INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION
(of UNESCO)

WORLD METEOROLOGICAL ORGANIZATION

JOINT TECHNICAL COMMISSION FOR OCEANOGRAPHY AND MARINE METEOROLOGY (JCOMM)

MANAGEMENT COMMITTEE

Second Session
Paris, 5-8 February 2003

SUMMARY REPORT

1. OPENING OF THE SESSION

1.1 OPENING

1.1.1 The second session of the Management Committee (MAN) of the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM) was called to order at 09.30 hours on Wednesday, 5 February 2003, at UNESCO headquarters in Paris, by the co-president of JCOMM Dr Savi Narayanan. Dr Narayanan welcomed the members of the Committee and other participants in the meeting. She then invited the Director of the GOOS Project Office, Dr Colin Summerhayes, to address the meeting.

1.1.2 On behalf of the Executive Secretary IOC, Dr P. Bernal, and of the Secretary-General of WMO, Professor G.O.P. Obasi, Dr Summerhayes welcomed participants to the meeting, to IOC and UNESCO, and to Paris. He stressed the IOC commitment to assist in JCOMM development and highlighted that this commitment was demonstrated by the recruitment, under the framework of the UNESCO "Young Professionals" scheme, of Ms Boram Lee, from the Republic of Korea, to concentrate her efforts to servicing JCOMM. Dr Summerhayes concluded in assuring the Committee of the full support of the joint Secretariat and wishing the participants a fruitful meeting and a pleasant stay in Paris.

1.1.3 Dr Narayanan highlighted the significant achievements of the management committee since its first session, one year ago. She thanked the joint JCOMM secretariat for all the support she received. She stressed that considerable amount of work still remains to be done, and that the Committee should therefore focus its attention during this meeting on establishing priorities and finding the means, including financial, to implementing them.

1.1.4 The list of participants is given in *Annex I*.

1.2 ADOPTION OF THE AGENDA

1.2.1 The Committee adopted the agenda for the session as reproduced in *Annex II*.

1.3 WORKING ARRANGEMENTS

1.3.1 Under this agenda item, the Committee agreed its working hours and other practical session arrangements. The documentation was introduced by the Secretariat.

2. REPORTS

2.1 REPORT BY THE CO-PRESIDENTS

2.1.1 The Committee noted with interest and appreciation a progress report by the co-presidents on JCOMM achievements during the past year. Dr. Narayanan stated that, as the committee had a mid-year report in the fall of 2002, and the annual report prior to the meeting, she will be brief in her reporting to allow time for discussions on issues and priorities. She requested others to be brief in their reporting as well and to focus on the items that require attention of and decision from the committee.

2.1.2 Dr Narayanan expressed particular satisfaction with the excellent cooperation between the Data Management Programme Area (DMPA) and the IOC International Oceanographic Data and Information Exchange (IODE) system to make progress in data management issues, which were crucial to JCOMM development. She further stressed the necessity of good communication mechanisms, in order that the results obtained within JCOMM be made as widely known as possible. She expressed satisfaction that only a small number of the actions facing the Committee and the Secretariat, as decided at MAN-I, were still pending. The full report of the co-presidents is attached as *Annex III*.

2.1.3 The Committee thanked the co-presidents for their report. Regarding one of the pending actions, namely "*to produce details on ICES, PICES, and POGO, including membership, which should be made available on the JCOMM web site*", the Committee agreed that it would be easy to insert links to the afore-

mentioned organizations sites, and that this should be done once the JCOMM official site would be agreed upon (see paragraph 5.4.3) (**Action**: Secretariat; **deadline**: ASAP).

2.1.4 Other issues reported by the co-presidents are dealt with under relevant agenda items.

2.2 REPORT BY THE JOINT SECRETARIAT

2.2.1 The Committee noted with interest and appreciation a report by the joint JCOMM Secretariat on its activities during the past year in support of JCOMM. This report covered JCOMM subsidiary body meetings; the two WMO/IOC memoranda of understanding on JCOMM; appointments to subsidiary bodies; publications and communications; the JCOMM booklet and logo; the 2003 sessions of the WMO Congress and IOC Assembly; funding and staffing for the JCOMM Secretariat; the conferences in Brussels in November 2003; meeting plans for 2003 and onwards; and formal actions for the Committee. Follow-up on a number of these matters is recorded under subsequent agenda items.

2.2.2 The Committee reviewed a near-final preprint of the JCOMM booklet, and expressed its appreciation to all concerned in its preparation. It approved the booklet for publication, with only very minor modifications (inclusion of attributions to the photographs and the use of non-personal email addresses for the Secretariat), noting that versions in French, Russian and Spanish were also in preparation. The Committee accepted the kind offer from Savi Narayanan, Philippe Dandin and Phil Parker to negotiate with their Institutes and the Secretariat regarding the publication of the booklet in one or more of their respective countries. In view of the general lack of time-specific information in the booklet (which meant that it would not need to be revised and reprinted for some time), the Committee suggested that the initial print run should, at a minimum, be for 8000 in English, 3000 in French, 3000 in Spanish and 1000 in Russian. (**Action**: Secretariat, Savi Narayanan, Philippe Dandin and Phil Parker.) The Committee agreed that there was no need for an additional, shorter, fold-out brochure on JCOMM at the present time, but that it would consider the possible preparation and publication of one–page "fact sheets" on specific JCOMM activities at future sessions.

2.2.3 The Committee reviewed with interest some proposals for a JCOMM logo, in particular those prepared at the request of Philippe Dandin by a graphics artist in Météo France. It expressed its considerable appreciation to all concerned for this work on behalf of JCOMM, which it considered fitted very well into the concept and spirit of the Commission. The Committee agreed on the general concept of one of the designs, and made a number of suggestions for its modification. It requested that, if possible, the modified design should be prepared and circulated to Committee members for a final review and approval before the end of February. This would then allow the logo to be included on the JCOMM booklet, which was expected to be sent to the printers by the end of March at the latest. The Committee requested Philippe Dandin to convey its particular thanks to the graphics artist for his/her excellent work. (**Action**: Philippe Dandin, Secretariat.)

2.2.4 The Committee noted with interest the advancing plans for the convening in Brussels during the week of 17 November 2003 of an historical seminar to celebrate the 150th anniversary of the International Maritime Conference, Brussels, 1853, convened by Lt. Matthew Maury USN. This celebratory event would take place in conjunction with the second JCOMM Workshop on Advances in Marine Climatology (CLIMAR-2). The Committee reiterated its support for the celebratory seminar and agreed that JCOMM should be considered as a formal co-sponsor, along with WMO, IOC and the Belgian Meteorological Service. It noted with appreciation that the US Navy had also agreed to co-sponsor, to participate and to contribute substantially; that other likely cosponsors would be various Meteorological Societies and possibly National Meteorological Services in Europe and North America; and that there was a possibility of some financial support and co-sponsorship from a major marine insurance company. The Committee suggested that further co-sponsorship and financial support might be sought from space agencies and related institutions such as Eumetsat, ESA, NESDIS, etc. To assist in this process, it suggested to the Secretariat that it should prepare a simple 1-page leaflet, describing the background to the seminar as well as its likely structure, contents, organization, audience, etc., recognizing that this leaflet would only be a preliminary one, in advance of the establishment of the formal Organizing Committee. (**Action:** Secretariat.) Members of the Committee also offered to assist in whatever way possible in the preparation of the seminar, in particular in identifying and seeking possible additional sponsorship, including financial support.

2.2.5 The Committee recognized that the reports of the co-presidents and Secretariat to the present meeting overlapped somewhat in content. It therefore agreed that, for future Sessions of the Management Committee, these reports should be combined into a single document. (**Action**: Co-presidents and Secretariat.)

3. REQUIREMENTS

3.1 THE OCEAN OBSERVATIONS PANEL FOR CLIMATE (OOPC)

3.1.1 The Committee reviewed the OOPC presentation that had been prepared for GSC-VI, given here by the Secretariat. There had been several particularly significant developments during the inter-sessional period. Neville Smith (Australia) had stepped down as chair and been replaced by Ed Harrison (USA). Art Alexiou had retired and been replaced as Technical Secretary for OOPC by Maria Hood. The proceedings and synthesis of the OceanObs99 Conference (St Raphael, October 1999) had been published as "Observing the oceans in the 21st Century", by Koblinksy and Smith. Copies were available from the GODAE Bureau. This document would be 'the bible' for ocean observations in support of climate for the next decade.

3.1.2 As noted in the report by Stan Wilson (see below paragraphs 4.1.1.2 & 4.1.1.3), the OOPC's Argo profiling float project was making good progress. Argo was a contribution to the Global Ocean Data Assimilation Experiment developed by the OOPC, and which was also making good progress. The *En Route to GODAE* Symposium in Biarritz in June 2002 drew an attendance of around 230 people. GODAE had lead responsibility for developing and demonstrating new ocean products and services. Prototype products were available from several groups (see URLs below). A draft Implementation Plan was now available through the GODAE web site and it emphasized the central importance of satellite data for the intensive phase and for the future. Key URLs are:

- Strategic Plan: http://www.bom.gov.au/GODAE/Strategic_Plan.pdf
- High-Resolution SST Pilot Project: http://www.ghrsst-pp.org/
- GODAE Symposium:
  http://www.bom.gov.au/GODAE/Symposium/GODAEGB.html
- Prototype products and URLs:
  http://www.bom.gov.au/GODAE/godae_product_urls.htm

3.1.3 The OOPC was promoting the development of an international Global Ocean Time-series Observing System based around a set of time series stations that will collect multi-disciplinary data on ocean properties over long time periods. It would include several of the current time series stations like those off Bermuda (BATS) and Hawaii (HOT), and would provide high quality fixed data sets for testing and developing models and for monitoring climate change (see http://uop.whoi.edu/geo). A pilot system had been designed and a Science Team was developing an implementation plan. The Committee recommended that the International Time Series Science Team simultaneously develop a data and information management plan, with advice from JCOMM.(**Action**: Secretariat).

3.1.4 The OOPC and COOP were working on the development of sets of indicators of the state of the ocean and the coastal ocean. When developed, the routine evaluation of these, together with uncertainty estimates, could become JCOMM products.

3.1.5 OOPC was keen to see frameworks developed for monitoring the performance of system elements; this would involve defining performance metrics. It was important to set the objectives (hypotheses or questions) against which the results (sensitivity) could be tested. OOPC would lead development of an Action Plan for a monitoring/evaluation system within JCOMM. The Committee considered that it was the role of the GOOS bodies to advise on performance metrics, and for JCOMM to oversee their application (see also paragraph 4.1.1.9 (i) & (ii) below). (**Action**: JCOMM Secretariat to request GSC-VI to consider how to develop evaluation procedures.)

3.1.6 OOPC was encouraging the integration of ocean carbon and biogeochemical measurements within the infrastructure of the ocean climate observing system, including time series stations and VOS, in partnership with the SCOR – IOC Advisory Panel on Ocean CO2. A background report had been published by the latter in April 2002 and is available at http://ioc.unesco.org/iocweb/co2panel/Publications.html. To coordinate existing ocean carbon observations, the CO2 Panel and the IGBP-IHDP-WCRP Global Carbon Project have initiated a pilot project (information available at: http://ioc.unesco.org/ioccp). In this context, the Committee agreed that SOT should maintain close contacts with the CO2 Panel. (**Action**: SOT with the Secretariat).

3.1.7 OOPC and CLIVAR had been fostering regional developments of observing systems in support of climate monitoring, notably through sessions at the first Indian Ocean GOOS Conference (Mauritius, November 4-9, 2002), and through a South Atlantic Climate Observing System workshop (Brazil, February 2-5, 2003).

3.1.8 Good progress was being made in developing the VOSClim project, which sought to involve at least a 200 ship subset of the VOS programme, and was designed to offer high quality meteorological data and associated metadata suitable for climate monitoring and research. **OOPC believed that this project needed continued strong advocacy.** Adequate resources were required for the training of Port meteorological Officers to maintain this development.

3.1.9 OOPC maintained an active interest in remotely sensed space-based measurements of ocean surface properties, and was strongly in support of the proposed Jason-2 mission. The GODAE High Resolution SST pilot project aimed to exploit all SST data to advance the skill and resolution of global SST analyses (see: http://podaac.jpl.nasa.gov/ghrsst/.). OOPC was interested in knowing how JCOMM proposed to interact with the satellite community – especially with CEOS and the IGOS Partners. (See also paragraph 4.1.2.2 below).

3.1.10 OOPC had been much involved in assisting GCOS in the preparation of the second report to the Conference of the Parties to the UN Framework Convention on Climate Change (UNFCCC) on the adequacy of the observing systems for climate. A draft of the 2nd report was available on the web:- http://www.wmo.ch/web.gcos.adequacy/Adequacy_Summary.htm. The final version would be presented late in 2003. The report identified a number of shortcomings in the present arrangements.

3.1.11 OOPC saw a need to move its emphasis away from platforms and sensors, and towards products. The Committee considered that it was appropriate for the OOPC, or some other advisory body or bodies of the GSC, to advise JCOMM on the development of and standards for present and new products and services. This advice would be given by a multidisciplinary working group (see action in paragraph 4.2.1.6 relating to the report of the SCG chairman).

3.1.12 There was some concern about the staff time available for the OOPC, given increasing other IOC responsibilities, for instance in the field of ocean CO2.

3.1.13 One of the tasks of the JCOMM was to facilitate implementation of the global ocean observing system called for by its advisory bodies. Recommendations for enhancements to the climate component of the global ocean observing system had been developed by an international scientific consensus out of the OceanObs99 conference in St Raphael, involving the climate research community, the sustained observations community and the ocean satellite community. The recommended next steps would be presented for endorsement by the GOOS Steering Committee, the GCOS Steering Committee (as part of the Second Report on the Adequacy of the Global Climate Observing System) and the Joint Scientific Committee (of the World Climate Research Program) in the next several months. Following endorsement of the scientific consensus, it would be necessary to seek funding to carry out the enhancements from the Nations, according to their perceived national interests.

3.1.14 It was understood that the present recommendations were based on the best information now available at the time of the session and on the availability of proven technology capable of global deployment. As more was learned and as new technology developed, it would be important to have processes to revise the observing strategy and to guide the subsequent evolution of the system. In this way, contributing

nations would be able to have confidence that their investments in the global ocean climate observing system would be as effective as possible. Periodic reports on the status of the observing system and suggestions for its evolution would need to be prepared. Efforts should be made to sustain scientific consensus to the greatest degree possible.

3.1.15 The Committee noted that OOPC should establish specific observational requirements for the OCG, and agreed that OOPC and the OGC should where possible hold their meetings back-to-back so as to benefit as much as possible from each others thinking. It recommended that Stan Wilson (as the forthcoming past Chair of OCG) should attend the next meeting of the OOPC (Ottawa, July 2003) (see also paragraph 4.1.1.9 (iv) below). (**Action**: Stan Wilson, then future OPA coordinator).

3.2 THE COASTAL OCEAN OBSERVATIONS PANEL (COOP)

3.2.1 The Committee reviewed a report on the activities of COOP, noting that the "Integrated Design Plan for the Coastal Module of GOOS" had now been finalised and was ready for publication. The report noted that the effective implementation of the Design Plan depended to a large extent on the collective activities of the GOOS Regional Alliances (GRAs), and pointed to the suggestion that this would be best achieved through formation of a Federation of GRAs. The Committee noted this concept, and considered that the GSC and I-GOOS would be the primary mechanism for promoting this concept. It suggested that, for now, JCOMM's role would be to note the progress and assist as appropriate in the planning and implementation of pilot projects.

3.2.2 The Design Plan recommended the measurement of a common set of core variables. The Committee noted that, while the body of the Design Plan did insist on the essential nature of meteorological measurements as part of coastal GOOS, the Executive Summary did not refer to meteorological variables. The Committee strongly advised that the Executive Summary of the Design Plan be changed to reflect the need for meteorological measurements to be made alongside the core variables (**Action**: GPO to pass the advice to COOP; **deadline**: ASAP). The Committee noted that many of the COOP variables would be measured in coastal seas, which was entirely consistent with the JCOMM ambit.

3.2.3 The Committee noted that some of the core variables were biogeochemical in nature. The precise mechanisms through which JCOMM would manages such variables when they become operational remained to be decided. Further interaction between JCOMM and COOP was required on this point, and the matter would be discussed by the JCOMM representative with COOP at the next meeting of COOP, in March 2003. (**Action**: co-presidents and Secretariat).

3.2.4 Establishment of the global coastal network called for in the Design Plan was critically dependent on capacity building. The Committee noted that the capacity building requirements of the Design Plan were being drawn to the attention of the GOOS capacity building panel, and recommended that they be considered also by the CBCG (and in future at joint sessions of the two groups) (**Action**: joint Secretariat).

3.2.5 The Committee also considered that it would be important for COOP to test its plans through pilot projects. It was agreed that the GRAs themselves could be considered to be pilot projects for testing COOP concepts before they were adopted by JCOMM.

3.2.6 The Committee also noted that while the implementation of COOP plans through the GRAs required the collection and use of meteorological data, the involvement of meteorological agencies in the GRAs tended to be small (more so in some regions than in others). JCOMM should strive to encourage a dialogue with meteorological agencies, to try to ensure that an integrated approach was taken to the development of the COOP Design Plan in the regions. (**Action**: co-presidents and Secretariat to devise ways and means of promoting an integrated approach; **deadline**: ASAP).

3.2.7 The Committee noted that some of what was required by the COOP Design Plan was already being carried out through IODE, and recommended a close linkage between IODE and COOP in the future. There was a need to check which of the COOP core variables were already being handled in IODE data centres. IODE also offered training facilities that might be used or adapted by COOP, such as the Ocean

Teacher programme, the Regional Ocean Portal, and the Ocean Data and Information Network (ODIN). (**Action**: recommend IODE attend COOP meetings, and vice versa).

3.3 CONTINUITY FOR SATELLITE ALTIMETRY

3.3.1 The Committee noted a concern that some key Member States still had not made a commitment to Eumetsat to support JASON-2. The Secretariat was asked to ensure (with the assistance of OOPC) that the scientific requirement and importance of support for Jason-2 were communicated to appropriate policy makers in the countries in question, well before the June deadline for national commitments (see *Annex IV*) (**Action**: Secretariat).

