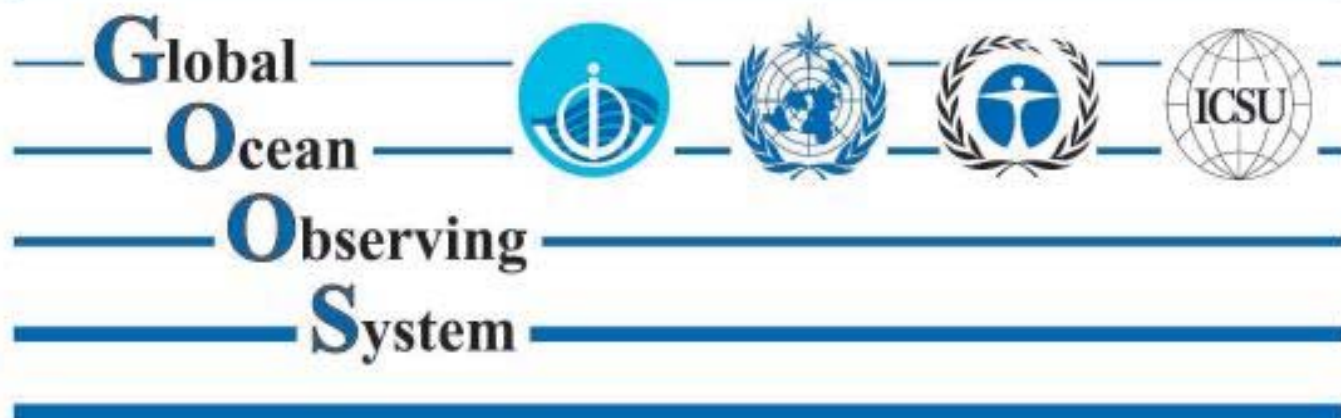




Intergovernmental Oceanographic Commission
Reports of Meetings of Experts and Equivalent Bodies

IOC-WMO-UNEP-ICSU Scientific Steering Committee of the Global Ocean Observing System (GOOS)

Tenth Session
13-16 March 2007
Seoul, Republic of Korea

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ABSTRACT

The 10th session of the GOOS Scientific Steering Committee, meeting in Seoul, Republic of Korea, from 13-16 March 2007. The meeting was preceded by a successful scientific workshop on coastal observations, regional models, and data management and assimilation, organized by the local hosts. The complementary roles of I-GOOS, JCOMM, GSSC, and the GOOS Regional Alliances were discussed. The meeting focused on two main areas: coastal implementation, and advocacy and outreach, including the role of industry in GOOS. An important distinction was made between GOOS Regional Alliances (regional policy and coordinating bodies) and the Regional Ocean Observing Systems (ROOSs, the observing systems themselves). It was recommended that the advice of the GSSC/JCOMM/GRA inter-sessional task team be taken, as endorsed by, and modified after, the GRA Forum. This includes immediately forming a sub-committee of the GSSC, the Panel for Integrated Coastal Observations (PICO) and later transforming it into a joint panel with GTOS. Progress in establishing (jointly with GEO) the first biological pilot project on ocean chlorophyll (ChlorOGIN) was welcomed, and several other potential pilot projects were mentioned (e.g. Harmful algal blooms, land-based sources of pollution, multi-hazard early warning systems, wind-wave-current interactions, the Ocean Tracking Network) and it is recommended that each GRA should demonstrate its activity by undertaking at least one pilot study of its own choice and priority. I-GOOS should formally recognize the GOOS Regional Council to co-coordinate GRAs and ROOSs and to represent GRA interests to I-GOOS. JCOMM should coordinate integration of common variables in coastal observations as the data streams become operational. The new PICO panel should liaise with the GEO Coastal Community of Practice in developing pilot studies. It was recommended that I-GOOS and IOC facilitate the acquisition of a standard set of routine underway measurements (such as SST, ADCP current measurements) by research vessels in coastal waters for storage in international databases. I-GOOS should try to obtain national commitments to ensure that GRAs have the necessary support to function. I-GOOS should encourage partnerships between GRAs and regional programs such as Large Marine Ecosystem projects and Regional Seas Conventions. Although the Global Module of GOOS was over 50% complete, its future operation was not secure in all areas and there remain large uncertainties in measurements, especially those at depth. The role of industry as both providers and users of information in GOOS was discussed. The group made several recommendations for action with regard to advocacy and outreach, including the need for professional marketing, and professional posters and material for presentation at large marine meetings and fora. Advocacy should be achieved through understanding the benefits of GOOS, placing a value on those benefits, and clearly conveying these benefits to stakeholders, including policy makers, funding bodies, industry, NGOs, the media and the public. The limited funds should be used to leverage more funding to better understand and quantify the benefits of GOOS to society and engage the wider community in supporting GOOS. The meeting concluded by assigning tasks and actions for the inter-sessional period.

TABLE OF CONTENTS

SUMMARY

1	OPENING AND WELCOME	1
1.1	ADOPTION OF THE AGENDA	1
1.2	FORMATION OF SESSIONAL WORKING GROUPS	2
2	INTRODUCTIONS	2
2.1	ROLE OF GSSC, I-GOOS, AND GOOS PROJECT OFFICE IN GOOS	2
2.2	REVIEW OF GSSC-IX ACTIONS AND I-GOOS VII RECOMMENDATIONS TO GSSC	3
3	GLOBAL GOOS	3
3.1	GLOBAL CLIMATE CHANGE: GAPS IN OUR UNDERSTANDING	3
4	COASTAL GOOS	4
4.1	RECOMMENDATIONS OF JOINT JCOMM-GSSC-GRA AD HOC TASK TEAM	4
4.2	RECOMMENDATIONS FROM THE THIRD GOOS REGIONAL FORUM	6
4.3	COASTAL HAZARDS AND OCEAN OBSERVATIONS: GAPS	7
5	GOOS IMPLEMENTATION	8
5.0	GOOS OUTREACH AND ADVOCACY	8
5.1	PILOT PROJECTS	9
5.1.1	CHLOROPHYLL OCEAN GLOBAL INTEGRATED NETWORK: ChlorOGIN9	
5.1.2	PLANNING OTHER PILOT PROJECTS.....	9
5.2	COASTAL GOOS IMPLEMENTATION	10
5.3	ROLE OF JCOMM	12
5.4	ROLE OF INDUSTRY AND INTEREST IN OCEAN OBSERVATIONS AND PRODUCTS	14
5.5	DATA MANAGEMENT	15
5.5.1	COORDINATION WITH IODE	15
5.5.2	COORDINATION WITH GOSIC.....	16
5.6	SUPPORT FOR RESEARCH ACTIVITIES IN GOOS FRAMEWORK	16
5.6.1	ENHANCING EFFICIENCY OF THE RESEARCH FLEET FOR UNDERWAY MEASUREMENTS	16
5.6.2	ALLIANCE FOR COASTAL TECHNOLOGIES	17

5.7	ROLE OF REGIONAL PROGRAMMES	18
5.7.1	NORTH PACIFIC MARINE SCIENCE ORGANIZATION (PICES)	18
5.7.2	INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES).....	18
5.8	GOOS AND GEO	20
5.8.1	GEO COASTAL ZONE COMMUNITY OF PRACTICE	20
5.8.2	GEONETCast.....	20
6	REPORT OF THE SCIENTIFIC WORKSHOP AND SESSIONAL WORKING GROUPS	21
6.1	REPORT ON THE SCIENTIFIC WORKSHOP	21
6.2	REPORT OF THE SESSIONAL WORKING GROUP	21
6.2.1	SESSIONAL GROUP ON OBSERVING SYSTEM REQUIREMENTS FOR INTEGRATING THE GLOBAL AND COASTAL MODULES	21
6.2.2	SESSIONAL GROUP ON GOOS FUNDING, OUTREACH AND PUBLICITY, AND ENGAGING INDUSTRY IN THE GOOD IMPLEMENTATION.....	25
7	GSSC SHORT, MEDIUM TO LONG-TERM PRIORITIES AND ACTIONS	26
8	INPUT TO I-GOOS VIII	26
9	MEMBERSHIP	27
10	DATE AND PLACE OF THE NEXT MEETING	27
11	CLOSURE OF THE MEETING	27

ANNEXES

I.	LIST OF PARTICIPANTS
II	AGENDA
III	EXECUTIVE SUMMARY OF THE MEETING OF THE JOINT JCOMM- -GSSC-GRA AD HOC TASK TEAM ON IMPLEMENTING THE COASTAL MODULE OF GOOS
IV	INITIAL CLASSIFICATION FOR THE DEVELOPMENT OF GOOS MATRIX
V	LIST OF DECISIONS, ACTIONS, AND RECOMMENDATIONS
VI	LIST OF ACRONYMS

1 OPENING AND WELCOME

- 1 The tenth Meeting of the GOOS Scientific Steering Committee (GSSC-X) was opened by the Committee Chair, Dr. John Field, at 09.00 hours on Tuesday, 13 March 2007, in the conference room of the Seoul Olympic Parktel. The Chair welcomed participants again to the meeting and thanked the Korea Ocean Research and Development Institute (KORDI) for hosting it and providing such a congenial environment and facilities.
- 2 Mr Ki-Dai Yum, President of the KORDI, welcomed the Committee to Korea, expressing his pleasure to meet the ocean experts in the Committee. He acknowledged the critical need to establish global observing systems providing data and information for mitigating natural hazards, climate change and further anthropogenic hazards, and expressed his wish that the GSSC would lead future prospects to provide valuable advice for the implementation of the Global Ocean Observation System as guidance for future action of ocean monitoring, modelling and forecasting. Mr Yum then informed that KORDI, as an integration operating agency, managed an integrated real-time data service system which provides domestic users with the real-time data collected from all the observing agencies in Korea and neighbouring countries, which is a major contribution to GOOS regional implementation. In closing, he reaffirmed his full support to the various programs related to GOOS, and wished a fruitful meeting.
- 3 Mr Jang-Hyun Choi, representative of the Korea Ministry of Maritime Affairs and Fisheries (MOMAF), extended his warm welcome to all participants. He recalled that many countries had difficulties recently because of climatic changes and unusual changes in the weather, in particular, ocean-related hazards such as Hurricane Katrina, which gave us a good lesson on the importance of forecasting. In this aspect, Mr Choi emphasized the importance of IOC's role in handling various ocean and coastal problems through the sharing of knowledge, information, technology and the coordination of the national programs such as the International Oceanographic Data and Information Exchange (IODE), and various ocean observing programmes in GOOS framework. Mr Choi then informed that the Korean government has made efforts to promote the development of marine science and technology by establishing a long-term plan for Marine Technology Development, comprising (i) the basic technology of ocean industry, (ii) the development and application technology of ocean resources, and (iii) the management and preservation of ocean environments. In this framework, MOMAF established an integrated Ocean Research Station in Jeodo – located in the south-west part of Korea - in June 2003, and has been continuing its effort to establish integrated ocean and coastal observing systems and information sharing systems, which would be an integrated part of GOOS in the future. Mr. Choi wished a successful workshop and following meeting, and a pleasant stay in Seoul.
- 4 The list of participants in the session is given in [Annex II](#)

1.1 ADOPTION OF THE AGENDA

- 5 The Committee adopted its agenda for the session, which is given in [Annex I](#).

1.2 FORMATION OF SESSIONAL WORKING GROUPS

6 The Committee agreed to break into two small working groups on:

- (i) Observing System Requirements for Integrating the Global and Coastal Modules (led by Helen Yap);
- (ii) GOOS Funding, Outreach and Publicity, and Engaging industry in the GOOS Implementation (led by Ralph Rayner).

Working Groups would work in parallel to formulate priorities and tasks for short, medium and long term. These groups were tasked with meeting at least twice during the second and third days of the meeting and reporting back to the full GSSC on the last day.

7 The Committee decided on its working hours and other arrangements for the conduct of the session.

2 INTRODUCTIONS

2.1 ROLE OF GSSC, I-GOOS, AND GOOS PROJECT OFFICE IN GOOS

8 The report by Mr François Gérard, the I-GOOS Chair, on the I-GOOS perspective for the next years was presented to the Committee by Dr. Keith Alverson.

9 Mr Gérard recalled the activities and achievement of GOOS during the intersessional period, including: (i) contribution to GEOSS implementation through leading the task CL-06-06 as well as through the GEO Coastal Community of Practice, (ii) I-GOOS chair leadership in the definition of the Global Ocean Hazard Warning and mitigation System (GOHWS), (iii) the third GOOS Regional Forum (November 2006, Cape Town), where a new concepts for GOOS regional implementation was agreed, through the Regional Ocean Observing Systems (ROOS), the GOOS regional council (GRC), and the Panel for integrated coastal observation (PICO). The GRC, as a policy-making group, would be able to act on behalf of I-GOOS through the GRAs, to make sure that ROOSs would be compliant with GOOS principles. Mr Gérard also recalled that, during the GOOS Regional Forum, it was emphasized the key role of GSSC not only as a scientific advisory body of GOOS but also as a link between GOOS executive bodies like I-GOOS/GRC and the technical advisory bodies (such as PICO and OOPC) as well as the implementation coordination body (like JCOMM).

