Summary Proceedings of IOGOOS-VII: The Seventh Annual Meeting of the Indian Ocean Global Ocean Observing System

Perth, Australia

July 12 – 16, 2010

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ACKNOWLEDGEMENTS

IOGOOS gratefully acknowledges the important support for this meeting from the UNESCO IOC Perth Regional Programme Office, as host and co-sponsor and from INCOIS, India, as Secretariat of IOGOOS. IOGOOS also acknowledges and appreciates the support of the IOC Perth Office's principal sponsors as providers of the underpinning resources enabling the meeting to be held in Perth (UNESCO IOC, Australian Bureau of Meteorology and Western Australian State Government). IOGOOS also thanks delegates who gave of their valuable time and resources in attending the meeting to progress the vision and programs of IOGOOS, and that appreciation extends to the delegates' host institutions for supporting IOGOOS through the approval and allocation of their representatives to engage in IOGOOS, its meetings and associated projects.

This report was written by Mr. Nagaraja Kumar based on the meeting notes recorded during the sessions, the preliminary report of Dr. V. Sampath, Consultant, BOBLME and with the inputs from Dr. T. Srinivasa Kumar, IOGOOS Officer and Dr. Nick D' Adamo, Head, IOC Perth Regional Programme Office.

1 INTRODUCTION

The IOGOOS-VII Workshop and annual meeting was held at Citigate Perth Hotel, Perth, Western Australia during July 12 – 16, 2010 and hosted by the UNESCO IOC Perth Regional Programme Office (IOC Perth). The IOGOOS Secretariat, based at INCOIS, coordinated the meeting with assistance from IOC Perth Office. This annual IOGOOS meeting was held in conjunction with a related and integrated package of meetings comprising the 7th meeting of the Indian Ocean Panel of GOOS/CLIVAR (IOP), 1st meeting of Sustained Indian Ocean Biogeochemistry and Ecosystem Research (SIBER) and 1st meeting of the Indian Ocean Observing System (IndOOS) Resource Forum (IRF). The IOGOOS meeting also included a workshop on the IOGOOS Pilot Project: Modeling for Ocean Forecasting and Process Studies, which followed a related workshop held at the same venue on 9-10 July 2010 which brought together related stakeholders interested in progressing capacity development in ocean forecasting throughout the IOGOOS and SEAGOOS and WAGOOS regions. In addition, the Bay of Bengal Large Marine Ecosystem (BOBLME) program held a Regional Oceanography Workshop as part of IOGOOS-VII.

The agenda of the meeting and the list of participants of IOGOOS VII Workshop and Annual Meeting are attached as **Annexures 1 & 2,** respectively**.**

The background notes to assist with the meeting's discussions and deliberations, produced by Dr. Nick D'Adamo, IOC Perth Office has been reproduced (with minor editorial corrections) in full in **Annexure 3.**

This report provides a record of the salient elements, recommendations and action items resulting from the meeting.

Presentations delivered by the delegates at the meeting are available through tghe IOGOOS website (http://www.incois.gov.in/Incois/iogoos/home.jsp).

2 OPENING ADDRESS AND INAUGURAL CEREMONY

Dr. Nick D'Adamo, UNESCO IOC Perth Office, welcomed the dignitaries and the delegates to the IOGOOS Workshop, IOP-7, SIBER-1 and IRF-1 meetings and presented an overview of the objectives of the week's meetings along with a brief outline of the accomplishments of IOGOOS, IOP, IndOOS, IRF and SIBER constituents of IOGOOS.

Dr. Noel Nannup, accompanied by indigenous music from Mr. Derek Nannup, provided a moving traditional Welcome to Country and drew participants' attention to the Indigenous cultural significance of the ocean and adjacent land.

His Excellency Dr. Ken Michael AC, Governor of Western Australia declared the IOGOOS -II officially open. His Excellency emphasised the world's changing weather and associated oceanographic patterns, and focused the audience's attention on the effects of these changes on the Indian Ocean and adjacent island and continental land masses, citing drastic changes in the rainfall patterns, extreme wind events etc., and attributed these changes to the land-sea interaction and the changing ocean conditions. His Excellency outlined the role of IOC in promoting ocean sciences, in capacity building and other compelling issues and, in the area of capacity building flagged the Western Australian Governor's initiative of involving over 150 young Western Australian students in a Science Forum, to engender their interests in science for sustainability of the ocean environment and its resources under mounting of threats from the vagaries of natural and anthropogenic pressures.

Ms. Julie de Jong, Acting Executive Director, Western Australian Department of Commerce, welcomed the dignitaries and delegates to the State of Western Australia, on behalf of the Government of Western Australia. Ms de Jong noted the Government's support of the mdeting through its ongoing support of the UNESCO IOC Perth office, for example, in its role as sponsor and host of the week's meetings. Ms de Jong highlighted the Indian Ocean as a biodiversity hotspot and pointed to climate change in the Indian Ocean region affecting agriculture, rainfall patterns, extreme weather and climatic conditions and how it was understood and appreciated that the work of the groups meeting during the week in Perth is playing vital role in characterising these phenomena and their influence on Indian Ocean island and rim communities, including Western Australian and Australia. Ms de Jong noted that societies throughout the entire region depends on reliable ocean and meteorological observations and predictions for conserving and sustaining natural resources.

Dr. Shailesh Nayak, Secretary to the Government of India in the Ministry of Earth Science and Chair, IOGOOS, gave a welcome address and traced the history of formation of IOGOOS, highlighting the discovery of the Indian Ocean Dipole as a major factor in the global / Indian Ocean climate. He emphasised the ocean's control on the global climate, and the interplay that occurs between ocean, land and biosphere as a key role on the monsoon, cyclones, coastal erosion and other environmental responses. The ocean resources are impacted by climate change and their conservation and sustainability require a sound system of in-situ and satellite based observations. Dr. Nayak emphasized the need for the establishment of a mechanism to continue these observations in a coordinated and concerted manner for which he sought the support of IOC. Dr. Nayak emphasised the essential importance of Capacity Building in coastal ocean observations including critical coastal habitats (eg coral reefs, mangroves, seagrass beds and areas of rich biodiversity) and coastal water quality, all

of which are critical to oceanic productivity. Form the perspective of societal needs for food and economic wealth from the oceans, Dr. Nayak further highlighted the dependence of coastal fisheries on water quality, nutrients and primary & secondary producers relating to critical coastal habitats. Dr. Nayak reminded delegates of the lack of adequate observational data on the coastal ecosystem domains of the IOGOOS constituency. Uniformity in data collection, data quality and calibration were highlighted as major requirements for sustaining ocean and coastal observations, as was the need to commit ourselves in undertaking sustained long-term observations. Furthermore, it was noted that level rise in the Indian Ocean is much faster than other regions and this aspect has to be given adequate priority in the future ocean observations.

Dr Wendy Watson-Wright, Executive Secretary of IOC and Assistant Director General of UNESCO, in her keynote address highlighted the role of the Global Ocean Observing System (GOOS) from the IOC perspective and provided related commentary on the synergistic role of the GRAs (such as IOGOOS) and related project groups (such as IOP, SIBER and IRF) in the IOC's global context. Science, applications and capacity building were emphasised as three major areas addressed by IOGOOS. Reference was made to the ICG/IOTWS as another IOC body progressing observations and related services through the Indian Ocean Tsunami Warning and Mitigation System. Dr Watson-Wright commended IOGOOS's role as a GOOS Regional Alliance that has been an effective vehicle for regional capacity building, and noted the increasing resources that will be needed to support the range of relevant initiatives that are and will be implemented under IOGOOS.