4. REVIEW OF PROGRAMME AREAS ACTIVITIES

4.0 The Committee requested that, for future Committee's sessions, the Programme Area coordinators systematically provide a one page summary of their presentations for inclusion in the bodies of the reports of the sessions (**Action**: PA coordinators).

4.1 OBSERVATIONS PROGRAMME AREA (OPA)

4.1.1 The report of the OPA coordinator and related issues

4.1.1.1 The Committee noted with interest and appreciation the report of the Observations Programme Area coordinator, Stan Wilson, which covered work undertaken within his programme area during the past year. The most salient issues of the report are described in the following paragraphs.

4.1.1.2 Regarding Argo, 21% of the 3,000-float global array was operating, and completion was anticipated in 2006. Argo did appear to be progressing so well because there had been an Argo Science Team that developed a plan with an easy-to-understand rationale and specific requirements – a 3,000-float global array. With this plan, it had been possible to develop international scientific consensus; and with international scientific consensus, it had then been possible to develop international political consensus, thereby facilitating international funding.

4.1.1.3 The major challenge at present was to maintain Argo funding long enough to complete the global array and demonstrate its value. Argo was *operational* in the sense of representing a routine way of collecting specific observations, but Argo was not *operational* in the sense of weather forecasting; most of its funding was from research agencies. The impact of observations on weather forecasts could be assessed within hours to days, but for climate it might take a decade or more. Therefore, it was less an issue of *transition from research to operations*, and more an issue of *sustaining long-term, society-relevant research*.

4.1.1.4 Regarding the Tropical Moored Buoy Implementation Panel (TIP), the TAO array had been proposed for transition from research to operations, with a corresponding transfer from a research to an operational organization. This proposal was being reconsidered, and one question to be asked was "*How many of the ~70 TAO moorings constituting this array are needed to support ENSO-based seasonal forecasts?*" Unless significant new funding was obtained, trade-offs would have to be made between maintaining the full TAO array in the Pacific, continuing PIRATA in the Atlantic after the initial phase, and/or initiating an array in the Indian Ocean.

4.1.1.5 The status of the GLOSS Core Network was as follows: ~ 180 of 270 stations regularly reported data, ~ 80 reported in real-time, and ~ ½ of 90 had been positioned for altimetry calibration. The major challenge for GLOSS was to complete the Network, and a first step was to update the 1997 Implementation Plan, reviewing the present and considering new requirements, including real-time & high frequency observations. GLOSS was the one *in-situ* system requiring the establishment of partnerships with developing countries for capacity building. It would also require the establishment of partnerships with AID-like agencies to help fund a travelling team to install and maintain sea level gauges and establish a central location for education and training. The GLOSS Africa Proposal was a good place to start.

4.1.1.6 Regarding the DBCP, the major challenge was to fund an increase from ~800 to ~1250 drifters. In order to do this, a more structured interaction between requirement-setting and implementing panels was needed. What were the specific requirements for observations? Sensors on drifters contributed to a number of parameter fields, while other platforms contributed to given parameter field. Moreover, there were multiple users of data from drifters, and there was no single science team, as with Argo. If there was scientific consensus on specific requirements, political consensus building could be developed to help secure funding. In this regard, Dick Reynolds was making good progress on SST requirements; similar progress was needed for other parameters, such a surface barometric pressure.

4.1.1.7 The major on-going activity facing the SOT was the integration of the existing SOOP, VOS, and ASAP programmes, as well as the emerging CO2 monitoring efforts. This integration included the services rendered by the Port Meteorological Officers and JCOMMOPS. For SOOP in particular, frequent changes in routes for specific ships constituted a special problem for which there was no obvious solution. The major financial challenge was to secure funding necessary to implement 200 VOSClim ships and to increase the number of XBTs for high-density lines from 28,000 to 35,000.

4.1.1.8 There was a general interface issue between the OOPC and JCOMM with regard to observational requirements. If addressed in a satisfactory manner, it would facilitate the issue of significant funding limitations for ocean observing systems. At the most fundamental level, the OOPC was a requirements group, and JCOMM an implementation group. Stan Wilson pointed out that *specific* requirements were important to JCOMM as an implementation body and for development of performance metrics.

4.1.1.9 In response to the information provided and various issues raised in the report, the Committee:

(i) Stressed the importance and value of observing system performance metrics, at the same time noting that the preparation of meaningful metrics required first clear statements of requirements, either in terms of platforms or specific variables (see also paragraph 3.1.5 above);

(ii) Requested that this message should be carried to OOPC through the GSC, with a view to developing these requirements through enhanced coordination between OOPC and the OCG; (**Action**: Co-presidents, OCG and Secretariat.)

(iii) Recognized that such climate requirements needed to be integrated with others, such as for the World Weather Watch, in view of the extended mandate of JCOMM;

(iv) Recognized the desirability of more frequent meetings of the OCG (annual), though such a requirement might not necessarily exist for other PAs. It therefore recommended that the OPA coordinator should coordinate with the Secretariat, with a view to scheduling such meetings on appropriate occasions, if possible in conjunction with other meetings as appropriate, and bearing in mind resources constraints; it was proposed that the next meeting of the OCG should take place in the USA in September 2003 (see also paragraph 3.1.15 above); (**Action**: OCG and Secretariat.)

(v) Reinforced the need to maintain Argo funding at least long enough to enable a reliable scientific assessment of the value of the project; (**Action**: Committee members to carry the message to national agencies.); and noted that all other OPA component teams also had funding problems in trying to meet stated implementation targets, and agreed that this message should be brought to the attention of the OOPC. (**Action**: Co-presidents and Secretariat.)

4.1.2 Satellite data

4.1.2.1 The Committee reviewed a document that had been prepared by the JCOMM Rapporteur for satellites, Hiroshi Kawamura. The report noted that massive increases were likely in the near future in the flow of space-based data. This would require significant adaptation of present systems for managing data, developing products, and training staff.

4.1.2.2 To ensure that its requirements were fed to the satellite operators, JCOMM needed to refine the Statements of Guidance in the JCOMM applications area, for the benefit of the several groups that had an active interest in global ocean observations from satellites - including the Committee on Earth Observation Satellites (CEOS), the Integrated Global Observing Strategy (IGOS)Partnership, and the Coordinating Group on Meteorological Satellites (CGMS), which despite its name had an increasing interest in operational oceanographic measurements from space. (**Action**: Services and Observations PAs and Secretariat). The IGOS Partners were focusing initially on an Ocean Theme, were developing a Carbon Theme that would include an ocean component, and had begun working towards the development of a Coastal Theme. The Ocean Theme was three years old and would this year be subject to a rolling review of requirements (**Action**: Secretariat to ensure that the updated requirements are coordinated with this process.) (See also paragraph 3.1.9 above.)

4.1.2.3 Requirements for ocean observations were currently being determined and fed through to the WMO data base by COOP and the OOPC and other bodies. Key requirements were identified at OceanObs99, and reinforced through publication of the Ocean Theme. JCOMM needed to decide what kinds of products and services it wanted from the space community and how it wished these to be distributed globally and regionally, and to make its requirements known. JCOMM also needed to consider what new products may be developed by merging space-based and *in situ* data – e.g. for new SST products. (**Action**: Rapporteur for satellites with SPA). (See also paragraphs 3.1.11 above & 4.2.1.6 below.)

4.1.2.4 The Committee noted that WMO considered that the Global Observing System (GOS) of the World Weather Watch (WWW) would in future include not only operational satellites but also selected R & D satellites that provided critical information about key parameters. Thus, both the *in situ* observing system and the remote sensing observing system were quasi-operational – being a mix of operational research measuring components. JCOMM requirements would be taken into consideration in redesigning the GOS.

4.1.2.5 The Committee agreed to request the appropriate scientific advisory groups (COOP and OOPC) and Programme Areas to refine their requirements for space-based data and products and services, for communication to the WMO data base (**Action**: co-presidents and Secretariat; **deadline**: ASAP).

4.2 SERVICES PROGRAMME AREA (SPA)

4.2.1 The report of the SPA coordinator and related issues

4.2.1.1 The Committee noted with interest and appreciation the report of the Services Programme Area coordinator, Phil Parker, which covered work undertaken within his programme area during the past year. The Committee noted that its two Expert Teams (on Maritime Safety Services and on Sea Ice) as well as the SCG held their first sessions and that these meetings had furthered the objectives of the SPA to meet the goals and work plan anticipated by JCOMM-I, with fine tuning of the activities in light of changing priorities and emerging issues.

4.2.1.2 Mr Parker highlighted the growing work programme of the SCG and commitments of key individuals. In particular he drew attention to the workshops on MPERSS and JCOMM Products which were being planned to be held in Toulouse in May 2004, the ongoing operation and development of the JCOMM Electronic Products Bulletin (JEB), the pathway to establishing a multidisciplinary group to oversee and manage the development and implementation of a new ocean products and the very successful first sessions of several Expert Teams.

4.2.1.3 The Committee noted that the SCG had established an ad hoc Task Team to redevelop the electronic publication WMO-No.9, Vol. D, *Information for Shipping*, and that the Team had been receiving input and views from WMO Members. The Committee agreed with the modified conceptual design for the electronic publication proposed by the Task Team. The Task Team would develop a final proposal pending a more representative return from WMO Members in a month or two. Assuming that the final proposal would be in line with the agreed conceptual design, the Committee agreed that the final proposal should be passed to the WMO Secretariat, which would take necessary technical actions based on the proposal. (**Action**: SPA coordinator, WMO Secretariat)

4.2.1.4 The Committee recognized that the JCOMM Electronic Products Bulletin (JEB) had proven to be a very valuable means for accessing and downloading both products and their associated data fields directly relevant to JCOMM, as evidenced by the large number of "hits" received by the site. It expressed its appreciation to Dr Yves Tourre (France), the JEB Editor, for his substantial contribution to the former IGOSS and to JCOMM. At the same time, it also recognized that the JEB was now only one among a large number of web sites providing access to such operational ocean data and products. For these, (including the JEB) the GOOS Products and Services Bulletin was designed to provide a portal, and thus was in many ways complementary to the JEB.

4.2.1.5 The Committee agreed that, in view of its evident value to many users, the JEB should be maintained, but that this maintenance would have to be transferred to an operational environment, most probably in a national agency. To this end, the Committee supported the plan of the SCG for Yves Tourre to prepare a detailed prospectus for the JEB, including maintenance costing, which should then be addressed to relevant operational agencies to seek support for such maintenance. In the event that this support was not forthcoming, the Committee requested the SCG to again review the situation, with a view to making alternative proposals, such as possible maintenance through JCOMMOPS, with associated costing. (**Action**: Yves Tourre, Secretariat, SCG.) With regard to the further development of the contents of the Bulletin, the Committee agreed that the planned products workshop, Toulouse, May 2004, would provide valuable input., It noted further with interest that Mr Parker was to hold discussions with Dr Tourre on options for mapping the future of the JEB, immediately following MAN-II. It considered that it seemed an appropriate juncture to evaluate the progress and strategy for developing the JEB given the strong interest shown in it by the user community and ahead of the ocean products Workshop in 2004.

4.2.1.6 The Committee noted that the membership of the ad hoc Task Team on Development of Ocean Services, as agreed by the SCG, would shortly be finalized, thus allowing the team to begin its work. It recognized that this team, within its existing terms of reference, would be able to implement part of the requirements of GOOS/OOPC regarding product and service development. It therefore proposed that the GSC should be invited to consider co-sponsoring the team, with terms of reference and membership modified as necessary (**Action**: Co-presidents, Secretariat and SPA coordinator.) (See also paragraph 3.1.11 above).With regard to membership, the Committee suggested that EuroGOOS, MedGOOS and the OIT Project should be invited to be represented. (**Action**: SPA coordinator and Secretariat.) (See also paragraphs 3.1.11 & 4.1.2.3 above.)

4.2.1.7 The Committee noted that so far only one nomination had been received for the ad hoc Task Team on MPERSS. The Committee agreed that the Secretariat should continue to seek additional nominations through informal communications with relevant persons in the selected Area Meteorological and Oceanographic Coordinators (AMOCs). The Committee further agreed that the Secretariat should take action to update the list of MPERSS focal points. (**Action**: Secretariat)

4.2.1.8 The Committee also noted and appreciated the initial planning work that had been developing since SCG-I regarding the JCOMM workshops on MPERSS and ocean products, now definitely to be held at Météo France operational headquarters in Toulouse over about two weeks in May 2004. The Committee expressed its thanks to Météo France for its generous support for these workshops, which would be a major undertaking for JCOMM and the SCG. Mr Parker advised that he would be meeting with the key players from Météo France (Dr P Dandin, Mr H Savina, Mr P Daniel) and WMO Secretariat to formalise initial plans for the workshops, including organisational and support arrangements and other necessary aspects, immediately following MAN-II. The co-presidents would be kept informed of progress on this project.

4.2.2 Possible contributions to Natural Disaster Reduction

4.2.2.1 The Committee reviewed an initiative by the WMO Technical Commissions and Regional Associations to develop a project proposal called "Marine Influences and Impacts on Coastal Lowlands Resources" (see more details in *Annex V*). The Committee recognized that regionally-focused specific pilot projects should be developed, to implement such a proposal and to seek support from appropriate funding agencies. The Committee noted that, once such region by region specific project proposals were developed, JCOMM could help their implementation mainly through the CBPA, including the Task Team on Resources.

4.3 DATA MANAGEMENT PROGRAMME AREA (DMPA)

4.3.1 The report of the DMPA coordinator and related issues

4.3.1.1 The Committee noted with interest and appreciation the report of the Data Management Programme Area coordinator, Shaohua Lin, which covered work undertaken within his programme area during the past year. In her introduction, Prof. Lin recalled that she had taken over from Dr Wang Hong as Chair of the DMPA shortly before MAN-I.

4.3.1.2 Prof. Lin provided an overview of the activities undertaken by the DMPA giving details on (i) the DMCG-I (22-25 May 2002, UNESCO, Paris); (ii) results of the ad hoc drafting group on the SOC system; (iii) the Second Session of the IODE Steering Group for Global Ocean Surface Underway Data Pilot Project (GOSUD) (16-17 September 2002, Ottawa, Canada); (iv) the Argo Data Management Meeting (18-20 September 2002, Ottawa, Canada); (v) the comparative study on JCOMM metadata formats, the Global Sea Surface Current Data Processing; (vi) Sea Ice Data Processing, the ODAS metadata centre; (vii) the Colour of Ocean Data Symposium (25-27 November, Brussels, Belgium); (viii) the Informal Session of the ETDMP (28 November 2002, Brussels, Belgium); (ix) the First Session of the OIT Steering Team (29 November 2002, Brussels, Belgium); (x) status of ETDMP activities; and (xi) status of ETMC activities.

4.3.1.3 She identified yet unresolved issues including (i) the development of a data management strategy; (ii)the vacant membership in the ETDMP (expert on non-physical data); (iii) the organization of the First formal Session of the ETDMP (proposed by the informal meeting for September 2003); (iv) the need for close communication and cooperation between the DMPA and other Programme Areas; and (v) the need for further investigations on existing data sources in both oceanography and marine meteorology.

4.3.1.4 Prof. Lin ended her introduction with an overview of the future work plan of the DMPA.

4.3.1.5 The Committee noted that one of the most important issues for the DMPA was the development of a JCOMM Data Management Strategy. Dr Savi Narayanan offered to lead work on this issue (**Action**: Dr Narayanan, DMPA; **deadline**: MAN-III). In this regard, the Committee noted that substantial efforts had been made in the recent past to develop GCOS and GOOS data and information management plans. Although JCOMM had a broader ambit than the above, the Management Committee recommended that for both the JCOMM and IOC data (and information) management strategies (see below paragraphs 4.3.4.3 through 4.3.4.6), the GOOS data and information management plan should be used as a basis. In this regard the Management Committee noted with appreciation that the membership of the Task Team on the Development of an IOC Strategic Plan for Oceanographic Data and Information Management included representatives from IODE, GOOS, JCOMM and WMO.

4.3.1.6 The Committee further noted that, for OOPC, data and information management was also a very high priority, and that OOPC was strongly supportive of the proposed Ocean Information Technology Project. The Committee recommended that the co-presidents write to CLIVAR to offer to collaborate on data and information management and invite CLIVAR to the next meeting of the JCOMM DMCG (**Action**: co-presidents; **deadline**: ASAP)

Expert Team on Data Management practices (ETDMP)

4.3.1.7 The Committee recalled that an informal Session of the ETDMP had been held in Brussels, Belgium on 28 November, hosted and co-sponsored by the Belgium Government, and organized back-to-back with the Colour of Ocean Data (COD) Symposium (25-27 November) and OIT Steering Team (29 November). The Session had discussed in detail the JCOMM strategy for end-to-end data management; agreed on the work plan for 2003-2004, discussed the tasks and assigned their implementation to members of the Group, present during the Session. It was recommended that the First Session of the JCOMM Expert Team on Data Management Practices be held in September 2003 and it was proposed that the meeting should have a duration of 3 days.

4.3.1.8 In particular the informal Session had recalled that the 2001-2005 ETDMP work plan had been based upon proposals and decisions of JCOMM-I (June 2001) related to the JCOMM Data Management

Programme Area (DMPA) as well as on decisions of DMCG-I (22-25 May, 2002) and was aimed at fulfilling the following basic tasks: (i) the GOOS and MMS requirements to E2EDM; (ii) assistance to existing and planned data management mechanisms and practices; and (iii) development of JCOMM E2EDM Strategy and E2EDM integration technology.

4.3.1.9 The Committee noted with appreciation the substantive work performed by the informal Session in just one day.

4.3.1.10 Taking into consideration the extensive list of actions that needed to be completed by the DMCG and ETs, the Committee called for close monitoring of progress by the Secretariat, the DMPA Chair and the ET Chairs. In this regard the Committee noted that the IODE Secretariat had prepared an extensive review of action items and requested that these should be distributed to all members of the DMPA and its subsidiary bodies (**Action**: IODE Secretariat).

Ocean Information Technology (OIT) Pilot Project

4.3.1.11 The Committee was presented with a report on the First Session of the Steering Team of the Oceans Information Technology (OIT) Pilot Project, that was held in Brussels, Belgium on 29 November, hosted and co-sponsored by the Belgium Government.