10 To conclude, Mr Gérard identified next steps to be made by GSSC, including:

- (i) ensuring GOOS sustainability, from the implementation (national commitments on networks) and political (agreement on the regional approach for GOOS) point of views,
- (ii) organizing the coastal module of GOOS,
- (iii) consolidating the roles of GOOS bodies in view of GOOS leadership in ocean observing systems, and

- (iv) particularly for the Committee during this meeting, reviewing the GSSC membership and accounting for PICO and the ROOS scheme.

2.2 REVIEW OF GSSC-IX ACTIONS AND I-GOOS VII RECOMMENDATIONS TO GSSC

- 11 The Committee reviewed the status of actions decided by its ninth session (6-8 March 2006, Paris), and noted that most actions were accomplished in due course. Some ongoing actions regarding the establishment/approval of coastal module of GOOS were further discussed under agenda items 4 and 5.

3 GLOBAL GOOS

3.1 GLOBAL CLIMATE CHANGE: GAPS IN OUR UNDERSTANDING

- 12 Dr. Ed Harrison, Chair of the Ocean Observations Panel for Climate (OOPC), reported on the growing networks of sustained global ocean observing system, as well as on challenges in moving to a fully functional and integrated system. He noted that the publication of the Intergovernmental Panel on Climate Change (IPCC) Working Group I report on the physical basis of climate change (2 February 2007) brought a lot of public attention to the issue of climate change and noted contributions from global ocean observations. Important progress had been made in the past year in implementation, availability of data/information and analysis/reanalysis. Dr. Harrison, however, noted that existing uncertainty constraints were still large, and listed current gaps in understanding the state of the ocean and climate, as following:
- (i) Historical data limitations in ocean sampling
 - (ii) Estimating uncertainty, as an ongoing research activity
 - (iii) Interannual and Decadal variability in trend estimation
 - (iv) Observing standards and best practices, including adequate metadata issues
- 13 Dr. Harrison then detailed some progress in the global module of GOOS. The in situ network elements of global GOOS were estimated to be 57% complete by the end of 2006, mainly by remarkable progress of Argo (2801 of a target 3000 floats in early March 2007); by the increasing real-time access to GLOSS tide gauge data, thanks to international support following the tsunami of December 2004; and with the surface drifting buoy network coordinated by DBCP. Progress with real-time metadata transmission is underway thanks to the JCOMM “Meta-T” pilot project, with growing awareness of the utility of real-time transmission of initial observations.
- 14 Ocean analysis and reanalysis had been actively conducted through the AOPC/OOPC SST and sea ice and surface pressure working groups, GHRST, GODAE, CLIVAR GSOP and national activities; interesting results and products have been obtained and comparison/evaluation metrics were being developed.
- 15 The OOPC web site on the state of the ocean (http://ioc.unesco.org/oopc/state_of_the_ocean/) was gaining visibility and used to display new indices. It was designed as a tool for basic

evaluation of the capabilities of the observing system, by reporting key ocean climate indices and their uncertainty; and as a tool for advocacy about the capabilities of the global module of GOOS.

- 16 Dr. Harrison pointed out that the ocean observing system was mostly in research and pilot project mode, and the community was still developing mechanisms to complete, sustain and evolve system end products. In this context, he requested the Committee's strong support on a reinforced observing platform support center. Relevant discussion and decisions are detailed under agenda item 5.3.
- 17 The OOPC has been encouraged by the GCOS Steering Committee, to plan with other interested groups a new conference focused on global ocean observations, in about 2009, ten years after the OceanObs99 conference in San Rafael (1999). The goals of this conference would be to take stock in progress and in major advances in scientific knowledge from the observing system, and to focus on challenges and opportunities, including new technologies, and new opportunities for global measurements of biogeochemical and ecosystem variables. The Committee considered that such a conference would be an important milestone for addressing scientific and technical recommendations for the global module of GOOS focused on the physics of the ocean, including plans for deep ocean observations (sub-Argo), improved monitoring of critical transports, and sustained polar ocean observations. **The Committee endorsed this plan**, and encouraged its members to contribute to the planning of the decadal-followup to OceanObs99 on the rationale, objectives, scope, and development.
- 18 To advance the ability to observe a larger number of biogeochemical and ecosystems variables on a global scale, it was required to develop, test, and proliferate new observing sensors. In this context, OOPC has been participating in the planning for a symposium on multi-disciplinary sensors and systems for autonomous observations of the global oceans, targeted for 2008 ("OceanSensors08"). The objectives of the symposium would be to foster the exchange of information (including through a sensor database), assess the technology needed to meet observing system goals, and providing valuable input into a proposed general ocean observations symposium. **The Committee endorsed and supported this plan**, noting in particular its potential contribution to observing improve non-physical variables.
- 19 Dr. Harrison informed that three members of OOPC were rotating off (Dickey, Michida, Taylor), and presented to the Committee with two new panel members (Piola and Suga). **The Committee endorsed new membership of OOPC.**

4 COASTAL GOOS

4.1 RECOMMENDATIONS OF JOINT JCOMM-GSSC-GRA AD HOC TASK TEAM

- 20 Dr. Tom Malone, Chair of the Joint JCOMM-GSSC-GRA ad hoc Task Team on Implementing the Coastal Module of GOOS, presented its final report. The Team was established by GSSC and JCOMM in March 2006 with members from GSSC, OOPC, JCOMM, and GRAs, to advise JCOMM, GSSC and GRAs on (i) a long term coordination mechanism, (ii) possible immediate and specific actions, as well as longer-term actions for coastal implementation of GOOS, (iii) recommendation on JCOMM's role in a coordinated integration of operational coastal module. The final report of the Task Team reflects the views of Task Team Members as well as JCOMM-MAN, participants in the 3rd GOOS Regional Forum, and the I-GOOS Executive Committee. Dr. Malone highlighted three issues and needs identified during this process, including:

- (i) Scientifically sound implementation of Coastal GOOS & C-GTOS: Across the land-sea interface
- (ii) Sustained & coordinated development of the global & coastal modules of GOOS
- (iii) Coordinated implementation of operational elements of GOOS as a whole

21 In responding above requirements, the Task Team recommended the following actions for the Committee's consideration:

- (i) Support the establishment of a GOOS-GTOS Joint Panel for Integrated Coastal Observations (J-PICO), to provide scientifically sound, technical guidance to GOOS & GTOS Steering Committees for coordinated implementation of the coastal modules of GOOS and GTOS across the land-sea interface. Until such a Panel can be established, create a sub-committee of the GSSC, the Panel for Integrated Coastal Observations (PICO), to provide this guidance
- (ii) Endorse the establishment of the GOOS Regional Council (GRC) to represent GRA interests to I-GOOS, GSSC, and GEO and to coordinate the development of Regional Ocean Observing Systems (ROOSs) that contribute to the development of the Global Coastal Network and are interoperable on a global scale
- (iii) Formalize the linkage between I-GOOS and the GRC to facilitate (i) the establishment and adoption of comprehensive GOOS-wide policies and procedures for developing an integrated coastal-global system and (ii) I-GOOS efforts to secure national commitments for coordinated implementation and sustained development of the coastal and global modules of GOOS. As a first step toward addressing (i) appoint the Chairperson of the GRC to serve as an ex officio member of the I-GOOS Board. For (ii), the I-GOOS Board must provide leadership, and GRA members must work to gain the support of their member states.
- (iv) For coordinated development of operational elements of both the global and coastal modules,
 - JCOMM should coordinate the integration of all of the common variables to be measured as part of the GCN as their data streams become pre-operational and responsible bodies have been established to sustain them. This should be a step-wise process based on recommendations from the GSSC that have been agreed to in collaboration with the GRC.
 - Guidance from GRAs and the GRC to JCOMM concerning coordinated implementation of GOOS (both global and coastal modules) in general, and the GCN in particular, should be transmitted to JCOMM by the GSSC.
 - The GSSC should work with the GRC to establish criteria for determining that the provision of data and information on the common variables is "pre-operational" and ready for JCOMM to coordinate their integration into GOOS.

22 The executive summary of the Joint JCOMM-GSSC-GRA Task Team report is reproduced in [Annex III](#).

- 23 **The Committee endorsed the report of the Joint JCOMM-GSSC-GRA Task Team as it is.** The discussion and following decisions were made in the Sessional Working Group on Observing System Requirements for Integrating the Global and Coastal Modules, and were reported back to the Committee for its approval, which are detailed under agenda item 5.2.

4.2 RECOMMENDATIONS FROM THE THIRD GOOS REGIONAL FORUM

- 24 Dr. John Field, GSSC Chair, reported to the Committee on the results of the 3rd GOOS Regional Forum (14-17 November 2006, Cape Town). The Forum was planned to link with two relevant Pan-African meetings (Pan-African GOOS- AFRICA /LME Leadership Workshop on Operational Oceanography and Remote Sensing in Africa, and the Second Pan-African LME Forum), to enhance the collaboration with existing regional efforts that have common goals including Large Marine Ecosystem programs and Regional Seas Conventions. This Forum aimed to:
- (i) Promote development of GRAs that contribute to and benefit from the development of GOOS by partnering with existing regional programmes with common interests
 - (ii) Initiate the establishment of a global network of GRAs that will enable regional development of coastal GOOS and oversee the establishment of the Global Coastal Network (GCN) as recommended in the Implementation Strategy for the Coastal Module of the Global Ocean Observing System.
- 25 Dr. Field expressed his satisfaction on the substantial discussion made during the Forum with participants of GOOS-Africa, 5 Pan African LMEs, Oil & Gas Producers' Metocean group, Remote Sensing Group, and I-GOOS Board members. He noted that the Forum led to exciting future prospects for GOOS-Africa, and for GOOS Regional Alliances in general, forging enhanced links among regional GOOS representatives, industry (e.g. OGP-Metocean) and LMEs.
- 26 Dr. Field then highlighted important recommendations of the 3rd GRA Forum, as follows:
- (i) *Recommendation 1:* The concept of Regional Ocean Observing Systems (ROOS, instead of RCOOS) be adopted to convey the understanding that both the coastal regional component as well as the global component of GOOS would be implemented in each region
 - (ii) *Recommendation 2:* The Forum endorses the concept of implementation for the Global Coastal Network (GCN) elements of the coastal system coordinated with the global as well as the land-based systems
 - (iii) *Recommendation 3:* The Forum recommends that one demonstration project, compliant with GOOS principles, be proposed per region
 - (iv) *Recommendation 8:* The I-GOOS Board shall consider proposals for performance metrics to enhance the capability of each GRA and guide the development of the ROOSs towards maturity. Performance metrics should be jointly developed by the GRAs and the GSSC.
 - (v) *Recommendation 10:* Four pilot projects were recommended for immediate implementation:
 - Chlorophyll Global Integrated Network (ChlorOGIN)
 - Land based sources of marine pollution and run-off

- Wind wave current interaction
- Multi-hazard early warning system

- (vi) *Recommendation 11:* Noting successful collaboration of Benguela LME project and GOOS-Africa, the Forum recommended that the projects conduct a “lessons learned” analysis of their experience with the five LME modules (productivity, fish and fisheries, pollution and ecosystem health, socio-economics and governance) and produce a report that could be used by LME and GRA partners in other regions.
- (vii) *Recommendation 12:* Proof of concept studies are needed for open ocean to coastal ocean 3-D dynamic model down-scaling and coastal ocean data assimilation experiments.
- (viii) *Recommendation 13:* ROOSs should be encouraged to form partnerships with the appropriate Large Marine Ecosystem Programs, where they overlap.
- (ix) *Recommendation 25:* The GSSC should work with the GRAs through the GOOS Regional Council (when established) to establish criteria for recommending to JCOMM the non-physical variables that it would include in its list of “pre-operational” assets to be coordinated by JCOMM

27 Following discussion and decisions/recommendations were made in the Sessional Working Group on Observing System Requirements for Integrating the Global and Coastal Modules, and were reported back to the Committee for its approval. Details are reproduced under agenda items 5.2 and 6.2.