Dr. Neville Smith, Deputy Director (Research and Systems), Bureau of Meteorology, Australia, in his key note address provided a history on ocean observations and related services for the Indian Ocean since the formative SOCIO meeting of 2000. As Dr Smith pointed out, of the 180 ocean observatories covering all the oceans in 1970s, there were only 7% in the Indian Ocean, but today it is much more. Nonetheless, for real-time information we have data arriving essentially from only the upper 400 m of the ocean. Ocean prediction as a complement to the observing system was initiated in the late 1990s. The related activities of IOGOOS will benefit the entire community, he said. Some of the major issues Dr Smith flagged as food for thought included: the need for a related set of Indian Ocean institutions committed to long-term Indian Ocean observations; and the establishment of an Indian Ocean entity such as an IOC sub-commission, as a plausible mechanism for the future that could effectively complement IOGOOS and serve as a broad platform for ocean science and observations.

3. PLENARY TALKS

Dr. Tim Moltmann, Director, Integrated Marine Observing System (IMOS), Australia spoke on IMOS, citing Australia as having the third largest ocean territory on earth being custodian of marine assets with globally significant conservation value and which are highly sensitive to the coupled ocean-climate influences. IMOS is a national, collaborative, research infrastructure program for sustained observations in the marine environment. It seeks to have in place integrated ocean observations from the open ocean to the continental shelf and coast. It focuses on addressing thematic issues crossing physics, chemistry, and biology and IMOS makes all the data discoverable and accessible for free, as per the international GOOS principles of free, open and timely access of data. IMOS was established in 2007 and has its current

tenure secure to at 2013. Core funding of AUD 102M was provided for IMOS by the Australian Government and this levered a co-investment (in-kind and cash) by collaborating groups in Australia in the order of AUD 110M. This national collaborative programme is hosted by the University of Tasmania. The observational framework is driven by science plans that are focused around geographical nodes of activity around the Australian shelf and coast. Observing equipment is then delivered, deployed and curated by instrument 'facilities', operating as national facilities based through a number of national marine institutions with the added role of providing their data to IMOS's centralised eMII (eMarine Information Infrastructure) data management and delivery facility.

Dr. Yukio Masumoto, IOP Co-chair gave a plenary talk on the subject "Indian Ocean Observations – Present status and science highlights and vision for the future in the context of synergies between IOP and the IRF". He highlighted the role of the Indian Ocean science drivers, viz. seasonal monsoons, severe weather events & cyclones, intra-seasonal variations, Madden Julian Oscillations, inter-annual variations, the Indian Ocean Dipole (IOD), Influence of ENSO, decadal variability, warming trends and ocean circulation & biogeochemistry. He also highlighted the Indian Ocean Observing System (IndOOS), a multi-platform long-term observation network, along with the present deployment status of its various mooring arrays such as RAMA, ARGO and XBT/XCTD lines, and the data availability at the IndOOS data portal site maintained by INCOIS. He also overviewed the science programmes that are using IndOOS data and how IndOOS is helping to improve the understanding of ocean phenomena of climate importance. He also underlined the strong linkages among IOGOOS, SIBER, IOP and IRF – a key for full implementation of IndOOS.

Dr. Raliegh Hood, Co-chair of SIBER, delivered a plenary talk on "SIBER as a new science alliance under IOGOOS and IMBER and vision for the future in the context of synergies with IOP and IRF". He outlined the genesis and maturation of SIBER, its emerging science plan and proposed implementation strategy for SIBER. Dr Hood outlined SIBER's major science areas as:

- Boundary current dynamics, interactions and impacts;
- Variability of the equatorial zone, southern tropics and Indonesian Throughflow and their impacts on ecological processes and biogeochemical cycling;
- Physical, biogeochemical and ecological contrasts between the Arabian Sea and the Bay of Bengal;
- Controls and fates of phytoplankton and benthic production in the Indian Ocean;
- Climate and anthropogenic impacts on the Indian Ocean and its marginal seas;
- The role of higher trophic levels in ecological processes and biogeochemical cycles.

Dr. Gary Meyers, IRF Convenor, delivered a plenary talk on the "Introduction of the IRF and convergence of IOGOOS, IOP and SIBER meetings towards the inaugural of IRF -1 meeting on Day 4 i.e. July 15, 2010. Dr Meyers provided the background to the IRF's evolution and the general nature in which the IRF is intended o work and support the IOP and SIBER in their operational puruits.

4. IOGOOS ANNUAL MEETING

Dr. Shailesh Nayak, Chair, IOGOOS welcomed and complemented those involved in contributing to the activities of IOGOOS and declared open the 7th meeting of IOGOOS. He also encourag3d and welcomed the notion of the Bay of Bengal Large Marine Ecosystem (BOBLME) program to become a member of IOGOOS. This was followed by the remarks of IOGOOS Officers, who welcomed BOBLME members to the meeting and invited the BOBLME to become actively involved in IOGOOS.

Dr. Nick D'Adamo, Officer-in-charge, UNESCO IOC Perth Regional Programme Office, Australia in his remarks gave an overview of the role of IOC Perth in supporting and facilitating IOGOOS and its programmatic activities, particularly the focus on developing a better observing system through IOP and IndOOS framework. In also welcoming BOBLME members to Perth, he suggested that the major activities of BOBLME could be harmonised with IOGOOS through a sub-regional programme under IndOOS and that in this context the relationship between BOBLME and IndOOS could be discussed during the meeting. He also pointed to capacity development as another area under IOGOOS for cooperation between developed and developing countries. He referred to INCOIS's training programme in Remote Sensing and training and IOGOOS's capacity development program aimed at improving member's proposal writing skills for submission to international funding agencies. The sphere of building capacity in ocean forecasting was highlighted in Dr D'Adamo's address and reference was made to the emerging IOGOOS Pilot Project: Modeling for Ocean Forecasting and Process Studies. In this context Dr D'Adamo highlighted the good progress that was made at the workshop (Perth, 9-10 July 2011) that immediately preceded IOGOOS-VII and which brought together IOGOOS and SEAGOOS stakeholders with a view to furthering the development of objectives in the project.

Dr. Srinivasa Kumar, IOGOOS Secretary, gave an account of the Chlorophyll Global Integrated Network (ChloroGIN) project in which eight IOGOOS members are participating. This project linked closely with GOOS programmes and will generate 1 km resolution data products and disseminate them to the IOGOOS member countries. *Societal Applications in Fisheries and Aquaculture Using Remotely-Sensed Imagery* (SAFARI), complementary to ChloroGIN, is another major capacity development initiative supported by IOGOOS. Dr Kumar noted the limited progress of late in IOGOOS's coastal ecosystem and shoreline management related capacity development activities, even though much progress had made been made up to end of 2008, culminating in the related workshop held in Malaysia (December 2008). He emphasised the importance that mapping of mangroves, coral reef and sea grass beds is to IOGOOS constituents and added that they should continue to receive focus as programs under IOGOOS. He invited the champions of these projects to come forward and take the lead to activate these projects. He also welcomed the new association of BOBLME with IOGOOS and hoped that a concrete action plan would emerge out of this association. Dr Kumar noted and welcomed Bangladesh's interest in joining IOGOOS.

4.1 Science Talks relevant to IOGOOS Activities

Dr. Andreas Schiller presented a science talk on "Ocean Modeling for Operational Forecasting in IOGOOS Region". In his talk he emphasized the need for integrating ocean observing systems with models and applications. He outlined the importance of having appropriate observation systems, including remote sensing and in-situ observations. Dr Schiller covered the availability and use of contemporary operational

forecast systems, associated services delivery systems. Dr Schiller outlined the role of specific observational parameters in ocean forecasting, including SST, sea level anomaly, currents etc. It was clear that researchers and general users require a diverse range of products from ocean forecasting systems and their inherent tools (models). Dr Schiller ended by emphasizing that this was a challenge in the context of IOGOOS's related pilot project.