4.3.1.12 The Session had recalled that the rationale of OIT was based upon (i) the demand for effective telecommunications; (ii) the need for common standards, practices and protocols (metadata management); (iii) the need for data and product service matched to the participants and users of GOOS data; (iv) the need for innovative data inquiry, access and delivery mechanisms; and (v) the need for intra-operability and interoperability. Components of OIT would include (i) improved telemetry; metadata management; (ii) data assembly, data set integrity, quality control; (iii) data circulation and transport; (iv) archives and archaeology; (v) applications and user interfaces; (vi) capacity enhancement, training; and (vii) governance, oversight, metrics.

4.3.1.13 The Session had included detailed presentation on data management in other programmes or projects such as GOOS, IODE, the Data Management and Communications Subsystem (DMACS) of the U.S. Integrated and Sustained Ocean Observing System (IOOS), Argo, the WOCE Data System and GODAE. It had been concluded that OIT would benefit from close interaction with national/regional initiatives in general, and with DMACS in particular. The Session had identified 5 specific components for the OIT Pilot Project: (i) metadata management; (ii) data circulation and communication; (iii) data assembly, quality control and quality assurance; (iv) archival; and (v) the user interface.

4.3.1.14 The Session had further recommended that OIT, as a JCOMM initiative, will be co-sponsored by GOOS, JCOMM and IODE.

4.3.1.15 The Session had developed an Action Plan based upon the agreed action items arising from the meeting and had assigned tasks to each member of the team.

4.3.1.16 The First Session of the OIT Steering Team had elected Dr Neville Smith as its Chair.

4.3.1.17 The Management Committee requested the Secretariat and Chair OIT Steering Team to liaise with the DMACS Chair to include a second DMACS member (in addition to Steven Hankin) in the OIT Steering Team (**Action**: Chair OIT, Secretariat; **deadline**: ASAP).

4.3.2 Global Ocean Surface Underway Data (GOSUD)

4.3.2.1 The Committee was informed on progress of the Global Ocean Surface Underway Data (GOSUD) Project, established by IODE-XVI in November 2000. The goal of the project was to develop and implement a data system for ocean surface data, to acquire and manage these data and to provide a mechanism to integrate these data with other types of collected data.

4.3.2.2 The objective of GOSUD was to organize the surface underway data that were collected and to work with data collectors to improve what was presently collected to try and meet the benchmarks of spatial and temporal sampling and data accuracy set forth by OOPC. The resulting data management system should meet requirement of CLIVAR. More specifically, the project had the following goals: (i) to build a comprehensive archive for surface data. This encompassed data collected by any instrumentation at any time. It would contain sufficient metadata that users would have clear information about accuracy, instrumentation, sampling, etc.; (ii) to add value to the archive by refining and standardizing existing quality assessment procedures carried out on data and documenting both what was done and the results; (iii) to provide data and information to users in a timely fashion. At any time after data collection, a user should be able to access the highest quality, and most recent data available. Users would be able to distinguish "levels" of quality in the archives. Users would be able to utilize the data and easily combine them with data from other sources.; (iv) to work with data collectors to improve the data acquisition systems and to provide information to data collectors about the data they provide; and (v) to work with scientific organizations interested in surface data to provide products to a broader community.

4.3.2.3 The group was co-chaired by Bob Keeley (Canada) and Thierry Delcroix (France) and had met in November 2001 (Brest) and September 2002 (Ottawa). The group had developed a draft Project Plan and a final version would be available by early March for presentation to IODE-XVII. A brochure on the project was also under development.

4.3.3 Colour of Ocean Data Symposium

4.3.3.1 The Committee was presented with an overview of the “Colour of Ocean Data” Symposium, organized from 25 to 27 November 2002 and co-sponsored by the Flanders Marine Institute, IOC/IODE, the Office of Scientific, Technical and Cultural Affairs of the Belgium Government and the Census of Marine Life.

4.3.3.2 The objective of the Colour of Ocean Data symposium was to bring together different communities with an interest in marine sciences and data management. The participants included physical oceanography and marine biology data managers, scientists, user communities and policy makers.

4.3.3.3 In a series of five sessions, various aspects of data management were discussed. The main aim was to allow the different communities to learn about developments on related fields, and to learn from each others’ experiences. The sessions covered (i) marine capacity building in global programmes; (ii) biodiversity data; (iii) ecological and community data; (iv) new internet developments; and (v) case studies. In addition the Symposium ended with a panel discussion, chaired by Dr Savi Narayanan. This panel discussion had as objective to identify what data centres saw as user needs and what users saw as user needs, and to start a dialog between different communities involved in/with an interest in ocean data management. The discussions had resulted in a set of interesting conclusions related to: (i) changing role of the data centres; (ii) bridging the gap between scientists and data managers; (iii) creating incentives for scientists to submit data to data centres; (iv) need for long-term activities; (v) duplication of effort; (vi) need for peer review of data sets and for standard practises; (vii) difference between biological and physical data management; and (viii) involving developing countries. More information is available from the COD web site:

http://www.vliz.be/En/Activ/Events/Cod/cod.htm, or from the IODE web site on:
http://ioc.unesco.org/iode/contents.php?id=120

4.3.4 Report on the IODE Review and the IOC Data Management Review

IODE review

4.3.4.1 The Committee recalled that, in preparation for IODE-XVI (2000)), the IODE Chair (Ben Searle) had prepared a Document on the ‘Review of IODE’. He had prepared this document as he felt that IODE had remained largely unchanged since it was formed in 1961. However, the marine community that it was created to support had changed considerably over this time. The IODE Committee, at its 16th Session, had decided that a comprehensive review was required that should answer the following questions: (i) What is the mandate of IODE?; (ii) What are the terms of reference, compositions and interactions of its subsidiary

bodies?; (iii) What relationships exist with other programmes, projects and bodies?; (iv) How does the IODE Programme serve science and monitoring programmes of the IOC (in particular GOOS)?; (v) What are the links with those programmes and what are the roles and responsibilities of Member States, IODE Officers and the Secretariat?. It was further recommended that the Review should be carried out by the IODE Officers and a group of invited consultants, *if necessary*, and that the Review should be submitted to the IODE Officers and to the 21st Session of the IOC Assembly (3-13 July 2001). The decisions taken during IODE-XVI effected rapid and substantial change to the way IODE operated as a programme, alleviating some of the concerns and setting up the process to address others. In particular, significant progress was made in developing close collaboration between IODE and JCOMM. It was therefore felt that a Review undertaken during the critical phase of the changes (2001-2002) would result in an incomplete and possibly even incorrect representation of "the state and future of IODE".

4.3.4.2 The Secretariat consulted Dr Ron Wilson, former Chair of IODE requesting him to consider assisting with the review process. A draft document including details on a possible way forward was produced, which will be submitted for consideration to IODE-XVII.

The IOC Strategic Plan for Oceanographic Data and Information Management

4.3.4.3 The JCOMM Management Committee, at its First Session (Geneva, Switzerland, 6-9 February 2002), recommended that a draft resolution be prepared for the 35th Session of the IOC Executive Council, calling for the development of an IOC integrated data management strategy, encompassing all programmes. It had been recommended also to use the experience gathered in the preparation of the GOOS Data Management Plan (1998-1999) and possibly the GCOS Data Management Plan as examples. (See paragraph 4.3.1.5).

4.3.4.4 A draft resolution was subsequently prepared and was submitted and adopted by the 35th Session of the IOC Executive Council (Resolution EC-XXXV.2 (IOC Strategic Plan for Oceanographic Data and Information Management). The Resolution also established a Task Team on the Development of an IOC Strategic Plan for Oceanographic Data and Information Management and defined its Terms of Reference.

4.3.4.5 Due to the heavy workload in 2002, and because it was felt that the results of the IODE review will be valuable input to the deliberations of the Task Team, the First Session of the Task Team was planned to take place on 23 June 2003, i.e. one day prior to the IOC Assembly.

4.3.4.6 The Committee recalled that the Resolution sets the composition of the Team as:

(a) the chairperson or vice-chairperson of IODE;
(b) the chairperson of the GOOS Steering Committee;
(c) the coordinator of the JCOMM Data Management Programme Area;
(d) a representative of the WMO Commission for Basic Systems;
(e) one co-president of JCOMM;
(f) the chairperson of the IOC Working Group on Data Policy;
(g) two additional experts nominated respectively by IODE and I-GOOS, taking into account the need for multi-disciplinary expertise.

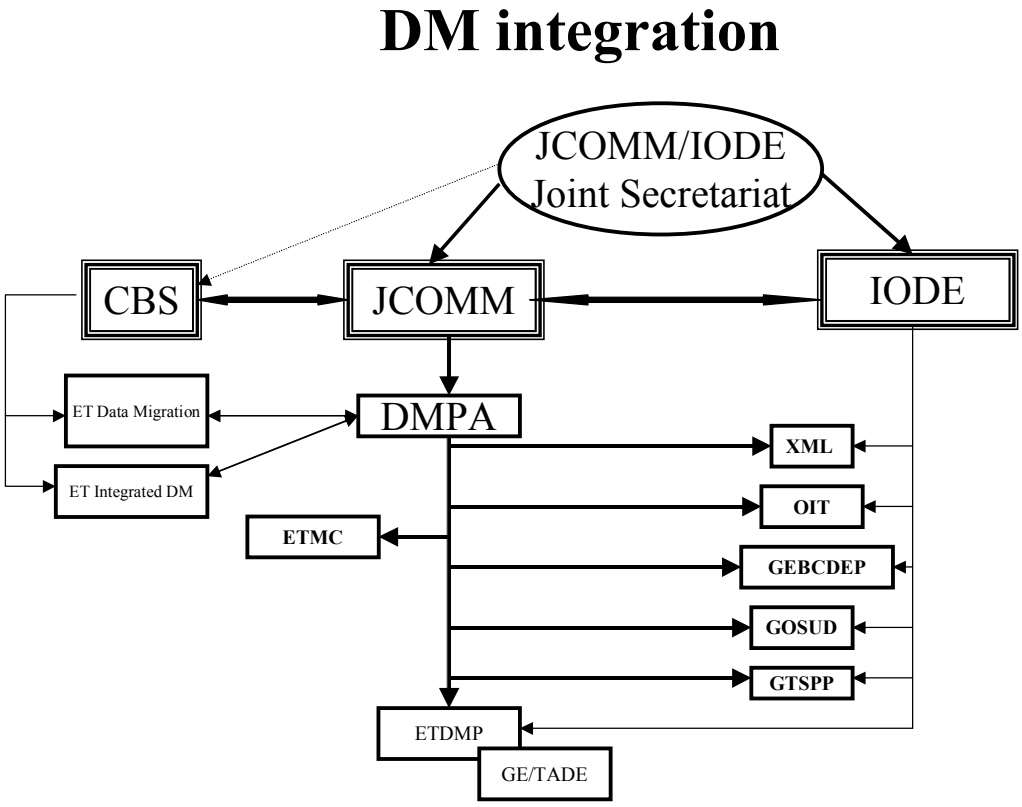
Conclusions

4.3.4.7 The Committee noted the various activities in the data management area, and in particular those sponsored by IODE. It expressed its appreciation to the IODE Secretariat for coordinating these activities in collaboration with JCOMM co-president Savi Narayanan, the DMPA coordinator and the chair of ETDMP.

4.3.4.8 In order to maintain momentum in implementing the work of the Data Management Programme Area and timely communication of the progress to relevant groups, the Committee requested the Secretariat and the DMPA coordinator to prepare quarterly progress reports for distribution to all DMPA members (**Action**: DMPA Coordinator, Secretariat).

4.3.4.9 In view of the obvious duplication between the JCOMM's ETDMP, and the IODE's GETADE, the Committee requested the IODE Committee to consider merging its GETADE with ETDMP (or

suspending GETADE) (**Action**: co-presidents; **deadline**: IODE-XVII). It was stated that this would create an excellent opportunity for close cooperation between IODE and JCOMM in the field of ocean data management. It was further recommended that the funds allocated for organizing GETADE Sessions could be used for ETDMP Sessions thereby assuring annual rather than bi-annual Sessions (**Action**: Secretariat).



ET	Expert Team
ETMC	Expert Team on Marine Climatology
GE	Group of Experts
GEBCDEP	Group of Experts on Biological and Chemical Data exchange Practices
GOSUD	Global Ocean Surface Underway Data pilot project
GTSPP	Global Temperature-Salinity Profile Programme
OIT	Ocean Information Technology Pilot project
TADE	Technical Aspects of Data Exchange
XML	Extensible Markup Language

4.3.4.10 Taking into consideration the importance of data management for JCOMM and the availability of relevant expertise at the IODE Secretariat, the Committee requested the IODE Secretariat to assume Secretariat responsibility for JCOMM's data management programme area as a Joint JCOMM/IODE DMPA Secretariat (**Action**: Secretariat).

4.3.4.11 The Committee requested the co-president to present its proposals to the 17th Session of IODE (3-7 March 2003)

4.3.5 The Specialized Oceanographic Centres (SOCs)

4.3.5.1 The Committee reviewed the results of the survey of SOCs undertaken by the *ad hoc* drafting group set up by MAN-I, in the form of a compilation of answers to a questionnaire. It recognized that the information provided in the answers was quite uneven, reflecting the great variety in SOCs functions and outputs. The centres had indeed evolved quite independently since their establishments as SOCs, and there was no organized forum where they might have been able to communicate amongst themselves. The Committee recognized the significant contribution of the SOCs , in promoting the development of operational oceanography during a period where that concept had very little acceptance.

4.3.5.2 The Committee recognized further that it had to assess if there was an actual need for SOCs or SOC-like centres, and to identify such need. It therefore decided to re-establish the small *ad hoc* group set up by MAN-I, made up now of Philippe Dandin, Morrison Mlaki (representing CBS), Savi Narayanan, Worth Nowlin, Phil Parker (chairperson), and Peter Pissierssens (secretary). The group was entrusted with (i) reviewing in depth the answers to the questionnaire; (ii) defining the need, or otherwise, within the JCOMM structure for a network of SOC-like centres; (iii) should such a need be clearly demonstrated, proposing new terms of reference for that network; and (iv) reporting on that topic to MAN-III (**Action**: *ad hoc* group, initiated by its chairperson; **deadline**: MAN-III or before).

4.4 CAPACITY BUILDING PROGRAMME AREA (CBPA)

4.4.1 The report of the CBPA coordinator and related issues

4.4.1.1 The Committee noted with interest and appreciation the report of the Capacity Building Programme Area coordinator, Miriam Andrioli, which covered work undertaken within her programme area during the past year. The most salient issues of the report are described in the following paragraphs.

4.4.1.2 In accordance to the tasks assigned in the Work Strategy established for the CBPA during CBCG-1, the CBCG conducted thorough national/regional requirements surveys in WMO Regional Associations (RA) I, II and V. The Programme Area coordinator, in her turn, submitted the study "Status Report on the Observing Systems and Data Collection in WMO RA III", which complements the requirement survey already conducted in South America by herself.

4.4.1.3 In addition, the Group prepared a draft proposal on "Storm surge monitoring: hindcasting and forecasting in the Gulf of Guinea of the Eastern Central Atlantic" and a project study on the possible use in future capacity building activities promoted by JCOMM of the capabilities and resources offered by the IODE Ocean Teacher programme in the fields of marine data and information management.

4.4.1.4 Finally, in view of the necessity to assess the results and accountability of the JCOMM CB activities as stated by the CBPA Work Strategy, the Group developed a series of three questionnaires oriented to audit the implementation and success of the future CB projects; these series of surveys were submitted to the new Task Team of Resources during TTR-1 for its consideration.

4.4.1.5 In response to the information provided and various issues raised in the report, the Committee recommended that:

(i) the results of the regional CB requirements surveys should be passed to the other JCOMM PA coordinators and the GOOS Capacity Building Panel for review and updating with their own CB requirements, to allow the preparation of a consolidated and coordinated set of CB requirement

priorities, for the preparation of specific CB projects and activities; (**Action**: CBPA coordinator and Secretariat.);

(ii) these priorities should then be used to develop outline project proposals, which should be forwarded to the Task Team on Resources for review, input and advice on potential funding sources (see also paragraph 4.4.2.1 below); (**Action**: CBPA coordinator, Secretariat and TTR.);

(iii) the further development of the outline storm surge proposal for the Gulf of Guinea should be coordinated with and incorporate advice from the International Coordination Group for the Tsunami Warning System in the Pacific and the JCOMM Expert Team on Wind Waves and Storm Surges; (**Action**: CBCG, ICG/ITSU, ETWS and Secretariat.);

(iv) the CBCG should specify what modules within OceanTeacher should be developed for JCOMM/GOOS, in coordination with the GOOS CB Panel; (**Action**: CBCG and GOOS CB Panel.):

(v) the CBCG should nominate a representative on the Steering Group for OceanTeacher; (**Action**: CBPA coordinator.);

(vi) collaboration should be established between the CBCG and the IODE project Ocean Data and Information Network for the Caribbean and South America (ODINCARSA), in view of the complementarity of plans to enhance data collection and data management systems in the region; (**Action**: CBCG.);

(vii) coordination should be enhanced between the requirements developed by the CBCG on the basis of the WMO regions and those developed by the GOOS Regional Alliances; (**Action**: CBCG and Secretariat.);

(viii) the various project proposals being developed under JCOMM, IODE and GOOSAfrica for capacity building in Africa should be urgently coordinated, with a view to consolidating activities and enhancing the possibilities for attracting funding support; (**Action**: Secretariat.)

4.4.1.6 The Committee noted the very positive results achieved by the concurrent meetings of the CBCG and the GOOS CB Panel, which took place in Geneva in June 2002. It recognized the largely overlapping functions of the two groups, the synergy generated through the meetings, as well as the potential resource savings which might be generated through their eventual merging. The Committee therefore supported the idea of such a merger, and agreed that such a proposal should be put to the forthcoming sixth session of the GOOS Steering Committee (Cape Town, 26-28 February 2003). If the GSC was in agreement, the Committee suggested that the CBPA coordinator should work with the chair of the GOOS CB Panel to prepare a plan for the eventual integration of the two groups, for consideration by MAN-III and GSC-VII. (**Action**: Secretariat, CBPA coordinator.)