4.3 COASTAL HAZARDS AND OCEAN OBSERVATIONS: GAPS

28 Dr. Dong-Young Lee, Vice-chair of GSSC, led the discussion on this issue, focused on a strategy for regional implementation and developing countries’ involvement. He noted that, since natural disaster mitigation is a priority for most coastal countries, the strategy for establishing ocean and coastal observation system could be formulated linking with coastal disaster reduction and mitigation systems. Identification of challenges in regions, in particular in developing countries, should precede such a strategy; Dr. Lee listed issues and challenges:

- (i) *Active participation of local, national government:* an ocean observing system often fails to demonstrate its usefulness in coastal hazard mitigation, which is a priority of the local/national government. The Regional GOOS strategy should help with building capacity of information production from the ocean observation, so that it eventually serves for the regions’ own benefit.
- (ii) *Cost-efficient approach of ocean observing system:* most developing countries have difficulties in finding resources to support observing systems. The Regional GOOS strategy should be developed to help extending/converting existing systems for coastal observations, to avoid duplications and overlaps of national/regional efforts as possible.
- (iii) *Sharing in site observation data and satellite data:* Developing countries are expected to share the observation data from their waters in return for their benefit from ocean satellite remote sensing – which is the results of developed countries’ investment. International programmes such as GOOS should promote wider share of the data by

helping developing countries understand the importance of in situ data for calibration and validation of remotely sensed data, and develop useful products

- (iv) *Promotion o regional cooperation:* Although neighbouring countries have common interests and problems, it is often challenging to share real-time observing data among neighbouring countries because of conflict in national interest such as security and pollution issues. The (regional) GOOS should make efforts to make countries work together toward the common benefit, such as capacity building for ocean forecasting and service systems that eventually lead the overall cooperation in the region.
- (v) *Improvement of Data Production for Nowcast, Forecasting, and Improvement of climate change studies.*

- 29 To develop and implement such a strategy, Dr. Lee suggested (i) enhance the role of Regional GOOS toward users (governments) and to GOOS, (ii) pay more attention to coastal hazard issues in developing and implementing Regional GOOS, (iii) promote Regional GOOS in terms of governments' immediate benefit to the coastal management, and (iv) coordinate with related programmes and systems such as GEO/GEOSS.
- 30 The Committee considered that such an approach would practically help the Regional GOOS activities and priority setting. Noting that coastal communities would appreciate and benefit from improved weather forecasts including wind, water level and wave information, **the Committee decided to prepare a support plan for coastal management and disaster prevention in developing countries that should be reported by the next session in 2008, based on Dr. Lee's report.**

5 GOOS IMPLEMENTATION

5.0 GOOS OUTREACH AND ADVOCACY

- 31 Dr. Ralph Rayner introduced this item. He noted that a sustained Global Ocean Observing System was an essential part of a global environmental information system (GEOSS) required supporting important societal, environmental and business needs (the societal goals of GOOS/GEOSS). In achieving this goal, adequate outreach and advocacy would be necessary to convince stakeholders that GOOS would generate societal, environmental and business benefits that are substantially greater than the necessary investment.
- 32 Dr. Rayner insisted that, to raise greater awareness of the benefits of sustained ocean observation and forecasting, concrete advocacy based on the outreach should be achieved, through the following steps: (i) to understand the benefits of GOOS, (ii) to place a value on these benefits, (iii) to clearly convey these benefits to stakeholders who are mainly outside of our rather insular community. Targets should include policy makers, funding organizations, industry, non-Governmental Organisations, the media, and the public.
- 33 Noting the limited funds available, it was emphasized that the limited financial resources should be used to leverage more funding for outreach and advocacy tasks, to better understand and quantify the benefits to the society, and engage the wider community in supporting GOOS.
- 34 Subsequent discussion and draft decisions/recommendations were made in the Sessional Working Group on GOOS Funding, Outreach and Publicity, and Engaging industry in the

GOOS Implementation, and were reported back to the Committee for its approval. Details and following decisions are reproduced under agenda item 6.2 and [Annex V](#).

5.1 PILOT PROJECTS

5.1.1 CHLOROPHYLL OCEAN GLOBAL INTEGRATED NETWORK: ChlorOGIN

- 35 Dr. John Field recalled that this pilot project was proposed at the 8th Meeting of GSSC (March 2005, Melbourne), with the aim of providing to a web server, regular ocean chlorophyll a images and associated products (daily, weekly or bi-weekly, depending upon each region's needs and conditions).
- 36 Dr. Field emphasized that this pilot study was developed under the auspices of Coastal GOOS, as the first biological pilot project for GOOS. It would provide a demonstration, using biological variables, of what can be achieved by coordinated ocean observation on a global scale. To this end, such a study would be an exemplary case of GOOS as the integrated ocean component of GEOSS.
- 37 The Committee was then reported on the results of the Plymouth Chlorophyll Meeting and Workshops (Extended Antares Network, 18 - 22 Sept 2006), which was sponsored by GOOS, GEO, IOCCG, PML and POGO, consisted of three components: 1) a plenary planning meeting, 2) a satellite remote sensing technical workshop and 3) an in situ observations technical and calibration workshop. It was a successful launch of the ChlorOGIN pilot project, aiming to deliver three products including (i) maps of ocean chlorophyll, (ii) sea surface temperature, as indicators of the state of the ecosystem needed for ecosystem and fisheries management, and (iii) at some sites, a measure of light penetration into the ocean (along with the other two variables, to calculate plankton primary production). A number of recommendations were delivered from the workshop regarding general products, remote sensing, and in situ observations. The summary report of this workshop is available on the GOOS website.
- 38 The Committee expressed its satisfaction on the progress of the pilot project, and commented that efforts should be made to get into the issue of carbon flux by the network to be made through this project.

5.1.2 PLANNING OTHER PILOT PROJECTS

- 39 Dr. Tom Malone informed the Committee that the Scientific Steering Committee for the Global Ecology and Oceanography of Harmful Algal Blooms (GEOHAB) has formally requested establishment of a dialogue with the goal of implementing operational observing systems for HABs as part of RCOOSs. For the first step, Dr. Malone proposed that the GSSC work with the GEOHAB SSC to implement HAB pilot projects under the umbrella of the GOOS chlorophyll pilot project (ChlorOGIN).
- 40 The Committee considered it was timely to pursue such collaboration by initiating dialogue with the GEOHAB SSC via the Intergovernmental Panel on Harmful Algal Blooms of the IOC. The aim is **to identify and enable implementation of high priority, regionally organized pilot projects for developing HAB warning systems in collaboration with GRAs that would lead to improve operational capabilities of the coastal module.** This could be linked to the ChlorOGIN Pilot Study that already has a HAB component in some regions.

- 41 The Committee received a report – presented by Dr. John Field – on Climate Impacts on Oceanic TOP Predators (CLIOTOP), a research efforts coordinated by the Global ocean ECosystems dynamics (GLOBEC). CLIOTOP had launched in 2004 to conduct “a worldwide comparative effort to understand the key processes of oceanic ecosystems and their top predator species (tunas, billfishes, sharks, marine mammals, turtles and seabirds) and determine the impact of climate variability”. The scientific committee of the CLIOTOP recently decided to promote the development and global deployment of acoustic recorders to monitor Mid-tropic level organisms through Mid-tropic Automatic Acoustic Sampler (MAAS) project. Funds for tackling Phase 1 (development of a prototype and small scale deployment) was being raised through European Commission FP7 proposal. The Committee noted that the MAAS plan was to use existing platforms for monitoring marine ecosystems, and considered that efficient coordination between the MAAS working group and existing observing networks should be sought.

[Census of Marine Life]

- 42 Dr. John Gunn provided an overview of the Census of Marine Life (CoML) One component of the CoML uses tagged animals to track ocean movement and temperature change, that can be analyzed and applied to many different environmental efforts, including climate change and the likelihood of natural disasters such as tsunamis. Another component, the Ocean Tracking Network (OTN).uses tiny acoustic transmitters tagged to fish and other marine animals so that their movements can be tracked by arrays of receivers placed at one-kilometre intervals along the ocean floor. As the animal swims over the receiver, it is recorded and the data is then uploaded to a central database, resulting in reliable records of migration patterns. The Committee noted that both John Field and Keith Alverson participated in OTN development to ensure its smooth integration into GOOS in keeping with IOC Resolution XXIII-3 in July 2005.
- 43 The Committee noted that the key CoML program funding from the SLOAN foundation was to terminate in 2010, however, that it was important to sustain this network into the future. The Committee considered such efforts should be made firstly through incorporating Ocean Biogeographic Information System (OBIS) into the existing data and information system such as USA Data Management and Communications (DMAC). The Committee also noted that instrumenting marine mammals was one of the drivers behind development of a Southern Ocean Observing System (SOOS). The Committee also commented that the data from CoML should be incorporated in GODAE, and that uncertainty in the data should be quantified.
- 44 **The Committee endorsed the OTN as a potential GOOS pilot project.**
- 45 **The Committee decided to identify pilot projects to improve operational capabilities of the coastal module** (e.g. land-based sources of marine pollution and run-off, wind wave current interaction, multi-hazard early warning system, OTN). The status and progress of pilot projects will be periodically reviewed against their goals and objective, which **the Committee agreed to establish such a procedure and criteria by its eleventh Meeting in 2008.**

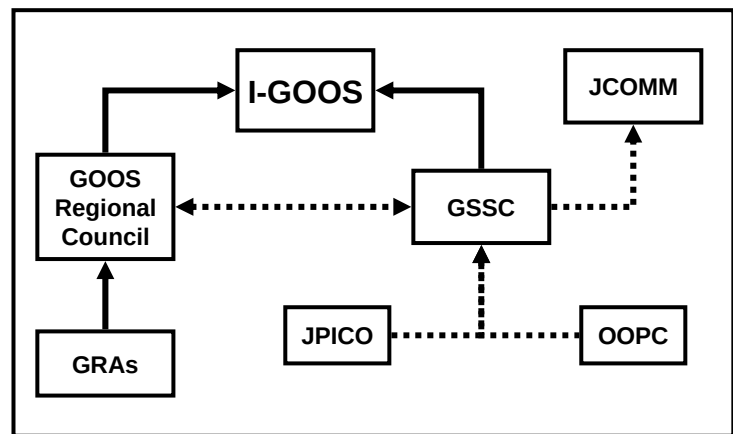
5.2 COASTAL GOOS IMPLEMENTATION

- 46 Dr. John Field recalled that the Coastal GOOS Implementation had developed since 2005 according to the following main steps:

- (i) The COOP Implementation strategy;
- (ii) GSSC-JCOMM-GRA Task team report (2006-2007);
- (iii) The GOOS Regional Alliance Forum (GRF) (Nov. 2006);
- (iv) I-GOOS Board meeting (Nov. 2006).

Above references are available on the GOOS website (<http://www.ioc-goos.org>).

47 Dr. Field then recalled the roles of various bodies in implementing GOOS (Figure to the right); I-GOOS as a policy body, GRAs as regional policy and coordinating bodies, He emphasized the role of GSSC as the Scientific and Technical advisory body to both I-GOOS and GRAs for strategy and guidance.



48 It was noted that a start has been made to Coastal GOOS implementation in a number of regions of the world. The Concept of the Regional Ocean Observing Systems (ROOSs) – the systems themselves – had emerged during the 3rd GOOS Regional Alliances Forum, and cooperation with other international bodies was encouraged in coordinating the development of ROOSs to ensure interoperability between the coastal and global modules worldwide.

49 Regarding the proposed Joint GOOS-GTOS Panel on Integrated Coastal Observations (J-PICO), the Committee noted it has no power to create a joint body with GTOS, which this decision must be taken by the GOOS and GTOS sponsors. Meanwhile, to coordinate Coastal GOOS implementation globally, **the Committee decided to create a technical sub-panel of the GSSC for Integrated Coastal Observation (PICO) as a first step toward establishing a Joint (GOOS-GTOS) PICO in due course.** The size of the GSSC – in terms of its membership – would be reduced to about 12 members over a few years..

50 As soon as it was established, the PICO would provide GSSC with technical advice needed for Coastal Implementation of GOOS. It would also be tasked to (i) establish mechanism to periodically review existing activities and access their research activities as well as the success efforts to transition activities to an operational mode, (ii) work with GRAs to prepare proposals to fund pilot projects, and (iii) work with the GEO Coastal Zone Community of Practice to help integrate coastal component of GOOS into GEOSS.

51 Subsequent discussion was made in the Sessional Working Group on Observing System Requirements for Integrating the Global and Coastal Modules. The Report and actions/decisions agreed by the Committee are detailed under agenda item 6.2 and [Annex V](#).

5.3 ROLE OF JCOMM

- 52 Dr. Peter Dexter, Co-president of JCOMM, reported on the progress of JCOMM activities during the intersessional period. The fifth session of the JCOMM Management Committee (MAN-V, October 2006, Geneva) reviewed the overall programme and provided guidance to the Secretariat and Co-Presidents on major issues, and assign specific tasks for each Committee member. Following outstanding achievements were identified during the intersessional period:
- (i) A strategic plan for JCOMM data management is nearing completion; the JCOMM end-to-end data management pilot project is making a major contribution to WMO Information System (WIS); and JCOMM is proceeding with the preparation of BUFR tables for non-physical ocean variables;
 - (ii) Three major scientific conferences sponsored by JCOMM are planned for the remainder of the intersessional period: a storm surge symposium, Seoul, October 2007; CLIMAR-III, Warsaw, May 2008; and a maritime services conference, Exeter, October 2008;
 - (iii) The JCOMM web presence is being substantially upgraded and unified under a new domain name (www.jcomm.info);
 - (iv) A greater emphasis across JCOMM programme areas on standards and quality control practices, for observational data, metadata, products and services;
 - (v) Review and reiteration of the importance of JCOMM direct involvement in and input to a range of cross-cutting activities, including marine multi-hazard warning systems, the IPY, GEO/GEOSS, and the implementation of coastal GOOS. The Committee also supported an enhanced JCOMM interaction with other WMO technical commissions, in particular CBS, CCI and CAS;
 - (vi) The Committee provided the co-presidents with a strong message to take to the GOOS Regional Forum in Cape Town, 13-17 November 2006, regarding the role of JCOMM in coastal GOOS implementation, and indicating areas where JCOMM can and will provide direct input and support (including the development of new BUFR tables as noted above);
 - (vii) Agreement on preparation of a JCOMM strategic implementation plan for capacity building, to be completed in early 2007;
 - (viii) Agreement on the annotated table of contents for a JCOMM implementation plan, as well as a timetable for its preparation (by a consultant, Jim Baker) and completion (late 2007); agreement also on the preparation and implementation of a JCOMM communications strategy;
 - (ix) Support for a continued and enhanced JCOMM dialogue with the private sector, as a follow-up to the recommendations of the JCOMM/GOOS/Industry task team meeting in March 2006;
 - (x) Review of and provision of some input to the WMO Strategic Plan 2008-2011, as well as agreement on procedures and a timetable for JCOMM input to the IOC/UNESCO Medium-Term Strategy, as well as to WMO Cg-XV and IOC Assembly XXIV in 2007.

