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Report of the Joint JCOMM-GSSC-GRA ad hoc Task Team

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Implementing the Coastal Module of GOOS

Terms of Reference

1. Propose a long-term coordination mechanism or mechanisms between the Joint IOC-WMO Technical Commission on Oceanography and Marine Meteorology (JCOMM), the Global Ocean Observing System (GOOS) Scientific Steering Committee (GSSC) and the GOOS Regional Alliances (GRAs), to address all areas of mutual interest and avoid overlap and duplication of effort

2. Based on the Coastal Ocean Observations Panel (COOP) Implementation Plan, and in the light of existing expertise and structures, propose possible immediate and specific actions for GSSC, JCOMM and the GRAs to further the implementation of coastal GOOS.

3. Consider and make proposals concerning possible longer-term actions by GSSC, JCOMM and the GRAs for the implementation of coastal GOOS, e.g., where additional expertise and/or subsidiary mechanisms may need to be developed.

4. Recommend what observations should be taken on by JCOMM and what should be left to the GRAs. It is important to remember that before a measurement or product can be turned over to JCOMM for regulation and coordination it must be in pre-operational phase with agreed standards and protocols for measurement, data management and product production, and it must have a group that is currently responsible for the measurement or product.
Executive Summary

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 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 (ROOSSs) 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.
Task Team Recommendations

Recommendations are presented below for each term of reference. Long-term actions and coordination mechanisms are considered first and then, in this context, more immediate actions for existing GOOS bodies to further the implementation of coastal GOOS. We conclude with recommendations to JCOMM on its role in coordinating the integration of pre-operational, non-physical data and information into GOOS and for modifications to the current structure of GOOS needed to implement the recommendations herein.

The Task Team (TT) notes that, although its Terms of Reference focus on the roles of and coordination among JCOMM, GSSC, and GRAs in the implementation of the Global Coastal Network (GCN),

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the role of I-GOOS in this process should also be considered, a decision 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. Those parts of the respective ToRs and Regional Policy that are particularly important for implementing coastal GOOS are summarized in Annex I.

1. Propose a long-term coordination mechanism or mechanisms between JCOMM, GSSC, and GRAs to address all areas of mutual interest and avoid overlap and duplication of effort [for implementing the coastal module of GOOS].

Implementation of the coastal module of GOOS will require effective collaboration between the GSSC, the Coastal Panel of GTOS, and the OOPC for technical guidance to the I-GOOS and JCOMM and between I-GOOS, JCOMM and GRAs for overseeing coordinated implementation of the global and coastal modules of GOOS. The recommendations below are intended to address these needs.

1.1 The GOOS Regional Council (GRC) should be institutionalized to ensure the implementation of a GCN that meets the needs of GRAs as a whole and is interoperable on a global scale (for both coastal and global modules). The GRC represent the interests of GRAs as a whole to the I-GOOS, GSSC, and other global bodies as needed and appropriate. GRC members should be appointed by GRA, and a Chairperson should be elected by the membership. The GRC should function under the auspices of I-GOOS.

1.2 Establish a Joint (GOOS/GTOS) Panel for Integrated Coastal Observations (J-PICO) for technical guidance as recommended by the IGOS Coastal Theme. J-PICO should report to the GSSC and the GTOS Steering Committee and provide strategic guidance to GRAs and JCOMM through them.

The goals of the coastal module of GOOS can best be achieved through collaboration with GOOS-GCOS and GTOS. The GSSC-Ocean Observations Panel for Climate (OOPC) provides a mechanism for the former. Although critical for successful

1 As described in the implementation strategy for coastal GOOS, the coastal module consists of a Global Coastal Network with Regional Coastal Ocean Observing Systems nested in it (http://www.ioc-goos.org/documents/GOOS-148-COOP-lowres.pdf).
development of the coastal module, no such mechanism exists to enable coordinated implementation across the land-sea interface. The IGOS Coastal Theme report (approved by the IGOS Partners in 2005) recommends the formation of a Joint Panel for Integrated Coastal Observations (JPICO) to satisfy this need. The recommendation has been endorsed by JCOMM, the GSSC, and the GEO Coastal Zone Community of Practice. JPICO should be established as an advisory body to the GSSC and the GTOS Steering Committee. Terms of Reference approved by the GSSC in 2006 are given in Annex III.

1.3 To enhance communications between I-GOOS and GRAs, points of contact for each GRA should be maintained and updated annually by the GOOS Project Office and GRA interests should be represented by the GRC at meetings of the I-GOOS and its Executive Board. The latter could be accomplished by appointing the Chairperson of the GRC to serve in an ex officio capacity on the I-GOOS Board.

1.4 National representatives to the I-GOOS must ensure that planning documents approved by the I-GOOS and/or the IOC (e.g., the coastal GOOS design plan and implementation strategy) are transmitted to the GRC and all GRA points of contact for endorsement and implementation.

1.5 Within the framework of the UN Convention on the Law of the Sea, agreements will be needed among countries to enable the timely exchange of data on the state of coastal waters relevant to achieving the six societal goals of coastal GOOS. This will be a challenge and should be a high priority for the I-GOOS, especially for those variables recommended for JCOMM to take on. As a first step toward global interoperability, it recommended that issues of access to and exchange of data on national coastal waters be addressed initially within each GRA with multi-national partners.

2. Consider and make proposals concerning possible long-term actions\(^2\) by the GSSC, JCOMM and the GRAs for the implementation of coastal GOOS, e.g. where additional expertise and/or subsidiary mechanisms may need to be developed.

GSSC

2.1 Advise the GRC as needed to help customize observing requirements for the common variables regionally and to periodically review and update these requirements for the GCN as a whole.

2.2 Using the implementation strategy for the coastal module as a guide, formulate a 5-year plan for building a GCN that is operational\(^3\), including the specification of research priorities, the implementation of regionally organized pilot (proof of concept, demonstration) projects, phased implementation of operational capabilities, and performance metrics.

