	L	Chairs, Secretariat	March 2005
9	Review of Technical Regulations	M/L	Chairs, Secretariat	January 2005
10	Guides	L	Chairs, Secretariat	January 2005

S = 1-2 pages
M = 3-5 pages
L = 5+ pages

Tentative list of SPA draft recommendations and resolutions for JCOMM-II

Rec. 5.4 – The future JCOMM Electronics Products Bulletin (JEB) web portal
Rec. 9(1) – Modifications to the Manual on MMS - revisions to the marine broadcast system for the GMDSS
Rec. 9(2) – Modifications to the Manual on MMS – guidelines for NAVTEX services
Rec. 10(1) – Modifications to the Guide to MMS – guidelines for the provision of JCOMM ocean products
Rec. 10(2) – Modifications to the Guide to MMS - Marine Pollution Emergency Response Support System
Rec. 10(3) – Guide to Storm Surge Analysis and Forecasting

Res. 2 – Services Programme Area

Annex XII

TERMS OF REFERENCE AND GENERAL MEMBERSHIP OF THE COORDINATION GROUP AND EXPERT TEAMS OF THE SERVICES PROGRAMME AREA

1. Services Coordination Group

Terms of Reference

The Services Coordination Group, in close collaboration with CBS, GOOS and GCOS subsidiary bodies and related experts, shall:

(a) Keep under review and advise on the effectiveness, coordination and operation of the Services work programme, including performance with respect to timeliness, standards, quality and relevance to established user requirements;

(b) Through the assembly of requirements identified by specialist service groups, and other PAs of JCOMM, provide advice on JCOMM services that need to be changed, implemented or discontinued;

(c) Develop interfaces to representative user groups in order to monitor the strength and weaknesses of existing services;

(d) With the concurrence of the co-presidents of JCOMM, establish and create Expert Teams, Task Teams, Pilot Projects and appoint Rapporteurs, as appropriate, to undertake the work of the Services Programme Area;

(e) Ensure effective coordination and cooperation with groups and bodies in the area of service provision, including other Programme Areas of the Commission;

(f) Liaise with external bodies, in particular those representing user communities.

General Membership

The Membership is selected to ensure an appropriate range of expertise and to maintain an appropriate geographical representation.

PA/Services Coordinator (chair)
Chairs Expert Teams (~~3~~4)
Chair Task Team on JCOMM Ocean Product~~s~~ Development~~An expert in MPERSS~~
~~Scientific Editor of the~~Chair Task Team on ~~-~~the JCOMM Electronic Products Bulletin
Three additional experts

Representatives of JCOMM Programme Areas and of other expert bodies may be invited as appropriate, with the concurrence of the co-presidents of the Commission, and in general with no resource implications to JCOMM.

2. Expert Team on Maritime Safety Services

Terms of Reference

The Expert Team on Maritime Safety Services, in close collaboration with IMO, IHO, ICS, IMSO and other concerned organizations and bodies on maritime safety issues, including the GMDSS, shall:

~~(a)~~(a) Monitor and review the operations of ~~the~~ marine broadcast systems, including for the GMDSS and others for vessels not covered by the SOLAS convention;~~and provide advice on improvements to the Services Programme Area, as necessary;~~

(b) Monitor and review technical and service quality standards for meteorological and oceanographic maritime safety information, particularly for the GMDSS, and provide assistance and support to Members and Member States as required;

(c) Ensure feedback from the user communities is obtained through appropriate and organised channels and applied to ~~o~~improve the relevance, effectiveness and quality of services;

~~(b)~~(d) Ensure effective coordination and cooperation with concerned organizations, bodies and Members and Member States on maritime safety issues;~~.~~

~~(c)~~(e) Propose actions as appropriate to meet requirements for international coordination of meteorological and related communication services;~~.~~

(f) Provide advice to the Services CG and other Groups of JCOMM, as required on issues related to maritime safety services.

General Membership

Chair, selected by the Commission.