- 53 Dr. Dexter informed that there had been a strong need expressed on the enhancements to the observing system monitoring and performance reporting. To this end, there had been ongoing investigation to further expand the work and scope of JCOMMOPS into an overall observing programme support centre, encompassing experimental and pilot observing systems such as OceanSITES and ocean carbon, as well as the existing operational components. The Committee felt that strong support on a reinforced observing platform support center is necessary to sustain observing network, that **endorsed and supported solicitation of proposals to address the identified need for enhanced observing program support** (a la JCOMMOPS).
- 54 Dr. Dexter then reported on a meeting of the SCAR/SCOR Expert Group on Oceanography (10-11 July 2006), Second Open Science Conference of the Scientific Committee on Antarctic Research (SCAR, 12-14 July 2006), and following workshop on a Southern Ocean Observing System (SOOS) (15 July 2006, Hobart), sponsored by POGO, CoML and CSIRO Marine and Atmospheric Research. The SCAR/SCOR Expert Group had been set up to encourage an inter-disciplinary approach to Southern Ocean observations, modelling and research, recognizing the inter-dependence of physical, chemical and biological processes in the ocean at present and in the past; to facilitate coordination between the physical oceanographic research groups currently active and those planning research in the Southern Ocean; to identify historical and reference data sets of value to researchers, focusing initially on physical oceanography data; to encourage the exchange of information with operational agencies; and to recognize the need to develop initiatives for education and training. The meeting recognized the potential value of cooperation with JCOMM, and identified some immediate actions, which include investigating the possibilities for JCOMMOPS to support its work through the development of monitoring and status products for ocean observations (including non-physical) in the Southern Ocean. The group also recognized the need for a more systematic and sustained approach to monitoring the Southern Ocean, and agreed to cooperate in and support any wider initiative to develop a SOOS.
- 55 The SOOS workshop again discussed difficulties inherent in making the case for comprehensive and sustained observations of the Southern Ocean, as opposed to the current situation of specific and un-coordinated research projects, was clearly recognized. In this context, it was agreed that support and advocacy for a SOOS would eventually be required from bodies such as the UNFCCC/COP (for ocean observations for climate) and the Antarctic Treaty Consultative Organization (for biological and other non-physical observations). The meeting eventually agreed that a more comprehensive, broadly-based, three-day workshop will be necessary, to fully develop the case and design plan for a SOOS, which was scheduled to take place in Bremen in early October 2007. Both JCOMM and GOOS would input to and be represented at the workshop. The Committee considered that, the developing SOOS concept represents the best chance yet to develop a comprehensive ocean observing system in the Southern Ocean, building on the legacy of the IPY, and as such, both GOOS and JCOMM need to play prominent roles. In this context, the Committee encouraged its Members be actively involved in the planning process for the SOOS, including the SOOS Workshop to be held in October 2007, Bremen. **Dr. Detlef Stammer agreed to represent GOOS in the 2007 SOOS workshop.**
- 56 Dr. Dexter then provided a brief overview on the voluntary observing ship (VOS) security issue. The high level meeting on ship security called for by WMO Executive Council (12 -13 February, Geneva), with participation from Australia, France/E-Surfmar, Japan, UK, USA, ICS, IMO, Intercargo/Intertanko, CBS, CCI and JCOMM. The meeting clearly recognized the seriousness of the security issue to the shipping industry as articulated by ICS and IMO, and agreed on the need for action. It noted that essentially two different approaches to ship call sign masking had been developed and proposed for implementation – a generic masking through substitution of the call sign by SHIP in GTS distribution (Japan and USA), with access to a secure data base containing the observational data with real ship ID available only to selected recipients; and

some form of call sign coding, for distribution on the GTS with the observations (Australia and E-Surfmar). More or less complex data management procedures are required with both approaches to ensure that the correct ship metadata are assigned to the observations for use in real time data quality monitoring and climate studies. The meeting recognized that it would not be possible to resolve and unify the two approaches in the short term, therefore agreed that the JCOMM Ship Observations Team (SOT) should establish a small Task team to review the trials and make recommendations of the best approach to be adopted in the long-term, as well as the most appropriate data management procedures to ensure that the concerns for quality monitoring and climate studies are adequately addressed. The SOT is to meet next in Geneva in mid-April 2007. **The Committee acknowledged the potential seriousness of the VOS Security issue and supported the actions of JOMM for its resolution.**

5.4 ROLE OF INDUSTRY AND INTEREST IN OCEAN OBSERVATIONS AND PRODUCTS

57 The discussion was led by Drs. Mary Feeley, Colin Grant, and Jay Pearlman, to consider (i) what industry could contribute to measuring and understanding the ocean environment, (ii) how industry benefit from improved knowledge of ocean conditions, and (iii) what the steps for GOOS would be. It was noted that, in the framework of ocean observations, industry provides data and information (as a provider), as well as uses such information for their products and services (as a user). Joint efforts among private and public sector and research community had been under way, including:

- (i) Initial cost/benefit study on potential water level rise and impact on design of coastal facilities were under way. Interim progress had been presented at UNESCO Paris Sea Level Workshop, October 2006;
- (ii) A globally focused business plan was drafted from a US perspective, led by Ralph Rayner and Mary Altalo;
- (iii) Marine Information Alliance Workshop on Arctic development issues (October 2006, London);
- (iv) A workshop was planned on “The Ocean as the key to improved forecasting of weather”, in October 2007;
- (v) OGP had been involved in GOOS Africa Workshop (November 2006, Cape Town).

58 Dr. Pearlman emphasized that, sound information and products from the ocean observation would make direct impact to wide range of societal and economic areas such as (i) Risk Reduction in various operations, (ii) maritime transport, and (iii) energy and power management. To visualize the benefit of ocean observations and convince the industry (as a user) to be involved in the GOOS efforts, following conditions should be met:

- (i) Data should be delivered in real time;
- (ii) Information and products should be value-added;
- (iii) Information should be delivered in sustained basis;
- (iv) The information and overall system should be globally Interoperable;

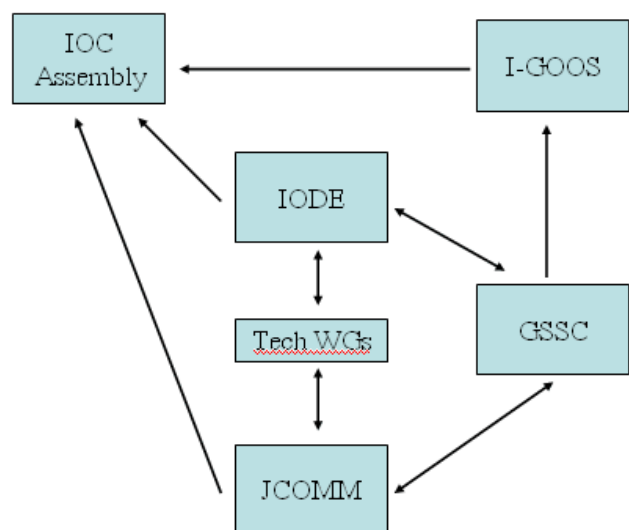
- (v) The observing system and its products (data and value-added information) should be financially affordable.

59 The Committee also recalled the first meeting of the joint JCOMM/GOOS Industry Task Team (3-4 March 2006), which aimed to enhance private sector involvement in the full implementation of a sustained global ocean observing system (includes advocacy to convince governments to continue to invest in the required infrastructure). In connection with the actions deduced from this meeting, as well as the above presentation, subsequent discussion was made by the Sessional Working Group on GOOS Funding, Outreach and Publicity, and Engaging industry in the GOOS Implementation. The report and Committee's decisions are reproduced under agenda item 6.2 and [Annex V](#).

5.5 DATA MANAGEMENT

5.5.1 COORDINATION WITH IODE

60 The Committee received a brief report through a video clip on the result of the discussions of IODE sessional working group on cooperation between IODE and GOOS which discussed the proposed joint meetings of IODE Officers and GSSC, and possibly the JCOMM Management Committee. Mr. Bob Keeley, the chairman of the IODE sessional working group recommended a joint meeting between the IODE Officers and the GSSC, noting that both groups had a similar size as well as similar interests. The working group had drafted a possible organigram (Figure to the right), indicating that the GSSC can express its needs to the IODE Committee through the Officers. The IODE Committee, through its various subsidiary bodies (Groups of Experts, Steering Groups) and projects will then implement the necessary activities to respond to these needs.



61 The Committee welcomed the proposal made by the IODE working group and approved by the IODE plenary, and emphasized the importance of close collaboration with IODE as the data management component of GOOS.

62 Dr. Peter Dexter, JCOMM Co-President, noted that there will be potential benefit to all bodies from having joint meetings, particularly in delivering and exchanging requirements in the area of common interests, although it would bear extra workload for the secretariat. He noted that the JCOMM community would cooperate with GOOS and IODE for joint meetings of GSSC, IODE officers meeting, and JCOMM Management Committee in 2008.

63 **The Committee instructed GPO to organize next session in 2008 jointly with IODE officers meeting and JCOMM Management Committee in close cooperation with their secretariats. Those bodies might have a joint session, then followed by parallel sessions by each**

panels/programmes. The Committee also agreed to explore possibilities to meet in conjunction with OOPC and PICO in alternate years.

5.5.2 COORDINATION WITH GOSIC

- 64 The Committee received a report with appreciation by Dr. Christina Lief, GOSIC coordinator, on the history and status of the Global Observing Systems Information Center (GOSIC) as an element of the Global Observing Systems. The GOSIC seeks to: (i) provide for searches for data and information across all participating Global Observing Systems data centers using the Internet; (ii) return results regardless of the data format, or where the data are located; (iii) provide results back in a standard easy-to-read, easy-to-understand format; (iv) allow users to determine the type and quality of the data through documentation provided by the participating data centers; and (v) allow users to obtain data sets. The GOSIC does not in and of itself hold data, but maintains metadata (information about the data sets that are available in the three programs) and points to the data centers. The GOSIC web site (<http://gotic.org>) a major tool to provide comprehensive and easily accessible gateway to integrate environmental observation data sets.
- 65 Dr. Lief informed that the development of GOOS data query Matrix was in progress, which would allow the users to access GOOS data by theme (http://gotic.org/goos/goos_matrix.aspx), based on the initial classification was developed by Dr. Ron Wilson and Dr. James Crease (*Annex IV*). Dr. Lief requested the Committee to provide input in particular for the establishments of the categories and classifications of the datasets, including the review on the initial classification. **The Committee encouraged its Members as well as the member countries of I-GOOS to provide feedback to GOSIC on its web pages and GOOS Matrix, and requested the GPO to send out a request to GSSC, I-GOOS, and GRAs in this context.**
- 66 Regarding the update of the GOOS national commitments and activities summaries (http://gotic.org/goos/GOOS_nat_commit.htm), the Committee expressed its concern on the procedure to ensure the latest information, with timely updates (on a monthly basis). Dr. Alverson reminded the IOC Circular Letter No.2220 on the re-establishment of the national commitments, and suggested GOSIC take this into account.

5.6 SUPPORT FOR RESEARCH ACTIVITIES IN GOOS FRAMEWORK

5.6.1 ENHANCING EFFICIENCY OF THE RESEARCH FLEET FOR UNDERWAY MEASUREMENTS

- 67 Dr Detlef Stammer led this discussion. In carrying out routine under-way measurements by research fleet of important upper-ocean parameters during long ocean-transects, an issue has been raised to obtain diplomatic permission to obtain standard measurements within national economic zones, especially for acoustically measured parameters.
- 68 Typically, “under way” parameters included sea surface temperatures, sea surface salinity, current measurements using ADCPs and meteorological parameters. However, these mainly physical measurements were traditionally not associated with specific research projects and, therefore, were not routinely processed or archived, let alone taken by the international research fleet. As a result, the important and expensive observing component "research vessel" is not adequately used as part of a global observing system. A re-organization of the observing

component "research vessel" was therefore internationally required. Dr. Stammer pointed out that routine and continuous measurements of the following parameters should be carried out from vessels:

- (i) Sea surface temperature (SST) and sea surface salinity (SSS);
- (ii) Current measurements with ADCP;
- (iii) Meteorological parameters, and
- (iv) Bathymetric measurements.