\(^2\) “Long-term” is interpreted to mean actions that should be initiated now to achieve long-term objectives as well as those that should be initiated sometime in the future.

\(^3\) For the purposes of this report, “operational” means the routine and sustained provision of quality controlled data at rates and in forms specified by decision makers for applied purposes relevant to achieving the six societal goals of the coastal module.
2.3 In collaboration with the GRC, identify and promote implementation of high priority, regionally organized pilot projects that will lead to improved operational capabilities of the coastal module. High priority projects are those that have clear socio-economic benefits and a high probability of success. Such 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.

2.4 Collaborate closely with the GTOS-SC to formulate strategic plans for coordinated implementation of the coastal and global modules of GOOS and GTOS.

2.5 In collaboration with the GRC, 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.

JCOMM

2.6 Recognizing that GRAs and national GOOS programmes are the primary implementing mechanisms for GOOS, coordinate the stepwise integration of the non-physical common variables into the GCN as they become pre-operational based on guidance from the GSSC. The JCOMM Observations Coordination Group (OCG) should provide fora for coordination of observational assets in order to try to attain the desired coverage and data density.

2.7 Capacity building is particularly important for implementing the coastal module globally. There is an immediate need to establish mechanisms by which GRAs determine priorities for capacity building in their respective regions and for JCOMM-IODE-IOC capacity building efforts to be coordinated to address these priorities. This should involve implementing capacity building efforts as part of ongoing programs (e.g., GLOSS capacity building) and GOOS pilot projects based on guidance from the GRC to the GSSC and the IOC Capacity Building Committee. Expert teams and the capacity building rapporteurs embedded within each JCOMM Programme Area should work to help make this happen with priorities communicated to JCOMM and I-GOOS by the IOC Capacity Building Committee.

2.8 Approve technical standards and best practices for common variables and related services as recommended by the GSSC.

2.9 Promote coordinated development of regional JCOMM-IODE-GRA partnerships to enable the growth of the GCN via the development of a regionalized, global data management and communications network as recommended in the implementation strategy for coastal GOOS. This should include fora for data management coordination conducted by IODE-JCOMM Data Management Coordination Group as well as collaboration among GRAs and developing ocean data management networks.

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such as the IODE-Ocean Data and Information Networks (ODINs)\textsuperscript{5} and the EU Sea-Search Net.\textsuperscript{6}

2.10 Ensure that the development of this data management and communications network is coordinated and interoperable with the GTS and the developing WMO information system.

GRAs

2.11 Establish a governance structure that conforms to the GOOS Regional Policy, and work with the I-GOOS to establish certification criteria and a process for certification as responsible bodies for GOOS implementation.

2.12 Encourage all coastal nations in their region to actively participate in governance, establishment of priorities for capacity building, building Regional Ocean Observing Systems, and using data and information provided by GOOS.

2.13 Implement JCOMM-approved standards, protocols and best practices for measurements of common variables, data telemetry, data management and modeling. It is the responsibility of data providers to make use of available assets for real time data transmission (the GTS is preferred) or delayed mode transmission (national and international data centres) to make observations available.

2.14 Submit reports to the I-GOOS every two years on the status of their governance mechanisms and inventories of contributions to GOOS infrastructure.

2.15 Work with the I-GOOS and the GSSC to establish the GOOS Regional Council as the primary mechanism to coordinate development of a GCN that meets the needs of all Member States and to represent the interests of GRAs as a whole to I-GOOS and the GSSC.

2.16 Promote and coordinate national and regional development of the GCN including (i) engaging user groups in the specification of data and information requirements for services and decision making, (ii) functioning as test beds for developing products and associated observing system requirements (including regional applications of remote sensing data), (iii) collaborating with other countries in the region to provide access to \textit{in situ} observations of the common variables in a timely fashion, (iv) collaborating with other GRAs to improve the calibration and validation of \textit{in situ} and remotely sensed observations, scaling capacity up for global implementation, and exchanging information on “what works” and “what does not work.”

2.17 Through the GOOS Regional Council, advise the GSSC on streamlining stepwise implementation of operational elements of the GCN.

\textsuperscript{5} \url{http://www.iode.org/files.php?action=viewfile&fid=249&fcat_id=56}

\textsuperscript{6} \url{http://www.sea-search.net/}
3. Based on the Coastal Ocean Observations Panel (COOP) implementation strategy, and in the light of existing expertise and structures, propose possible immediate and specific actions for GSSC, JCOMM and the GRAs to further the implementation of coastal GOOS.

JCOMM

3.1 For incorporation into JCOMM Programme Areas, JCOMM-MAN should review all proposals from self-financing bodies engaged in ocean observations, data management, modeling and/or services and coordinate their integration into GOOS based on guidance from the GSSC.

GSSC

3.2 Review existing GOOS-related, regional activities and assess their research-pilot project-preoperational-operational status and their importance to developing the GCN.

GRAs

3.3 Work with the I-GOOS to establish the Regional GOOS Council as a mechanism for global coordination of coastal GOOS implementation and for representing GRA interests to the I-GOOS, GSSC and other global bodies as needed.

3.4 Engage I-GOOS representatives in the respective regions in regional implementation of GOOS, including obtaining national funding commitments via the I-GOOS.

3.5 Establish partnerships with regional programs having mutual interests. These include Large Marine Ecosystem Programmes, Regional Seas Conventions, and Regional Fishery Bodies.

3.6 Initiate procedures that will enable timely access to and exchange of data on the common variables among countries in the region. This should include establishing a data exchange policy consistent with the GOOS data policy, the development and maintenance of inventories of data (variable names, availability, metadata, etc.) that are or should be in the public domain.

3.7 Inventory existing operational assets and data stream/bases that are available and determine next steps to improve operational forecasts and risk assessments.