4.4.1.7 The Committee noted with interest a report by Stan Wilson on the results of a recent workshop on Potential Applications of Ocean Observations for the Pacific Islands (Fiji, October 2002), which was regarded as the first step in building a comprehensive ocean information system for Pacific Island states. It recognized that this development was of considerable potential value to JCOMM, in ways which cross-cut all PAs. JCOMM also had a potential role to play in furthering the overall system, particularly through the CB programme. At the same time, it agreed that such input would first require further elaboration of specific project proposals, which might then be assessed by relevant JCOMM subsidiary bodies, in particular the Task Team on Resources, which might eventually be requested to assist in project development and funding. In the interim, it was agreed that the report of the workshop should be passed to Sachooda Ragoonaden, the member of the CBCG with specific responsibilities for the south-west Pacific, with a request for him to analyse and propose possible future JCOMM support. (**Action**: CBPA coordinator and Secretariat.)

4.4.2 Report on the 1st session of the Task Team on Resources (TTR)

4.4.2.1 The Committee noted that, following the advice from MAN-I and CBCG-I, the membership of the Task Team on Resources had been finalized, and that the team had held in first meeting in Paris, 3-4

February 2003, just prior to MAN-II. It further noted with interest a brief report from the Secretariat on the outcomes of the meeting. These included the development of a key-word searchable data base of key funding agencies, their priorities and criteria for the selection of aid programmes, to easily link JCOMM CB projects to potential funding sources; advice on CB project evaluation and selection process; agreement by the Task Team to assist in the further development of WIOMAP, and in general to be involved in the development of detailed project proposals based on the results of the requirements surveys. With regard to the development of projects based on the requirements surveys, the Committee agreed that initial draft projects proposals should first be prepared by the CBCG, prior to seeking the input and advice of the TTR (see also 4.4.1.5 (ii)).(**Action**: CBCG and TTR.)

4.4.2.2 In general, the Committee expressed its strong support for the composition and work of the Task Team, which it agreed would provide valuable support to GOOS in addition to JCOMM.

5. CROSS-CUTTING ISSUES

5.1 DEVELOPMENT OF AN OVERALL JCOMM STRATEGIC PLAN OR STRATEGY DOCUMENT

5.1.1 The Committee recalled that, at its first session, it had agreed that preparation of the JCOMM Booklet (see paragraph 2.2.3 above) should constitute the first step towards preparation of a JCOMM Strategy Document or Strategic Plan. It agreed that such a document should, in general, provide some overall guidelines for the work of the Commission, in moving from an initial state (the present) towards achieving its long-term objectives, deriving from its vision statement. It should take into account existing or planned strategy documents (e.g. for Data Management, Capacity Building, DBCP, VOS, etc.) but should not include detailed implementation plans, which were more properly part of the work plans for the Commission and its component Programme Areas.

5.1.2 Following considerable discussion, the Committee reached a consensus that such a strategy document was in the best interests of JCOMM. It would provide a broad road map for the Commission itself; serve to illustrate the value and place of JCOMM in relation to the parent Organizations, Member States and their National Agencies, and the overall user community; and assist in securing funding support through demonstrating a clear and structured approach to achieving the JCOMM objectives. The Committee further agreed that the document should be based around an overall set of guiding principles, which would cover issues such as streamlining and integration, technological advances, user interactions, responsiveness to the parent Organizations and other stakeholders, outreach, communications, etc.

5.1.3 The Committee requested the co-presidents and the Secretariats to prepare the basic structure and input for the document, which might then be passed to a consultant for the preparation of a complete draft document for the consideration of the third session of the Management Committee in early 2004. The agreed Strategy Document would eventually be submitted to JCOMM-II for final approval. (**Action**: co-presidents and Secretariat.)

5.2 STANDARDS AND REFERENCE MATERIALS

5.2.1 The Committee received with interest and appreciation a presentation by Patricio Bernal on the topic of standards and reference materials. He noted that in many instances recently the standards developed by particular scientific programmes, such as WOCE, had become the *de facto* standards for the community. There was no wish to duplicate or interfere with the activities of the scientific community in producing such advice. However, what was required for operational oceanography was a basic handbook on measurement methods and standards that could be applied by all Member States anywhere; such a document was currently lacking,. IOC and WMO had the mandate to set standards for operational purposes.

5.2.2 Given the existence of standards developed for WOCE, JGOFS and similar programmes in recent years it should not be difficult at this point in time to compile the available information, based on the principle of best practices, which could then form the basis of a handbook for all Member States. Such handbooks already existed in some countries, for example through the US Navy for physical oceanographic

measurements. But what was required at present was agreement on international standards that were internationally promulgated.

5.2.3 The Committee agreed with this thesis, noting that for some measurements several different techniques might be used to reach the standard required. The Committee agreed that the first step would be to compile the information, list what was available, and advertise it through the JCOMM web site. It was agreed that a consultant should be hired to spend (say) 3-6 months over a 1-2 year period to compile the available information, starting with the outputs from WOCE and JGOFS, and including what had been produced in SOOP, VOS and DBCP, and other international bodies such as ICES. The Secretariat should be requested to resource this activity and to bring it to the attention of Member States at the next meetings of the governing bodies of IOC and WMO. It was recognised that it might be advisable to use consultants from the different disciplines to handle physical, biological, and chemical standards. The consultant(s) would be expected to work with the Observations Coordination Group. The Committee requested the Executive Secretary of the IOC to treat the question of compiling standards for operational oceanography as a priority (**Action**: Secretariat, then consultant[s]).

5.2.4 The Committee noted the initiative taken by WMO to establish a Quality Management Framework relating to operational products and services. In a more mature stage of operational oceanography, a similar framework might become mandatory, and the handbook would be a component of a JCOMM Quality Management Framework.

5.3 CONTACTS WITH POGO, ICES, PICES, IOI ETC

Partnership for Observation of the Global Oceans (POGO)

5.3.1 Co-president Savi Narayanan reported on developments in POGO, which comprised a group of the Directors of major oceanographic research establishments. POGO could help JCOMM with capacity building, through training and Fellowships. POGO also had a group working on the development of time series observations, which would benefit from working with the JCOMM data and information management group. POGO also had a data and information management group of its own, on which Savi was now a member. This would help to ensure good cross linkages between POGO and JCOMM.

5.3.2 The committee noted the importance of close collaboration between JCOMM and POGO and recommended continued participation of appropriate JCOMM members in POGO activities (**Action**: Savi Narayanan and Tony Knap).

International Council for the Exploration of the Sea (ICES)

5.3.3 Regarding the topic of links with ICES, the Committee noted that Tom Malone had been invited to give one of the keynote speeches, on COOP/GOOS, at the recent ICES Annual (Centennial) Science meeting, at which there had also been a well-attended GOOS seminar. This reflected a growing interest in GOOS on the part of ICES that was also reflected in the activities of the joint ICES-IOC steering group on GOOS. Through that group a pilot project had been developed for the North Sea, on the ecosystem-based approach to fisheries management. The ICES and GOOS group was keenly interested in working with other GOOS groups on the development of a regional GOOS approach to the North Atlantic.

Extensible Markup Language (XML)

5.3.4 The ICES-IOC Study Group on the Development of Marine Data Exchange Systems using XML (SGXML) had been established with the following Terms of Reference:

a) develop a framework and methodology for the use of XML in marine data exchange in close consultation with IOC and the Marine XML Consortium;
b) develop a workplan that within 4 years will lead to published protocols for XML use in the marine community;
c) explore how to best define XML tags and structures so that many ocean data types can be represented using a common set of tags and structures.
d) test and refine these common tags and structures using designated case studies i.e.;

i) Point (physical/chemical) data (profile, underway, water sample)
ii) Metadata (cruise information, building from the ROSCOP/Cruise Summary Report)
iii) Marine Biology data (integrated tows (e.g., zooplankton-phytoplankton tows), demonstrate the use of taxonomy);

5.3.5 The first meeting of SGXML, held in April 2002, developed an Action Plan that included defining a parameter dictionary; investigating and testing the use of XML to tag oceanographic point data; constructing a general metadata model and mapping between existing metadata directories (including the MEDI system). The IOC had established a community portal for marine XML discussion and is available at http://marinexml.net.

5.3.6 Another current initiative was the EU-funded Marine XML project that would demonstrate how XML technology could be used to develop a framework that improves the interoperability of data for the marine community and specifically in support of marine observing systems. The project would develop a prototype of an XML-based Marine Mark-up Language (MML). The MarineXML project was to be developed by a consortium of international agencies, government departments and organisations responsible for data standards to ensure that the research met the needs of key stakeholders with interests in global ocean observing systems. IOC, through the IODE programme, was a member of this consortium. The objectives of the project were:

- To produce a prototype marine data ontology framework for interoperability
- To produce working demonstrations of the data interoperability framework
- To develop a prototype MML specification
- To advance the standardisation of a Marine Mark-up Language

5.3.7 IODE was responsible for the management of Workpackage 2 – Exploitation and Dissemination, and would be in charge of: (i) disseminating the developments and findings of MarineXML to interested stakeholders and organisations; (ii) developing an Exploitation Plan for identified exploitable project deliverables; and (iii) ensuring the post-project development of MML.

International Ocean Institute (IOI)

5.3.8 The Committee noted that the International Ocean Institute (IOI) was also interested in further developing links with JCOMM. The Executive Director of the IOI (Dr. Iouri Oliounine) had participated in the JCOMM CB workshop in Geneva in June 2002, and he and the ex-Director of the IOI, Gunnar Kullenberg, had participated in the Task team on resources meeting in Paris on Feb 3-4, 2003.

5.4 COMMUNICATIONS: GOSIC, WEB, etc.

5.4.1 The Committee noted it was facing two different issues in the domain of communications: one was the definition and implementation of a communication plan at large, and the other was the question of the web site or sites for JCOMM.

5.4.2 As far as the former was concerned, the Committee recognized that the GSC was already in the process of developing a communication strategy that with little adaptation might be as useful for JCOMM as it was for GOOS. The Committee then urged Peter Dexter and Johannes Guddal to participate in the deliberations of the communications group when it meets with the GSC in Cape Town (Feb 26-28), and to participate in the follow up activities of that group so as to develop a communication strategy that was fully useful to both organizations. This should be brought back to MAN-III for approval (**Action**: Peter Dexter, Johannes Guddal).

5.4.3 Regarding the web site problem, the Committee recognized that it was not satisfactory to continue with a multiplicity of web sites. The Committee recognized the effort of the IODE Secretariat in registering jcomm.net and developing and implementing the current version at the IOC website. However, there was a need to integrate jcomm.net with other JCOMM related websites. The mechanism by which this would happen should be the subject of discussions between Peter Dexter, Savi Narayanan, Etienne Charpentier and Peter Pissiersens. Further discussion on the means by which the website should eventually

be modified should be delayed until the report of the communications group referred to above (**Action**: group defined above)

5.4.4 The Committee further noted that there were a number of JCOMM-related web sites which might not readily be seen as related to JCOMM. It therefore requested that measures be taken to place on each of the concerned home pages a graphic that would indicate immediately that the site was relating to JCOMM activities (**Action**: jcomm.net webmaster and other JCOMM-related sites; **deadline**: ASAP).

5.5 CRITERIA FOR PROJECT ADOPTION

5.5.1 The committee discussed the establishment of a process by which it might select projects developed by non-JCOMM groups, either as CB projects, or pilot projects. It concluded that developing such approval criteria would require careful consideration and consultation, and agreed that a small team led by co-president Johannes Guddal and with members Philippe Dandin, the CBPA coordinator and Worth Nowlin, would develop these criteria for consideration at MAN-III. In the interim, any project approval request will be discussed by the management committee via e-mail, and a response will be prepared and sent to the proponent. (**Action**: co-presidents, Committee members, Secretariat, afore-mentioned team).

5.6 FORMAL ISSUES

5.6.1 The Committee noted that a number of issues requiring formal recognition, endorsement or decisions by itself had arisen during the past year through the work of the different PAs. Some of these had already been dealt with under preceding agenda items. Of the remainder, the Committee:

(i) Noted and endorsed the various appointments made during the year by the co-presidents on behalf of the Commission;

(ii) Noted with regret the resignation from the Management Committee of Ian Hunter (South Africa), and expressed its sincere appreciation and thanks to Ian for his input to the Committee and support for JCOMM in general;

(iii) Agreed that Ms Regina Folorunsho (Nigeria) should be invited to become a member of the Committee, to replace Ian Hunter; (**Action**: Co-presidents and Secretariat.)

(iv) Agreed that no further action should be taken for the moment regarding the final expert (on non-physical data) for the Expert Team on Data Management Practices;

(v) Approved the new terms of reference for the SOT, as endorsed by OCG-I;

(vi) Approved the election of Steve Cook (USA) as chair of the SOOP Implementation Panel;

(vii) Approved the submission to JCOMM-II of a proposal for a revision of the WMO technical guidance regarding the reporting by ships of original wind speed and direction, instead of reduced (10m) wind speed; (**Action**: Secretariat.)

(viii) Approved the interim designation of Kenya as a Preparation Service for the GMDSS, subject to successful trials and final approval by JCOMM-2; (**Action**: Services PA coordinator and Secretariat.)

5.6.2 The Committee noted with regret that Stan Wilson would have to stand down from his position as Observations PA coordinator and member of the Committee following the present session, because of a change in national responsibilities. It expressed its considerable appreciation and thanks to Stan for his major work in support of JCOMM in general and the Observations PA in particular, both internationally and nationally, over many years, and wished him every success in his future activities. The Committee noted the two potential candidates as replacement OPA Coordinator and agreed that both were excellent, and could contribute substantially to JCOMM. It therefore urged that a decision on the replacement should be finalized as soon as possible, with a view to continuing the work of the OPA in a seamless way. (**Action**: Worth Nowlin.)

5.7 JCOMM IMPLEMENTATION: A BRAIN-STORMING SESSION

Development of ocean services

5.7.1 The Committee briefly discussed the prospects for establishing the proposed ad hoc TT on Development of Ocean Services. The lack of progress so far in obtaining membership of the TT especially from some key, major international players, and the recent change in leadership of OOPC were seen as presenting only short term challenges. With fairly strong interest expressed by GOOS in this new activity, it was felt that entraining the wider GOOS community at an early stage, once more definite plans had been formulated, would be advantageous. It would be advisable to focus on the more achievable target outcomes, deriving synergies where possible with other projects underway or being planned elsewhere. It would of course be necessary to build in strong links to user requirements, but it is envisaged that the multidisciplinary nature of the proposed group would naturally assist in this regard.

New ocean services

5.7.2 Discussion on demand for new ocean services resulted in the following conclusions:

- Improve existing products. It would be useful to review the standard products generated by existing programmes under IOC, ICES , WMO and other organisations;
- Add refinements to these products as necessary to support safety and security at sea and maintenance of environmental quality;
- Review the requirements for climate change issues;
- Services required for offshore activity
- Bootstrapping of developing countries
- Socio-economic goals
- Monitoring of surface coastal currents;
- Monitoring of core state variables, provision of standard analyses and products in support of the requirements of developing countries.
- Sea-level changes;
- Seasonal and interannual climate variability;
- HF radar for coasts.

5.7.3 It was noted that JCOMM needed to look ahead to output from GODAE and other pilot projects and be ready to advocate or facilitate implementation.

JCOMM-II and the scientific conference

5.7.4 The participants were informed of the progress in the planning of JCOMM-II to be held in Halifax, Canada. A scientific conference is also being scheduled for the week prior to the JCOMM-II. An organizing committee has been established, which is in the process of fixing the dates of the two meetings, and deciding on the requirements in consultation with the joint JCOMM Secretariat. The management committee members were asked to inform the organising committee through Savi Narayanan, their ideas on the overall theme of the conference, and topics for individual sessions. (**Action**: Committee members; **deadline**: ASAP)

6. WORK PLAN FOR MAN

6.1 The Committee agreed that its workplan for its next intersessional period would be made up of (i) pending tasks from MAN-I, plus (ii) new tasks as decided by MAN-II. The workplan is reproduced in *AnnexVI.*

7. DATES AND PLACE OF NEXT SESSION

7.1 The Committee noted with appreciation the offer by WMO to host the third session of the JCOMM Management Committee at WMO headquarters in Geneva, sometime in February 2004.

8. CLOSURE OF THE SESSION

8.1 In closing the session, the co-presidents expressed their appreciation to all participants for the substantial work accomplished so far, both in the period since MAN-I and during the session, and for their spirit of cooperation during the deliberations. They specially wished to express their appreciation and thanks to Stan Wilson for his accomplishments as coordinator of the Observations Programme Area. The co-presidents, supported by the whole Committee, offered their thanks to the Secretariat. On behalf of the participants, Patricio Bernal expressed his special thanks to the co-presidents for their wisdom in conducting the debates.

8.2 The second session of the Management Committee of the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology closed by 12.40 on Saturday, 8 February 2002.

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. REPORTS

2.1 REPORTS BY THE CO-PRESIDENTS
2.2 REPORT BY THE JOINT SECRETARIAT

3. REQUIREMENTS

3.1 THE OCEAN OBSERVATIONS PANEL FOR CLIMATE (OOPC)
3.2 THE COASTAL OCEAN OBSERVATIONS PANEL (COOP)
3.3 CONTINUITY FOR SATELLITE ALTIMETRY

4. REVIEW OF PROGRAMME AREAS ACTIVITIES

4.1 OBSERVATIONS PROGRAMME AREA (OPA)
- **4.1.1 The report of the OPA coordinator and related issues**
- **4.1.2 Satellite data**

4.2 SERVICES PROGRAMME AREA (SPA)
- **4.2.1 The report of the SPA coordinator and related issues**
- **4.2.2 Possible contributions to Natural Disaster Reduction**

4.3 DATA MANAGEMENT PROGRAMME AREA (DMPA)
- **4.3.1 The report of the DMPA coordinator and related issues**
- **4.3.2 Global Ocean Surface Underway Data (GOSUD)**
- **4.3.3 Colour of the Ocean Data Symposium**
- **4.3.4 Report on the IODE review and the IOC data management review**
- **4.3.5 The Specialized Oceanographic Centres (SOCs)**

4.4 CAPACITY BUILDING PROGRAMME AREA (CBPA)
- **4.4.1 The report of the CBPA coordinator and related issues**
- **4.4.2 Report on the 1st session of the Task Team on Resources (TTR-I)**

5. CROSS-CUTTING ISSUES

5.1 DEVELOPMENT OF AN OVERALL JCOMM STRATEGY DOCUMENT OR STRATEGIC PLAN
5.2 STANDARDS AND REFERENCE MATERIALS
5.3 CONTACTS WITH POGO, ICES, PICES, IOI etc
5.4 COMMUNICATION: GOSIC, WEB, etc.
5.5 CRITERIA FOR PROJECT ADOPTION
5.6 FORMAL ISSUES
5.7 JCOMM IMPLEMENTATION: A BRAIN-STORMING SESSION

6. WORK PLAN FOR MAN

7. DATES AND PLACE OF NEXT SESSION

8. CLOSURE OF THE SESSION

ANNEX III

PROGRESS REPORT BY THE CO-PRESIDENTS

I. Organization

Management Committee: With the appointment of Professor Lin Shaohua (China) as the coordinator of the PA on Data Management and Ms Miriam Andrioli (Argentina) as the coordinator of the PA on Capacity Building, the Management Committee is now complete. It is to be noted that, though Prof. Worth Nowlin has stepped down as the chair of GSC and was replaced by Dr. D. James Baker, Worth will continue to be a member of JCOMM Management Team to help the new chair of GSC. Worth's continued involvement in JCOMM will be of great benefit.