In addition, (i) Rainfall measurements, (ii) Radiation (spectral resolution, total and UV, PAR), (iii) O₂ of sea water, and (iv) Acidity/pH of sea water were also recommended as new "under way". "Under way" data should be made available to an international database after evaluation.

- 69 Dr. Stammer pointed out that obtaining diplomatic permission is a significant obstacle for obtaining routine under way measurements in national economic zones of countries, especially for acoustically based approaches, such as ADCPs or scanning sonar measurements of the sea floor. In this context, Dr. Stammer proposed that (i) having an internationally agreed on standard set of ocean parameters that can routinely be measured from research vessels would greatly enhance the efficiency of the research fleet in collecting important upper ocean parameters, and (ii) having IOC engaged in an international discussion on a standard set of variables that can be agreed on to be measured from any research vessel regardless which nationality and where it operates, without getting individual permits.
- 70 Dr. Stammer highlighted that the parameter set: T, S, ADCP and bathymetry should be classified as a standard set of measurements, comparable with meteorological measurements. Similar to meteorological data, these data should be classified as internationally recognized routine research data in order to simplify the procedures to obtain permits. In this context, "under way" data were to be listed in the new "Green Book for EU Marine Policy" of the European Commission as standard set of scientific measurements to provide a consistent and clear regulation at least in the European waters. Once established, such a regulation could be used as a pilot for international agreements.
- 71 After the discussion, **the Committee recommended that I-GOOS should bring this issue to IOC to agree on an international standard set of ocean parameters that can routinely be measured from research vessels without particular permits.** Meanwhile, the Committee called for caution on a potential unintended negative consequence of bringing this issue to the governing body, which might be potentially endangering working agreements that are in place for ongoing programs such as Argo.

5.6.2 ALLIANCE FOR COASTAL TECHNOLOGIES

- 72 Dr. Tom Malone provided a brief overview on the USA Alliance for Coastal Technologies (ACT, <http://www.act-us.info>), which was established to foster the development and use of effective and reliable in situ sensors and platforms. ACT was to provide three major services including (i) function as third party test bed for quantitative evaluations of the performance of new and existing sensors and platforms; (ii) build capacity through technology specific workshops that review the current state of instrumentation, build consensus on research priorities, and enhance

communications between users and developers; and (iii) function as an information clearinghouse by providing a searchable, online database of sensors and platforms with community discussion boards. Currently eight partnering institutions comprised the ACT, and industry worked to ensure that ACT focuses on research needed to support products and services. Dr. Malone informed that the ACT also conducted verifications of commercially available instruments to validate manufacturers' performance specifications or claims, as well as designed workshops to help build consensus on the steps needed to develop useful tools while also facilitating the critical communications between the various groups of technology developers, manufacturers, and users.

5.7 ROLE OF REGIONAL PROGRAMMES

5.7.1 NORTH PACIFIC MARINE SCIENCE ORGANIZATION (PICES)

- 73 The Committee received with interest the report by Dr. Philip Mundy, PICES representative, on the overview of PICES activities and achievement. PICES was an international intergovernmental scientific organization established by convention in 1992 to promote and coordinate marine scientific research in the northern North Pacific and adjacent seas, with membership of Canada, Japan, People's Republic of China, Republic of Korea, the Russian Federation, and the United States of America.
- 74 Dr. Mundy introduced activities under its Technical Committee on Monitoring (MONITOR); which was charged with identifying principal monitoring needs of the PICES region and developing approaches to meet these needs, including training and capacity building. MONITOR was also to serve as a forum for coordination and development of the PICES components of the Global Ocean Observing System (GOOS), including possible method development and inter-comparison workshops. To this end, it established a Study Group to develop a strategy for GOOS (SG-GOOS), to identify and describe the major observing systems (present and proposed) in the PICES region, including description of general data types, contact information, and data transmission (real-time vs. delayed), and to provide a recommendation and justification to MONITOR on whether or not PICES should propose a North Pacific GOOS pilot project to I-GOOS. The SG-GOOS presented a number of recommendations for closer relations between PICES and I-GOOS. A recommendation was also made to continue to improve working relationships with existing observing systems in the North Pacific (i.e., NEAR-GOOS and IOOS). The Committee noted that PICES members are active in GRAs, too, and considered that closer collaboration should be made between PICES and GRAs in the region (such as NEAR-GOOS and SEAGOOS), then further with the I-GOOS.
- 75 The Committee was then introduced on the Continuous Plankton Recorder Survey in the North Pacific (CPR, http://www.pices.int/members/advisory_panels/CPR.aspx). PICES formed the CPR Advisory Panel in October 1998, to provide technical advice on parameters to be measured for additional monitoring initiatives and to advise on linkages to other potential initiatives in the North Pacific and elsewhere. **The Committee endorsed the PICES North Pacific Continuous Plankton Recorder (CPR) as an ocean observing tool.**

5.7.2 INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

- 76 Dr. Adi Kellermann, ICES representative, provided a brief overview on ICES activities; ICES is a science community of more than 1600 marine scientists from 20 member states and several

affiliated countries, to promote and coordinate marine science in the North Atlantic and produces unbiased advice to governments and commissions. It had been working on clear science priority on (i) science needed to implement the Ecosystem Approach to (Fisheries) Management (EAM), and (ii) reducing uncertainty in the science underpinning the advice (e.g., in assessment data, ecosystem and environmental data). ICES Data Centre provided supports Science and Advice, as a warehouse for long data series of oceanography, biology, environment, and fisheries (surveys, catch, landings).

- 77 Amongst various activities under way, Dr. Kellermann highlighted the following working group activities which would be regarded as contributions to GOOS:
- (i) Working Group on Oceanic Hydrography (WGOH), contribution to the global efforts to promote climate and ocean sciences. Links were established with CLIVAR, and WGOH publishes regularly the “ICES Reports on Ocean Climate” (IROC) providing summary information on climatic conditions in the North Atlantic since 1998;
 - (ii) Working Group on Zooplankton Ecology (WGZE) produces a summary report on zooplankton in the ICES area based on the time series obtained in ongoing national monitoring programmes, to give a global (ICES scale) and visual overview of zooplankton distributions for the preceding years with interpretations of the ecological significance;
 - (iii) ICES-IOC Working Group on Harmful Algal Bloom Developments (WGHABD) is a joint venture with IOC and has the task to, inter alia, compile national reports on harmful algal blooms with a view to explore near-realtime status report options as well as forecasting tools like models. It also makes efforts in the detection of harmful algal blooms and their dynamics by remote sensing techniques;
 - (iv) Working Group on Operational Oceanographic Products (WGOOP) to produce new value added products with the right format and timing to become useful for the ecosystem approach and the main deliverables of ICES within research and management advice. WGOOP must interact with IOC/JCOMM/GOOS, especially EuroGOOS/ArcticGOOS as well as with GMES/GEOSS and take advantage of existing marine operational services like NOOS/BOOS), as well as projects such as MERSEA/ECOOP.
- 78 The Committee observed that the ICES network has been sustained over 100 years, that GOOS should use ICES as a model for how to sustain a program. Noting that there have been good working relations between ICES and EUROGOOS, further with IOC, the Committee encouraged enhancing such collaboration.
- 79 **Building on the results of the 3rd GOOS Regional Alliances Forum, as well as on the discussion made during this Meeting, the Committee encouraged partnership between GRAs and regional programs with common interests in terms of the provision of data and/or data applications, e.g., with Regional Seas Conventions, LMEs.** Such an effort would possibly be made through workshops and joint discussions with various regional programmes.
- 80 With regard to scientific links between PICES and GOOS are concerned, **the Committee decided to continue inviting ICES and PICES to the annual Meeting.**

5.8 GOOS AND GEO

5.8.1 GEO COASTAL ZONE COMMUNITY OF PRACTICE

- 81 Dr. Tom Malone reported on the establishment of the GEO Coastal Zone Community of Practice. Based on the IGOS Coastal Theme report, which was approved in 2005, the leadership of the IGOS Coastal Theme Team (Paul DiGiacomo and Liana McManus as Co-chairs, Bob Christian of GTOS, and Tom Malone of GOOS) submitted a proposal to the GEO User Interface Committee (GEO-UIC) to establish a Coastal Zone Community of Practice (CZCP). The proposal was approved by the GEO in 2006. The GEO-UIC was to engage users in the nine societal benefit areas of the GEOSS in the development, implementation, and use of a sustained GEOSS that provides the data and information required by user groups on national, regional and global scales, through the “communities of practice” as the primary mechanism.
- 82 The purpose of the CZCP is to develop a strategy for engaging user groups across the land-sea interface in the development of those elements of the GOOS and GTOS that are required to provide and integrate data on terrestrial, freshwater, marine and atmospheric systems that converge in the coastal zone. Its primary objectives for the period of 2007-2008 included:
- (i) Establish a Joint Panel for Integrated Coastal Observations (J-PICO) by the IOC and FAO;
 - (ii) Engage GOOS Regional Alliances (GRAs) as Communities of Practice;
 - (iii) Initiate Planning for 2007 Coastal Theme/GEO CZCP workshop.

For the first step, a Workshop on “Coastal Urbanization, Development, & Inundation” was planned for spring 2008. Dr. Malone recommended the GSSC to help identify a venue and sources of funding for this workshop, and to encourage GRAs to become involved in the CZCP.

- 83 **The Committee agreed, as soon as the PICO is established, to work with CZCP help integrate coastal component of GOOS into GEOSS, e.g., through the planned workshops leading to Pilot Projects.**

5.8.2 GEONETCast

- 84 Dr. Jay Pearlman provided an update on the development of GEONETCast. GEONETCast is a near real-time data dissemination system – in support of the GEO societal benefit areas – by which environmental in situ, airborne, and space-based observations, products, and services are transmitted to users through satellites. The GEO tasks for 2007 included (i) Identify other infrastructure providers and integrate contributions into a global dissemination capability, and (ii) Identify and incorporate additional data and product contributions to serve all GEO Societal Benefit Areas.
- 85 Dr. Pearlman noted that GEONETCast operations targeted for September 2007, which could support ocean information distribution (perhaps with WMO Info System). In doing so, it needed potential requirements for ocean data to GEONETCast planning group. Therefore, He suggested creating phased program with initial information sets for first phase implementation; multiple phase implementation should be planned for five years. **The Committee accepted this suggestion, and requested that JCOMM recommend initial information sets for distribution.**

- 86 The Committee also considered creating user manuals for data to broaden information utilization, and address need for ability to communicate data to “central” center for conversion to information. **The Committee agreed to communicate with GEO/GEONETCast for relevant program and issues, in coordination with IGOS/IOS.**

6 REPORT OF THE SCIENTIFIC WORKSHOP AND SESSIONAL WORKING GROUPS

6.1 REPORT ON THE SCIENTIFIC WORKSHOP

- 87 The Committee reviewed briefly the results of the scientific and technical workshop, which was held from 1100 hours to 1800 hours on 13 March 2006. Fourteen presentations had been delivered during the workshop, covering the issues of

- (i) Coastal Observations;
- (ii) Regional Marine Environment and Ecosystem Modelling, and
- (iii) Data Management and Assimilation.

This workshop was organized for the first time to emphasize scientific focus of the Committee, through stimulating discussion in regions as well as in global scale on major issues in Ocean Observation and Research.

- 88 Three session chairs (Tom Malone, Philip Dandin, and Detlef Stammer) summarized the presentations made in each session. All presentations made during the workshop are available on the GOOS website (<http://www.ioc-goos.org/gssc10>). In conclusion, they noted that the workshop had been a great success not only in highlighting scientific issues but also in involving scientists of the Region in the scientific discussion related to GOOS.

- 89 The Committee expressed its appreciation to Dr. Dong-Young Lee and Ms Boram Lee for their hard work in organizing the workshop, and thanked the chairs for chairing the sessions and leading the discussion. It noted that such a workshop is an excellent initiative to review status and problems of regional or coastal GOOS, as well as to introduce new or improved technology in ocean observations and their application. In this context, **the Committee decided to again organize a scientific workshop in conjunction with the eleventh Meeting in 2008.**

6.2 REPORT OF THE SESSIONAL WORKING GROUP

6.2.1 SESSIONAL GROUP ON OBSERVING SYSTEM REQUIREMENTS FOR INTEGRATING THE GLOBAL AND COASTAL MODULES

- 90 A draft report of this sessional working group was distributed in hard copy and presented by Dr. Helen Yap, Chair of this sessional group. Members of the group included Keith Alverson, Philippe Dandin, John Field, Huasheng Hong, Adolf Kellermann, Tom Malone, Jose Muelbert, Phillip Mundy, Uwe Send, and Detlef Stammer. The report submitted for consideration by the Committee was as follows (*in italics*).