Dr. Nicolas Hoepffner, delivered a talk on "Applications of Satellite Data to Marine Ecosystem Management: contribution of the SAFARI and ChloroGIN initiatives". He explained the objectives and outline of ChloroGIN, as an international network for promoting ocean colour and related satellite and in-water observations to assess the state of marine coastal and inland water ecosystems for the benefit of society. SAFARI was referred to as having the aim of assimilation of ecosystem observational data into fisheries research and ecosystem-based fisheries management. He explained the capacity and training initiatives under the project and the role of INCOIS in processing data products and capacity building through training, and through the coordination of eight related time series stations off the east and west coasts of India.

Dr. Sidney Thurston of NOAA, Climate Program Office, gave a brief on the 1st IOC/WMO Data Buoy Cooperation Panel In-Region Western Indian Ocean Capacity Building Workshop, held in Cape Town, South Africa during April 2010. He also outlined the goals of NOAA in this context, which seeks to build and sustain infrastructure to provide services to benefit society, in the areas of ocean observations, forecasts, analysis and capacity building. Dr Thurston also highlighted that as of February 2010, in respect to GOOS's global progress in implementation of its overall suite of observational components, 62% of the overall plan has been reached. Within the overall GOOS network, 87% of surface observations from ships are complete, 100% of global drifting surface buoy array is now in place, and 100% of ARGO (profiling floats) are operational. In respect to progressing IndOOS, and in particular the mooring array (RAMA) of IndOOS, NOAA has developed (or imminent) formal bilateral agreements with the agencies in India, Japan and Indonesia and with the Agulhas Somali Current Large Ecosystem program (ASCLME) comprising nine east African countries. NOAA is also working with India and Indonesia on related training, education, capacity building and ship time.

Dr. Yukio Masumoto, Japan, delivered a science talk in which he gave an account of the "Present Status and Science Highlights of the Indian Ocean Observations", which covered IndOOS, related mooring arrays, the IndOOS data portal and RAMA mooring stations. He outlined how real-time and delayed mode data from IndOOS assisted in characterizing and understanding the devastating cyclone Nargis in the Bay of Bengal (April-May 2008). In addition, reference was made to the 2006 field experiment MISMO (Mirai Indian Ocean Cruise for the Study of the Madden Julian Oscillation Convection), outlining the observations and large-scale background conditions that existed during the height of 2006 Indian Ocean Dipole.

Dr. S.S.C Shenoi, Director, INCOIS, India gave a presentation on "Operational Oceanographic Services in IOGOOS Region". In his talk he highlighted the success story of the Potential Fishing Zone (PFZ) advisory provided to fishermen off India, which has recently been used for developing Tuna Fishery forecasts, forecasting of the waves under the INDOFOS programme;, which comprises Ocean State Forecast including high wave alerts, mixed layer depth, depth of thermocline, surface currents, sea surface temperatures etc. Dr Shenoi discussed critical assessments of the quality

of INDOFOS, the Ocean Data and Information System (ODIS) and the role of INCOIS in providing these advisories to the user agencies and public.

Dr. B.K. Jena, Scientist from NIOT, Chennai, gave a presentation on the "HF Radar Network along the Indian coast under Tsunami Early Warning System (TEWS) India". HF radars are deployed at 10 locations along the Indian coastline, of which eight are in the Bay of Bengal. This network plays a key role in tsunami warnings, oceanographic studies, climate research and disaster management. HF Radar provides information on sea surface currents and waves. A pair of HF radar stations in the network can cover sea areas of between about 30000 and 40000 sq. kms. The HF Radars transmit data every hour to the NIOT and INCOIS data centres. When monitoring for tsunami, the data are received every 5 minutes. Future plans are being developed for establishing a HF Radar network that will cover the entire Indian coastline.

Dr. Rudolf Hermes, Chief Technical Adviser, BOBLME gave an overview presentation on the BOBLME Programme. In his presentation he gave a brief history of the BOBP, recent history on the BOBLME Project development dating back to 2001, the LME concept and the five modules of BOBLME (Pollution & Ecosystem Health, Productivity, Fish & Fisheries, Socio-economics and Governance), the five components of BOBLME (Development of an Action Plan, Resource Management, Understanding the Environment, Ecosystem Health and Communications) and the details thereof. He also outlined the achievements so far, the project activities, project budget and the components of the programme, along with the expected project outputs and outcomes.

4.2 IOGOOS Annual General Meeting

Day 2 of IOGOOS-VII opened with an introductory remark by the Chair of IOGOOS. This was followed by remarks from Officers of IOGOOS and presentations of the progress reports on IOGOOS related activities covering the period since IOGOOS-VI.

Mr. M Nagaraja Kumar, Co-Secretary, IOGOOS presented the IOGOOS Secretariat Report for the period December 2008 to June 2010, highlighting the actions taken on recommendations made at IOGOOS-VI and progress in implementation of various activities during the interim. Mr. Kumar also detailed the three major leadership and proposal writing capacity building workshops held respectively in Kota Kinabalu (Malaysia), Hyderabad (India) and Kochi (India) and reported on the sponsorship for such through IOC and IOGOOS. He also requested that members pursue with their respective institutions for remittance of IOGOOS Annual Membership fees. He also tabled the status of the tenure of the IOGOOS Officers and the vacant positions which required election during the annual meeting and the nominations received against the vacant positions.

Dr. Nick D'Adamo, Officer in Charge, IOC Perth Office presented a report on IOGOOS related activities, outlined the role of IOC Perth Office in enabling the present IOGOOS meeting and generally in facilitating collaborative arrangements with neighboring GOOS Regional Alliances (GRAs). He referred to the IndOOS Resource Forum (IRF) which is sponsored and facilitated by IOC Perth, including funding of Dr Gary Meyers as IRF Convener. For consolidating the IOCs role in the Indian Ocean he referred positively to the suggestion by Dr Neville Smith (on day 1 of the IOGOOS-VII meeting) in regard to the concept of the formation of an IOC sub-

commission for the IOGOOS region, to consolidate the formal networks into perhaps a more efficient, streamlined and cost-effective entity. He also reiterated IOC Perth's support for BOBLME to engage in IOGOOS through membership and collaboration**.** Dr D'Adamo also emphasized the virtues to increasing the membership of IOGOOS and requested delegates to consider membership. IOC Perth is committed to supporting the GRA's of the region and Dr D'Adamo raised the idea of forming a GRA related reference group to include the GRAs and associated entities within the region under the purview of the IOC Perth Office (eg IO/SEA/SW Pacific/Southern Ocean), possibly prior to IOGOOS-VIII. (Dr. Nayak, Chair, IOGOOS expressed support for this concept and requested that Dr D'Adamo work towards its implementation). Dr D'Adamo agreed and suggested that it may timely to hold the first meeting of the reference group prior to the next GRA Forum (ie the GRA5 Forum, Poland, October 2011). Dr Somkiat Khokiattiwong also supported this idea, both as IOGOOS Officer and also as Coordinator of SEAGOOS.

Dr. Yukio Masumoto presented a report on Indian Ocean Panel (IOP) activities, referring in detail to the presentation he gave in plenary on Day 1.

Dr. Gary Meyers suggested that it would be timely and relevant for IOGOOS to now become more active in increasing awareness and working towards integrating the variety of ocean observing systems at work within the IOGOOS domain. In this regard, the IOGOOS Secretariat was requested to provide information on the Indian based ocean observing system and forward the detail to IOP with a view to enhancing integration with other complementary IOP programs.

Dr. Gary Meyers presented a Report on IRF activities and the agenda discussion paper for the IRF-1 meeting. He also briefed members on the agenda for the IRF-1 meeting scheduled for 15 July 2010. In regards to IRF reporting to IOGOOS, Dr Meyers advised that as Convener he would prepare and submit annual reports to IOGOOS meetings.