OPA: The OPA coordination committee is now fully subscribed with the appointment of Dr Hiroshi Kawamura (Japan) as satellite rapporteur and Dr Tony Knap (USA) as rapporteur on non-physical variables. Hiroshi and Tony are both members of the GOOS-COOP and thus will be able to help us to better align JCOMM with COOP's requirements. In addition, Hiroshi is actively involved in GODAE and is responsible for the establishment of a global satellite-derived SST database, thus providing another link with GOOS.

SOT, DBCP and GLOSS have open membership, therefore no new members needed to be appointed. However, the following changes have occurred:

- The chair of SOT, Rick Bailey had to step down because of other commitments and was replaced by Graeme Ball, Bureau of Meteorology Australia. Graeme is in charge of the Australian VOS programme, and is also directly involved there with operational SOOP matters and the WRAP project. He is thus directly acquainted with all three main components of the SOT. Recently, Graeme has implemented an excellent web site for the VOS, which is maintained on the Bureau of Meteorology web server, and can be accessed through JCOMMOPS. He is making a liaison mission to Europe in December 2002, to meet with panel chairs and begin work on issues such as a JCOMMOPS development plan.
- Steve Cook from US was appointed as the chair of SOOPIP as Rick had stepped down from the chairmanship of SOOPIP to take the chair of SOT. Steve has many years of involvement in the SOOP, and has the knowledge and the interest to coordinate the SOOP activities globally.
- Michael Myrsilidis from Greece has accepted the responsibilities of the chair of the VOS, as George Kassimidis had to step down. Michael Myrsilidis is a very experienced marine meteorologist, including with the Greek VOS, and is now the marine supervisor in the Greek NMS.

PAS: Recognizing that discharging all the tasks associated with MPRESS could not be completed by a single Rapporteur, Mr Pierre Daniel, the Services Programme Area Coordination group recommended that a small *ad hoc* Task Team be established to undertake that work. Subsequently, with approval from the co-presidents the Task team was established with Pierre as the Chair and the membership being sought from a number of countries currently active in MPERSS implementation. This Task Team will work mainly by email correspondence and that its members will take the opportunity of other meetings they would attend together to discuss items that deserved live exchanges of views.

DMPA: The DMPA membership as well as the membership of the Marine Climatology ET is also complete. There is still a vacant membership in ET/DMP, designated for bringing in someone who is an active scientist, preferably in a non-physical field, with good contacts with both the scientific community as well as the data management community. Even after considerable effort, no suitable and willing candidate was identified.

Data management is a major challenge for not only JCOMM but for other programmes and organizations as well. Recognizing that JCOMM DMPA on its own will not be able to achieve the

results expected of JCOMM, the members of DMPA participated in, played a key role in and led many key data management activities.

- A member of DMPA, Bob Keeley is also the co-chair of the Argo data management subgroup. Bob and his co-chair Sylvie Pouliquen, IFREMER, France have been very active to build the data management structure for Argo under the scientific guidance of the Argo Science team, and held a 3-day meeting in Ottawa. Report is available on the Argo website.
- A major challenge for JCOMM is to address the requirements for integrated multi-disciplinary data in a timely manner. Under IODE, a group was established to address the requirements associated with the end-to-end data management of 'underway data' which includes thermo-salinographs, pCO2 and others. MEDS hosted an international workshop in Ottawa attended by not only the IODE group, but also other interested groups including ICES. It has been the consensus that JCOMM in collaboration with IODE will operationalize the structure that will be developed for this group of data. The project Plan V1 and meeting report may be found at
  http://www.ifremer.fr/sismer/program/gosud/documentation.htm
- Even though JCOMM was not an official sponsor of the 'colour of ocean data' conference, many JCOMM members played a major role in organizing of the conference and presented key papers that will help us move forward to achieve the goals of JCOMM. The quality of the papers and the participation from the scientific community (government and universities), data management groups, funding/international agencies and clients, were well beyond expectations. It was particularly exciting to note that many countries are already implementing multi-disciplinary integrated 'one-stop shopping' systems. JCOMM/IODE leadership with right funding could bring these efforts into focus and make significant advances in the way we do data management globally. The proceedings will be published.

CBPA: Since MAN-I, nominations were received for candidates for the Task Team on Resources. These were reviewed, and the selected candidates were appointed. The members are: Thomas Spence, Gunnar Kullenberg, Jan Stel, Iouri Oliounine, and Len Hinds, with Sergey Priamikov as chairman.

II. Promoting and reporting on JCOMM

- The co-presidents, with assistance from the PA coordinators and other members of the Expert Teams, prepared a comprehensive presentation on JCOMM. This was presented at the IOC and WMO Executive Councils.
- An article on JCOMM was published in the Canadian meteorological and Oceanographic Society (CMOS) Bulletin. CMOS has a broad membership among meteorologists and oceanographers in the university, government and industry in Canada.
- A presentation was made to the senior managers of the Fisheries and Oceans Canada to inform them of the progress JCOMM has made since JCOMM-I and to obtain their approval to initiate the planning for JCOMM-II, planned for 2005 in Halifax, Nova Scotia, Canada. There was enthusiastic support to Canada hosting JCOMM and it was suggested that a special short conference on operational oceanography or some other relevant topic, may be organized immediately prior to the assembly.
- The co-presidents attended the GOOS-COOP V meeting in S. Africa, where the design plan was finalized and the strategy document for the COOP implementation was initiated. JCOMM co-president, Oceans, was one of the lead authors of the data management section of COOP design plan, thus strengthening the link between COOP and JCOMM. JCOMM has been accepted as the venue for the COOP implementation.
- JCOMM co-president, Oceans, collaborated with IODE to organize the 'colour of the ocean data' conference held in November, 2002, and chaired a panel discussion. This conference was very useful to define the work activities of the DMPA.
- The co-presidents continued their efforts to facilitate sustained forecasting services in the South China Sea region and to identify opportunities to involve JCOMM in more multidisciplinary projects within Natural Disaster Reduction. This includes a close cooperation with the WMO/IOC Tropical Cyclone programme. This initiative is believed to stimulate the creation of a SEAGOOS.

- JCOMM co-president, meteo, has followed up a suggestion by the WMO SG to seek joint WMO Technical Commission priority areas which could materialize into projects. The first step of this has been to agree with CAgM (Commission for Agricultural Meteorology) on a draft for a pilot project titled "Marine Influences and Impacts on Lowlands Agriculture and Coastal Resources", MILAC. Towards the end of 2002, also WMO Regional Associations (II, III, and V) became involved in preparing a project proposal.
- Presentations on JCOMM were made to both the Indian Ocean GOOS and EuroGOOS Conferences (November and December 2002). IOGOOS has been approached concerning participation in MILAC and has responded positively. EuroGOOS operates closely in communication with its major potential sponsor, the European Commission. The major drivers of the future European ocean programme are "Building the European Capacity for Operational Oceanography", and "Global Monitoring for Environment and Security". Both sectors have obvious roles for JCOMM, and both EU and EuroGOOS have been approached in that context. In particular, it is believed that JCOMMOPS could play a major role.
- Less mature are some ideas of "new products and services" to be suggested to SPA. Offline and online wave data for marine design and operation will be one example.
- Regarding CB, it has been suggested to emphasize on pilot projects, and to consider the creation of freely available numerical models for experimentation and pre-operational use.

III. Work Plan Status

	par	action	by whom	when	Pr	Status	what
1	2.1. (iii)	Develop a calendar of events such as EuroGOOS Conference (Athens, December 2002) where a presentation on JCOMM should be made, to be accessed via the JCOMM web site	Secretariat		L	Calendar is on JCOMM.net site	
2	2.2	Have a future JCOMM meeting plan show only those meetings under or directly relevant to or supported by JCOMM	Secretariat	MAN2	L		
3	2.2	Any future proposals for projects, groups or activities to be declared as supporting JCOMM should be thoroughly reviewed by the relevant JCOMM body before being accepted as such	Co-presidents and Secretariat	MAN2	L	Ongoing	
4	2.3	Make meeting documents available to Committee members as early as possible	Committee members and Secretariat	MAN2	L		
5	3.1.1 (ii)	Action for the one remaining vacant position in ETDMP	Committee members, Secretariat and Co-pres.			Pending	
6	3.1.2	Proceed with obtaining the necessary confirmation of appointments of coordinators of the DMPA and the CBPA from the respective agencies in Argentina and China	Secretariat			Done	
7	3.1.3	Distribute a letter suggesting Members/Member States designate a (preferably a single) national focal point for JCOMM.	Secretariat			Done	

8	3.2.1.3	Arrange for JCOMM co-sponsorship to the Indian Ocean workshop in November 2002 and to the GODAE Conference in Biarritz (June, 2002)	Secretariat			Done	
9	3.2.2.2	Help the process of review and revision of the report by Dr Kawamura and Mr Charpentier through the JCOMM Services and Observations Coordination Groups, in a similar way to the process adopted with the Seasonal to Interannual Forecasting Statement, through AOPC/OOPC	Secretariat, Hiroshi Kawamura			Done	
10	3.2.3.3	Make a link to the COOP Design Plan, when published, on the JCOMM web site	Secretariat and Tony Knap	.		Pending. Design plan is in the final stages of printing	
11	3.3.5	Incorporate general and specific proposals on the 6LTP draft and submit the revised version, on behalf of the co-presidents, for further review by the WGLTP and the Executive Council. Eventually, this final draft will form a part of the full 6LTP, which will be presented to Fourteenth Congress in 2003 for adoption.	Secretariat			Done	
12	3.4.2	Maintain good liaison between JCOMM and POGO, especially in the areas of observations and capacity building.	Co-pres. and Secretariat			Done. Ongoing	
13	3.4.4	Invite ICES to be involved in the observation and data management programme areas, as appropriate, and develop web links between the two organizations.	Secretariat and Obs. and Data Man. Coord.			Done	IOC to do
14	3.4.6	Produce, by the end of March, details on ICES, PICES, and POGO, including membership, which should be made available on the JCOMM web site.	Secretariat			Pending	IOC to do
15	4.1.2 (ii)	Issue invitation for Dr Anthony Knap, Rapporteur for Non-Physical to OCG-I to discuss the status of the development and delivery of products and services needed to meet COOP requirements and the extent to which liaison and interaction was needed with organizations such as the International Council for the Exploration of the Seas (ICES) in the North Atlantic and PICES, its counterpart in the North Pacific (from 3.2.3.3)	Secretariat			Done	

16	4.1.2 (iii)	Invite Dr Shubha Sathyendranath, Executive Director of POGO to OCG-I to explore mutual interests between the OPA and POGO, including planning for the collection of non-physical observations on an operational basis, the feasibility of distribution on the GTS of drifting buoy observations collected by researchers, and the status of capacity building for developing and deploying deep-sea moorings	Secretariat			Done	
17	4.1.2 (iv)	Arrange for co-sponsorship to the Workshop on 'Potential Applications of Ocean Observations for the Pacific (with no financial obligation), when so requested	Secretariat			WS was held in October	
18	4.1.2 (ix)	Arrange for Ms Doublet to temporarily join SCG	Secretariat and Ms Doublet			Done	
19	4.2.1 (i)	Communicate with France regarding the host for the proposed second MPERSS workshop in Toulouse.	France, Services PA Coord. and Secretariat			Done	
20	4.2.1 (iv)	Prepare for MPERSS and JEB workshop in 2004	France, Yves Tourre, Services PA Coord. and Secretariat	In 2003		Initial prep. underway	
21	4.2.1 (v)	Arrange setting up a special Task Team on the "Development of Ocean Services", to include the Services and Observations Coordinators, plus representatives from the OOPC and major operational centres.	Services PA Coord. and Secretariat)			Done	
22	4.2.1 (vi)	Arrange for KMS to prepare a document on its proposal regarding Issuing and Preparing Services to be submitted to ETMSS-I in consultation with Mauritius	Services PA Coord., chair ET/MSS, Secretariat			Done	
23	4.3.4	Prepare a Draft Resolution for the next Session of the IOC Executive Council calling for the development of an IOC integrated data management strategy, encompassing all IOC programmes.	IODE, Secretariat (IOC)			Done	
24	4.3.5	Fill vacancy for a data flow monitoring expert on DMCG	Secretariat			Vacancy filled, though not specifically data flow monitoring	
25	4.4.2	Arrange for Dr Desa to join both GOOS Capacity Building Panel and JCOMM CBCG.	Secretariat			Done	

26	4.4.3	Take steps to appoint members to the Task Team on Resources, and asked Management Committee members to submit names of possible candidates to the Secretariat by the end of February.	Secretariat and Man. Committee members			Done	
27	5.2	Prepare a concise summary of the vision and strategy for JCOMM, of perhaps 10-15 pages. The summaries for each Programme Area should be prepared by the PA Coordinators, in consultation with their respective Coordination Groups, and would thus be finalized by mid-2002. It requested that the remaining sections should also be finalized on this time scale, so that the full document would be available for review and adoption by the Committee soon after this date. The document should then receive wide distribution both within and outside JCOMM	Co-pres., PA Coords. and Secretariat			Done	
28	5.3	In consultation with the co-presidents, arrange for the conversion of the Vision and Strategy document, when finalized, into a brochure format, with appropriate illustrations, and for its publication, if possible with the assistance of a Member State.	Secretariat and Co-pres.			Underway	
29	5.6 (ii)	Try making budgetary savings through a rationalization of the subsidiary bodies of JCOMM, IODE and GOOS, in particular through joint/overlapping meetings and membership.	Secretariat			Ongoing	
30	5.6 (iii)	Propose strategies for support from external funding sources on the basis of specific JCOMM programmes and activities.	Secretariat			Ongoing	
31	5.7	Continue to seek new avenues for expanding the funding base for all JCOMM activities including JCOMMOPS and capacity building	Secretariat			Ongoing	
32	6.4	Action for CLIMAR-II and Brussels 150	Initially Secretariat			Underway	
33	6.6	Maintain JCOMM web sites. Receive guidance from the co-presidents on technical and organizational details	Secretariat and co-pres.			Ongoing	
34	6.7	Prepare some proposals for a JCOMM logo, for review by the Committee, for adoption if possible prior to its second session	Secretariat			Graphics artists in Australia and France preparing proposals for MAN 2	
35	7.1	Finalize the exact dates of MAN-II as soon as possible, in consultation with the co-presidents, and inform Committee members accordingly	Secretariat			Done	

36	7.2	Develop the agenda for MAN-II on the basis of MAN-I, and arrange for appropriate position papers to be prepared relating to these strategic issues, for consideration at the session.	Co-pres. and Secretariat			Done	

ANNEX IV

THE IMPORTANCE OF JASON-2

Satellite altimetry is key to understanding the role of the oceans in climate, as well as the coupled ocean/atmosphere system and marine weather. Data collection initiated by TOPEX/Poseidon in 1992 – and being continued by Jason-1 today – has demonstrated that satellite-derived observations of the surface topography of the oceans are essential for understanding global sea level rise. Through their use in data assimilation and modeling, such observations are also essential for understanding how the oceans redistribute heat and carbon across our planet. As a consequence, these missions have been identified by the international community as critical elements of the Global Climate Observing System, and it is important that this capability be continued well into the future.

These missions have been jointly developed by the National Aeronautics and Space Administration (NASA) and the French Centre national d'études spatiales (CNES).

Looking to the future, a broadened trans-Atlantic partnership is emerging to facilitate the continuation of climate-quality satellite altimetry beyond Jason-1, and is being pursued as part of the Ocean Theme of the Integrated Global Observing Strategy.

It is important to note that the broadened partnership, involving both research and operational agencies on both sides of the Atlantic, reflects the view that satellite altimetry is ready to start making the transition to operational status – a view based on its demonstrated value to marine meteorology, operational oceanography, and seasonal prediction.

In the U.S., the National Oceanic and Atmospheric Administration (NOAA) has partnered with NASA in this endeavor. In particular, NOAA is planning to implement and operate the ground system for the follow-on mission, Jason-2, called the Ocean Surface Topography Mission in the U.S. Further, NASA is negotiating with the U.S. Navy for the provision of a launcher for OSTM. Finally, NASA is studying the inclusion of a wide-swath altimeter to observe cross-track topography, a technique that – if successfully demonstrated – could dramatically improve global sampling and enhance the value of the mission to operational, as well as research, users.

In Europe, CNES, the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT), and EUMETSAT Member States have partnered to facilitate the continuation of climate-quality satellite altimetry beyond Jason-1. Given that Jason-2 is a voluntary program within EUMETSAT, a sufficient number of Member States must subscribe to participate for it to become a reality. We understand that once the U.K. subscribes, the program can proceed toward implementation.

Recognizing the significant contributions it will make to the global community, the JCOMM Management Committee recommends that its parent organizations, the WMO and IOC, urge all members of this partnership to proceed with implementation of the Jason-2 mission.

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ANNEX V

MARINE INFLUENCES AND IMPACTS ON LOWLAND AGRICULTURAL AND COASTAL RESOURCES (MILAC).