91 1. Objective

It is a given that GRAs have their own priorities, contrasting governance structures, and ocean observing capabilities that differ significantly in their levels of development.

Partnerships between research and operational communities are needed to sustain the provision of quality controlled data in forms and at rates specified by user groups for both research and applied purposes relevant to achieving the six societal goals of GOOS.

Issues: *How to do this in those regions that are dominated by developing countries with differing capabilities? Probably not a role of GSSC, but should be done within participating nations and GRAs?*

*Bearing in mind the importance collaborating with existing programs of the sponsors as appropriate and of national participation in the **JCOMM** Sessions, the focus here is on mechanisms for implementing regional ocean observing systems globally with priority given to developing the capacity for routine and sustained observations, data management, analysis and modeling in regions dominated by developing countries.*

Thus, the objective is to promote and enable the development of scientifically and technically sound regional ocean observing systems and a Global Coastal Network that meet the data and information needs of user groups regionally and globally.

GSSC Action: *To these ends, endorse the report of the Joint JCOMM-GSSC-GRA Task Team report on Implementing the Coastal Module of GOOS and communicate this to the I-GOOS Board. (immediate)*

2. Mechanisms for Implementing Regional Ocean Observing Systems

2.1 GOOS Regional Alliances (GRAs)

Successful development of GRAs is critical to implementing the coastal module. GRAs are coordinating bodies for national commitments to implementing GOOS. They have been created to “meet common scientific, technical or logistic needs and social and political aspirations that can benefit from coordinated ocean observing system elements. GRAs are recognized and encouraged as an important “bottom up” means to build the GOOS through the gradual development of regional and national observing systems leading to enlarged spheres of coordination and cooperation. As such, GRAs are responsible for designing and implementing Regional Ocean Observing Systems that contribute to the development of GOOS as a whole and provide data and information on oceans and coasts that are needed by user groups in the respective regions for decision making, research and education.

I-GOOS Action: *Work to obtain National commitments to ensure that GRAs have the support needed to perform these management functions for those GRAs that meet the criteria for being designated a GRA as specified in GOOS policies and procedures.*

2.2 Scientifically and Technically Sound Implementation of the Coastal Module

The IGOS Coastal Theme and the Joint JCOMM-GSSC-GRA Task Team both recommend the establishment of a Joint [GOOS-GTOS] Panel for Integrated Coastal Observations [across the land-sea interface].

GSSC Action: Create a Sub-Panel of the GSSC for Integrated Coastal Observations (PICO) as a first step toward establishing a Joint [GOOS-GTOS]-PICO in due course. Draft Terms of Reference are appended to this document. Reduce the size of the GSSC accordingly. (immediate)

2.3 Pilot Projects

Pilot projects are “proof of concept” organized activities that are intended to improve operational capabilities of GOOS. Projects should focus on implementing requirements for remote and in situ sensing recommended in the Implementation Strategy for Coastal GOOS and the IGOS Coastal Theme Report.

High priority projects have clear socio-economic benefits, a high probability of success, and build capacity. Pilot projects must be evaluated periodically (e.g., annually) to assess progress toward the project’s objectives and to determine and disseminate to all GRAs information on what works (“best practices”) and what does not.

GSSC Action: Collaborate with GRAs ~~through the GRC~~ to identify and enable implementation of high priority, regionally organized pilot projects that will lead to improved operational capabilities of the coastal module – possibly through workshops. (ongoing)

GSSC Action: Endorse priority pilot projects identified at the 3rd GOOS Regional Forum (Addendum II). (immediate)

GSSC Action: Work with ~~the GRC and~~ GRAs to prepare proposals to fund pilot projects, e.g., GEF targeted research and capacity building projects – possibly through workshops. (medium)

GCCS Action: Periodically review the status and progress of pilot projects against their goals and objectives. Establish criteria to do so. (ongoing)

2.3 Partnerships

There is a need for coordination between GOOS and GEOSS development.

PICO Action: Work with the GEO Coastal Zone Community of Practice to help integrate coastal components of GOOS into GEOSS, e.g. workshops leading to Pilot Projects. (short)

Functional partnerships between GOOS and IGBP/SCOR research programs (LOICZ, GEOHAB, IMBER) and other relevant bodies (PICES, ICES) are needed to ensure the development of scientifically sound operational capabilities.

PICO Action: Work with relevant research programmes and GRAs to implement joint pilot projects that benefit both the research programmes and GOOS possibly through workshops. (medium)

I-GOOS Action: Building on the results of the 3rd GOOS Regional Forum, encourage partnerships between GRAs and regional programs with common interests in terms of

the provision of data and/or data applications, e.g., with Regional Seas Conventions, LMEs – possibly through workshops.

2.4 Building Operational Capacity

A phased (step-wise) implementation strategy is needed.

PICO Action: *Using the implementation strategy for the coastal module as a guide, collaborate with the GRAs, the OOPC and the Coastal-GTOS Panel to formulate a 5-year plan for building a GCN that is operational, including the specification of research priorities, implementation of regionally organized pilot (proof of concept, demonstration) projects, phased implementation of operational capabilities and performance metrics, and periodically reviews and updates of the common variables based on their operational status and their use in the provision of products and services. (Medium)*

The plan should be based in part on inventories of existing operational GOOS assets (infrastructure) and workforce to help identify priorities for research, pilot projects and building capacity.

Phased implementation of operational capabilities and performance metrics must include specification of procedures for determining when data streams are operational and identifying bodies responsible for providing them (including QA/QC and conformance to standards and protocols, e.g., for serving data on the GTS).

GSSC Action: *Establish mechanisms to periodically review existing GOOS-related, regional activities and assess their (1) research-pilot project-preoperational-operational status, (2) importance to developing the GCN, and (3) the success of efforts to transition activities from a research to an operational mode. (short)*

GSSC Action: *Advise the GRAs as needed to help customize observing requirements for the common variables regionally and to periodically review and update these requirements for the Global Coastal Network (GCN) as a whole. (ongoing)*

GSSC Action: *Establish criteria for identifying those data streams that are ready for coordinated integration into GOOS by JCOMM and establish mechanism as needed to determine the research to operational status of the common variables from measurements and data telemetry to data management, models and services and advise JCOMM accordingly. (Short)*

- 92 Subsequent discussion was made based on the report under agenda item 4.1, 4.2, 5, and Sessional Group report. Finally, **the Committee endorsed the report of the Sessional Working Group, including proposed actions and recommendations.** The specific decisions and actions adopted by the Committee are listed in the [Annex V](#).
- 93 The Committee agreed that the Terms of Reference of a technical sub-panel for Coastal Observation (PICO) should be finalized as soon as possible. **It should be submitted to the Committee for its approval as soon as possible during the intersessional period, with proposed membership.**

6.2.2 SESSIONAL GROUP ON GOOS FUNDING, OUTREACH AND PUBLICITY, AND ENGAGING INDUSTRY IN THE GOOD IMPLEMENTATION

94 Dr. Ralph Rayner, Chair of this Sessional Working Group, presented the report. Members of the group included James Baker, Peter Dexter, Mary Feeley, Colin Grant, Ed Harrison, John Gunn, Christina Lief, and Jay Pearlman. The report consisted of the following suggested actions for consideration and approval by the Committee (*in italics*).

95 [*Create outreach tools / Marketing*]

- *Marketing document (use IOOS document as starting point), by Ralph Rayner, Colin Grant, Ocean US, and GPO*
- *Poster/stand/exhibition booth material, by GPO*
- *Engage professional marketing skills to support, by GPO*
- *GOOS to exhibit at all major conferences and trade shows, such as Oceans, Oceanology, OTC, GEO Ministerial Meeting, Climate workshop, etc. GPO to coordinate*

[*Create outreach tools / Sales*]

- *Create a standard GOOS presentation pack which can be customised for target organisations, by GPO, 'industry group'*
- *Compile target contact lists, by the 'industry group'*
- *Craft 'elevator' messages tailored to targets, by 'industry group'*
- *Engage with professional fundraiser for advice, by GPO*

[*Targets – NGO's*]

- *Engage with key NGO's, e.g., WWF Climate Group (by Ralph Rayner), Conservation International (by whom?), Nature Conservancy (by whom?)*
- *Screen possible NGO's and create prioritised list (by IMarEST)*

[*Targets – Media*]

- *Media briefing with Science Media Centre, by Ralph Rayner and Colin Grant*
- *Contact with TV companies: BBC (by Ralph Rayner), Discovery Channel (by Ed Harrison, Colin Grant), PBS (by Ed Harrison, Colin Grant)*

[*Sources of funds*]

- *Take advice from UN Foundation (by James Baker)*
- *Take advice from Census of Marine Life (by GPO)*
- *Screen foundations to determine targets (by GPO with support of professional fundraiser)*
- *Screen individuals/trusts to determine targets (by GPO, Jay Pearlman with support of professional fundraiser)*

[*Advocacy*]

- *Obtain advice on approach (by James Baker to set up meeting with ex Lockheed Martin CEO)*
- *Target and engage at least two major multinational companies for visits/briefings associated with each GSSC meeting (by GPO, 'industry group')*
- *Populate matrix of key individuals/target industries/target geographies (by 'industry group')*
- *Set up 'pilot' with climate/environmental advisors in major companies (by Ralph Rayner and Colin Grant)*

[Hold regular progress meetings]

- *Monthly telephone conferences for next three months (by GPO, 'industry group')*
- *Thereafter as needed but at least quarterly (by GPO, 'industry group')*

96 The Sessional Group report was discussed. **The Committee agreed on the urgent need for GOOS advocacy and outreach, and endorsed the report including suggested actions.** The specific actions adopted by the Committee are listed in the [Annex V](#).

7 GSSC SHORT, MEDIUM TO LONG-TERM PRIORITIES AND ACTIONS

97 Based on the discussion conducted during the Meeting, the Committee reviewed and approved its decisions, actions, and recommendations for the coming intersessional period. These are given in [Annex V](#). **The Committee requested the GPO send reminders to its Members and relevant bodies of actions and workplan**, to ensure that all actions are accomplished timeously.

98 The Committee felt that it is important to set up priorities and specific actions with clear deadline, to ensure Committee's achievement in providing guidelines to GOOS as a whole. **It therefore decided to have a dedicated in-session discussion on short, medium to long-term priorities from its eleventh Meeting in 2008.**

99 **The Committee also requested the GPO provide an overview on GOOS budget status by the eleventh Meeting in 2008.**

8 INPUT TO I-GOOS VIII

100 Among the agreed decisions and actions (see [Annex V](#)), the Committee decided to forward following recommendations and actions to the I I-GOOS VIII (13-16 June 2007, Paris):

- (i) It was recommended that I-GOOS bring the issue of an internationally agreed standard set of ocean parameters that can routinely be measured from research vessels and that would greatly enhance the efficiency of the research fleet in collecting important upper ocean parameters. I-GOOS should request the IOC be engaged in an international discussion on a standard set of variables that can be agreed upon, to be measured from any research vessel regardless which nationality and where it operates, without getting individual permits;
- (ii) It was recommended that I-GOOS establish the GOOS Regional Council to represent the collective interests of GRAs to I-GOOS, GEO and other international bodies as appropriate;
- (iii) I-GOOS should work with the sponsors of GOOS and GTOS to establish J-PICO;
- (iv) It was recommended that I-GOOS should work to obtain national commitments to ensure that GRAs have the support needed to perform management functions for those GRAs that meet the criteria for being designated a GRA as specified in GOOS policies and procedures;
- (v) Building on the results of the 3rd GOOS Regional Forum, I-GOOS should encourage partnerships between GRAs and regional programs with common interests in terms of

the provision of data and/or data applications, e.g., with Regional Seas Conventions, LMEs – possibly through workshops;

- (vi) In coordination with GSSC and other related implementation coordinating bodies such as JCOMM, a phased program (for five years) should be created with initial information sets for GEONETCast ocean information distribution.

9 MEMBERSHIP

- 101 The Committee recalled that the membership was endorsed by the GSSC sponsors before the ninth Meeting in 2006, and a term of membership is three years.
- 102 Two members, Dr. Jose Muelbert and Dr. Helen Yap, had met the end of their second terms. The Chair thanked them for their dedicated service, particularly in the area of marine ecology and coastal management. He hoped that the GSSC would continue to benefit from their expertise through the discussion on coastal observations.
- 103 In conjunction with the formation of the GSSC sub-panel for Integrated Coastal Observations (PICO), and to keep the size of the Committee in an appropriate level, the Committee decided not to fill the vacancies immediately. The membership of the Committee would be finalized as soon as the PICO membership was decided, and it would include a PICO representative.

10 DATE AND PLACE OF THE NEXT MEETING

- 104 Following the discussion and decision under agenda item 5.5, the Committee decided that the next meeting be jointly held with IODE officers meeting and JCOMM Management Committee, hosted by IOC. The dates would be sometime in March 2008.