OPEN membership, including representatives/nominations of the Issuing Services for the GMDSS, representatives of IMO, IHO, ICS, IMSO, and other user groups as appropriate.

The Chair, in consultation with the co-presidents of the Commission, should secure support to enable appropriate and adequate participation in the meetings of this group.

3. Expert Team on Wind Waves and Storm Surges

Terms of Reference

The Expert Team on Wind Waves and Storm Surges shall:

(a) Review and advise on the implementation of wind wave and storm surge activities within JCOMM and propose amendments as required;

(b) Develop technical advice on wave and storm surge modelling, forecasting and service provision and provide assistance and support to Members/~~ and~~ Member States as required;

(c) To interact closely with ETMSS on all aspects of sea state and~~s~~ surge forecasting relevant to the operation and improvement of maritime safety services;

~~(c)~~(d) Monitor projects for verification of operational wind wave and storm surge model outputs and assist in their implementation as required;

~~(d)~~(e) Ensure effective coordination and cooperation with other WMO and appropriate GOOS bodies, particularly on requirements for, and implementation of, wind wave and storm surge products and services;~~.~~

~~(e)~~(f) Provide advice to the Services CG and other Groups of JCOMM, as required on issues related to wind waves and storm surges.

General Membership

The Membership is selected to ensure an appropriate range of expertise and to maintain an appropriate geographical representation.

Up to nine members, including the Chair, representative of the range of activities related to wind waves and storm surges within JCOMM. Additional experts may be invited as appropriate, with the concurrence of the co-presidents of the Commission and in general with no resources implications to JCOMM.

4. Expert Team on Sea Ice

Terms of Reference

The Expert Team on Sea Ice shall:

(a) Review and catalogue the products and services required by user communities in sea ice areas;

(b) Encourage and advise on the relevant numerical models and forecast techniques for products and services;

(c) Develop technical guidance material, software exchange, specialized training and other appropriate capacity building support with regard to sea ice observations and services and provide assistance and support to Members/ and Member States as required;

(d) Interact closely with the ETMSS and ETMAPSAR on all aspects of the impacts of sea ice relevant to maritime safety, marine pollution response and search and rescue services;

(d)(e) Maintain linkages with relevant international organizations and programmes, in particular BSIM, CLIC, IICWG, and ASPeCt, GCOS and IHO;

(e)(f) Keep under review and provide guidance as appropriate on the operations of the Global Digital Sea Ice Data Bank, including appropriate QC, error analysis and archiving mechanisms, and encourage and facilitate enhanced submissions of sea ice data to the bank;

(f)(g) Review and propose amendments to formats, nomenclatures and procedures for sea ice data and information exchange as well as to relevant terminology, coding and mapping standards, including management of an an ice objects register within ECDIS, and requirements for sea ice information as an Essential Climate Variable (ECV) within GCOS;

(h) (g) Provide advice to the Services CG and other Groups of JCOMM, as required on issues related to sea ice and the ice-covered regions;

(i) Play a key role in JCOMM involvement in major international polar projects such as IPY 2007-2008.

General Membership

The Membership is selected to ensure an appropriate range of expertise and to maintain an appropriate geographical representation.

Up to twelveeight members, including the Chair, representative of the range of activities related to sea ice and the ice-covered regions within JCOMM. (It is expected that, in general, the ETSI will be self-funding.)

Representatives of regional and international sea ice bodies in particular the Baltic Sea Ice Meeting and the International Ice Charting Working Group will also be invited to participate at their own expense.