A Contribution to Natural Disaster Reduction.
Submitted by the presidents of CAgM and JCOMM to the
Joint Meeting of Presidents for WMO Technical Commissions, 5 February 2003.
.
With major contributions from dr. H.P. Das, CAgM, dr. Paul Pilon, CHy,
dr. H.K. Lam, RA II, dr. Justin Ahanhanzo, GOOS Africa.
With informal support from the WMO Regional Associations I, II, III, V.
With informal support from Indian Ocean GOOS and GOOS Africa.

Summary.

The document proposes a contribution to Natural Disaster Reduction (NDR). It attempts to create synergy between WMO Technical Commissions's and Regional Associations, and GOOS Regional Alliances. A background description will be found in the Appendix I to this document. The aim of this proposal is to establish a contribution to NDR in relation to coastal lowlands where marine influences play a major role in addition to those caused by meteorological processes such as extreme precipitation causing inundation. The proposal will avoid advance prescription by including as an initial step a "Problem Identification" involving regional/national expertise, and a widely accepted "Solution Strategy" before going into the actual work activities deemed necessary. Further, the "end product" shall become:

1. A clearly designed "problem solution" system, rather than a comprehensive 'center of excellence".
2. A system including the metrics of its performance, the documentation of the benefits of its being used, or not used.

Consequently, this proposal is limited in scientific ambition and scope. It is thereby assumed that its success or non-success provides a learning scenario for potential larger scale projects.

MILAC is a success if it can be measured to improve the quality of life and the safety for societies and people in the marginal coastal zones where marine influences are crucial.

Project strategy and elements.

The strategy is to build a system based on regional (lowland) priorities, consisting of observational monitoring and numerical simulation techniques, keeping in mind the limitation in performance of such tools. Focus is made on tropical coastal lowlands, and on the well-known phenomena of tropical cyclones which produce extreme precipitation, winds, waves, storm surges and soil degradation. This choice of strategy leads to the following project elements or steps to be taken:

1. Problem identification.
2. Establishment of a solution strategy.
3. Provision of tools, which may be in terms of hindcasts, nowcasts and forecasts.
4. Testing and implementing operational arrangements for such tools.
5. Inclusion of tools system in complementation with a regional/national disaster mitigation system.

The following sections describe briefly the nature and contents assumed for each of these steps.

1. Problem Identification.

1.1. **Paramount incentives.**

Extreme events in coastal lowlands have dramatic impacts on economic activities such as agricultural productivity, the environment and the safety of the people. It is necessary to consider carefully where one can (realistically) contribute to mitigating these effects in close cooperation with existing disaster mitigation organizations. The prominent expert advice will be provided via the WMO RA's. Since the project has a limited scope of ambition, one may have to compromise and not try to create solutions to "everything".

This first step will be the outcome of a composition of expertise from RA experts, CAgM and JCOMM experts, and from other relevant partners such as the Tropical Cyclone Program, The ISDR etc. Also GOOS regional bodies such as for Africa, the Indian Ocean and the South East Asia are potential contributors.

The crucial questions are such as:

- How can population safety be improved?
- How can crop and life stock losses be avoided/reduced?
- How vulnerable is the infrastructure (roads, powerlines…) and where can one assist in the best manner to help prevent damages?

Typical outcome:
It may be decided to focus on forecasting of storm surge as a realistic means to decide on whether to evacuate populations. There are many additional features of a comprehensive risk reduction strategy that should be considered. These would include producing risk maps as support to land-use planning and zoning, policy development for use of lands within designed risk areas, adoption of flood proofing measures, structural works, modification to building codes, etc.

In order to figure HOW a MILAC project would look in practice, the outlines of a combined and integrated project could be as follows:

- ***Selection of a target area such as the coast of West Africa, the Bay of Bengal or the South China Sea.***
- ***Provision of and setting in operation numerical tools for storm surge and wave forecasting with appropriate meteorological input.***
- ***Agreement with relevant RA on strategy for hindcasts and forecasts.***
- ***Agreements on updated monitoring programmes.***
- ***Contacting the local disaster mitigation mechanisms and agreeing on inter-active relations both for the preventive and 'within' disaster scenarios.***
- ***Establishing training and alertness programmes.***
- ***Carrying out exercises.***
- ***Public awareness programmes.***
- ***Establishment of cost/benefit assessments.***
- ***Coordination with international mechanisms for Disaster Mitigation.***

1.2. Analysis.

In contemplating the disastrous efforts that a tropical cyclone can have upon a country, the question obviously arises as to whether the people and its government can take well planned measures which would prevent or at least reduce the losses of lives and the damage which may appear inseparable from tropical cyclones. The answer to such a question is that carefully planned measures functioning through an efficient organization are well worth the effort. If a nation prepares itself and takes all possible action for protection, a tropical cyclone would cause much less loss of life and much less damage to property, crops and live stocks than if no precaution had been taken. The purpose of this project would be to describe and explain what can be done and to suggest ways of doing it. Special attention should be given to the forecasts and warning systems and to the immensely important subject of the dissemination of warnings to all concerned. Those who have responsibilities in the emergency organization should have a background knowledge of tropical cyclones and their main

characteristics and of the type of forecast and warning that are issued so that these messages will be interpreted and acted upon in the most effective manner. It has also to be ensured that the general public understands the dangers that accompany cyclones, is ready to co-operate with the emergency organization, and knows what actions need to be taken when notified.

It would be grossly inadequate merely to plan and implement relief actions to be taken after disasters have occurred. The actual and potential consequences of disasters are so serious that much greater emphasis should be given, nationally and internationally to planning and prevention. The sheer magnitude of the human problem in disaster prone areas, especially the rapid expansion and concentrations of population in slums and squatter settlements, indicates that relief measure and post-disaster action alone are not sufficient.

Disaster prevention and preparedness consists of a wide range of measures, some long-term and other short-term, aimed at saving lives and limiting the amount of damage that might otherwise be caused. Prevention covers the long-term aspects and is concerned with policies and programmes to prevent and eliminate the occurrence of disasters. The corresponding measures are to be taken in such fields as physical and urban planning, public works and buildings. Short-term measures are designed to cover the action necessary during the approach of a possible disaster, during the existence of a disaster situation and in the ensuing period devoted to relief and rehabilitation.

An organization for disaster prevention and preparedness is inevitably complex. It involves a variety of different services and skills all of which must be blended together so that the whole organization can function smoothly and meet its objectives. There is therefore a high degree of interdependence between the various components. Taking an overall view, it can be said that disaster prevention and preparedness form a system of enormous scope which involves official and voluntary organizations at national, regional and local levels, involving the general public directly in a number of critical aspects.

In the present case, the strategy of disaster preparedness/impact mitigation should also include:

(a) Cyclone impact mitigation

- development and dissemination of cyclone resistant agricultural practices and crops on the coastal areas
- development and dissemination of measures and technologies to reduce cyclone impact on the fisheries sector (destruction of landing sites, loss of boats, fishing gear and pots at sea).

(b) Preparedness

Actions to minimize the adverse effect of cyclones and floods on the agriculture and fisheries sector through precautionary measures and to ensure timely, appropriate and efficient organization and delivery of emergency response following the impact of the disaster.

The major components of this phase are associated with:

- Institutional framework for decision making and implementation at local, national and sub-regional level;
- Early-warning information systems;
- Vulnerability and risk assessment;
- Resource data base;
- Establishment of response mechanisms;
- Public education and training

Possibly it is in these contexts mentioned in the above mentioned paragraphs that the problems and subsequent actions should be fixed in connection with this project proposal.

2. Solution Strategy.

Given a consensus on the spectrum of problems that realistically can be "attacked", one can design a solution strategy. In this context, one must consider the predictability of phenomena of interest, such as storm surges, the availability of data required, numerical models etc. In general;

- improved statistical and hindcast information can assist in agricultural planning ,
- seasonal forecasting can help crop management,
- nowcasting (including supportive measurements) can assist in taking immediate decisions and in post disaster activities.
- Forecasting (2 – 5 days) can assist in operation of mitigation activities, preparedness, evacuation, search and rescue.
- Incident retrospective analysis can assist in post disaster actions.

It might appear that even perfect forecasting over 24 hours is useless due to the enormous and time-consuming preparations needed for evacuation of population, so the realistic ambition is rather to improve the basis for planning, management and pre-disaster mitigation measures. It might also appear that even intensive monitoring is useless due to the extremity of disasters. In a tropical cyclone the sustained wind speed may exceed 150 knots, while an anemometer on a moored buoy has a much lower performance limit. So it might appear that post disaster actions are better served from MILAC than nowcasts/forecasts under the actual incident. These are all considerations that influence on the solution strategy.

Typical outcome:
One may establish a " problem to solution" matrix and design a strategy for those boxes given a problem identification.

The solutions to disaster reduction have to be found for each locality that can be implemented properly and maintained. At first, the purpose or the specific goals relevant to disaster reduction should be identified. It is impossible to prevent the formation of a tropical cyclone, but mitigation measures can be adopted to counter the disastrous impacts for a given return period of hazard frequency. The intent is to reduce the overall risk associated with a hazard to a publicly accepted level, as it would be either impossible or socially unacceptable to totally eliminate the public's exposure to risk. The time frame and costs associated with mitigation measures often have to be in balance with other economic and development needs of the society. However, disaster mitigation should be viewed as an incremental process to reduce the frequency of the disaster cycle through long term planning and by taking appropriate measures to reduce risk. Countries that have been successful in reducing losses from natural disasters have achieved this success through long term commitment to reduce vulnerability by providing permanent protection from disasters; i.e. by implementing disaster resilient infrastructure (buildings, power lines etc.) and implementing disaster reducing land management practices.

Disaster reduction requires the integration of information from diverse sources. Geographic Information Systems (GIS) is one key new technology often used to collect, store, analyse and display large amount of spatially distributed information layers. The core of a GIS is a set of spatially referenced maps, which are stored either as points, lines, polygons or raster data. GIS makes it easy to assign attributes to these spatial quantities and combine different layers of information.

Mathematical simulation and modelling disaster processes is the main procedure in forecasting or warning, as well as in impact assessment. Recent advances in acquisition of spatially distributed information through remote sensing, processing of that information in GIS and the advancement of knowledge of basic disaster mechanism are making it possible to more accurately depict natural phenomena. Most natural processes resulting or leading to disasters involve complex interactions of many processes, which generally require numerical computations. Improvements in computational capacity combined with the rapid growth of computational power, declining costs and continuous advancements of model developments are contributing to the simulation of disaster-causing natural phenomena with increasing accuracy.

There are mainly two categories of numerical modelling activities related to disaster mitigation. One is the simulation of the phenomena itself, that can be used in scenario analysis to

identify risk, and the other is to forecast the future state of an extreme event currently taking place. Currently mathematical modelling is used operationally in weather forecasting, cyclone tracking and strength prediction, flood forecasting, lava flows resulting from volcanic eruptions, forest fire and management modelling, landslide hazard identification, landslide forecasts, behaviour of structures during disasters, relief operations and tsunami modelling.

One of the most important requirements of mathematical modelling for forecasting, warning and risk analysis is the historical data of past disasters as well as long term record of the magnitude of natural phenomena, even when they do not cause disasters.

At the threat of an emergency, such as the time when the warning service indicates the possible approach of a tropical cyclone, one of the questions that will have to be considered by the authorities would be: which areas might have to be evacuated? The resulting decisions would be largely based on the forecasts of conditions to be expected – strength of the wind and amount of rainfall, areas likely to be flooded and anticipated depth of water, likelihood of storm surge and coastal areas to be affected. When all these questions have been considered and conclusions reached, the organization for evacuation, already at full readiness, would be called into action. The effectiveness and operational efficiency of this organization can have a decisive influence on the success or failure of the whole system for disaster preparedness in conditions of actual emergency. It is important to reiterate that even a perfect forecast over 24 hours may not be helpful due to the enormous and time consuming preparations needed for evacuation of the population, so the realistic strategy would be to improve the basis for planning and management.

After the cyclone has passed, it is important to inform the public about what has happened and what the government is doing to meet the emergency needs of the people. Emergency services include evacuation, rescue, safe water and food, clothing, shelter, medical/nursing, rehabilitation and other social welfare services. The public should be kept informed of the facilities that are being made available and should, at the same time, be advised on the action which they should try to take as families or as individuals so that the administration and the people may work together to overcome their difficulties.

3. Provision of tools and implementing operational arrangements.

It is assumed that the “toolbox” is a mixture of observations (real-time or historical), and numerical models for both the atmosphere and the adjacent ocean. Many of such tools are either commercially or freely available. MILAC will not require the development of new tools, but will rather use what is available and effective for lowest possible cost. The crucial problem is to put such tools together in a coherent toolbox. Further, serious considerations must be given to data, model resolution and data management issues. One aspect of this is that “community based” monitoring programmes should be considered. This also helps to increase the effectiveness of the forecasting and warning programme and its overall sustainability.

Typical outcome:
One may decide on the installation of numerical models, implement a monitoring program, or to retrieve archived data for the solution.

Hindcasts, nowcasts, forecasts (incl. Seasonal).
Atmospheric, oceanographic or hydrological tools are classified according to the prospective applications within hindcasts, nowcasts or forecasts. These classes require different technological/computer environments. There is also a requirement for validation of such tools. Validation provides the basis for having confidence in a specific application of a tool, and it also provides a benchmark for comparing new types of tools for potential implementation.

The responsibilities for providing forecasts and warnings of tropical cyclones and of the associated winds, rainfall, floods and storm surges fall upon the national Services concerned with meteorology, hydrology and hydrography. These responsibilities assume the greatest importance with regard to tropical cyclones because of the possibilities of a pending disaster. At such a time, the Meteorological Service, by means of a series of forecasts, advisory messages and warnings, must keep all other concerned services, authorities and the general public fully informed as to the evolution of the

tropical cyclone, its intensity, speed and direction of movement, wind strength, the rainfall expected and the possibility of storm surges. The meteorological forecasters should work closely with hydrologists in regard to river flooding and with hydrographers in regard to storm surges.

Monitoring and forecasting tropical cyclones

The science and practice of weather forecasting are dependent upon data over a wide geographical area; the telecommunication facilities to allow the data to be collected from the numerous observing stations; and the system and facilities to rebroadcast data and products for interception by all services requiring them. In order to forecast for a specific area, the forecaster needs data on conditions at the surface and in the upper atmosphere for a very large area. Atmospheric processes are taking place all the time, hence the data must be constantly renewed. Some data are required at hourly intervals, others every 3, 6 or 12 hours so that the state of the atmosphere and of the sea surface can be monitored continually. Some observing facilities, e.g. weather radar, permit a continuous surveillance of rain and system movement within the range of the equipment, and the information is made instantly available and thereby increasing its value.

A country that is liable to be affected by tropical cyclones should install additional observation facilities to supplement the basic meteorological network required for its normal forecasting and climatological requirements for aviation, industry, agriculture, shipping, the general public, etc. The normal or basic network would include observing stations for reporting the values of meteorological elements at the surface and in the upper air and would also include equipment at main forecasting centers for the interception of satellite cloud pictures that are most valuable for indicating the centers of low-pressure systems. The additional facilities required by a country that is vulnerable to tropical cyclones should be developed on the following lines:

(a) *Weather radars* that provide a continuous watch on a tropical cyclone and enables the Meteorological Service to provide accurate, unquestionable information as the storm comes closer to a threatened area.

(b) *Auxiliary reporting stations* which should be deployed along coastal areas to measure pressure, wind and rainfall.

(c) *In-flight reports from aircraft* which provide data from areas remote from the standard observing network, e.g. over the oceans.

(d) *Aircraft reconnaissance reports* which provide valuable meteorological information including the position of the centre of the cyclone, reports on cloud structure and on the distribution of temperature, wind and pressure.

(e) *Rawinsonde launch facilities for emergency situations to supplement regular launches.*

(f) *Moored marine buoys to monitor the coastal situation of advancing storm tracks, as measurements by human observers are often not available due to the perilous situation and expenditure of manned reconnaissance missions.*

Telecommunication facilities

A national Meteorological Service requires an elaborate telecommunications system in order to collect and retransmit data obtained from the national network and also in order to participate in the Global Telecommunication System whereby data from all countries are made available as required to each individual country. The national meteorological telecommunications, which all include landline and radio, should work at appropriate high speeds and should, in addition to exchanges of plain language and numerical coded data, provide for the reception and transmission of weather charts by facsimile equipment and for the interception by the most efficient means of pictures from the meteorological satellites.

Forecasting methods

During the past two decades the range and flexibility of forecasting methods have greatly expanded as a result of the introduction of powerful computers which permit the application of mathematical techniques in addition to the traditional procedures which have been developed and steadily improved since the early years of the last century.

The technical routine in a forecasting office consists of the plotting and analysis of synoptic charts and aerological diagrams followed by the construction of prognostic charts depicting the forecast state of the atmosphere 12, 24, 36, … hours ahead. The efficiency and success of this routine procedure are dependent upon the availability of adequate basic data, as already explained, and the skill of the forecaster. It should be stressed that many, if not most, of the serious errors in forecasting arise through deficiencies in basic data.

Tropical cyclone warning

The Meteorological Service has a crucial role in the programme for disaster prevention and preparedness against the effects of tropical cyclones. The alerting of the community and its responsible authorities must begin, as soon as the existence of a tropical cyclone over the seas bordering the country is known. The earliest notification that the meteorologist can give of the existence and possible approach of a tropical cyclone helps other components of the emergency organization to reach a state of full readiness in good time for all the preparations and tasks that have to be performed. It is clearly appropriate to regard the issue of a tropical cyclone warning as the trigger for starting off all the precautionary and emergency arrangements.

An essential element of a warning service is that there should be certainty that the warnings will reach the intended recipients promptly and without any possibility of misdirection. The supporting communications system, including back-up facilities, should therefore be planned and implemented in full detail. Every opportunity should be taken, e.g. during exercises, to test the efficiency and adequacy of the warning service.
It is also essential that the responsible authorities and individuals who receive tropical cyclone warnings know what actions should be taken as soon as the warning message has been received. The warning itself might be the signal for preparedness action to be taken. This would, of course, be the first of a series of executive measures that responsible authorities would set in motion. The meteorological warning, besides giving precise information about the tropical cyclone itself and the winds and rainfall to be expected, might be useful for assessing the potential of flood and storm surge. Preliminary alerts and warnings of flooding and storm surge would be issued by the responsible service.