Dr. Raliegh Hood reported on SIBER activities, referring to the formative SIBER Conference held in October2006 (Goa, India) and the SIBER Project Writing Workshop held in Goa during November 2007. He emphasized that these meetings paved the way for the subsequent development of the six major research themes in SIBER Science and Implementation Plan. The meetings also layed he foundations for the recent Indian National SIBER Programme Workshop held during April 2009 in Goa and at which SIBER research proposals were developed and presented and the structure and outline of a Indian National SIBER Programme was finalized. He also mentioned that the SIBER Science Plan and Implementation Strategy had been completed and approved in principle by IMBER and IOGOOS, and reviewed with support by the IOC Perth office (SIBER co-sponsor). Dr Hood also briefed members on the new SIBER – RAMA initiative relating to IOP-SIBER collaboration for the addition of biogeochemical sensors on selected RAMA moorings in order to provide data on biogeochemical variability in key regions of the Indian Ocean.

Dr. T. Srinivas Kumar, Secretary IOGOOS presented the "Report on Indian Ocean Core Remote Sensing Project", which highlighted the project vision, objectives, operational aspects and achievements under the ChloroGIN Project. He also presented the Indian Ocean Core Remote Sensing Project Work Plan, its components, progress in respect to Ocean Colour (OC) Product generation, dissemination and validation, capacity building, etc. He also mentioned that POGO has submitted a proposal to the

Group on Earth Observation (GEO) with strong connection to ChloroGIN. He also added his optimism and enthusiasm in respect to opportunities for collaboration with BOBLME and SIBER in the area of remote sensing.

Dr. Nick D'Adamo reported on the IOGOOS Pilot Project "Modeling for Ocean Forecasting and Process Studies". He highlighted the emergence of multiple ocean forecasting systems relevant to the IO, SEA, SW Pacific and Australian regions. He referred to the 1st IOC/WMO Data Buoy Cooperation Panel In-Region Western Indian Ocean Capacity Building Workshop, held in Cape Town, South Africa during April 2010. In that regard Dr D'Adamo reported that the delegates at the Cape Town meeting were very interested in the development of the IOGOOS Pilot Project on 'ocean forecasting', particularly in respect to the potential for ocean forecasting to provide information on ocean dynamics per se in their respective regions of interest and also in respect to the capacity for ocean forecasting systems to provide boundary conditions and input for finer scale nested modeling. Dr D'Adamo pointed out that capacity building in ocean forecasting (an underpinning motivation for the IOGOOS pilot project) requires substantial resourcing in the form funding. He also reported on the *Ocean Forecasting Demonstration Project for IOGOOS & SEAGOOS. Project Planning Meeting, 9-10 July 2010, Perth, Western Australia* held as an adjunct to the IOGOOS-VII meeting and where a draft project plan was commenced and which would be used as the basis for the IOGOOS-VII breakout session for the development of the IOGOOS Pilot Project: Modeling for Ocean Forecasting and Process Studies. Dr D'Adamo emphasised that he believed it important that IOGOOS and SEAGOOS continue to work towards collaboration in their respective ocean forecasting development pursuits, referring to SEAGOOS's recent progress in developing an ocean forecasting demonstration project under the IOC WESTPAC frameowork.

Mr. Nagaraja Kumar presented the Status of the project on "Monitoring of Shoreline Changes". He presented the progress made by the project since IOGOOS-VI, the proposed work plan for the next year and the constraints in making progress in this the project. Dr Kumar urged the current focal points of the project to take a more active participation in the project's development and management or to suggest alternative project leader(s). Sri Lanka has indicated that it would be willing to host a workshop to further develop the project, if sufficient funding for such could be found.

4.2.1 Accounts and Financial Summary

Mr. Nagaraja Kumar, Co-secretary, IOGOOS tabled the IOGOOS statement of finances for the period 1 December 2008 to 30 June 2010 and detailed the major sources of income and expenditures incurred in organizing the workshops and meetings, and in sponsoring IOGOOS members for IOGOOS related workshops, meetings etc. The accounts have been verified by IOGOOS Officers, accepted and endorsed by Members.

This was followed by nomination of working groups for the two planned breakout sessions in respect to the agenda's ocean forecasting and remote sensing items.

4.2.2 Election/Nomination/Confirmation of IOGOOS officers

Mr. Nagaraja Kumar reported on the tenure status of existing IOGOOS Officers, including the two vacant positions. The Chair of IOGOOS submitted his intention to step down. The officer positions held by Dr. Alfonse Dubi and Dr. Somkiat

Khokiattiwong are eligible for extension for another two years, subject to the unanimous agreement of all Members. With the above in mind, the IOGOOS Secretariat had sent notification requesting for nominations. The Secretariat had received one nomination for Dr. Mitrasen Bhikajee to be IOGOOS Chair and two Officer nominations Dr. Andreas Schiller, CSIRO, Australia (representing the Eastern Indian Ocean Region) & Dr. T. Srinivasa Kumar, INCOIS, India (representing the Central Indian Ocean region). Dr. Alfonse Dubi and Dr. Somkiat Khokiattiwong have expressed their willingness to serve one more term of two years.

The floor was then opened further nominations, elections and confirmation of the positions. Dr. Somkiat supported the nomination of Dr. T. Srinivasa Kumar and Dr. Sateesh Shenoi supported the nomination of Dr. Andreas Schiller. There were no other nominations received and the Members supported the above nominations. Hence, the following are the IOGOOS Officer positions conferred.

Region	Person	Designation
Indian Ocean Islands	Dr. Mitrasen Bhikajee	Chairman
Central Indian Ocean	Dr. T. Srinivasa Kumar	Officer
Eastern Indian Ocean	Dr. Andreas Schiller	Officer
East Africa	Dr. Alfonse Dubi	Officer
North Eastern	Dr. Somkiat Khokiattiwong	Officer

The Elections were followed by a discussion on the date and venue of the next annual IOGOOS meeting (ie IOGOOS-VIII) and the endorsement of IOGOOS Members to change the nomenclature from "MoU" to "Agreement" for new membership in order to facilitate easy approvals for new Membership by newly interested countries / institutions. The request came from Sultan Qaboos University, Sultanate of Oman, as it would, fore example, itself becoming a member of IOGOOS. The proposition was endorsed by IOGOOS.

With this the annual meeting came to a close.

4.3 Breakout Sessions of Working Groups

4.3.1 Working Group 1. IOGOOS Pilot Project: Ocean Forecasting for Modeling and Process Studies.

The Working Group was led by Dr. Andreas Schiller supported by Dr. Nick D'Adamo.

The group took the elements of the draft project plan that was developed during the preceding complementary workshop of 9-10 July 2010 and began populating the plan with background detail on the project, objectives, methods and it also examined the approximate resources that might be required to achieve a successful project.

It was agreed that the project should be rationalized into a number of more workable sub-regional demonstration areas. These were:

- Ocean scale.

  This covers the IOGOOS region as a whole and, in anticipation of potential future collaboration with SEAGOOS in the project, also includes the South East Asian / Western Pacific region.

- South West Indian Ocean.
  This focuses on Mauritius, and covers the waters off east Africa, including the Seychelles and Maldives.

- North Indian Ocean.
  This focuses on India, and stretches across the north Indian Ocean, including the Arabian Sea and Bay of Bengal.

- South East Indian Ocean (including Arafura-Timor Seas).
  This focuses on the Arafura-Timor seas region.

In addition, and in respect to any future prospective integration with the IOC WESTPAC ***SEAGOOS Ocean Forecasting Demonstration*** project, the group discussed a potential collaborative focus that would comprise the South China Sea, including the Malaysian, Gulf of Thailand and Indonesian regions and also the Coral Triangle Initiative region.