GSSC and GRAs

3.8 Promote implementation of priority pilot projects recommended in the COOP implementation strategy\textsuperscript{1} and the IGOS coastal theme.\textsuperscript{5} An example of a recommended coastal GOOS pilot project that should be given high and immediate priority is the “Ocean Colour Pilot Project” of POGO, the IOCCG, and GEO.\textsuperscript{7}

\textsuperscript{7}http://www.ocean-partners.org/documents/GOOS_ChlPilotMtgReport.pdf
3.9 Identify and prioritize additional pilot projects for implementing on national and regional scales.

4. Recommend what observations [variables] should be taken on by JCOMM and what should be left to the GRAs? It is important to remember that before any measurement or product can be taken on by JCOMM for regulation and coordination, it must be in a pre-operational phase with agreed standards and protocols for measurement, data management, and product production, and it must have a group that is responsible for the measurement or product.

4.1 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 bodies have been established to sustain them. This should be a step-wise process based on recommendations from the GSSC and supported by the GRC.

4.2 The GSSC should work with the GOOS Regional Forum to establish criteria for recommending to JCOMM that it take on the non-physical, common variables recommended in the implementation strategy for coastal GOOS, e.g., criteria for being classified as “pre-operational.”

4.3 The GSSC should periodically review and update the list of common variables based on their operational status and their use in the provision of products and services.
Recommended New Structure of GOOS

Implementing the recommendations above requires more effective coordination and collaboration of GRAs; more effective communications between GRAs, I-GOOS and the GSSC; and the provision of strategic guidance for developing a scientifically sound, operational network of observations, data management and modeling across the land-sea interface (Figure 2). Thus, the Task Team recommends (i) that the GOOS Regional Council (GRC) be charged with representing the common interests of GRAs to the I-GOOS and the GSSC and with coordinating the development of a GCN that meets the collective data and information needs of GRAs and (ii) the creation of a Joint (GOOS/GTOS) Panel for Integrated Coastal Observations (JPICO) to provide scientific and technical advice for coordinated implementation of the coastal modules of GOOS and GTOS. The Task Team believes that this is the minimum level of bureaucracy needed for effective implementation of GOOS as a whole.

Recommended relationships between the GOOS Regional Council (GRC) and the Joint Panel for Integrated Coastal Observations (JPICO) and the I-GOOS and GSSC.
Annex I

Roles of the I-GOOS, GSSC, OOPC, JCOMM, IODE and GRAs in the Design & Implementation of GOOS

Recommendations made herein assume that (1) the Joint WMO/IOC Commission for Oceanography and Marine Meteorology (JCOMM), the Intergovernmental Committee for the Global Ocean Observing System (I-GOOS), and the GOOS Scientific Steering Committee (GSSC) will achieve the objectives embodied in their respective Terms of Reference and (2) that GOOS Regional Alliances (GRAs) are (or soon will be) in compliance with the GOOS Regional Policy.

1. I-GOOS (Responsible for governance and commitments)\(^8\)

I-GOOS, established in 1992 by the IOC Executive Committee, has the overall responsibility for formulating policy, procedures and strategy and for coordinated implementation of GOOS. GOOS will be implemented by Member States operating at the national level, and, where appropriate, in partnership with neighboring States operation at regional and global levels.\(^9\) Implementing the coastal module globally depends on the ability of the I-GOOS to (i) facilitate implementation through national and regional initiatives and subsidiary bodies of IOC, including the identification and mobilization of needed resources; (ii) assist in developing the capacity of all Member States to contribute to and benefit from GOOS and in particular aid countries to acquire and make best use of information products and services derived from GOOS; and (iii) promote international support and cooperation for implementation of GOOS, through other UN agencies and international mechanisms such as the Global Earth Observation System of Systems.

These aspects of the I-GOOS Terms of Reference are interpreted by the Task Team (TT) to mean that I-GOOS will not only promote and coordinate the implementation of a technically and scientifically sound GOOS, it will work to obtain the resources needed for implementation on a global scale. In regard to the latter, capacity building and funding to enable GRAs to build the GCN are critical to successful implementation of the coastal module of GOOS.

2. GSSC and OOPC (Technical advisory committees for strategy and guidance)

The GSSC provides technical guidance for implementing both the global and coastal modules of GOOS.\(^10\) The Committee advises I-GOOS and is composed of experts in relevant disciplines of marine science and global observation. Co-sponsored by IOC, WMO, UNEP, FAO and ICSU, the GSSC (i) advises the I-GOOS on all scientific and technical aspects of GOOS, including resource requirements; (ii) develops and updates, as appropriate, a long-term scientific and technical plan and accompanying short- to medium-term action plans and targets for GOOS; (iii) is responsible for the scientific and technical aspects of GOOS design and operation, and undertakes appropriate activities to support the design process; and (iv) submits, as required, reports to the sponsoring organizations and to I-GOOS.

The Ocean Observations Panel for Climate (OOPC) provides technical guidance for sustained implementation of the global ocean observing system for climate in support of the goals of its sponsors (GOOS, GCOS, and WCRP). This enables collaboration between GOOS and GCOS for coordinated development of the global ocean and marine meteorological elements of GOOS and GCOS, respectively. No such body exists to provide technical guidance for coordinated development of the coastal modules of GOOS and GTOS. In this context, it is noteworthy that the IGOS Coastal Theme report\(^11\) (which has been approved by the IGOS Partners) recommended the formation of a Joint (GOOS/GTOS) Panel for Integrated Coastal Observations (JPICO) to satisfy this need. The recommendation has been endorsed by JCOMM and

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\(^8\) http://www.ioc-goos.org/content/view/18/32/
\(^10\) http://www.ioc-goos.org/content/view/19/33/
\(^11\) http://www.igospartners.org/docs/theme_reports/IGOS%20COASTAL%20REPORT%20midrez.pdf
by the GSSC, but was not approved by the IOC Executive Committee at its 2006 meeting. Currently, this important activity must be done via the GSSC and the GTOS Coastal Panel.