4. Mitigation system.

When tools are in place in an operational, managed and validated environment, information can be produced according to user requirements. Users are found in the relevant parts of the society, and the products must be delivered in the form, the time and the place defined by these users. Regional/national/local branches of organizations for disaster mitigation are the most typical example.
There must be an effective distribution system and mechanisms for user feedback and for following up on their views. An additional aspect to consider is assessing the cost/benefits of the use of the MILAC products. This should be in the form of estimation of costs/benefits at the society level. For instance: When a MILAC product has been applied, what would have been the alternative for not receiving the MILAC product, or getting it in a non-timely way?

Typical outcome:
One may decide, in close agreement with a national organization for NDR, to implement routine for dissemination, standby routines, and post disaster actions.

For any effective cyclone mitigation measure, public awareness and participation in the overall mitigation process is important. People in the coastal areas must understand the physical nature of the threat and its disastrous potential. They should understand the language of the warnings so that they can respond effectively to these cyclone warnings. For that the warnings should be worded in

such a manner that these can be easily understood by all. Extensive educational and training programmes should be conducted. Lectures, film shows, seminars etc. may be arranged in schools and in public theatres. Non-governmental organizations, (clubs, scientific organizations etc). play a very effective role in mass education. Wide publicity through different media like radio, TV and newspapers during the pre-cyclone season can remind the people in general to be aware of the possibility of an ensuing calamity. Fishermen are the most vulnerable as they are typically at sea for extended durations. They should carry at least a transistor radio set to keep abreast of the latest weather situation. They should also be aware of inherent risks and how to minimize their exposure to risk. For example, if they are caught in an offshore wind associated with a cyclone, they are likely to be drawn away from the shore and may not be able to escape the cyclone. Many fishermen may also suffer from a false sense of security as they might claim to have weathered a number of cyclones in their long carrier, but there is no guarantee that they would be so fortunate the next time as conditions may be worse than they have previously experienced.

Mitigation of cyclone disaster requires progress in four areas:

(1) Accuracy of warnings
(2) Expeditious dissemination of warnings
(3) Community understanding of tropical cyclone, and
(4) Effective utilization of the warnings by the community.

Persons entrusted with cyclone distress mitigation works should have a higher level of cyclone awareness and education. It is therefore essential to have training facilities to district and sub divisional officials and volunteer group leaders. In India cyclone familiarization meetings/seminars are held biannually. This provides a forum for State and Central government officers, who are directly associated with cyclone distress mitigation activities, to participate and exchange knowledge and experiences.

To mitigate the distress of the people affected by cyclone the following steps may be taken in order of urgency.

(i) Medical aid

(ii) Disposal of dead bodies and carcasses

(iii) Preventive measures against epidemics like cholera and other water borne diseases

(iv) Arrangement for supply of safe water and food

(v) To carry out repairs to tanks and other water bodies

(vi) To mobilize building materials and distribute these for repairs

(vii) Supply cattle feed and fodder

Other measures

Cyclone prone areas should be subjected to land reforms. The harvests should be rephased so that they coincide with the periods of low risk. Better communications are also needed, both to improve the speed of information and to aid evacuation. Protective forests (mangrove) should be encouraged, both to reduce the frequency of inundation and to initiate reclamation, although it is not easy to divert limited resources to protective measures.

The analysis of risk zone mapping and analysis of land use pattern should guide growth and development away from cyclone prone areas. Land use legislation and building regulations and codes should be established and enforced in cyclone prone areas. Architects and planners have a great responsibility in the field of disaster mitigation. They must discourage the development of primary social functions, vulnerable production facilities, and human settlements coastal zones in cyclone prone areas.

Estimation of cost/benefit of the use of the project

Traditional cost-benefit analysis provides an analytical framework that seeks to compare the consequences of alternative policy actions on a quantitative rather than a qualitative basis.

Traditional cost-benefit analysis requires that all costs and all benefits be expressed in a monetary unit to facilitate the comparison. Modern cost – benefit analysis also includes techniques such as cost-effectiveness analysis and multicriteria analysis to analyze trade-offs when some of the benefits and/or costs can be quantified but cannot be expressed in monetary units.

5. Integration of MILAC in regional/national disaster mitigation systems.

Unless MILAC is part of an integrated disaster and comprehensive mitigation system, MILAC is of no use. It is therefore worthwile to see MILAC grow along with the WMO/UNEP/UNDP cooperation mechanisms in relation to NDR. It is also worthwhile to see it as being complementary to the growing issue of Integrated Coastal Zone Management. Appendix II reflects some ongoing activities in that sense and offers recommendations useful MILAC.

MILAC prospective partners.
The initial core group is from CAgM, JCOMM, RA I/II/III/V, Indian Ocean GOOS, and Africa GOOS. Additional partners could potentially be CCl, CHy, CBS, TCP, GOOS etc.
There are potential non-WMO/IOC partners both within and outside the UN family. There are external projects and initiatives where resources (data, knowledge, expertise) could be obtained.

MILAC funding strategy and further planning and preparation.
It is at present not realistic to look at the WMO regular budget for funding this initiative. New, external sources must be identified and approached. After the Joint Meeting of presidents of WMO Technical Commissions, MILAC will be submitted to other prospective partner, and a funding strategy will be worked out.

APPENDIX I

The following document was submitted to CAgM XIII in Ljubljana, Slovenia, October 2002 , and serves as a background document for the proposal.

CAGM AND JCOMM CONTRIBUTION TO NATURAL DISASTER REDUCTION; MARINE INFLUENCES AND AGRICULTURAL IMPACTS

Submitted by the president of CAgm, and co-president Johannes Guddal of JCOMM.

Purpose of document:
CAgM is requested to consider and conclude on this joint proposal from the president of CAgM and JCOMM. JCOMM will on its side consider this proposal at its MC meeting in February 2003.

1. **Background.**

At the 1999 Joint meeting of presidents of the WMO Technical Commissions, the SG of WMO requested the TC presidents to identify areas of joint priority which could transform into cross-commission activities and thereby produce synergy benefits for the WMO as a whole. Since then, the TC presidents have met both at their regular joint TC meetings in 2000 and 2001, as well as in informal meetings in connection with EC sessions. During these meetings they have exercised studies and considerations over work areas where they could possibly engage in cross-commission activities. Two such areas have been identified; (1) Coordination of data management resources and procedures, and (2) WMO/TC contribution to Natural Disaster Reduction (NDR). This document addresses the NDR issue and originates from these discussions with the preliminary conclusion that the appropriate way forward is to organize limited scale pilot projects which later can provide learning scenarios for larger Commission integrated projects for NDR. Regarding the issue of NDR contribution, it was further agreed that this concept should be closer focused to concern Natural Disasters in Coastal lowlands.

2. **Characteristics of coastal lowland disasters.**

Technical Commissions Contributions to NDR in coastal lowlands primarily calls for the participation, in the first instance, of CAgM and JCOMM, however with optional and even substantial support requested from other WMO.

There are several reasons for focusing on coastal lowlands:

- recent and historical incidents of coastal inundation due to storm surges and river flooding,
- the proximity to the ocean,
- potential crop and livestock losses due to pending storm surges,
- degradation of vegetation and agricultural productivity,
- salinization and leaching of fertile soils,
- land-use strategies to mitigate the impact of storm surges to agriculture,
- use of risk probabilities with storm surge forecasts,
- evacuation of population in high risk areas,
- protection of infrastructure (roads, power lines, health care) during and before flooding,
- re-occupation of living areas after flooding incidents,
- changes in sedimentation, ecology and biodiversity due to flooding,

Further, incidents of this types are known to cause most extreme damage in densely populated and exploited areas exposed to landfall of tropical cyclones, in particular in coastlines facing the Indian Ocean and the South China Sea.

3. **Non-WMO organizations, potential WMO linkages.**

During the 2001 joint TCP meeting, presidents were informed on a secretariat initiative to formulate a WMO contribution to NDR. One of the more significant external partners in this undertaking could be the International Strategy for Disaster Reduction (ISDR) secretariat in Geneva. The objective of ISDR is to enable all societies to become resilient to the effects of natural hazards and related technological and environmental disasters, in order to reduce human, economic and social losses. ISDR sponsors and organizes a number of conferences CAgM /JCOMM project. Ocean influences to the coastal Zone in the tropics are also to a high degree dominated by storm surges. The and seminars around the world, related to prevention and mitigation of disasters. There are occasions of cooperation with WMO commissions, in particular CHy, and there are expressions of ISDR interest to broaden its cooperation with WMO. Mentioned here are also the activities under the Tropical Cyclone program (TCP). Further, the project Land-Ocean Interaction in the Coastal Zone, LOICZ, provides expertise regarding the interaction processes which are significant to a potential joint conventional forecasting/hindcasting of storm surges depends on the use of modeled atmospheric wind/pressure forces, and numerical ocean models. One unexploited resource in this context is the exploitation of satellite altimetry which can enhance our knowledge on the shape and the extension of a storm surge.

5. **Existing and imminent NDR projects calling for WMO contributions.**

In addition to the formal commitment for cross-TC cooperation, TC's should still have their opportunities to contribute to existing NDR related projects or programmes as considered appropriate. Following is a list of such opportunities:

1. Storm Surge project for the Indian Ocean. Proposal developed by WMO/IOC and submitted to World Bank and other potential sponsors.
2. Storm Surge and Waves Forecasting for the South China Sea. A GOOS Pilot Project. A series of workshops and pre-operational forecasting systems in existence. A jointly operated system is under consideration.
3. CHy related projects .
4. Other related projects.

In the context of NDR and within the framework of Sustainable Development of the developing States, the WMO Tropical Cyclone Program (TCP) will assist NMHS's of TCP members mainly through the five Tropical Cyclone Regional Bodies in their efforts to implement their Comprehensive Regional Cooperation Program towards the mitigation of tropical cyclone disasters in their respective basins. The Comprehensive Regional Cooperation Programs include the five components i.e. meteorological, hydrological, disaster prevention and preparedness, training and research, of the Technical Plans, which aim at further development of their effective and timely warning systems and services.

7. Recommendation.

CAgM and JCOMM will jointly initiate a project titled "Marine Influences and Agricultural Impacts". As the planning evolves, additional partners will be approached and invited. Such partners can be The Tropical Cyclone Programme, LOICZ, GAMBLE (altimetry applications).
In particular, WMO RA's will be approached. Important information will come from studies of population changes in the coastal areas of developing countries.
The outcome will be information tools to mitigate damages from Natural Disasters in coastal lowlands; in terms of effects on population, crops, lifestocks and infrastructure.

There will be a set of small, well targetted pilot projects, mostly structured according to the following:

1. Problem identification, with RA involvement.
2. Establishing a solution strategy.
3. Establishing tools for solutions, such as enhanced measurements, hindcasts, forecasts.

4. Exercising tools for case studies.
5. Manifestation of mitigations systems; addressing population, crops, life-stocks

APPENDIX II

RECOMMENDATIONS OF THE INTERNATIONAL SYMPOSIUM ON LOW-LYING COASTAL AREAS - HYDROLOGY AND INTEGRATED COASTAL ZONE MANAGEMENT

(9 – 12 September 2002, Bremerhaven, Germany)

Low-lying coastal areas including small islands are among the most intensively used regions in all countries. More than 60 % of today's world population of approximately six billion people live there. Coastal areas are not only among the most densely populated regions of the earth, they are also subject to extraordinarily intensive use through industrial and commercial sites, agriculture, aquaculture and tourism. This intensive exploitation has considerable impact on hydrological conditions in coastal regions. Problems arise from conflicts between different uses of coastal land and waters, overexploitation of coastal resources, discharge of wastes and effluents into coastal waters, elevated risk of storm damage, increasing stress by sea level change and growth of coastal population.

The IHP/OHP National Committees of Germany and The Netherlands in cooperation with UNESCO, WMO and IAEA conducted this symposium in Bremerhaven from 9 to 12 September 2002 to address emerging coastal zone issues. The aim of the symposium was to increase public and political awareness of the vulnerability of coastal zones and to discuss tools and measures for sustainable water management in coastal areas at an expert level. Main topics of the symposium were tools for coastal zone management, groundwater and measures for integrated coastal zone management. Keynote lectures introduced the focus of the conference.

The participants came from 20 countries and organisations like UNESCO, WMO, UN-ESCWA and the global change science community. The conference supported IHP-VI Focal area 3.4 Small islands and coastal zones. At the end of the symposium the participants summarised their conclusions and made the following recommendations.

The Conference recognises that:

low-lying coastal areas are crucial to the development of nature and of society. They

- are heterogeneous domains, dynamic in space and time
- comprise less than 20% of the earth's surface
- contain more than 60% of the human population
- are the location of 70% of cities with more than 1.6 million inhabitants
- yield 90% of the global fisheries
- produce about 25% of global biological productivity
- host previous and fragile natural biotopes
- are the major sink for sediments
- are very vulnerable to natural hazards and the effects of climate change
- are areas where seawater intrusion threatens freshwater resources and where submarine groundwater discharge is an important pathway for both freshwater and nutrients
- are a zone where integrated management is complex but achievable
- are areas where there should be strong commitment and support from national governments and international organisations
- are a zone in which both freshwater and salt water play a paramount role
- pose considerable problems such as population growth, pollution and degradation of natural resources. They are exposed to natural hazards, and the global climate change and sea level rise are likely to exacerbate many of these problems.
- will be affected by human efforts to adapt to the changing environmental conditions.

The Conference agrees that:

- a number of valuable scientific and operational tools, methodologies and models are available to address water-related issues in low-lying coastal areas
- there is a strong need to integrate the available tools to solve the complex multidisciplinary problems in integrated coastal zone management
- there is a lack of easily available and easily accessible data on the hydrological cycle in low-lying coastal areas
- submarine groundwater discharge is the expression at the sea floor of the processes that drive both salt water in and freshwater out under the shoreline. Although inseparable in nature, these two processes are currently being investigated by separate groups using different methodologies
- submarine groundwater discharge should be consistently and explicitly integrated into coastal water budgets
- there exist possibilities to conduct multinational, multidisciplinary, multispatial and multitemporal research work to solve complex coastal problems using expertise, equipment, data and methodologies from various nations
- great threats and water problems will be posed for low-lying coastal areas in the near future
- human adaptation to the consequences of global environment needs to be integrated more strongly into existing frameworks of coastal planning in order to build adaptive capacity and to avoid maladaptation
- the conference has highlighted the need for a stronger integration of aspects of social vulnerability into integrated coastal zone management (ICZM)
- knowledge management is important for the diverse and vast knowledge already available.

The Conference recommends that:

- UNESCO enhance its efforts, for example in education and training, to contribute to a better understanding of all water-related processes which play an important role for a sustainable development of low-lying coastal areas.
- UNESCO further enhance the coordinated implementation of cross-cutting projects, and education and training activities between IHP, MAB, IOC, IGCP, CSI and MOST[1] under the leadership of IHP.
- UNESCO invite other GOs and NGOs to contribute to its water-related projects in low-lying coastal areas.
- UNESCO take the initiative to establish regional sub-centres and make use of the expertise in the universities and advanced research centres of the numerous (developing) countries for its various projects and activities.
- WMO encourage the strengthening and improvement of hydrological monitoring in low-lying coastal areas.
- UNESCO/WMO explore methods to promote integrated approaches to coastal zone management.
- UNESCO, in recognition of local, regional and global efforts towards the advancement of coastal change sciences, establish and/or strengthen its links with the scientific community, e.g.

[1] IHP : International Hydrological Programme
MAB : Man and the Biosphere
IOC : International Oceanographic Commission
IGCP : International Geological Correlation Programme
CSI : Coastal Regions and Small Islands
MOST : Management of Social Transformations Programme

the relevant programmes under the Earth System Science Partnership of IGBP, IHDP, WCRP and DIVERSITAS[2].

- UNESCO/WMO promote awareness of the key issues and approaches to coastal zone management and uses knowledge management to develop efficient communication strategies.

The Conference suggests the following activities and projects:

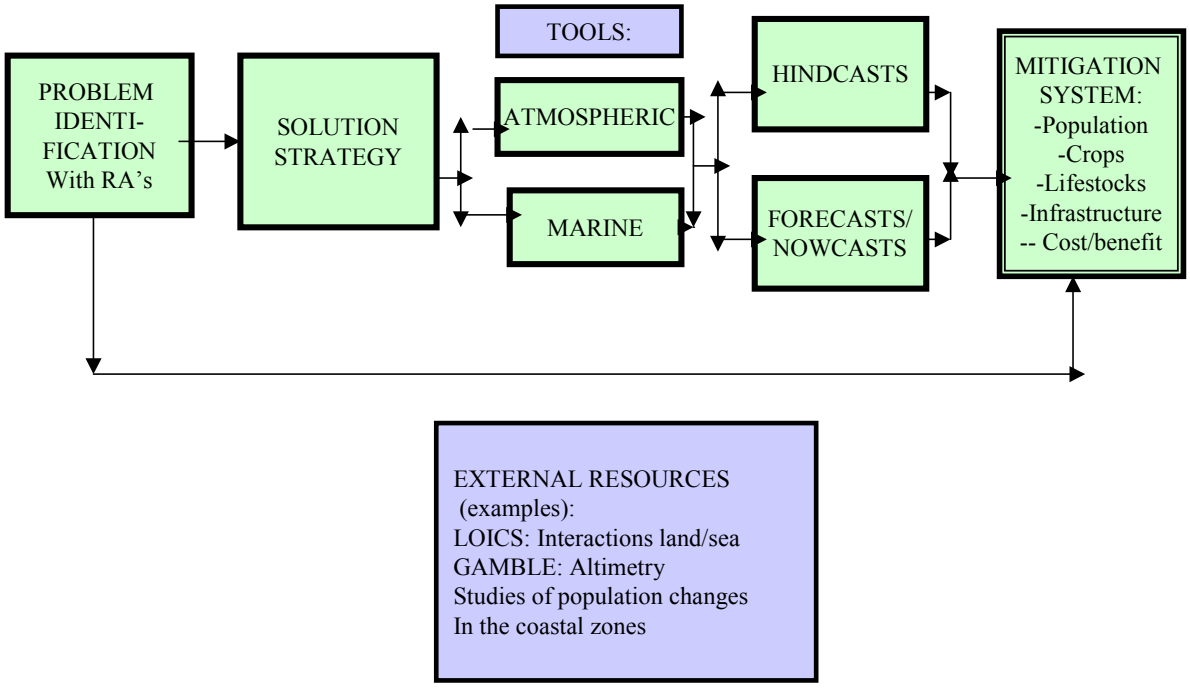
- The initiation of a project on submarine groundwater discharge that will investigate the pathways for freshwater and nutrients to the coastal zone in an integrated fashion. This can best be done by development of type or "flagship" sites for extrapolation to larger areas. These sites would be characterised by joint studies using hydrological modelling, geophysics, geochemical tracers and other approaches.
- The initiation of a submarine groundwater recharge project to investigate the process, potential and possibilities for sustainable use of the coastal areas of the world. Studies could make use of remote and in situ data and the results could be published as a handbook of detailed investigations and later as an atlas.
- Specialised thematic workshops such as submarine groundwater discharge, salt water intrusion, remote sensing and GIS for ICZM, so that national level specialists could interact with international experts for further detailed research work.
- The initiation of projects and meetings which explore efficient mechanisms for integrating scientific, engineering, social and institutional analyses of the coastal zone to reduce conflicts and promote better management.
- The initiation of a project that will investigate the sediment transports starting from the catchment areas through the rivers to and along the coast, including the problem of coastal erosion.
- The development of "knowledge portals" whereby a team is assigned to build such portals. Possible topics are hydrogeomorphology, land use, socio-economic aspects and groundwater.