The workshop led to a set of notes in which members representing the above five demonstration areas developed general and specific objectives, methods and resource requirements. With those notes in hand, it was resolved that the Project Coordinator, Dr Nick D'Adamo, would prepare a draft report, submit it to members ahead of IOGOOS-VIII for revision and then submit the revised version to IOGOOS-VIII for discussion, agreement and./or further development.

4.3.2 Working Group 2. Indian Ocean Core Remote Sensing Project

The Working group was led by Dr. T. Srinivasa Kumar. The working group discussed the three ongoing sub-projects of the Indian Ocean Core Remote Sensing Project i.e. centered respectively around 'keystone ecosystem monitoring (KEY)', 'shoreline changes', and 'Chlorophyll-a Mapping'. Representatives from 10 countries and BOBLME participated in the deliberations of the working group. Dr. Kumar also presented the outcomes of the ChloroGIN meeting held at Kochi, India during February 2010. Dr. Kumar requested the gathering to express their own interests and requirements for ChloroGIN Products relevant to their own respective regions. The working group discussed how the largely dormant KEY and Shoreline Changes projects could be re-energized and taken forward.

Dr. Rudolf Hermes, BOBLME that BOBLME representatives be permanently represented in the ChloroGIN project. He enquired whether the satellite data involved in ChloroGIN was cloud & atmospheric corrected and if so the format in which the data is made available. Dr Kumar answered yes to both. Dr. Hermes also enquired in respect to the coral bleaching studies being carried out in India especially in the Andaman & Nicobar Islands areas.

Dr. Kumar requested whether the group believed it useful to hold a capacity building workshop for interested participants focused on ChloroGIN. Dr. Hermes indicated that if any such workshop is planned, BOBLME would wish to participate through its members. Dr Hermes also asked learning whether India could provide related training for BOBLME members on board its research vessels in the related areas of data collection and analysis.

Participants re-affirmed the importance of the KEY project for the IOGOOS region and noted that the project coordinator had moved from IOGOOS, thence resolving that a new Project Coordinator be found. It was suggested that the term "Indian Ocean Rim Countries" be added to the title of the project. It was also suggested that three small teams addressing three respective ecosystems in IOGOOS, be identified to lead the project. These teams would be represented by a three-member 'core working group'. Dr. Kanthi Yapa suggested that Prof. L.P. Jayatissa from Sri Lanka be contacted for inclusion in the three-member core working group. The IOGOOS Secretariat was tasked to write to participating members of the project and seek their interest in being on the three-member core working group. It was proposed to identify possible project links with BOBLME and SIBER and it was also suggested that emphasis on properly reviewing other related initiatives be undertaken in order to facilitate synergy, integration and to avoid duplication of effort (eg CTI, CORDIO, EARTHWATCH) to ensure that there is no duplication of the work. JRC has shown interest in collaborating with IOGOOS in this project especially for the eastern African region.

Dr. Mabel Manjaji Matsumoto, Malaysia offered to take the role of 'KEY' Project Coordinator. It was also suggested that the IOGOOS Secretariat contact IMS to request for an alternative nomination to replace Dr. Greg Wagner on the project. During the discussions, BOBLME indicated that Myanmar would be interested in the project. The representative of Maldives conveyed that Maldives was interested in participating in this project and would provide the contact details of the respective authority. The IOGOOS Secretariat was tasked with circulating the draft project document to the focal points from all participating countries and current working group participants, requesting their active engagement in the project or for appropriate nominations of alternative members (preferably one member from each country representing each of the respective ecosystems: mangroves; seagrasses and coral reefs). It was also decided that the project proposal should be finalized in consultation with the participating members for further submission to the donor agencies. For this, the Secretariat was requested to obtain contact details of the members from the participating countries by August 2010. Also considering that the project had been well progressed to date, the group proposed to work by email to finalize the proposal for submission to donor agencies by end of 2010.

The 'shoreline changes' project discussions mainly concentrated on identifying the data requirements and finalizing the proposal for further submission to the funding agencies The members have recommended taking forward the shoreline change monitoring project. The working group members volunteered to communicate with Dr. Kamal Tennakoon, Project Leader of the project in this regard and to update the group on his status and his views on the project. Bangladesh offered to provide case studies on shoreline changes for inclusion in the project proposal and sought to remain included in the project. Maldives expressed interest in the project. Dr. Arul, Nara, Sri Lanka, will share a report on related activities from Sri Lanka. The IOGOOS Secretariat was tasked to communicate to the focal points of all participating countries and current working group participants requesting for their active engagement in the project or for appropriate nominations of alternative members. The IOGOOS Secretariat will circulate the draft project document to these focal points. Dr. Nick Hoepffner suggested looking at EU funded projects on concerning shoreline management, and Dr Hoepffner offered to share references with the group in this regard.

The working group suggested finalizing the project proposal in consultation with participating members for submission to potential donor agencies. For this, the IOGOOS Secretariat was tasked with obtaining contact details of members from participating countries by August 2010. In consideration of the relatively advanced state of the project, the group proposed to work by email to finalize the proposal for submission to donor agencies by end of 2010.

The working group recommended that the existing products being delivered under ChloroGIN programme by India are useful for IOGOOS members and requested that these products continue to be provided. The working group suggested establishing possible links with BOBLME and SIBER Projects and integration of ChloroGIN-IO and SIBER. The group suggested continuing collaboration with Global ChloroGIN. It was suggested that new products would be useful in this project, such as PP and HAB's etc. It was suggested that member countries could make vital contributiosn to the overall success of the project by monitoring core variables, and in this regards the following capacity development aspects were highlighted:

- Finalization of relevant monitoring methodologies and protocols;
- Organisation of related training programmes; and
- Preparation of related proposals for funding thereof.

Dr. Kanthi Yapa, Sri Lanka volunteered to prepare the first draft by drawing on inputs from a ChloroGIN based proposal submitted to GEO as well as soliciting and consolidating inputs from the initial participating countries in this project and newly engaged BOBLME member countries. It was proposed that a first draft be ready within one month following IOGOOS-VII and the final proposal be ready by end of 2010. The following capacity development initiatives were also noted in the context of the project:

- BOBLME countries representatives should be invited to any related Capacity Building training programmes, and could be funded through the BOBLME program;
- The EC-JRC training course on 'Methods and Applications of Ocean Colour remote sensing in coastal and regional seas' to be held during 2011 in Mauritius; and
- NF-POGO regional training course on 'Ocean Colour Remote Sensing".

The group also noted and recorded that the following new products have been proposed by ChloroGIN:

- Bloom indicators - timing and magnitude of bloom s;
- Frontal zone – mesoscale features;
- PFZs (Potential Fishing Zones); identification of mesoscale features;
- PFTs (Phytoplankton functional types) such as Trichodesmium, coccolithophores;
- Diatoms: INCOIS's efforts to develop a RTI (Red Tide Index) for HABs (Harmful Algal Blooms) as a first step; and HAB index in South Africa;
- Water quality related indicators (eutrophication index, water transparency) case study in Europe (Oxyrisk);
- Primary production estimates; and
- Regional Chl and SST anomalies (implies long satellite data time series);

Further information and clrifications were sought by members on various aspects of the project, such as: availability of high resolution data; collection of additional data other than satellite data; availability of budget for equipments and the funding agencies that are to be targeted. Dr. Kumar responded to these queries.