5. Expert Team on Marine Pollution Emergency and Search and Rescue Support (MAPSAR)

Terms of Reference

The Expert Team on Marine Pollution Emergency and Search and Rescue Support shall:

(a) Monitor the implementation and operations of the Marine Pollution Emergency Response Support System (MPERSS), including the contents of the overall system plan, and suggest improvements to the plan, as necessary;

(b) Facilitate coordination and cooperation amongst the Area Meteorological and Oceanographic Coordinators (AMOCs) of MPERSS, in particular with a view to ensuring full and ongoing operations in all areas, as well as the exchange of relevant advice, information, data and products between AMOCs, as appropriate and required;

(c) Monitor requirements for meteorological and oceanographic data, information, products and services to support maritime search and rescue operations world wide, and prepare draft amendments to the Manual on Marine Meteorological Services (WMO-No. 558) in this regard, as appropriate;

(d) As necessary, facilitate coordination and cooperation amongst ~~AMOCs and/or other~~ relevant agencies in the provision of meteorological and oceanographic information and support to maritime search and rescue operations;

(e) Ensure effective and ongoing coordination and cooperation with concerned organizations and bodies, as well as with Members/Member States on marine pollution emergencies and maritime search and rescue issues;

(f) Provide advice to the Services CG and other Groups of JCOMM, as required on issues related to marine pollution emergencies and search and rescue~~.~~

General Membership

Chair, selected by the Commission

OPEN membership, including representatives of the AMOCs for MPERSS ~~as the core membership~~ and other national agencies as appropriate

Representatives of IMO, IHO and other concerned organizations and bodies, including representatives of specific user groups as appropriate, should be invited to participate.

The Chair, in consultation with the co-presidents of the Commission, should secure support to enable appropriate and adequate participation in the meetings of this group.

Annex XIII

LIST OF ACTION ITEMS

para	action	By whom	when
3.21	Write to IHO to express the continuing desire of JCOMM to collaborate in the definition and standardization of relevant objects for ECDIS, and to inform IHO of an appropriate focal point in each JCOMM Expert Team	Secretariat	
5.3	Prepare first draft proposal on JCOMM ocean product development for review by the JCOMM Management Committee in February 2005, prior to submission to JCOMM-II in September 2005.	TT on JCOMM Ocean Product Development	by Jan/Feb 2005
5.5	Take Guddal's suggestion into account in the preparation of its proposal	TT on JCOMM Ocean Product Development	
6.3	Report on the operational status of MPERSS to WMO EC, IOC EC and IMO MEPC.	Co-presidents, Secretariat	WMO EC, IOC EC, IMO MEPC meeting
6.4	Establish MPERSS web site	Météo-France	
6.4	Make available detailed information on their MPERSS operations, and specifications of available models, in an appropriate manner, such as on their own web sites where possible	AMOCs	
7.1	Prepare a draft plan on the future JEB for consideration by MAN-IV in February 2005, before submission to JCOMM-II	TT on Restructuring the JEB	by Jan/Feb 2005
7.2	Continue to investigate the future development of such a facility and its access via the JEB portal	Yves Tourre, TT on JEB, and others	30 October 2004
8.3	revise/restructure Vol. D, based on the proposed revised table of contents but with the existing available information	Secretariat, following advice from SOT on Chapter 4	
8.3	Write to NMS and other agencies and organizations concerned, requesting updates to the publication on the basis of the revised contents and structure; the letter should also formally request at least annual updates in the future	Secretariat	
8.3	Investigate the feasibility of preparing country-specific extracts of the publication, in a suitable electronic format	Secretariat	
8.3	Prepare and forward extracts to the chair of ETMSS (if found feasible), who will in turn distribute them to relevant individuals in national agencies through the Issuing Services for the GMDSS, with a request for their updating and return to the Secretariat, through the chair ETMSS	Secretariat	

para	action	By whom	when
9.2.1	Arrange, if possible, for Capt. Gordon Mackie to again prepare an analysis of the survey results to be made available at JCOMM-II	Secretariat	
9.2.1	Continue with its preparation of a web-based survey form, for eventual use on an ongoing basis and in parallel with the existing paper survey	ETMSS	
9.3.4	Submit documents to JCOMM-II by the deadline	SPA coordinator, chairs and Secretariat	
9.4.1	Propose the transformation of the MPERSS Task Team into an Expert Team on Marine Pollution Response and Search and Rescue Support (MAPSAR) at MAN-II and prepare document on subject to JCOMM-II	SPA Coordinator, Secretariat	

