

Global Ocean Observing System for the Indian Ocean (IOGOOS)

Strategic Plan 2014-2019

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1. Mission of IOGOOS

To foster cooperation and concerted actions on ocean monitoring and observations, ocean science, operational oceanography and ocean services to meet societal needs for the Indian Ocean, to mitigate the impacts of natural disasters and climate change and to inform policy and decision making for protecting life and property and marine habitats and resources.

2. Objectives

The association of marine operational and research agencies and institutions which is IOGOOS recognize the imperative need to take a pro-active role and concerted actions to understand the ocean and coastal regions of the Indian Ocean for making informed decisions that save lives and protect living habitats and resources in the Indian Ocean region,

The broad intent is to contribute, collectively, to the progress of ocean observations, ocean science and operational oceanography, focusing on these imperative needs of the Indian Ocean region,

IOGOOS provides an organizational framework for planning, coordination and effective implementation of appropriate regional and sub-regional ocean and coastal observing systems, associated research and development, and services,

Members of IOGOOS will collaborate and work together for developing programmes for the implementation of GOOS in the Indian Ocean and for promoting activities of common interest for the development of operational oceanography in the Indian Ocean region.

The specific objectives are to:

- a) Contribute to the enhancement and establishment of the ocean observing system in the region;
- b) promote and facilitate efficient and effective management, exchange and utilisation of oceanographic data and information;
- c) promote and facilitate projects in coastal oceanography, in particular in relation to the prediction and mitigation of the impacts of hazards;
- d) promote programmes and projects in operational oceanography and ocean services in the region meeting the requirements of end-users;
- e) strengthen capacity building for enhancing the capabilities in the region;
- f) encourage research in support of the above and the needs of users;
- g) develop synergies with other ocean programmes and regional GOOS bodies; and
- h) contribute to international planning and promotion of GOOS.

3. Strategic Approaches

3.1. Enhancement of the Ocean Observing System

- a. Identify gaps and deficiencies in the existing/planned in -situ and remote sensing ocean observing system, and develop a programme for realizing a well-designed and affordable ocean observation system for the region, adhering to the 'GOOS principles'.
- b. Promote the development of cost-effective operational instrumentation and observing systems.

3.2. Data Management, Data Exchange and Communication

- a. Promote the development of cost-effective systems for acquisition, management, processing and interpretation of data.
- b. Expand and strengthen networking of countries using modern technology including internet for real and near real time exchange of data, information and products.
- c. Promote the development of standardized data procedures, including data quality control, adoption and use of metadata models, and data management more generally.
- d. Provide high quality data and time series for a better understanding and improving the Indian Ocean ecosystem.
- e. Collaborate with other programme and bodies in the field of data collection and data management, including as appropriate, through the ocean contribution to GEOSS.
- f. Co-ordinate GOOS data acquisition with existing regional and national data gathering systems under the agreements and conventions relating to pollution monitoring, marine meteorology, navigation and safety at sea.
- g. Establish an inventory of available data, information and products.
- h. Promote the exchange of coastal sea level data.
- i. Establish an ocean expert data base for the IOGOOS region.

3.3. Applications and operational Services

- a. Identify priorities for operational oceanography and ocean services in the Indian Ocean region, based on evaluation of environmental, social and economic benefits.
- b. Promote the development of regional and local operational oceanography, taking into account the components of GOOS, for realizing services and products of maximum value to the countries of the region.
- c. Support operational oceanography and services in collaboration with marine- related public and private sector organizations and programmes.

3.4. Capacity Building

IOGOOS should work with IOC and members to identify requirements in Capacity Building for the region and possible solutions encompassing the following:

- a. Involve institutions, develop leadership;
- b. Identify the training needs of countries in the region and promote organization of training courses, workshops and seminars;
- c. Promote the development of common infrastructure, major systems or capital installations required to support operational oceanography in Indian Ocean;
- d. Promote and aid capacity building, exchange of know-how, technology and personnel as well as collaboration, within the framework of GOOS (including co-sharing the facilities for data acquisition, processing and development of interpretational skills);
- e. Promote pilot projects and studies in the countries of the region to demonstrate the economic benefits of GOOS;
- f. Strengthen collaboration with GOOS, POGO and JCOMM, including IODE and DBCP capacity building panels and other capacity building programmes of IOC and its sub-commissions in the Indian Ocean region;
- g. To exploit bilateral and multi-lateral opportunities for CB in the region (e.g., exchange of training for access to facilities).

3.5. Research

- a. Promote research and operational research for solving problems relating to operational oceanography in the Indian Ocean, including modeling and analyses of observation.

3.6. Co-operation with other programmes and bodies

- a. Contribute to international planning and implementation of GOOS.
- b. Assist in developing policies for the furtherance of GOOS and co-ordinate the best regional participation in GOOS, identifying where greatest value is added by collaboration.
- c. Promote collaboration between existing regional multi-national agencies, programmes, organizations, and initiatives having expertise in oceanography, operational systems, and remote sensing of the ocean.
- d. Collaborate, as appropriate, with relevant regional GOOS-related and complementary regional initiatives, such as LME programmes through joint projects and activities.
- e. Cooperate, as appropriate, with organizations concerned with the assessment of climate change, global environmental research, and the impacts of climate variability and climate change.
- f. Promote collaboration with space agencies and remote sensing scientists and

engineers so as to ensure optimum integration of both in situ and remote sensed data in operational oceanography.