4.4. Plenary - Finalization of the Work plans

Dr. Andreas Schiller briefed the members on the progress of the working group on the IOGOOS Pilot Project: Modelling for Ocean Forecasting & Process Studies and the associated drafting of a 'project plan'. The contents for the respective North Indian Ocean & Central South East Asia demonstration area were well advanced. The content for the South West Indian Ocean demonstration area had been begun to preliminary stage. The exercise will be completed in consultation with the focal points in each region, hopefully within the next few weeks. A Workshop with IOGOOS, WESTPAC and SEAGOOS will be held in about a month, for which the timing, venue and content/schedule will be worked out and finalized and it is unclear at this stage as to who, if any, will be represented at the workshop from IOGOOS. Further communications will be received via SEAGOOS.

Dr. T. Srinivasa Kumar presented the progress of the working group on Indian Ocean Core Remote Sensing Project. The new linkage with BOBLME, particularly under the KEY project on coral reefs mangroves and sea grass beds, was welcomed. He also presented the proposed targets for taking the project forward. Dr. Kumar mentioned that the participating members will work through email communication and finalize the project proposals by end of December 2010.

4.5 Closing of the Meeting

The invitation extended by Iran to host the next IOGOOS annual meeting was highly appreciated and gratefully accepted by members. The Secretariat was tasked to coordinate with the host agency in finalizing the dates in consultation with IOGOOS Officers and to notify members and other invitees in respect to the IOGOOS-VIII meeting accordingly.

Dr. Nick D'Adamo, Dr. Somkiat Khokiattiwong gave their closing remarks. Dr. Mitrasen Bhikajee, newly elected Chairman, IOGOOS thanked the members for his election as the next IOGOOS Chair and added that he viewed the Chairmanship of IOGOOS as a remarkably responsible position. He commented on the outstanding legacy left by outgoing Chair, Dr. Shailesh Nayak, in this regard and added that he as new Chair will try his utmost to emulate that standard. He also recollected on the formation of IOGOOS back in the early 2000s, when a small group of founding members and associated Secretariat initiated and helped IOGOOS constituents develop and initiate new proposals. He thanked member countries for bringing their nationally important projects to IOGOOS and for the manner in which members worked together in this regard. He finally thanked Dr. Shailesh Nayak again and Dr. Nick D'Adamo for their support in the successful conduct of IOGOOS meetings.

Dr. Shailesh Nayak, the outgoing Chair, IOGOOS concluded the 7th IOGOOS Annual meeting. He commented that during the past few years IOGOOS had made great progress and started many new and important initiatives. He highlighted the value of IOGOOS's contribution to improving the ocean observation system in the Indian Ocean. He pointed to the fact that 80% of the proposed observations within IndOOS

were completed and that it was hoped to be at 100% within the next 2 years. He referred to SIBER, IOP and IRF and also to the coastal ecosystem project, ocean forecasting initiaive and ChloroGIN project as having had very good progress and that this was indeed heartening to have overseen as Chair. He also mentioned the importance now to integrate the Indian Ocean's regional observation systems with the national systems. He wished SIBER well in advancing their science and implementation plans. He noted and welcomed the forthcoming 2nd DBCP training meeting (2011) and also BOBLME's willingness to become a member of IOGOOS. He also urged members to renew their membership and welcomed all new members. He finally thanked Dr. Nick D'Adamo for his and his teams' tireless and tremendous in conducting the IOGOOS-VII meeting successfully. With this he wished members a safe journey back to their homes.

5. KEY ACTIONS ITEMS OUT OF IOGOOS VII MEETING

- Dr. Nick D'Adamo to coordinate a joint meeting of regional GRAs.
- IOGOOS Secretariat to collect the information on the OOS system that India has and pass it to IOP to further explore integration.
- IOGOOS Secretariat to reflect the new elected positions in its communications and communicate to all the members.
- IOGOOS Secretariat to communicate with Sultan Qaboos University on the acceptance in the change of nomenclature of MoU to Agreement.
- IOGOOS Secretariat to write to participating members of the KEY project component of the Indian Ocean Core Remote Sensing project and seek their participation to be part of the core working group.
- IOGOOS Secretariat to contact IMS, Tanzania to request for an alternative nomination due to the retirement of Dr. Greg Wagner from the group.
- IOGOOS Secretariat to circulate the draft project document on the KEY project and Shoreline Changes project to focal points from participating countries and IOGOOS-VII working group participants, requesting their active engagement in the project or for appropriate nominations of alternative member. IOGOOS Secretariat to obtain and update contact details of members from the participating countries.
- Dr. Nick D'Adamo to prepare a draft report from the working group breakout session on the IOGOOS Pilot Project: Modeling for Ocean Forecasting and submission and discussion at the next IOGOOS meeting.

IOGOOS -7, IOP-7, IRF-1 and SIBER -1 Inaugural Function

IOGOOS Annual Meeting Group Photo

ANNEXURE 1

IOGOOS Workshop and Seventh Annual Meeting (IOGOOS-VII)

July 12 – 16, 2010 at Perth, Western Australia

Venue: Citigate Perth Hotel, 707 Wellington Street

Agenda

July 12, 2010 (Monday) 08 45 to 10 30 Hrs	
Introduction by Dr Nick D'Adamo, Officer in Charge, UNESCO IOC Perth Office	
Welcome to Country by Dr Noel Nannup (Accompanied by Indigenous music from Derek Nannup)	
Official Opening by His Excellency Dr Ken Michael AC, Governor of Western Australia	
Welcome on behalf of the State of Western Australia by Julie de Jong, Acting Executive Director, Western Australian Department of Commerce, representing Hon Bill Marmion, MLA, Government of Western Australia	
Welcome on behalf of IOGOOS by Dr Shailesh Nayak, Chair IOGOOS; Secretary, Ministry of Earth Sciences, India	
Keynote Address by Dr Wendy Watson-Wright, Executive Secretary IOC; Assistant Director General UNESCO. GOOS from the IOC perspective and related commentary on the synergistic roles of GRAs (eg IOGOOS) and related project groups (eg IOP, SIBER, IRF) in the IOC's global context	
Keynote address by Dr Neville Smith, Deputy Director (Research and Systems), Bureau of Meteorology, Australia. The past 10 years: ocean observations and services in the Indian Ocean since SOCIO 2000	
1030 to 1100 Hrs	**Morning Tea Break**
Plenary Talks – 11 00 to 12 00 Hrs	
1100 to 1115 Hrs	**Keynote plenary talk by** Dr. Tim Moltmann, Director of IMOS Australi:. Australia's Integrated Marine Observing System (IMOS)
1115 to 1130 Hrs	**Plenary Talk by Dr Yukio Masumoto & Dr Weidong Yu**, IOP Co-Chairs: IOP since IOP-6 in June 2008 and vision for the future in the context of synergies with SIBER and the IRF
1130 to 1145 Hrs	**Plenary Talk by Professor Raleigh Hood**, SIBER Co-Chair. SIBER as a new science alliance under IOGOOS and IMBER and vision for the future in the context of synergies with IOP and the IRF
1145 to 1200 Hrs	**Plenary Talk by Dr Gary Meyers**, IRF Convenor. Introduction to the IRF, and convergence of the IOGOOS, IOP and SIBER

	meetings towards the inaugural IRF meeting on Day 4 (Thursday 15 July 2010)
1200 to 1330 Hrs	**Lunch Break**