3. JCOMM (Implementation)\(^\text{12}\)

The Joint Commission was established to coordinate marine meteorological and oceanographic services and their supporting observations, data management, and capacity building world wide. This includes enhancing and sustaining “an integrated global marine meteorological and oceanographic observing and data management system containing both in situ and remote sensing components.” In addition, JCOMM is to “…contribute to the prevention and control of marine pollution, sustainable development of the marine environment, coastal area management and recreational activities, and [to provide marine services in support of the safety of coastal habitation and activities]…”\(^\text{13}\) Coordination is achieved through a Management Committee and coordination groups (Programme Areas) for observations, data management, and services (including modeling). Capacity building is a cross-cutting activity integrated into the remit of each coordination group and undertaken under the auspices of IOC and WMO. Among other things, the JCOMM Management Committee is charged with “reviewing the internal structure and working methods of the Commission, including its relationship to other bodies [e.g., GRAs and the GOOS Regional Forum] and the development of proposals for modifications as appropriate.”

In regard to the Programme Area for data management, it should be emphasized that the Intergovernmental Oceanographic Data and Information Exchange (IODE) committee of IOC was formed long before JCOMM to manage oceanographic data from all disciplines before there was opportunity for rapid exchange of these data. Later, the oceanographic forerunner of JCOMM (the Integrated Global Ocean Services System, IG OSS) was formed primarily to encourage real-time ocean data exchange. IG OSS and IODE worked closely together to build a data management system that covered the spectrum of real-time to delayed data delivery. When IG OSS merged into JCOMM, it was recognized that the close working relationship with IODE would need to evolve to one between JCOMM and IODE. This has occurred with the organizations jointly sponsoring projects, expert teams and coordinating capacity building resources.

Although JCOMM is currently focused on coordinated implementation of the physical oceanographic and meteorological aspects of GOOS as related to the ocean-climate system and marine services, it is important to note that the Commission has recognized the need to include observations from other disciplines and is already involved in a number of coastal networks including wave buoy networks, water level networks (GLOSS), and coastal meteorological data buoys. Likewise, oxygen is routinely measured on many Argo floats now and \(\text{pCO}_2\) and \(\text{in vivo}\) fluorescence are expected to be in the near future.

In this context, there are two immediate issues that JCOMM must address in terms of implementing the coastal module:

(1) Should JCOMM expand its activities be responsible for coordinated implementation of all elements of the coastal module, and, if so, how?

(2) Does the Commission have the community and institutional support (in the form of funding and personnel) needed to do so.

\(\text{ Although (1) is the subject of this report, it must be emphasized that it will not be possible to implement the recommendations herein without substantial increases in international support for JCOMM in the form of both funding and qualified personnel.}\)

4. IODE (Data management)

The IOC’s International Oceanographic Data and Information Exchange (IODE) Programme was established in 1961 to enhance marine research, exploitation and development by facilitating the exchange of oceanographic data and information between participating Member States and by meeting the needs of

\(^{12}\) http://www.wmo.ch/web/aom/marprog/JCOMM/jcomm-tors.htm

\(^{13}\) http://ioc.unesco.org/jcomm/meetings/jcomm2/draft-jcomm2-report.doc
users for data and information products. Quality controlled data are archived and made available oceanographic data to member states through a global network of organizations consisting of Designated National Agencies (DNAs), National Oceanographic Data Centres (NODCs), Responsible National Oceanographic Data Centres (RNODCs) and World Data Centres (WDCs). During the past 40 years, IOC Member States have established over 60 oceanographic data centres in as many countries. The main objectives of the IODE Programme are (1) to facilitate and promote the exchange of all marine data and information including metadata, products and information in real-time, near real time and delayed mode, (2) ensure the long term archival, management and services of all marine data and information; (3) promote the use of international standards, and develop or help in the development of standards and methods for the global exchange of marine data and information, using the most appropriate information management and information technology; (4) assist Member States to acquire the necessary capacity to manage marine data and information and become partners in the IODE network; and (5) support international scientific and operational marine programmes of IOC and WMO and their sponsor organizations with advice and data management services.

5. GRAs (Implementation)

- 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, GOOS Regional Alliances 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.

6. GRAs, I-GOOS and JCOMM

I-GOOS is primarily concerned with the overall governance of coordinated implementation of GOOS and with national commitments to implementation. JCOMM is primarily concerned with coordinated implementation of the global ocean-climate modules of GOOS and GCOS (ocean and coastal) at technical level. Despite the role of the GOOS Project Office as a coordinating body between I-GOOS, JCOMM and GRAs (Figure 1), working relationships between these bodies are not clear. This has been a chronic problem that is especially problematic for phased implementation of the coastal module as recommended in the implementation strategy for the coastal module.²

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² 26 April 2001, IOC-XXI/2, Annex 8
http://unesdoc.unesco.org/images/0012/001246/124684e.pdf#search='GOOS%20Regional%20Policy'
20 December 2006

Annex II

Comments Received from Reviewers of the Draft Preliminary Task Team Report

As of 1 December 2006, reviews have been received from JCOMM-MAN, IOGOOS, the President of I-GOOS (François Gerard), participants in the 3rd GOOS Regional Forum, and Helen Yap (GSSC).

A. From JCOMM-MAN

(1) The Committee stated its strong preference to maintain the GSSC as its single point of contact for requirements within GOOS, in recognition that the GSSC is the technical and scientific advisory body of GOOS for the global and coastal modules. The Committee also recognized that the development of JCOMM’s roles in facilitating the implementation of the coastal module and of common variables will involve considerable interaction with the GSSC and its technical experts.

(2) The Committee re-stated its eagerness to facilitate the implementation of coastal GOOS and to foster worldwide observation of physical and common variables and delivery of services relevant to these variables.