- g. Promote collaboration between Institutes and agencies in providing aid and assistance to developing countries for operational oceanography, and the necessary capacity building.
- h. Provide as appropriate, expertise, consultants, etc., to the IOC/WMO/UNEP GOOS Steering Committee (GSC), and to the international sponsoring agencies of GOOS.

3.7. Publications

- a. Publish findings of meetings, workshops, studies and other documents commissioned by the IOGOOS members and submission of documents to international meetings related to GOOS and collective representation of GOOS to regional and national agencies when requested by members.

3.8. Ocean and coastal systems and services

- a. Promote the development of observational networks (pilot and operational) that support monitoring.
- b. Promote joint research, the establishment of centres, and the exchange of data and related information services with a focus on
 - i. Ocean and coastal hazards and their mitigation and adaption options,
 - ii. Coastal Zone Management,
 - iii. Marine Ecosystems and resources,
 - iv. Shoreline change, including coastal erosion/inundation,
 - v. Ocean data analysis and forecasting,
 - vi. Climate variability and change impacts on the marine environment, including trends.
- c. Contribute to the development of the Indian Ocean Tsunami Warning System (IOTWS) through fostering and promoting collaboration on sea level observations and systems.

4. Strategic Priorities 2014-2019

4.1. Observing System Activities

- a. The ongoing Indian Ocean (Climate) Observing System activities that are being pursued by the CLIVAR/IOGOOS Indian Ocean Panel (IOP) are direct contributions of IOGOOS to the Global Observing System with a focus on the Indian Ocean. The IOP coordinates the deployment of a basin-wide observing system in the Indian Ocean

(the Indian Ocean Observing System, IndOOS, which includes the Research Moored Array for African-Asian-Australian Monsoon Analysis and Prediction, RAMA). These deployments are accompanied by efforts to maintain the Argo float network and a variety of physical oceanographic survey and mooring support cruises.

- b. SIBER is a basin-wide, international research initiative sponsored jointly by IOGOOS and the Integrated Marine Biogeochemistry and Ecosystem Research (IMBER, see <http://www.imber.info/>) Project, with close ties to the IOP and the IndOOS Resources Forum. The long-term goal of SIBER is to understand the role of the Indian Ocean in global biogeochemical cycles and the interaction between these cycles and marine ecosystem dynamics. SIBER has been motivated by Indian Ocean observing system deployments, accomplished under the auspices of the IOGOOS and IOP that have created new opportunities for carrying out biogeochemical and ecological research.
- c. The IndOOS Resource Forum (IRF) was established by resolution of IOGOOS, incorporating the institutions that are currently committing resources to the IndOOS. The membership of the IRF is invited by the Chair of IOGOOS and comprised of representatives of institutions allocating or facilitating resources to accomplish the overall goals of IndOOS, with the Chair of the CLIVAR/GOOS Indian Ocean Panel and the Chair of the Sustained Indian Ocean Biogeochemistry and Ecosystem Research Scientific Steering Committee as Observers. The IRF reviews membership at each meeting and invites additional members as required. The main function of the IRF is to provide a multi-institutional Forum to facilitate the alignment of resources for implementation of the IndOOS, including the following:
 - To review the requirements for the implementation of IndOOS;
 - To facilitate and coordinate resources that may be applied to the system, especially ship time for the Research Moored Array for African-Asian-Australian Monsoon Analysis and Prediction (RAMA);
 - To encourage scientific and technological initiatives, in the participating countries, to meet the objectives of IndOOS;
 - To report on its activities to the Heads of the institutions providing resources.
- d. The International Indian Ocean Expedition 50th Anniversary Initiative (IIOE-2) has been in a planning phase with IOGOOS a key stakeholder community engaged in the planning, as endorsed by UNESCO IOC at its 27th Assembly meeting, 2013. SCOR and IOC are jointly planning the IIOE-2 with IOGOOS (during 2012-15). IIOE-2 is likely to run from 2015 to 2020. IOGOOS is also providing three members to the IOC's IIOE-2 Interim Planning Committee (Group of Experts), as per the Resolution on IIOE-2, (Ref: IOC Executive Council meeting No 47, 2014).
- e. IOGOOS role and contributions to the Global Coastal Network (GCN) related to Chloro-GIN: An audit could be coordinated from IOGOOS that could cover national programmes of the IOGOOS members in coastal monitoring, in-situ and remote sensing activities, data products, modelling and prediction activities, Data and Information Management, etc.
- f. IOGOOS role and contributions to the coastal ocean beyond the Global Coastal Network (GCN): The coastal ecosystem pilot project, the Indian Ocean elements of Chloro-GIN and the remote sensing activities of IOGOOS have been identified as the

IOGOOS contributions to the coastal ocean beyond the GCN. These activities are to be pursued.