IOGOOS VII Independent Meeting

July 12, 2010 (Monday)	
1330 to 1400 Hrs	**Opening Session of the IOGOOS Independent Meeting** • Welcome by Chair, IOGOOS • Remarks by IOGOOS Officers • Remarks by Nick D'Adamo • Remarks by Secretary, IOGOOS
1400 to 1500 Hrs	**Science Talks relevant to IOGOOS Activities (20 min each)** • Ocean Modelling for Operational Forecasting in IOGOOS Region – Dr. Andreas Schiller • Applications of Satellite Data to Marine Ecosystem management: contribution of the SAFARI and ChloroGIN initiatives – Dr. Nicolas Hoepffner • Brief on DBCP Western Indian Ocean Capacity Building Workshop – Dr. Sidney Thurston
1500 to 1530 Hrs	**Afternoon Tea Break**
1530 to 1710 Hrs	**Science Talks relevant to IOGOOS Activities (20 min each). contd..** • Indian Ocean Observations – Dr. Yukio Masumoto / Dr. Weidong Yu • Operational Oceanographic Services in IOGOOS Region – Dr. Shenoi, INCOIS • HF Radar Network along the Indian Coast – Dr. Basanta Kumar Jena, NIOT, India • BOBLME Overview presentation – Dr. Rudolf Hermes • Collaborative Arrangements with other GRAs – Dr. Nick

July 13, 2010 (Tuesday) :	
0900 to 1015 Hrs	**IOGOOS Annual Meeting** i. Remarks by Chair, IOGOOS ii. Remarks by IOGOOS Officers iii. Presentation of Secretariat Report – Secretary, IOGOOS

	(15 min) iv. Report by Dr. Nick D'Adamo, Head, IOC-Perth on IOGOOS related activities (15 min) v. Report on IOP Activities - Dr. Yukio Masumoto / Dr. Weidong Yu, Vice-chair of IOP (15 min) vi. Report on IRF Activities – Dr. Gary Meyers, IRF (15 min)
1015 to 1045 Hrs	**Morning Tea Break**
1045 to 1200 Hrs	**IOGOOS Annual Meeting (Contd..)** vii. Report on SIBER Activities – Dr. Raliegh Hood, SIBER (15 min) viii. Report on Indian Ocean Core Remote Sensing Project – Dr. Srinivasa Kumar, Project Coordinator (15 min) ix. Report on Modelling for Ocean Forecasting & Process Studies – Dr. Ravichandran, Project Coordinator (15 min) x. Status of other IOGOOS Pilot Projects xi. Accounts and Financial Summary xii. Nomination of Working Groups xiii. Election / Nomination / Confirmation of IOGOOS Officer/s xiv. Next Meeting and any other Items (Change of Nomenclature "MoU" to "Agreement" for facilitating easy approvals for Membership – Endorsement of IOGOOS) **xv.** Conclusion
1200 to 1330 Hrs	**Lunch Break**
1330 to 1500 Hrs	**Break Out Sessions of Working Groups** • Modelling for Ocean Forecasting & Process Studies • Indian Ocean Core Remote Sensing Project (Chl-a Mapping; Keystone Ecosystems; Coral Reefs; Shoreline Changes)
1500 to 1530 Hrs	**Afternoon Tea Break**

July 14, 2010 (Wednesday)	
0900 to 1015 Hrs	**Break out session of Working Groups (Continued)** • Modelling for Ocean Forecasting & Process Studies • Indian Ocean Core Remote Sensing Project (Chl-a Mapping; Keystone Ecosystems; Coral Reefs; Shoreline

	Changes)
1015 to 1045Hrs	**Morning Tea Break**
1045 to 1200 Hrs	**Finalization of Work Plan and Closing of the Meeting**
1200 to 1330 Hrs	**Lunch Break**

July 15, 2010 (Thursday) Plenary Talks	
0900 to 0920 Hrs	Science in Western Australia – Prof. Lyn Beazley, Chief Scientist of Western Australia
0920 to 0940 Hrs	IOGOOS – 7 Report – Dr. Shailesh Nayak, IOGOOS Chair
0940 to 1000 Hrs	IOP – 7 Report – Dr. Yukio Masumoto and/or Dr. Weidong Yu, IOP Co-chairs
1000 to 1020 Hrs	SIBER – 1 Report – Prof. Raliegh Hood, SIBER Chair
1020 to 1030 Hrs	Introduction to IRF and contextual segue to the IOGOOS, IOP and SIBER reports – Dr. Gary Meyers, IRF Convenor;
1030 to 1100 Hrs	Morning Tea Break

IRF – 1 Meeting Follows

ANNEXURE 2

List of Participants for the IOGOOS Workshop and Seventh Annual Meeting

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Annexure 3

Background paper on UNESCO IOC Perth Office, IOGOOS, IOP, SIBER and IRF

UNESCO IOC Perth Office

The UNESCO IOC Perth Office was formed in 1998 jointly by UNESCO IOC, the Western Australian State Government and the Australian Bureau of Meteorology, under a tri-partite sponsorship agreement. It is co-located with the Secretariat of the Intergovernmental Coordination Group (ICG) for the Indian Ocean Tsunami Warning and Mitigation System (IOTWS), which the UNESCO IOC Perth Office helped establish soon after the 2004 Boxing Day tsunami event.

The role of the UNESCO IOC Perth Office is as a regional focal point of the IOC to coordinate and facilitate the development and implementation of oceanographic programmes and initiatives, and Capacity Development thereof, as relevant to the balanced strategic and tactical priorities of the Office's sponsoring Parties, across the full spectrum of the IOC's broad programme areas (ocean observations and services, ocean sciences, hazards, and capacity development), but with a focus on the *Global Ocean Observing System (GOOS, www.ioc-goos.org)* and noting that:

- The UNESCO IOC Perth Office's domain of responsibility covers the Southern Hemisphere regions centred on Australia and focusing, in order of priority, on Western Australia, and the Australian and adjacent regions of the Indian Ocean, Southern Ocean, South East Asia, and South West Pacific; and
- The UNESCO IOC Perth Office's priorities are driven by the balanced mutual objectives of the three sponsoring Parties, aligned with the IOC's recently re-affirmed High Level Objectives (Ref: IOC Assembly Meeting 2009: Resolution XXV-3): *prevention and reduction of the impacts of natural hazards; mitigation of the impacts of and adaptation to climate change and variability; safeguarding the health of ocean ecosystems; management procedures and policies leading to the sustainability of coastal and ocean environment and resources*.

During its first 5 years the UNESCO IOC Perth Office focused on the development of four new Global Ocean Observing System (GOOS) Regional Alliances (GRAs), through which it promotes, facilitates and coordinates programs, initiatives and projects consistent with its role in the oceanic and coastal regions in and around Australia. These are: Indian Ocean Global Ocean Observing System (IOGOOS); Western Australian Global Ocean Observing System (WAGOOS); South East Asian Global Ocean Observing System (SEAGOOS); and Pacific Islands Global Ocean Observing System (PIGOOS). The Office also works closely with the IOC Sub-Commission for the Western Pacific (IOC WESTPAC), particularly in respect to facilitating SEAGOOS, and also engages closely with the Australian Integrated Marine Observing System.

These four GRAs provide a means to creating multi-national and/or multi-institutional initiatives to progress, in a regional sense, the global objectives of the IOC, for the balanced mutual priorities of the Office's three sponsoring parties (IOC, Western Australian State Government, and Australian Government).

GRAs provide two-way vehicles for (i) conveyance of the IOC's 'message' (in terms of its mission and objectives) more closely to the IOC's constituency of Member States and their related communities and (ii) expression of the aspirations of those communities in terms of their own regional priorities and needs, so that programmes and projects can be most effectively designed in order to best harness and align resources with local priorities. The GRAs and sub-alliance groups and projects that are established within them can bring to bear significant regional and local resources in response to these imperatives.

The GRAs have evolved from originally being principally focused on blue-water physical oceanography, services and capacity development. They now generally have broadened scopes in terms of oceanic **and** coastal processes and applications, across **both** physics and biology, and continue to grow capacity development as a key end point for these programmes. This has been consistent with the maturation of the regional alliances in terms of their capacities to deliver benefits across the IOC's full range of objectives and to an increasingly larger global constituency.