Annex XIV

List of Acronyms and Other Abbreviations

AARI	Arctic and Antarctic Research Institute (Russia)
ACSYS	Arctic Climate System Study
AIRSS	Arctic Sea Ice Regime Shipping System
AMOC	Area Meteorological and Oceanographic Coordinators
AOPC	Atmospheric Observations Panel for Climate
BoM	Australian Bureau of Meteorology
BSIM	Baltic Sea Ice Meeting
BUFR	Binary Universal Form for Representation of Meteorological Data
CBS	Commission for Basic Systems (WMO)
CEOS	Committee on Earth Observation Satellites
CG	Coordination Group
CliC	Climate and Cryosphere project (WCRP)
CLIMAR	Workshop on Advances in Marine Cliamtology
CMM	Commission for Marine Meteorology (WMO)
COADS	Comprehensive Ocean Atmosphere Data Set
COOP	Coastal Ocean Observing Panel (GOOS)
DMCG	Data Management Coordination Group
ECDIS	Electronic Chart Display Information System
ET	Expert Team
ETMSS	Expert Team on Maritime Safety Services
ETSI	Expert Team on Sea Ice
ETWS	Expert Team on Wind Waves and Storm Surges
GCOS	Global Climate Observing System
GDSIDB	Global Digital Sea Ice Data Bank
GMDSS	Global Maritime Distress and Safety System
GIS	Geographic Information Systems
GODAE	Global Ocean Data Assimilation Experiment
GOOS	Global Ocean Observing System
GOS	Global Observing System (WWW)
HF	High Frequency
IGOSS	Integrated Global Ocean Services System
IHO	International Hydrographic Organization
IHP	International Hydrological Programme (UNESCO)
IICWG	International Ice Charting Working Group
IMO	International Maritime Organization
IMSO	International Mobile Satellite Organization
IOC	Intergovernmental Oceanographic Commission (of UNESCO)
JMA	Japan Meteorological Agency
JCOMM	Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology
JEB	JCOMM Electronic Product Bulletin
JMA	Japan Meteorological Agency
KMD	Kenya Meteorological Department
LDEO	Lamont-Doherty Earth Observatory
MAN	Management Committee
MARPOLSER	International Seminar/Workshop on the Marine Pollution Emergency Response Support System
MARSAR	Marine Population Response and Search and Rescue Support (proposed new name of a JCOMM Expert Team)
MDB	Marine Data Bank (U.K.)
MPC	Marine Environment Protection Committee (IMO)
MMS	Marine Meteorological Services

MPERSS	Marine Pollution Emergency Response Support System (WMO)
MPI	Marine Pollution Incident
MSI	Maritime Safety Information
NAVTEX	International system for reception of marine safety information
NCEP	National Centers for Environmental Prediction (NOAA)
NMS	National Meteorological Service
NOAA	National Oceanographic and Atmospheric Administration (USA)
NSIDC	National Snow and Ice Data Center (USA)
OCG	Observations Coordiantion Group
OGP	International Association of Oil and Gas Producers
OOPC	Ocean Observation Panel for Climate (of GOOS, GCOS, WCRP)
PA	Programme Area
PMO	Port Meteorological Officer
QC	Quality Control
RA	Regional Association (WMO)
SAR	Synthetic Aperture Radar
SCG	Services Coordination Group
SIGRID	Format for the archival and exchange of sea-ice data in digital form
SOC	Specialized Oceanographic Centre (IGOSS)
SOLAS	International Convention for the Safety of Life at Sea
SPA	Services Programme Area
SST	Sea Surface Temperature
SST/SI WG	Sea Surface Temperature/Sea Ice Working Group (AOPC/OOPC)
TCP	Tropical Cyclone Programme (WMO)
TOR	Terms of Reference
UNESCO	United Nations Educational, Scientific and Cultural Organization
WCP	World Climate Programme (WMO)
WCRP	World Climate Research Programme (WMO/IOC/ICSU)
WDC-A	World Data Center A
WMO	World Meteorological Organization
WWW	World Weather Watch (WMO)