(3) The Committee agreed that prerequisites to JCOMM accepting coordination responsibility for a particular variable should be that the measurement or product must be in a preoperational phase with agreed standards and protocols for measurement, data management, and product production. The Committee further agreed that some of the preparatory groundwork (for example preparation for new data types and formats) could be undertaken by the Commission in the appropriate Programme Areas.

(4) The Committee noted the critical importance of coastal marine weather, wave and water level forecasts to all coastal nations, and that JCOMM could look into how improved access might be achieved as one of its initial activities in support of coastal GOOS.

(5) The Committee will provide written feedback for revision of the draft report based on the discussion during this session (action: secretariats).

(6) The Committee stressed the need for GOOS to recognize JCOMM’s role in the implementation of the global observing system. It also invited I-GOOS to reflect this role in GOOS policy. Recognizing this essential role, the Committee also felt that there would be two-way benefits in the coordination between JCOMM and GOOS if JCOMM were to be represented on the I-GOOS Board. (action: GOOS member of Committee).

B. From François Gerard, President of I-GOOS

General principles: I-GOOS is charged to set up, develop, and maintain a system for the observation of the ocean. This system has to be global, in the sense it has to cover in a coherent way the world ocean, its adjacent seas and their coastal areas. This involves filling the existing gap between the GOOS module relating to the climate, covering the free ocean, and that relating to the coastal activities from which the development strategy has just been approved.

The ideas presented below rest on the elements advanced in the documentation available, in particular the reports of the two regional forums (2002, 2004), the strategy for implementation of the coastal GOOS module (2005), the report of the JCOMM-GSSC-GRA (2006) task team. They also result from informal discussions with persons involved in the process. They are based on four simple principles.

a) The clear separation of the implementation of the GOOS and of its governance. The implementation is the responsibility for a system of oceanic observation networks defined around basins. The governance is the responsibility for the GRA and I-GOOS.

b) The existence of an accreditation process of the GRA in line with the principles of GOOS quoted in appendix. This accreditation would include in particular an I-GOOS delegation as regards control and technical certification of the observation systems of their responsibility.

c) The constitution of the GOOS regional council (GRC), as a committee placed to I-GOOS under the same conditions as the GSSC and contributing with him to the overall governance of the system.
A network of ocean basin observing systems

We take up again here concept of Global coastal network (GCN) proposed as an element of the strategy of development of the coastal GOOS module, but while widening. One can indeed consider that the basic unit of development of GOOS is the Ocean region, defined either around an individual sea (the Mediterranean, the Caribbean Sea, the Arctic Ocean), or from an oceanic or coastal region showing individual characteristics (the margins of the North-East Atlantic, the western coast of South America). The geographical, physical and biological characteristics of these Ocean Basins condition the users' requests on the one hand, and the configuration of the observation network and of the corresponding information systems, on the other. We will designate them as regional ocean observing systems (ROOS).

The examples of this approach of the observation by basin are numerous and often old. It is the case of the systems developed in Europe around the Baltic (BOOS), of the Mediterranean (MOON) and of the margins of the North-East Atlantic (NOOS). It is that of the Indian Ocean (IOGOOS). The interest of the approach by basin is to make of the climatic GOOS module an observation system among others.

Let us note that we do not speak here directly about the regional coastal observation networks (RCOOS). The coastal applications are so diverse that they can be treated in GOOS only through a very strict principle of subsidiarity. The coastal systems will thus be regarded as elements of the basin systems. The proposal are therefore:

a) Elementary bricks for the implementation of GOOS are the ROOS, these systems including coastal components (RCOOS);
b) ROOS first meet the needs expressed on the ocean region under consideration, while contributing also to the overall system relating to the climate;
c) The coherence of all the ROOS is ensured by:
   i) the definition of a number of variables of common interest for the overall observation system, as proposed in the strategy of implementation of the coastal GOOS module;
   ii) the definition of methods, tools and common standards in the areas of the measure at sea, data management, modelling and analysis of the oceanic phenomena, to which each ROOS will have to adhere to be accredited as a system taking part in GOOS.
d) Each ROOS should be implemented by operators (existing entities or to be created) in charge of observations, data management, modelling and analysis, on the scale of on the region and its coastal areas.

We do not propose any standard model of organisation for the operators of the basin observation systems. This organisation will arise from the socio-economic characteristics and from the technical capabilities of the bordering actors of the region. The initiative is regional. On the other hand, the responsibility for overall consistency belongs to GOOS.

Groups who are led to play the first roles in the implementation of this network network are in particular the JCOMM and IODE, which have a long practice of the questions of coordination and of standardisation. These are not the only entities able to intervene on the matter of implementation, these are today first. It is therefore through this prism that we have to study the proposals made by the task team.

Lastly, it will be of the I-GOOS responsibility to validate these procedures and methods, within the framework of a process, not of certification (this term is not suitable), but rather of technical accreditation of the systems having vocation to form part of GOOS where to fold in its recommendations. A governance making it possible to facilitate this coordination, standardisation and accreditation work must then be found by decentralising it at most. It is here that GOOS regional alliances (GRA) intervene.

A regional alliance network closer to the users

In the spirit of the editor, each GRA shows the interests in and the needs with respect to GOOS of the Members of the IOC of a given Region, in the sociopolitical and geopolitical meaning of the term. Whatever is the origin of the alliance, it should therefore, at least:
20 December 2006

a) Organise and ensure the collection of the regional and local needs as regards monitoring, forecast, and protection of the oceanic and coastal environment;
b) Promote the acquis and the capacities of operational oceanography;
c) Transform the needs into specifications for observing systems on the scale of the basin and/or on the scale of the coasts;
d) Contribute to implementation of the ROOS meeting these needs, and ensure their consistency;
e) Contribute to capacity building in the region;
f) Ensure the institutional link with the governing bodies of GOOS, while acting in particular as an I-GOOS agent for certain coordination tasks.