IHP/OHP-Sekretariat
Bundesanstalt für Gewässerkunde
Kaiserin-Augusta-Anlagen 15-17
56068 Koblenz
Germany

[2] IGBP : International Geosphere-Biosphere Programme
IHDP : International Human Dimensions Programme on Global Environmental Change
WCRP World Climate Research Programme
DIVERSITAS : An Integrated Programme of Biodiversity Science

APPENDIX III

Joint CAgM /CHy/JCOMM/RAI/II/III/V, +GOOS project proposal:
Marine Influences and Impacts on Lowland Agriculture and Coastal Resources



ANNEX VI

WORKPLAN FOR THE MANAGEMENT COMMITTEE
(from MAN-I & II decisions)

#	Ref.	Action	By whom	When	Status
I.	**GENERAL**				
1	MAN-I 2.2, MAN-II 5.5.1	To develop criteria for project adoption and implement interim procedure	co-pres., Com. members, Secr., small team	MAN-III, continuous	
2	MAN-I 3.2.1.3 (i)	To consider how the transition of GODAE and Argo from research to operational status under JCOMM should be planned, and how the management of Argo data would evolve	OOPC		
3	MAN-I 5.6 (ii)	Try making budgetary savings through a rationalization of the subsidiary bodies of JCOMM, IODE and GOOS	Secr.	continuous	
4	MAN-I 5.6 (iii)	To propose strategies for support from external funding for specific JCOMM programmes and activities.	Secr.	continuous	
5	MAN-I 5.7	To try expanding the funding basis for all JCOMM activities including CB and JCOMMOPS	Secr.	continuous	
6	MAN-I 6.4 MAN-II 2.2.4	To prepare for CLIMAR-II and Brussels 150; to prepare a 1-page leaflet on Brussels 150	Secr.	ASAP	underway
7	MAN-II 3.3.1	To ensure that scientific requirements and importance of support for Jason-2 are communicated to appropriate policy makers	Secr. with OOPC	before June 2003	
8	MAN-II 5.1.3	To prepare basic structure and input for a JCOMM Strategy Document	co-pres., Secr.	ASAP	
9	MAN-II 5.2.3	To hire (a) consultant(s) to compile available information on standards & reference materials	Secr; then consultant(s)	ASAP	
II.	**OBSERVATIONS PROGRAMME AREA**				
10	MAN-I 3.2.3.4	To consider the need of specialized group(s) to look at both currents and waves	OCG	ASAP	
11	MAN-I 4.1.2 (vi)	To ask the 5 OPA component groups to report on efforts to counter vandalism and possible "lessons learned"	OPA Coord.	continuous	
12	MAN-II 3.1.5 & 4.1.1.9 (ii)	To request GSC/OOPC to consider how to develop performance metrics; stress the need for clear statements of requirements	co-pres., OPA Coord., Secr.	GSC-VI, OOPC next	done
13	MAN-II 3.1.6	To maintain close contacts with the CO2 Panel	SOT, Secr.	SOT-II, continuous	

#	Ref.	Action	By whom	When	Status
14	MAN-II 3.1.13 & 4.1.1.9 (iv)	OCG to hold more frequent (yearly) sessions; next one back to back with OOPC	OPA Coord., Secr.	continuous	
15	MAN-II 4.1.1.9 (v)	To reinforce the need to maintain Argo funding long enough	Com. members & their agencies	continuous	
16	MAN-II 4.1.1.9 (v)	To bring to OOPC attention that all OPA teams have funding problems in trying to meet stated implementation targets	co-pres. & Secr.	OOPC VIII	
17	MAN-II 4.1.2.2	To ensure that updated requirements for satellite data are coordinated with the Ocean Theme rolling review of requirements	Secr.	When requirements are expressed	
18	MAN-II 4.1.2.3	To determine what kinds of products & services are wanted from the space community + which kind of distribution	Rap. on sat. & SPA	ASAP	
19	MAN-II 4.1.2.5	To request advisory groups & PAs to refine their requirements re. sat. data for communication to WMO database	co-pres. & Secr.	ASAP	

III. SERVICES PROGRAMME AREA

20	MAN-I 4.2.1 (iv)	To prepare for MPERSS and JEB workshops in 2004	France, Y. Tourre, SPA Coord., Secr.	2003	underway
21	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	
22	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	
23	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
24	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

IV. DATA MANAGEMENT PROGRAMME AREA

25	MAN-II 3.1.3	To recommend to International Time Series ST to develop data and inf. man. plan, with advice from JCOMM	Secr.	ASAP	
26	MAN-II 4.3.1.5	To develop a JCOMM Data Management Strategy	S. Narayanan, DMPA	MAN-III	
27	MAN-II 4.3.1.6	To offer to CLIVAR to collaborate on data and information management and invite CLIVAR to next meeting of the JCOMM DMCG	co-pres., Secr.	ASAP	
28	MAN-II 4.3.1.10	To distribute to all DMPA members the extensive review of action items prepared by IODE Secr.	IODE Secr.	ASAP	

#	Ref.	Action	By whom	When	Status
29	MAN-II 4.3.1.16	To liaise with the DMACS Chair to include a second DMACS member in the OIT Steering Team	OIT chair, Secr.	ASAP	
30	MAN-II 4.3.4.8	To prepare quarterly progress reports for distribution to all DMPA members	DMPA coord., Secr.	quarterly	
31	MAN-II 4.3.4.9	To request IODE Committee to consider merging GETADE with ETDMP (or suspending GETADE)	co-pres., Secr.	IODE-XVII	merging agreed
32	MAN-II 4.3.4.9	To use GETADE funds to convene yearly sessions of ETDMP	Secr.	yearly	
33	MAN-II 4.3.4.10	To assume Secr. responsibility for DMPA as a Joint JCOMM/IODE Secr.	IODE Secr.	continuous	
34	MAN-II 4.3.5.2	To discharge its terms-of-reference [see report]	*ad hoc* group on SOCs	MAN-III or before	

V. CAPACITY BUILDING PROGRAMME AREA

35	MAN-I 4.4.2	To develop capacity building requirements & communicate to CBCG	OPA & SPA Coords.	ASAP	
36	MAN-II 3.2.4	To consider CB requir. of COOP Design Plan	CBCG, Secr.	continuous	
37	MAN-II 4.4.1.5 (i)	To pass the results of the regional CB requirements surveys to the other PA coord. and the GOOS CB Panel, to allow the preparation of a consolidated and coordinated set of CB requirement priorities	CBPA coord., Secr.	ASAP	
38	MAN-II 4.4.1.5 (ii) & 4.4.2.1	From those priorities, to develop outline project proposals & forward them to the TTR for review, input and advice on potential funding sources	CBCG, then TTR, Secr.	When feasible, continuous	
39	MAN-II 4.4.1.5 (iii)	To coordinate development of the outline storm surge proposal for the Gulf of Guinea with ITSU & ETWS	CBCG, ETWS, Secr. with ICG/ITSU	ASAP	
40	MAN-II 4.4.1.5 (iv)	To specify what modules within OceanTeacher should be developed for JCOMM/GOOS	CBCG with GOOS CB Panel	ASAP	
41	MAN-II 4.4.1.5 (v)	To nominate a representative on the Steering Group for OceanTeacher	CBPA coord.	ASAP	
42	MAN-II 4.4.1.5 (vi)	To establish cooperation between CBCG & ODINCARSA	CBCG with IODE	continuous	
43	MAN-II 4.4.1.5 (vii)	To enhance coord. of requirements for WMO Regions & GOOS Regional Alliances	CBCG, Secr.	continuous	
44	MAN-II 4.4.1.5 (viii)	To coordinate JCOMM, IODE & GOOS Africa projects prop. for CB in Africa	Secr.	ASAP & continuous	
45	MAN-II 4.4.1.6	To propose to GSC the merging of the CBCG and the GOOS CB Panel	Secr.	GSC-VI	agreed
46	MAN-II 4.4.1.6	If GSC agrees on above, to prepare a plan for eventual integration of the two groups	CBPA coord., Secr. with chair GOOS CB Panel	MAN-III & GSC-VII	underway

#	Ref.	Action	By whom	When	Status
47	MAN-II 4.4.1.7	To pass the report of workshop on Potential Applications of Ocean Observations for the Pacific Islands to S. Ragoonaden, with a request for him to analyse and propose possible future JCOMM support	CBPA coord., Secr., S. Ragoonaden	ASAP & before MAN-III	

VI. COASTAL QUESTIONS

48	MAN-I 3.2.3.3	To make a link to the COOP Design Plan on the JCOMM web site (see # 59)	Secr.	when Plan is published	.
49	MAN-II 3.2.2	To urge that the Executive Summary of the COOP Design Plan reflect the need for meteorological measurements	GPO	ASAP	done
50	MAN-II 3.2.3	To interact with COOP re. operational bio-geo-chemical data management	co-pres., Secr.	continuous	
51	MAN-II 3.2.6	To devise ways and means of promoting integrated approach (with Met. agencies) to development of COOP Design Plan	co-pres., Secr.	ASAP	
52	MAN-II 3.2.7	To recommend close linkage between IODE and COOP	Secr.	IODE-XVII, continuous	

VII. PARTNERSHIP/COMMUNICATIONS

53	MAN-I 3.4.2 MAN-II 5.3.2	Maintain good liaison between JCOMM and POGO, especially in the areas of observations and capacity building.	S. Narayanan, T. Knapp, Secr.	continuous	
54	MAN-II 2.1.3	To establish links to ICES, PICES & POGO on JCOMM website (see # 59)	Secr.	ASAP	
55	MAN-II 2.2.2	To negotiate with Institutes and Secr. publication of JCOMM booklet	S. Narayanan, P. Dandin, P. Parker	ASAP	done
56	MAN-II 2.2.3	To prepare & circulate modified logo	P. Dandin, Secr.	ASAP	done
57	MAN-II 5.4.2	To participate in deliberations & follow up activities of the GSC communications group, to develop a communication strategy	J. Guddal, P. Dexter	MAN-III	underway
58	MAN-II 5.4.3	To discuss integration of "jcomm.net" with other JCOMM related websites	small team [see report]	MAN-III	
59	MAN-II 5.4.4	To place on each JCOMM-related home pages a graphic indicating immediately that the site relates to JCOMM activities	webmasters	ASAP	

VIII. ORGANIZATIONAL/HOUSEKEEPING

60	MAN-I 3.1.1(ii)	To fill the remaining vacant position in ETDMP	Com. members, co-pres., Secr.	ASAP	
61	MAN-II 2.2.5 MAN-I 2.3	To combine co-pres. & Secr. reports in one document & to target the reports to specific actions and activities identified in the JCOMM work plan	co-pres., Secr.	every MAN sessions	
62	MAN-II 4.0	To provide 1 page summary of presentations for the report	PA Coords.	every MAN sessions	
63	MAN-II 5.6.1 (iii)	To invite Ms Regina Folorunsho to become a member of MAN	co-pres., Secr.	ASAP	done

#	Ref.	Action	By whom	When	Status
64	MAN-II 5.6.1 (vii)	To arrange for revision of WMO technical guidance re. reporting by ships of original wind speed and direction	Secr.	JCOMM-II	
65	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	
66	MAN-II 5.6.2	To finalize decision of OPA coord. replacement	W. Nowlin	ASAP	
67	MAN-II 5.7.4	To provide S. Narayanan with ideas on overall theme of JCOMM-II conference & topics for individual sessions	MAN members	ASAP	
68	MAN-II 7.1	To arrange for MAN-III	Secr., co-pres.	last quarter 2003	

ANNEX VII

ACRONYMS AND OTHER ABBREVIATIONS

AMOC	Area Meteorological and Oceanographic Coordinator (MPERSS)
ASAP	As soon as possible
BATS	Bermuda Atlantic Time-Series Station
CB	Capacity Building
CBCG	Capacity Building Coordination Group (JCOMM)
CBPA	Capacity Building Programme Area (JCOMM)
CEOS	Committee on Earth Observation Satellites
CG	Coordination Group (JCOMM)
CGMS	Coordinating Group on Meteorological Satellites
CLIMAR	JCOMM Workshop on Advances in Marine Climatology
CLIVAR	Climate Variability and Predictability (WCRP)
COOP	Coastal Ocean Observations Panel
CSI	Coastal Regions and Small Islands (UNESCO)
DBCP	Data Buoy Cooperation Panel (OPA)
DIVERSITAS	An Integrated Programme of Biodiversity Science
DMACS	Data Management and Communications Subsystem (IOOS)
DMCG	Data Management Coordination Group (JCOMM)
DMPA	Data Management Programme Area (JCOMM)
E2EDM	End-to-End Data Management
ESA	European Space Agency
ET	Expert Team
ETDMP	Expert Team on Data Management Practices (DMPA)
ETMC	Expert Team on Marine Climatology (DMPA)
ETWS	Expert Team on Wind Waves and Storm Surges (SPA)
Eumetsat	European Organization for the Exploitation of Meteorological Satellites
GCOS	Global Climate Observing System
GEBCDEP	Group of Experts on Biological and Chemical Data exchange Practices (IODE)
GETADE	Group of Experts on Technical Aspects of Data Exchange (IODE)
GLOSS	Global Sea-level Observing System
GMDSS	Global Maritime Distress and Safety System (IMO)
GODAE	Global Ocean Data Assimilation Experiment
GOOS	Global Ocean Observing System
GOS	Global Observing System (WWW)
GOSUD	Global Ocean Surface Underway Data
GPO	GOOS Project Office
GRA	GOSS Regional Alliance
GSC	GOOS Steering Committee
GTOS	Global Terrestrial Observing System
GTSPP	Global Temperature-Salinity Profile Programme
HOT	Hawaiian Ocean Time-Series (station)
ICES	International Commission for the Exploration of the Sea
ICG/ITSU	International Coordination Group for ITSU (IOC)
IGBP	International Geosphere-Biosphere Programme
IGCP	International Geological Correlation Programme
IGOS	Integrated Global Observing Strategy (GCOS-GOOS-GTOS+CEOS)
IGOSS	Integrated Global Ocean Services System (IOC-WMO) (*superseded by JCOMM*)
IHDP	International Human Dimensions Programme of Global Environmental Change
IHP	International Hydrological Programme
IMO	International Maritime Organization (UN)
IOC	Intergovernmental Oceanographic Commission (of UNESCO)
IODE	International Oceanographic Data and Information Exchange (IOC)
IOI	International Ocean Institute
IOOS	Integrated and Sustained Ocean Observing System (USA)

ITSU	Tsunami Warning System in the Pacific
JASON	Altimeter Satellite (TOPEX follow-on)
JCOMM	Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology
JCOMMOPS	JCOMM *in situ* Observing Platform Support Centre
JEB	JCOMM Electronic Products Bulletin
JGOFS	Joint Global Ocean Flux Study
MAB	Man and the Biosphere
MAN	Management Committee (JCOMM)
MEDI	Marine Environmental Data Information Referral Service
MML	Marine Mark-up Language
MOST	Management of Social Transformations Programme
MPERSS	Marine Pollution Emergency Response Support System (JCOMM)
NESDIS	National Environmental Satellite Data and Information Service (USA)
OceanObs99	The 1st International Conference for the Ocean Observing System for Climate
OCG	Observations Coordination Group (JCOMM)
ODAS	Ocean Data Acquisition Systems, Aids and Devices
ODIN	Ocean Data and Information Network (IODE)
ODINCARSA	ODIN for the Caribbean and South America
OIT	Ocean Information Technology
OOPC	Ocean Observations Panel for Climate
OOSDP	Ocean Observing System Development Panel (*superseded by OOPC*)
OPA	Observations Programme Area (JCOMM)
PA	Programme Area (JCOMM)
PICES	North Pacific Marine Science Organization (Pacific ICES)
PIRATA	Pilot Research Moored Array in the Tropical Atlantic
POGO	Partnership for Observation of the Global Oceans
RA	Regional Association (WMO)
ROSCOP	Report of Observations/Samples Collected by Oceanographic Programmes
SCG	Services Coordination Group (JCOMM)
SGXML	Study Group on the Development of Marine Data Exchange Systems using XML (ICES-IOC)
SOOP	Ship-of-Opportunity Programme (SOT)
SOT	Ship Observations Team (OPA)
SPA	Services Programme Area (JCOMM)
SST	Sea Surface Temperature
TAO	Tropical Atmosphere Ocean Array
TIP	Tropical Moored Buoys Implementation Panel
TOPEX	Ocean Topography Experiment
TTR	Task Team on Resources (CBPA)
UN	United Nations
UNESCO	United nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
URL	Uniform Resource Locator
VOS	Voluntary Observing Ships (OPA)
VOSClim	VOS for Climate (OPA)
WCRP	World Climate Research Programme
WIOMAP	Western Indian Ocean Marine Applications Project (GOOS)
WMO	World Meteorological Organization (UN)
WOCE	World Ocean Circulation Experiment (WCRP)
WWW	World Weather Watch (WMO)
XBT	Expendable Bathy-Thermograph
XML	Extensible Markup Language