11 CLOSURE OF THE MEETING

- 105 In concluding the meeting, the Chair thanked KORDI, Dr. Dong-Young Lee, and the local organizers, for their excellent hosting to make the meeting a success and a pleasure for all participants. The Chair then applauded all Members and Participants for engaging in the Committee's mission that led to fruitful results of the meeting. The Chair then thanks the Ms Boram Lee for her assistance in the arranging and conducting the meeting..
- 106 The tenth Meeting of the GOOS Scientific Steering Committee closed at 1230 hours on Friday, 16 March 2007.
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AGENDA

- 1 OPENING AND WELCOME**
 - 1.1 ADOPTION OF THE AGENDA
 - 1.2 FORMATION OF SESSIONAL WORKING GROUPS
 - 2 INTRODUCTIONS**
 - 2.1 ROLE OF GSSC, I-GOOS, AND GOOS PROJECT OFFICE IN GOOS
 - 2.2 REVIEW OF GSSC-IX ACTIONS AND I-GOOS VII RECOMMENDATIONS TO GSSC
 - 3 GLOBAL GOOS**
 - 3.1 GLOBAL CLIMATE CHANGE: GAPS IN OUR UNDERSTANDING
 - 4 COASTAL GOOS**
 - 4.1 RECOMMENDATIONS OF JOINT JCOMM-GSSC-GRA AD HOC TASK TEAM
 - 4.2 RECOMMENDATIONS FROM THE THIRD GOOS REGIONAL FORUM
 - 4.3 COASTAL HAZARDS AND OCEAN OBSERVATIONS: GAPS
 - 5 GOOS IMPLEMENTATION**
 - 5.0 GOOS OUTREACH AND ADVOCACY
 - 5.1 PILOT PROJECTS
 - 5.1.1 CHLOROPHYLL OCEAN GLOBAL INTEGRATED NETWORK: ChlorOGIN
 - 5.1.2 PLANNING OTHER PILOT PROJECTS
 - 5.2 COASTAL GOOS IMPLEMENTATION
 - 5.3 ROLE OF JCOMM
 - 5.4 ROLE OF INDUSTRY AND INTEREST IN OCEAN OBSERVATIONS AND PRODUCTS
 - 5.5 DATA MANAGEMENT
 - 5.5.1 COORDINATION WITH IODE
 - 5.5.2 COORDINATION WITH GOSIC
 - 5.6 SUPPORT FOR RESEARCH ACTIVITIES IN GOOS FRAMEWORK
 - 5.7 ROLE OF REGIONAL PROGRAMMES
 - 5.8 GOOS AND GEO
 - 6 REPORT OF THE SCIENTIFIC WORKSHOP AND SESSIONAL WORKING GROUPS**
 - 6.1 REPORT ON THE SCIENTIFIC WORKSHOP
 - 6.2 REPORT OF THE SESSIONAL WORKING GROUP
 - 7 GSSC SHORT, MEDIUM TO LONG-TERM PRIORITIES AND ACTIONS**
 - 8 INPUT TO I-GOOS VIII**
 - 9 MEMBERSHIP**
 - 10 DATE AND PLACE OF THE NEXT MEETING**
 - 11 CLOSURE OF THE MEETING**
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**The Joint JCOMM-GSSC-GRA *ad hoc* Task Team
on Implementing the Coastal Module of GOOS**

Tom Malone (GSSC, Task Team Chairman)
Geoff Brundrit (GRA), Hans Dahlin (GRA), Philippe Dandin (JCOMM & GSSC),
Ed Harrison (GSSC), Johannes Guddal (JCOMM), Bob Keeley (JCOMM), and
Janice Trotte (GRA)

Executive Summary of the first meeting

The Joint JCOMM-GSSC-GRA *ad hoc* Task Team (TT) was established to advise JCOMM, the GSSC and GRAs on four issues related to implementing the coastal module of GOOS:

- Coordination between the JCOMM, GSSC and GRAs,
- Actions that should be taken by these bodies in both short- and long-terms, and
- The extent to which JCOMM should coordinate implementation of operational elements of the coastal module of GOOS (and, by implication, the need for another JCOMM-like body to oversee see coordinated implementation of the non-physical elements of the coastal module).

Although the Terms of Reference focus on JCOMM, GSSC, and GRAs, the TT agreed that the role of I-GOOS in this process should also be considered. This recommendation was endorsed by the President of I-GOOS at the first meeting of the TT on 19-20 June, 2006 in Paris. Thus, this report address the roles of GSSC, JCOMM, and GRAs (and, via these bodies, the countries that constitute them) in the broader context of the I-GOOS mandate. A brief summary of the roles of existing bodies engaged in the governance, design and implementation of GOOS is given in Annex I.

This, the final report of the TT, is a revision of a preliminary draft based on reviews by the François Gérard (President of I-GOOS), participants in the 3rd GOOS Regional Forum (14-17 November 2006), JCOMM-MAN, IOGOOS, and Helen Yap (GSSC) (Annex II).

Detailed recommendations to I-GOOS, JCOMM, the GSSC and GRAs are given for each of the Terms of Reference in the main text of this report. Three issues stand out: (1) scientifically sound implementation of the coastal modules of GOOS and GTOS across the land-sea interface (2) sustained and coordinated development of the global and coastal modules of GOOS, and (3) coordinated implementation of operational elements of GOOS. TT recommendations for each of these are summarized below.

(1) Scientifically sound implementation of the coastal module of GOOS

- Establish a Joint (GOOS/GTOS) Panel for Integrated Coastal Observations (across the land-sea interface) to provide technical strategic guidance to the Steering Committees of GOOS (GSSC) and GTOS for coordinated implementation of the coastal modules of GOOS and GTOS.

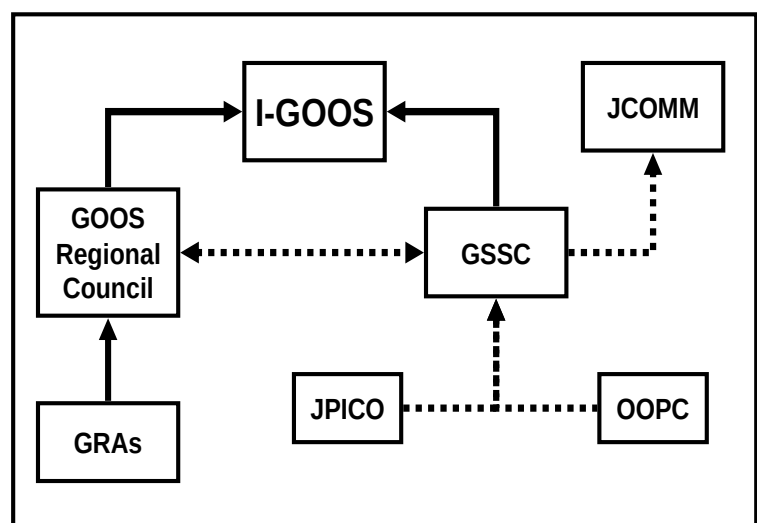
(2) Sustained and coordinated development of the global and coastal modules

- Recognize the GOOS Regional Council (GRC) and task this body to (i) coordinate the development of GOOS Regional Alliances (GRAs) and Regional Ocean Observing Systems (ROOSs) world wide and (ii) represent GRA interests to I-GOOS, the GSSC and other global bodies as needed. GRC members should be appointed by participating GRAs with a Chairperson elected by the membership.
- Formalize the linkage between I-GOOS and the GRC to facilitate (i) the establishment and adoption of comprehensive GOOS-wide policies and procedures for developing an integrated coastal-global system and (ii) I-GOOS efforts to secure national commitments for coordinated implementation and sustained development of the coastal and global modules of GOOS. As a first step toward addressing (i) appoint the Chairperson of the GRC to serve as an ex officio member of the I-GOOS Board. For (ii), the I-GOOS Board must provide leadership, and GRA members must work to gain the support of their member states.
- GRAs are responsible for implementing ROOSs that include both coastal and global elements of GOOS. Thus, replace “Regional Coastal Ocean Observing System” with “Regional Ocean Observing System.”

(3) Coordinated implementation of operational elements of GOOS

- JCOMM should coordinate the integration of all of the common variables to be measured as part of the GCN as their data streams become pre-operational and responsible bodies have been established to sustain them. This should be a step-wise process based on recommendations from the GSSC that have been agreed to in collaboration with the GRC.
- Guidance from GRAs and the GRC to JCOMM concerning coordinated implementation of GOOS (both global and coastal modules) in general, and the GCN in particular, should be transmitted to JCOMM by the GSSC.
- The GSSC should work with the GRC to establish criteria for determining that the provision of data and information on the common variables is “pre-operational” and ready for JCOMM to coordinate their integration into GOOS.

As shown in the figure below, addressing the three sets of recommendations given above can best be achieved by establishing (i) a GOOS Regional Council (GRC) that reports to the I-GOOS and interacts with JCOMM via the GSSC and (ii) a Joint GOOS/GTOS Panel for Integrated Coastal Observations (JPICO) across the land-sea interface. The GRC provides both a coordinating mechanism and a mechanism for representing the interests of GRAs to the I-GOOS and to JCOMM via the GSSC. With the establishment of JPICO, the GSSC will have two technical panels, one for oceans and atmosphere and one for oceans and land.



DEVELOPMENT OF THE GOOS MATRIX

By Dr. Ron Wilson

1 Background

The GOOS Matrix was developed in response to a recommendation by the last Review Panel to provide an additional method of navigating the site for those people who did not know the GOOS program in terms of its various component programs such as GLOSS or the Drifting Buoy Program. The suggestion of the Panel was that we provide a matrix that would help users navigate to the datasets in terms of the IGOS themes.

2 Development

The IGOS themes included various classifications as below.

- Global Carbon Cycle
- Geohazards
- Ocean
- Water Cycle
- Atmospheric Chemistry
- Coastal Observations
- Coral Reefs Sub-Theme
- Land
- Cryosphere

After examination some of these themes seemed too all encompassing. For example all of blue water oceanography was included under the heading “Ocean”, “Land” and “Cryosphere” seemed also to be too general and “Atmospheric Chemistry” was the only place for atmospheric data except perhaps for some data sets which could be classified under “Global Carbon Cycle”. Most people asked whether a data set was relevant to the global carbon cycle both classifiers and users would have to guess with uncertain results.

The same problem would occur in classifying data sets in the theme “Geohazards”. If you asked three people to do such a classification for a number of data sets from their descriptions, they would probably also have to guess at the classifications and arrive at three different lists, again with uncertain results.

Dr. Jim Crease and Dr. Ron Wilson therefore set out to develop a classification method that would be more straight-forward for both the classifiers and the users and lead to more consistent results in classifying and in finding the data sets that the user was after. Classifications were developed for both the GOOS and GCOS data sets as it was intended that there would be a similar matrix for GCOS to demonstrate the true breadth and variety of the data sets required for the GCOS program which did not seem to be covered in the GOSIC site at that time or in fact to be covered by AOPC.

The result they came up with was first to classify the data sets in columns as follows:

- Global
- Regional
- Historical
- Satellite
- Gridded
- Modeling
- National

These classifications were thought to be useful in that the data sets were straight forward to classify and the user would understand them clearly. The other purpose of these classifications for the columns and for the row classifications described below, and for the matrix itself, was to demonstrate the richness, the breadth, and the variety of the data sets that it is necessary to collect to address the goals of GOOS and GCOS.

The row classifications were chosen as follows. These apply to GOOS. A different set were chosen for GCOS. In both cases the classifications were intended to permit clear choices in classification for GOSIC staff and clear understanding of what they were getting by the user. And of course as above these row classifications demonstrated the breadth of the data requirement for GOOS.

- Ocean Surface Physical Data
- Ocean Sub-surface Physical Data
- Ocean Circulation & Currents
- Sea Level & Ocean Topography
- Surface Met Observations
- Ocean Chemical Data
- Physical Coastal Zone Data
- Chemical Coastal Zone Data
- Biological Coastal Zone Data
- Sea Ice
- Ocean Carbon Data
- Coral Reef Data.

To say it again the intentions were to provide easily understood classifications by the classifier and the user, and to demonstrate the breadth and variety of the data being collected and provide by GOOS.