Thus, regional alliance can have to direct several basin observation systems. Conversely, a basin observation system can meet the needs for several alliances and for other users. The example of the MOON system, on the Mediterranean will illustrate this remark. Resulting from an initiative of EuroGOOS, this observation system is also useful to MedGOOS (Countries of the circumference of the Mediterranean), and to Goos-Africa.

The GOOS regional Council.

The overall governance has to ensure the harmonious development of GOOS while respecting the currently still valid principles of it enacted in 1996. We are dealing with a system of systems, going from the general (the climate) to the specific (a bay or an estuary). The governance to be set up has therefore to obey a strict subsidiarity principle. We see here two governance levels, the global level and the regional level.
a) The global GOOS governance was clarified by the 23rd meeting of the IOC. I-GOOS ensures strategic control. The GSSC is the planning and scientific and technical expertise body. Join to also the J-COMM and IODE in their normative and operational support role. Only lacks the representation mechanism for the GRA.
b) The regional GOOS governance is the business of regional alliances. The link with the users and the answers to data fall within their competence. In their region they will have to follow the principles of GOOS, to exert some of the I-GOOS coordination tasks, make sure of the implementation of the ROOS of their responsibility and take care of the consistency of the depending RCOOS.
c) Ensuring the consistency of the system necessitates that GRA work together and have a close institutional link with I-GOOS and the IOC. Whence two proposals:
   i) Secure the regional GOOS forum as a bi-annual workshop of the GRAS, as a place of experience and proposal sharing.
   ii) Establish the GOOS regional council (GRC) taking part in the overall governance, as called upon by the second forum, and according to methods specified hereafter. The difficulty, noticed by the 23rd assembly of IOC, is to introduce into the system of the IOC the representation of groups which is not recognised structures both in the convention and in the rules of procedure of the organisation. The step proposed below can achieve the process, pending legal validation.
   iii) I-GOOS, at its next session agrees existing alliances, on the basis of the GOOS principles and related recommendations from the third forum.
   iv) All the GRA thus recognised constitute the GOOS regional council (GRC). In practice each alliance nominates a representative in this council. The Council nominates then a Chairperson who becomes a new ex-officio member of the of I-GOOS board.
v) In this context, the GRC could be a governance structure having same legal status than the GSSC.

It is under cover of the GRC that the Working groups suggested in the development strategy could be established. A simple way of forward is that the accreditation of alliances includes the existence in each one of them of a person in charge of the question followed by the working groups, whether this person is a rapporteur or a chairperson of a regional working group. All the regional rapporteurs of the observation thus set up the working group of the GRC, linking with the corresponding programme area of the JCOMM.
Consensus Recommendations from the 3rd GOOS Regional Forum, 14-17 November 2006, Cape Town, South Africa

GOOS Structure

1. Adopt the revised organizational structure shown below.
2. Create the Joint Panel for Integrated Coastal Observations (JPICO) as an advisory body under GSSC for the purpose of coordinating the coastal modules of GOOS and GTOS. Adopt the Terms of Reference for JPICO as presented by the Joint JCOMM-GSSC-GRA Task Team.
3. Formally recognize existing GRAs that conform to GOOS principles at the next session of the IGOOS.
4. Create a GOOS Regional Council (GRC) to represent GRAs interests to IGOOS and other global international bodies as appropriate and to promote coordinated development of operational capabilities for those GOOS goals requiring non-physical data. The GSC will consist of representatives of GRAs that have been recognized by the IGOOS. The Chairperson of the GRC is to be elected by GRC members and should serve as an ex-officio member on the I-GOOS Board. ToR for the GRC should be based on initial on recommendations from the 2nd and 3rd GOOS Fora.
5. The IGOOS board should develop performance metrics to enhance the capability of each GRA and guide the development of the ROOS towards maturity
6. The GSSC and the GRC should collaborate to establish criteria for designating observations of the common variables as “pre-operational” and ready for JCOMM to coordinate their integration into GOOS as an operational observational asset.

RCOOSs and the GCN

1. RAs should oversee and manage the development of Regional Ocean Observing Systems (ROOSs) that include both global and coastal components. The term “RCOOS” should be dropped.
2. Implement the GCN in collaboration with the global module of GOOS (basin scale) and the coastal module of GTOS (land-based systems).
3. Propose 1 pilot project per region that demonstrates compliance with GOOS principles

GOOS and LMEs

1. GRAs should partner with LMEs to achieve common goals in those regions where both are active.
2. To stimulate this process and demonstrate the power of such a collaboration, GOOS Africa and the Benguela LME Programme should implement an end-to-end (observations-data management-modeling) pilot project that contributes to the development of both efforts.
D. From IOGOOS

Recommendations are presented below for each term of reference. Long-term actions and coordination mechanisms are considered first and then, in this context, more immediate actions for existing GOOS bodies to further the implementation of coastal GOOS. We conclude with recommendations for which observations should be taken on by JCOMM and for modifications in the current structure of GOOS needed to do so.

Our model for accomplishing this varies a great deal from the proposed model in this paper, wherein others are given the responsibility for implementation.

1. Propose a long-term coordination mechanism or mechanisms between JCOMM, GSSC, and GRAs to address all areas of mutual interest and avoid overlap and duplication of effort [for implementing the coastal module of GOOS].

1.2 Establish a Joint (GOOS/GTOS) Panel for Integrated Coastal Observations (J-PICO) for technical guidance as recommended by the IGOS Coastal Theme (and for reasons given in the preamble above). J-PICO should function under the auspices of the GSSC and the GTOS Steering Committee (and their sponsors) and provide strategic guidance to GRAs and JCOMM through them.

J-PICO should provide guidance to the GRAs through GSSC.

1.3 To enhance communications between I-GOOS and GRAs, points of contact for each GRA should be maintained and updated annually by the GOOS Project Office and GRA interests should be represented at meetings of the I-GOOS and its Executive Committee. GRA interests should be represented by whom at I-GOOS?