4.2. Data and Information Management

- a. INCOIS and the IOGOOS Secretariat are involved in the Data Management of the IOP Data. An interface to the data is already provided on the IOGOOS Website (<http://www.incois.gov.in/Incois/iogoos/home.jsp>). Further, a comprehensive data and information management plan could be evolved by ensuring wide participation of the data managers from the region.

4.3. Applications and Operational Services

- a. Applications of ocean climate reanalyses and climate change projects through downscaling (coral reefs and fisheries applications).
- b. Downscaling ocean analysis and prediction: the long-term objective is to develop regional, coastal and near-shore modeling capability within the constituency of IOGOOS.
- c. Chloro-GIN Project.

4.4. Capacity Building and Training

- a. IOGOOS should work with IOC and IRF to identify requirements for the region and possible solutions.
- b. Activities need to align with the projects of IOGOOS.
- c. IOGOOS should pursue activities that facilitate expert/scientist exchange/visits.
- d. IOGOOS should hold short term training courses and workshops with the collaboration of member states.

4.5. Support Ocean and Coastal Research/Observing

- a. IOGOOS has strong programmes in ocean and coastal ecosystems and climate as well as remote sensing. IOGOOS could play a potentially strong role in coordinating coastal research/observing.
- b. Support and Strengthen existing regional networks for monitoring at marine habitats (e.g. Global Coral Reef Monitoring Network (GCRMN) regional nodes).

4.6. Co-operation

- a. Participation of IOGOOS on the GOOS Regional Forum .
- b. Collaboration between the IOP, SIBER and IRF.
- c. Other GOOS entities and related regional programmes.

5. Operational Plan (Programme of Work)

Regional work programs are a fundamental component of the IOC structure to translate the global programmes and ocean services of the Commission into activities that maximize the benefit for Member States, taking into account the regional-specific perspectives and capability and the priorities indicated by Member States.

IOGOOS is not part of the intergovernmental structure but is recognized as one of the GOOS Regional Alliances and can influence the development of GOOS. The MoU for IOGOOS delivers a measure of autonomy since it is the Members themselves who decide actions and mutual commitment.

However, IOGOOS will only be seen as effective as a GRA if its work and actions truly add value and capacity in line with GOOS objectives and related Member State needs. The creation of a GOOS Regional Alliance does provide a mechanism for formally linking the work program of IOGOOS to GOOS itself but, in practical terms, it will be through working to the priorities established in GOOS plans, collaboration in bodies and panels of GOOS, and national coordination via GSC and JCOMM.

Regional alliances have a unique role in terms of building partnerships and cooperation at the agency level and it is at this level that IOGOOS is most effective.

Work (action) of IOGOOS takes on many forms:

- a. Building scientific knowledge and supporting data for ocean and coastal management,
 - decision making and policy formulation, and
 - as contributions to the broader base of oceanographic data and knowledge;
- b. Increasing national and regional capacities in marine sciences and observations through
 - training,
 - development of leadership,
 - networking among scientists and research institutions, and
 - the mobilization of resources;
- c. Improving bilateral and multilateral support arrangements; and
- d. Enhancing communication and awareness building.

The work program can be organized in a number of different ways including

- a. Sector/field or regional specific projects. They are characterised by (among other things):

- A project plan, with specified objectives, outcomes and measures of performance;
 - An agreed period for the project; and
 - Identified leaders and participants.
- b. Work that is a direct contribution to a GOOS or related IOC program of action. The definition of this work should include
- Well defined objectives, which may be ongoing;
 - Designation of rapporteurs and/or leaders responsible for interaction with GOOS;
 - A schedule of work for each inter-sessional period; and
 - A clear identification of the IOGOOS role and responsibility.

5.1. Project Areas (2014/15)

5.1.1. Currently being pursued:

- a. International Indian Ocean Expedition 2.
- b. Indian Ocean Panel and IndoOS;
- c. Sustained Indian Ocean Biogeochemistry and Ecosystem Research (SIBER) Program;
- d. IndoOS Resource Forum;
- e. Modeling for Ocean Forecasting and Process Studies;
- f. Indian Ocean Core Remote Sensing Project with sub-projects on Coastal Ecosystems, Shoreline Changes and Real-time Chlorophyll Mapping and Applications;
- g. Capacity Building.

5.1.2. Potential New Projects:

- a. Regional (coastal) projections of climate change (sea level, sea temperature, acidification);
- b. Extended provision of remote sensing products and involvement in satellite missions;
- c. Call for proposals for Ocean Colour Sensors;
- d. Invitation to develop payload instruments for future small sat missions;

- e. Digital elevation projects to support inundation studies (storm surges, sea level rise), coastal morphology and shoreline change, tsunami modelling;
- f. Contributions to the Tsunami and Other hazards Warning System (TOWS);
- g. Ensure appropriate remote sensing CB activities are built into IOGOOS Pilot Projects.
- h. Constitution and development of Oceanic Small Scale Industry Capacity Building and Mega-Regional Networks.