LIST OF DECISIONS, ACTIONS, AND RECOMMENDATIONS

I. Decisions

No.	Agenda	Item	Due Date	By Whom
1	3.1	Endorse new membership of OOPC	-	GSSC
2	3.1 5.3	Endorse solicitation of proposals to address the identified need for enhanced observing program support (a la JCOMMOPS)	-	GSSC
3	3.1	Support the plan for 2008 Workshop on ocean sensors (especially for non-physical variables, but physical also)	-	GSSC
4	3.1	Endorse the plan for a decadal-follow up to OceanObs99	2009	GSSC in cooperation with OOPC, CLIVAR GSOP
5	4.1	Endorse the report of the Joint JCOMM-GSSC-GRA Task Team on Implementing the Coastal Module of GOOS	-	GSSC
6	4.1 4.2 5.2	Create a Sub-Panel of the GSSC for Integrated Coastal Observations (PICO) as a first step toward establishing a Joint [GOOS-GTOS]-PICO in due course. Reduce the size of the GSSC	done	GSSC
7	4.2 5.1.2	Endorse priority pilot projects identified at the 3rd GOOS Regional Forum (Addendum II)	-	GSSC
8	5.0	GOOS to exhibit at all major conferences and trade shows	-	GSSC, with GPO coordination
9	5.0	Engage with Key NGOs and Media for GOOS outreach and fundraising	-	GSSC
10	5.1.2	Endorse the PICES North Pacific Continuous Plankton Recorder as an ocean observing tool	-	GSSC
11	5.1.2	endorsed the OTN as a potential GOOS pilot project	-	GSSC
12	4.2 5.1.2	Collaborate with GRAs to identify and enable implementation of high priority, regionally organized pilot projects that will lead to improved operational capabilities of the coastal module – possibly through workshops	ASAP	GSSC, PICO
13	4.2 5.1.2 5.2	Establish mechanisms to periodically review existing GOOS-related, regional activities and assess their (1) research-pilot project-preoperational-operational status, (2) importance to developing the GCN, and (3) the success of efforts to transition activities from a research to an operational mode	ASAP	GSSC (PICO to identify the leader)
14	5.3	Acknowledge the potential seriousness of the VOS Security issue and support the actions of JCOMM for its resolution	-	GSSC chair, Stammer
16	5.6	Have an internationally agreed-on standard set of ocean parameters that can routinely be measured from research vessels	ASAP	Detlef Stammer to interact with I-GOOS Chair Ralph Rayner to provide info on US initiative
17	5.8	Work with the GEO Coastal Zone Community of Practice Help integrate coastal components of GOOS into GEOSS, e.g. workshops leading to Pilot Projects.	continuous	PICO (when established)

18	5.8	Establish criteria for identifying those data streams that are ready for coordinated integration into GOOS by JCOMM and establish mechanism as needed to determine the research to operational status of the common variables from measurements and data telemetry to data management, models and services and advise JCOMM accordingly	ASAP	GSSC, in cooperation with JCOMM and IODE
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II. Actions

No.	Agenda	Item	Due Date	By Whom
1	4.2 5.1.2	Work with GRAs to prepare proposals to fund pilot projects, e.g., GEF targeted research and capacity building projects – possibly through workshops	ASAP	PICO (when established)
2	4.3	To report to GSSC-XI on support plan for coastal management and disaster prevention in developing countries	GSSC-XI	Dongyoung Lee
3	5.0	Create a marketing document	GSSC-XI	Industry Group cooperation with Ocean.US assistance by GPO
4	5.0	Create outreach material including poster, stand, and exhibition booth material	GSSC-XI	GPO
5	5.0	Engage professional marketing skills to support	GSSC-XI	GPO
6	5.0	Identify major conferences and trade shows where GOOS/GSSC should represent	GSSC-XI and thereafter	GPO to coordinate, with GSSC input
7	5.0	Create a standard GOOS presentation pack which can be customised for target organisations	GSSC-XI	Industry Group with GPO assistance
8	5.0	Compile target contact lists for GOOS outreach	GSSC-XI	Industry Group
9	5.0	Craft ‘elevator’ messages tailored to outreach targets	GSSC-XI	Industry Group
10	5.0	Engage with professional fundraiser for advice	GSSC-XI	GPO
11	5.0	Screen possible NGO’s and create prioritised list, for GOOS outreach and cooperation	GSSC-XI	IMarEST
12	5.0	Contact with WWF Climate Group for GOOS outreach and cooperation	GSSC-XI	Ralph Rayner
13	5.0	Identify other NGOs for GOOS outreach and cooperation	GSSC-XI	Industry Group
14	5.0	Media briefing with Science Media Centre	GSSC-XI	Ralph Rayner Colin Grant
15	5.0	Contact with BBC for media briefing on GOOS	GSSC-XI	Ralph Rayner
16	5.0	Contact with Discovery Channel for media briefing on GOOS	GSSC-XI	Ed Harrison Colin Grant
17	5.0	Contact with PBS for media briefing on GOOS	GSSC-XI	Ed Harrison Colin Grant
18	5.0	Take advice from UN Foundation for GOOS funds	GSSC-XI	Jim Baker
19	5.0	Take advice from Census of Marine Life on GOOS funds	GSSC-XI	GPO
20	5.0	Screen foundations to determine targets for fundraising	GSSC-XI	GPO with support of professional fund raiser

21	5.0	Screen individuals/trusts to determine targets	GSSC-XI	Jay Pearlman with support of professional fund raiser, GPO assistance
22	5.0	Set up meeting with ex Lockheed Martin CEO, to obtain advice on approach re. GOOS advocacy	GSSC-XI	Jim Baker
23	5.0	Target and engage at least two major multinational companies for visits/briefings associated with each GSSC meeting	GSSC-XI and thereafter	GPO Industry Group
24	5.0	Populate matrix of key individuals/target industries/target geographies	GSSC-XI	Industry Group
25	5.0	Set up 'pilot' with climate/environmental advisors in major companies	GSSC-XI	Ralph Rayner Colin Grant
26	5.0	Hold monthly telephone conferences (until June 2007), thereafter as needed but at least quarterly	continuous	Industry Group with GPO assistance
27	5.0	Improve branding of GOOS by having made a lapel badge and/or tie/scarf for all GOOS participants	GSSC-XI	GPO
28	5.1.2	Identify pilot projects to improved operational capabilities of the coastal module (e.g. land-based sources of marine pollution and run-off, wind wave current interaction, multi-hazard early warning system, OTN)	ASAP	John Field to coordinate
29	5.1.2	Periodically review the status and progress of pilot projects against their goals and objectives. Establish criteria to do so	GSSC-XI to report, and continuous	John Field
30	5.2	Formulate a 5-year plan for building a GCN that is operational, including the specification of research priorities, implementation of regionally organized pilot (proof of concept, demonstration) projects, phased implementation of operational capabilities and performance metrics, and periodically reviews and updates of the common variables based on their operational status and their use in the provision of products and services.	ASAP	PICO (when established), in collaboration with GRAs, OOPC
31	5.2	Advise the GRAs as needed to help customize observing requirements for the common variables regionally and to periodically review and update these requirements for the Global Coastal Network (GCN) as a whole	continuous	PICO (when established)
32	5.3	Be actively involved in the planning process for the SOOS, including the SOOS Workshop (Bremen, October 2007)	October 2007	Detlef Stammer
33	5.5	Organize GSSC-XI jointly with IODE officers meeting and JCOMM Management Committee	Early 2008	GPO in collaboron with IODE and JCOMM secretariats
34	5.5	Explore possibilities to meet in conjunction with OOPC and PICO in alternate years	-	Chairs, GSSC, OOPC, and PICO, and GPO
35	5.5	Provide feedback to GOSIC on its web pages and its GOOS matrix	September 2007	GSSC, I-GOOS, GRA Members
36	5.5	Send out a request/communication to GSSC, I-GOOS, and GRA for feedback to GOSIC	September 2007	GPO
37	5.5	Consider whether to meet with OOPC and PICO in alternate years	2009	GSSC
38	5.7	Continues to invite ICES and PICES in GSSC	continuous	GPO

39	5.8	Identify and recommend initial information sets for distribution through GEONETCast, with implementation issues and anticipated long term requirements	April 30 2007	JCOMM (Peter Dexter)
40	5.8	Discuss with GEO/GEONETCast for program and issues, in coordination with IGOS/IOS	June 2007	Jay Pearlman in cooperation with JCOMM, IGOS/IOS
41	6.1	Organize a scientific workshop in conjunction with the GSSC-XI	GSSC-XI	GSSC Chair, with GPO (communication with IODE and JCOMM)
42	7	Send a reminder to GSSC members and relevant bodies of actions and workplan		GPO
43	7	Provide a review of GPO budget status, with details of the GSSC budget	GSSC-XI	GPO

III. Recommendations

No.	Agenda	Item	Due Date	To Whom
1	4.1 4.2 4.3 5.2	Work to obtain National commitments to ensure that GRAs have the support needed to perform these management functions for those GRAs that meet the criteria for being designated a GRA as specified in GOOS policies and procedures	ASAP	I-GOOS
2	4.1 4.2 4.3 5.2	Establish the GOOS Regional Forum to represent the collective interests of GRAs to I-GOOS, GEO and other international bodies as appropriate	ASAP	I-GOOS
3	4.1 4.2 4.3 5.2	Work with the sponsors of GOOS and GTOS to establish J-PICO	ASAP	I-GOOS (further to IOC)
4	5.1.2	Consider a pilot project to develop a HAB alert and forecasting system, based on their regional ocean observing system	ASAP	NEARGOOS and SEAGOOS
5	5.1.2	Building on the results of the 3rd GOOS Regional Forum, encourage partnerships between GRAs and regional programs with common interests in terms of the provision of data and/or data applications, e.g., with Regional Seas Conventions, LMEs – possibly through workshops	-	I-GOOS
6	5.6	Engage in an international discussion on a standard set of variables that can be measured from any research vessel regardless which nationality and where it operates, without getting individual permits	-	I-GOOS (further to IOC)
7	5.8	Create phased program (for five years) with initial information sets for GEONETCast ocean information distribution	ASAP	I-GOOS, GSSC
8	5.8	Create user manuals for data to broaden information utilization, and address need for ability to communicate data to “central” center for conversion to information	ASAP	GSSC

LIST OF ACRONYMS

ADRICOSM	ADRIatic sea integrated COastal areaS and river basin Management system
BNSC	British National Space Centre
CEOS	Committee on Earth Observation Satellites
ChlorOGIN	Chlorophyll Ocean Global Integrated Network (pilot project of GOOS)
CIDA	Canadian International Development Agency
CLIVAR	Climate Variability and Predictability
CNES	Centre national d'études spatiales (France)
CODAE	Coastal Ocean Data Assimilation Experiment
CoML	Census of MarineLife
COOP	Coastal Ocean Observations Panel
CPR	Continuous Plankton Recorder
DBCP	Data Buoy Co-operation Panel
EC	European Commission
EUMETSAT	European Organisation for the Exploitation of Meteorological Satellites
ESA	European Space Agency
FAO	Food and Agriculture Organization of the United Nations
GE-BICH	Group of Experts on Biological and Chemical Data Management and Exchange Practices
GCN	Global Coastal Network
GCOS	Global Climate Observing System
GCOS IP	Global Climate Observing System Implementation Plan
GCRMN	Global Coral Reef Monitoring Network
GEF	Global Environment Facility
GEO	Group on Earth Observations
GEONETCast	GEO Network Broadcast (data information system)
GEOSS	Global Earth Observation System of Systems
GLOSS	Global Sea-Level Observing System
GMES	Global Monitoring for Environment and Security
GODAE	Global Ocean Data Assimilation Experiment
GPS	Global Positioning System
GPO	GOOS Project Office
GOOS	Global Ocean Observing System
GRACE	Gravity Recovery and Climate Experiment
GRAs	GOOS Regional Alliances
GRAND	GOOS Regional Alliances Network Development
GRC	GOOS Regional Council
GSSC	GOOS Scientific Steering Committee
GTOS	Global Terrestrial Observing System
GTS	Groupe de Travail Scientifique
ICES	International Council for the Exploration of the Sea
ICPC	Interagency Coordination Panel for Earth Observations
ICSU	International Council for Science
IECC	Institute of Electrical and ElectronicS Engineers
IGBP	International Geosphere-Biosphere Programme
IGOS	Integrated Global Observing Strategy
IGOS P	Integrated Global Observing Strategy Partnership
I-GOOS	Intergovernmental Committee for GOOS
IMarEST	Institute of Marine Engineering, Marine and Technology
IOC	Intergovernmental Oceanographic Commission (of UNESCO)
IODE	International Oceanographic Data and Information Exchange

ISC	International Scientific Committee
JCOMM	Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology
JCOMM-MAN	JCOMM Management Committee
JCOMM TT	JCOMM Task Team
J PICO	Joint GOOS GTOS Coastal Panel
LME	Large Marine Ecosystem
LOICZ	Land-Ocean Interaction in the Coastal Zone
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
NASA	National Aeronautics and Space Administration (USA)
NOAA	National Oceanic and Atmospheric Administration (USA)
ODIN	Ocean Data Information Network
OOPC	Ocean Observations Panel for Climate
OTN	Ocean Tracking Network (fish tracking project)
PICES	North Pacific Marine Science Organization
PIRATA	Pilot Research Moored Array in the Tropical Atlantic
POGO	Partnership for Observation of the Global Ocean
SAHFOS	Sir Alister Hardy Foundation for Ocean Science
SCOR	Scientific Committee on Oceanic Research
SOOP	Ship-of-Opportunity Programme
SST	Sea Surface Temperature
TEMA	Training, Education and Mutual Assistance programme (IOC)
TOR	Term of Reference
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNEP	United Nations Environment Programme
UNFCCC	United National Framework Convention on Climate Change
VOS	Voluntary Observing Ships
WCRP	World Climate Research Programme
WESTPAC	IOC Sub-Commission for the Western Pacific
WMO	World Meteorological Organization