1.4 National representatives to the I-GOOS must ensure that planning documents that have been approved by the I-GOOS and the IOC (e.g., the coastal GOOS design plan and implementation strategy) are transmitted to all GRAs via the GOOS Regional Forum for endorsement and implementation. The transmittal of planning documents to GRAs is by national reps to I-GOOS through the GOOS Regional Forum. Thereafter the GRAs have implementation responsibility although elsewhere in this report responsibility is given to the Forum or JCOMM?

1.5 To ensure the implementation of a GCN that meets the needs of GRAs and is interoperable on a global scale (for both coastal and global modules), the GOOS Regional Forum should function under the auspices of I-GOOS and become a formal advisory body to JCOMM. As such, the Forum should work with JCOMM to populate JCOMM Programme Areas, set JCOMM priorities and agendas, and identify or establish responsible bodies for stepwise implementation of the GCN. The GOOS Regional Forum becomes an advisory body to JCOMM.

1.6 Within the framework of the UN Convention on the Law of the Sea, agreements will be needed among countries to enable the timely exchange of data on the state of coastal waters relevant to achieving the six societal goals of coastal GOOS. This will be a challenge and should be a high priority for the I-GOOS, especially for those variables recommended for JCOMM to take on. It recommended that this be initiated within GRAs with multi-national participation. What is to be initiated by GRAs and who is “it”? Timely sharing of data is already a basic principle of GOOS. Why is a recommendation needed?

2. Consider and make proposals concerning possible long-term actions by the GSSC, JCOMM and the GRAs for the implementation of coastal GOOS, e.g. where additional expertise and/or subsidiary mechanisms may need to be developed.

GSSC
2.1 Collaborate with GRAs (via the GOOS Regional Forum) to customize observing requirements for the common variables regionally and to periodically review and update these requirements for the GCN as a whole.

Thus it appears that a role of GSSC is to collaborate with GRAs within the GOOS Regional Forum to customize observing requirements for common (coastal) variables.

JCOMM

2.5 Take on the implementation of the GCN in a stepwise fashion based on advice from the GSSC and consistent with the GOOS Regional Policy. See page 6/7 where it states that GRAs…. Are the primary implementing bodies for building the coastal module of GOOS including the GCN.

2.6 Capacity building is particularly important for implementing the coastal module globally. There is an immediate need to establish mechanisms by which GRAs determine priorities for capacity building in their respective regions and for JCOMM-IODE-IOC capacity building efforts to be coordinated to address these priorities. This should involve integrating capacity building efforts into ongoing programs (e.g., GLOSS capacity building). Expert teams and the capacity building rapporteurs embedded within each JCOMM Programme Area should work to make this happen, and priorities could be communicated to the I-GOOS via the GOOS Regional Forum.

JCOMM should identify priorities for capacity building and transmit those to I-GOOS. What is role of GRAs in developing capacity building?

2.7 Collaborate with GRAs, through the GOOS Regional Forum, to ensure that standards and protocols adopted by JCOMM-IODE for those common variables currently overseen by the Observations Programme Area are adopted and used by GRAs globally.

This role was assigned to GSSC in para 2.1?

For global coverage, this includes capturing the relevant data streams from all platforms (coastal and oceanic), ensuring that they are transmitted to data centers, and filling gaps in spatial and temporal coverage as needed.

GRAs

2.12 Submit reports to the I-GOOS every two years on the status of their governance mechanisms and contributions to GOOS infrastructure.

Assume submission of reports to I-GOOS is also a requirement for I-GOOS members?

2.13 Work with the I-GOOS and JCOMM to establish the GOOS Regional Forum as a mechanism to coordinate development of a GCN that meets the needs of all Member States and to serve as a formal advisory body to JCOMM.

What is the formal mechanism for providing advice? What is the status of the GRAs in this process? In para 2.15 it states that GRAs will advise JCOMM on streamlining stepwise implementation of operational elements of the GCN. Does the GOOS Regional Forum become the development coordinator of the GCN?

The latter should include helping to engage user groups, populate JCOMM Programme Areas, set priorities and agendas, and identify of establish responsible bodies for stepwise implementation.

How does a GRA help populate a JCOMM programme area?

2.14 Promote and coordinate national, regional and global development of the GCN including engaging user groups in the specification of data and information.

As stated here, it is the responsibility of GRAs to coordinate development of the GCN? Para para 2.5 states this is the role of JCOMM??

requirements, functioning as test beds for developing products and associated observing system requirements (including regional applications of remote sensing data), collaborating with other countries in
the region to provide access to in situ observations of the common variables in a timely fashion, collaborating with other GRAs to improve the calibration and validation of in situ and remotely sensed observations, scaling capacity up for global implementation, and exchanging information on “what works” and “what does not work.”

2.15 Through the GOOS Regional Forum, advise JCOMM on streamlining stepwise implementation of operational elements of the GCN.

Again, there is confusion on roles of JCOMM, GRAs and Forum re implementing GCN.

3. Based on the Coastal Ocean Observations Panel (COOP) implementation strategy, and in the light of existing expertise and structures, propose possible immediate and specific actions for GSSC, JCOMM and the GRAs to further the implementation of coastal GOOS.

**JCOMM**

3.1 Expand the JCOMM Terms of Reference to explicitly address all aspects of implementing the coastal module of GOOS *(does this mean the GCN? See para 2.14 and page 6/7 where this role is given to the GRAs.)*, including coordination with GRAs, the global ocean-climate module, and the coastal module of GTOS. This should occur in a considered, step-wise fashion over time.

3.2 Ensure that GRA interests are represented in all Programme Areas.

**How will this be accomplished?**

3.3 The Programme Area for observations should assess existing (e.g., Continuous Plankton Recorder surveys) emerging operational networks (e.g., High frequency coastal radar networks) and establish procedures to include them.

**What is meant by “them”?**

**GRAs**

3.5 Establish the Regional GOOS Forum as a mechanism for global coordination of coastal GOOS implementation.

*See para 2.14 and page 6/7 where this role is given to GRAs? GRAs are to “Promote and coordinate national, regional and global development of the GCN”*

**GSSC and GRAs**

3.10 Promote implementation of priority pilot projects recommended in the COOP implementation strategy1 and the IGOS coastal theme.5 An example of a recommended coastal GOOS pilot project that should be given high and immediate priority is the “Ocean Colour Pilot Project” of POGO and the IOCCG.

*Under 2 on page 8 this task is given to GSSC. In paras 3.5 to 3.9 above there is no mention of the role of GRAs in developing pilot projects.*

4. Recommend what observations [variables] should be taken on by JCOMM and what should be left to the GRAs? It is important to remember that before any measurement or product can be taken on by JCOMM for regulation and coordination, it must be in a pre-operational phase with agreed standards and protocols for measurement, data management, and product production, and it must have a group that is responsible for the measurement or product.

4.1 JCOMM should take on

**what is meant by “take on”**

all of the common variables to be measured as part of the GCN as their data streams become pre-operational and bodies have been established to sustain the data streams. This should be a step-wise process based on recommendations and support from GRAs as a group.
E. From Helen Yap

First of all, congratulations on this product after what looks like hard work.

I understand the difficulty of trying to fit existing organizations into a scheme which hopes to achieve the following: essentially, a system which allows unimpeded communication among (1) local policy makers or government bodies that articulate the needs of their respective constituencies; (2) the technical personnel who actually collect the data on the ground (normally situated within local meteorological and/or oceanographic institutions or agencies); (3) the regional representatives who coordinate the local efforts; and (4) the global oversight bodies.

The task team report appears to emphasize that the process is driven from the bottom up, which is how it should be (in my opinion). The regional representatives are the GRA’s grouped into the Regional Forum. They receive and coordinate the local inputs, then provide the essential feedback loop back to the local level to ensure that the entire process moves forward in a coherent, and positive, fashion. They also report to the global bodies.

I suppose the global oversight bodies are represented by JCOMM, the OOPC and the GSSC which create additional feedback loops back to the regional, but also to the local levels as well, to ensure that the entire process is integrated.

Given all of this, it is not clear to me what the role of I-GOOS really is (having attended none of their meetings; but neither of JCOMM nor OOPC for that matter).

I am sure the meeting in Cape Town in November will help resolve this. Good luck!

H.T. Yap
26 October 2006
The Coastal Theme Team was established by the IGOS Partners to determine requirements for observations needed to assess interactions among coastal marine and terrestrial systems across the land-sea interface. The Team’s report builds on and complements design and implementation plans of the coastal modules of GOOS and GTOS. Both plans identify phenomena of interest, such as land-use, land-cover, coastal flooding and erosion, habitat loss, harmful algal blooms, mass mortalities of marine mammals. In so doing, it was recognized that terrestrial and marine phenomena, or changes in them, are often related and that interactions among them must be addressed explicitly.

Implementation of the Coastal Theme is critically important to the development of robust and effective policies and management plans to ensure that coastal regions are managed in a sustainable manner with respect to such interfacial phenomena. Recognizing that the Steering Committees for GOOS and GTOS are responsible for the provision of science and technical advice for scientifically sound implementation of GOOS and GTOS as a whole, a Joint Panel for Integrated Coastal Observations (J-PICO) is now needed to provide scientific and technical advice for the implementation of integrated coastal observations across the land-sea interface and to promote and enable coordinated development of such a system as part of the implementation of GOOS, GTOS and GEOSS. J-PICO will significantly improve the ability of participating nations to achieve their goals and those of GEOSS and international agreements and conventions for environmental protection, sustainable resources and biodiversity, healthy coastal ecosystems, and periodic assessments of the status of coastal ecosystems. To these ends, the recommended terms of reference J-PICO are as follows:

(1) Provide the IGOS Partners, CEOS and the Steering Committees of GOOS and GTOS with technical advice needed for scientifically sound, coordinated implementation of the Coastal Modules of GOOS and GTOS as related to cross-boundary (land-sea) effects of climate change, natural hazards and human activities on coastal development (urbanization, agriculture, infrastructure development, etc.), public health risks, hydrological and biogeochemical cycles, and ecosystem health and productivity.

(2) Facilitate and enable implementation of IGOS Coastal Theme in coordination with implementation of GOOS, GTOS and GEOSS as a whole. This should include the identification of users and specification of observing system requirements based on their data and information needs.

(3) In collaboration with CEOS, promote the development of space-bases platforms and sensors that meet coastal requirements for higher spatial, temporal and spectral resolution.
(4) As needed, conduct workshops and work with the national and international bodies to plan and implement pilot projects that enable development of integrated observations across the land-sea and air-sea interfaces.

(5) Establish ties with the scientific and technical organizations (e.g., IGBP and SCOR) to facilitate synergy between advances in science and technology and the development of operational capabilities of the coastal modules of GOOS and GTOS as related to land-sea interactions.

(6) Provide expertise and advice to JCOMM, FAO and other bodies as appropriate on the development of the operational elements of the GCN including the management and dissemination of non-physical, physical and socio-economic variables regarding:
   • Observations,
   • Data Management and distribution,
   • Modelling, and
   • Communication of data and information to user groups.

(7) Advise capacity building programs, including those of the FAO, JCOMM and the IOC, regarding capacity building needs of nations and regions and approaches to addressing such needs.

(8) Using the implementation strategies and plans for coastal GOOS and GTOS as guides, prepare and periodically update an Implementation Action Plan for the Coastal Theme that is coordinated with implementation of the GEOSS in general and GOOS, GCOS and GTOS in particular.

(9) Organize periodic assessments of the status of implementation and performance of cross-boundary elements of the coastal modules of GOOS and GTOS and recommend improvements and enhancements in them.

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