GRAs provide for a greater connection and ownership amongst the IOC's constituents at regional, local and community scales. Each of the following four GRAs receives varying degrees of facilitation, coordination and sponsorship from the UNESCO IOC Perth Office. Each GRA has a Chairperson and a Secretariat that is provided through the in-kind support of institutions within each GRA.

IOGOOS

The Indian Ocean Global Ocean Observing System (**IOGOOS**) membership derives from the following organisations / countries of the Indian Ocean rim and islands, with the IOGOOS Secretariat hosted by the Indian National Centre for Ocean Information Services (INCOIS), Hyderabad, India. The Chair of IOGOOS is Dr Shailesh Nayak, Secretary, Ministry of Earth Sciences, India.

UNESCO IOC (Perth Office); Australia; India; Iran; Kenya; Mauritius; Mozambique; South Africa; Sri Lanka; USA; Madagascar; Tanzania; Indonesia; France.

WAGOOS

The Western Australian Global Ocean Observing System (WAGOOS) membership comprises the following organisations (Western Australian and/or Australian based), with the WAGOOS Secretariat hosted by the University of

Western Australia, Perth, Western Australia. The Chair of WAGOOS is Dr Ray Steedman, GHD, Perth, Western Australia.

UNESCO IOC (Perth Office); CSIRO; BoM; Fastwave Communications, Perth; Marine Science Associates; Freehills Lawyers; Royal Australian Navy; National Oceans Office; Department of Fisheries; Indian Ocean Climate Initiative; Dampier; Port Authority; Curtin University; Murdoch University; University of Western Australia; Woodside Energy Limited; RSG - MetOcean Engineers; Australian Petroleum Production and Exploration Association; Defence Science and Technology Organisation; Department of Environment and Conservation; Australian Institute of Marine Science; Department of Commerce (formerly Department of Industry and Resources).

SEAGOOS

The South East Asian Global Ocean Observing System (**SEAGOOS**) is still in a state of formation in respect to formal membership of member states under IOC WESTPAC. In the interim, SEAGOOS involves the following list of organisations / countries in initiatives. The SEAGOOS Coordinator (Dr Somkiat Khokiattiwong) is based at the Government of Thailand's *Phuket Marine Biological Centre,* Phuket, and complementary Secretariat support is provided through the IOC WESTPAC office in Bangkok, hosted by the Government of Thailand.

Australia; China; Indonesia; Japan; Malaysia; Myanmar; Philippines; Singapore; Thailand; UNESCO IOC Perth; Vietnam.

PIGOOS

The Pacific Islands Global Ocean Observing System (**PIGOOS**) comprises the following membership and key stakeholder/sponsors, with the Secretariat hosted by the Secretariat of the Pacific Regional Environment Programme (SPREP), Apia, Samoa. The Chair of PIGOOS is Dr David Sheppard, Director, SPREP, Apia, Samoa.

American Samoa; Australia; Cook Islands; F.S. Micronesia; Fiji; French Polynesia; Guam; Kiribati; Marshall Islands; Nauru; New Caledonia; New Zealand; Niue; Palau; Papua New Guinea; Samoa; Solomon Islands; Tonga; Tuvalu; Vanuatu.

The Indian Ocean Global Ocean Observing System (IOGOOS)

IOGOOS is meeting for the seventh time in Perth during 12-16 July 2010. This year represents the 10th anniversary since the formative 2000 workshop (SOCIO: *Sustained*

Observations of Climate in the Indian Ocean). SOCIO 2000 was held in Perth and co-hosted by the UNESCO IOC Perth Office. SOCIO 2000 laid the foundations for the creation of IOGOOS and later the Indian Ocean Panel of GOOS/CLIVAR (**IOP**).

Under the IOGOOS framework, there has also been the development of the biogeochemical science alliance called **SIBER**: *Sustained Indian Ocean Biogeochemical and Ecological Research*.

More recently, a forum has been established comprising a high level group of leaders in operational oceanography, with the aim of providing a means whereby IOP and SIBER can advocate for operational resources to support their physical and biological observing systems in the Indian Ocean. This new group is called the Indian Ocean Observing System (IndOOS) Resources Forum (**IRF**).

IOGOOS involves a number of other initiatives and projects, which bring benefit to its constituents in the Indian Ocean rim and islands. Some of those established or under active development include the following themes:

- Keystone ecosystem mapping and monitoring of indicators of ecosystem health in coastal habitats;
- Shoreline change monitoring;
- Capacity Development in writing proposals for funding, and training for leadership in marine science/management;
- Remote sensing for environmental protection, conservation and natural resource management, including:
    - SAFARI = *Societal Applications in Fisheries and Aquaculture Using Remotely-Sensed Imagery* - International Symposium on "Remote Sensing and Fisheries" during February 15 – 17, 2010, to be held in conjunction with a Chlorophyll Global Integrated Network (ChloroGIN) General Meeting during February 18 – 19, 2010 at Kochi, Kerala, India.
    - ChloroGIN project aims to promote in situ measurement of chlorophyll in combination with satellite derived estimates. The project was initiated following recommendations of the "Plymouth Chlorophyll Meeting and Workshops (Extended Antares Network)" sponsored by GOOS, GEO, IOCCG, PML and POGO 18 - 22 Sept 2006 and was inspired by the Antares network that provides satellite coverage over Latin America. The ChloroGIN portal is maintained by Plymouth Marine Laboratory. The IOGOOS Secretariat (at INCOIS, Hyderabad, India) is a partner and provides the IOGOOS link to this project. ChloroGIN aims to support the remote sensing needs of communities in large marine regions, which currently include the central-north Indian Ocean and the southwest Indian Ocean areas.

Another recent initiative has been the development of a joint IOGOOS/SEAGOOS project to build regional capacities in ocean forecasting in the IO and SEA regions, with the collaborative support of Australia's ocean forecasting community (through BLUElink> Australia, www.bom.gov.au/bluelink). This 'ocean forecasting' project is the subject of a meeting to be held during 9-10 July 2010 in Perth, hosted by the UNESCO IOC Perth Office, in the week leading up to the IOGOOS-7 and related

package of meetings. An information document providing background and objectives for that meeting is reproduced below, for reference (**see Appendix VI**).

IOGOOS's related IOP-7, SIBER-1 and IRF-1 meetings are occurring at the same time in Perth, as an integrated package. Overviews of these groups are given below.

Indian Ocean Panel of GOOS/CLIVAR (IOP)

The IOP is a pilot project of IOGOOS. It will hold its seventh meeting in Perth during 12-16 July 2010.

- The IOP receives underpinning sponsorship through the UNESCO IOC Perth Office and through CLIVAR of the WCRP. CLIVAR is the *Climate and Variability* project (www.clivar.org) under the *World Climate and Research Program* (WCRP: **http://wcrp.wmo.int/wcrp-index.html**).
- The IOP is improving the characterisation of the Indian Ocean's relatively poorly understood oceanographic and coupled climatic processes, and how those processes influence island and continental rim countries (including Australia, and with relevance to Western Australia). The spectrum of oceanic phenomena and related topics within the IOP's science framework includes the improved description, understanding and ability to predict (ie model):
    - *Seasonal monsoon variability;*
    - *Indian Ocean Dipole (ENSO-like phenomenon in the Indian Ocean);*
    - *Madden Julian Oscillation;*
    - *Intraseasonal (30-90 day period) oscillations and far field impacts (ENSO, hurricane formation, west coast US rainfall);*
    - *Decadal variability;*
    - *Warming trends since the 1970s;*
    - *Ocean circulation (Indonesian Throughflow, shallow and deep overturning circulation);*
    - *Marine ecosystems and biogeochemistry (note the link with SIBER, below).*
- IOP is coordinating and using the data from a wide variety of GOOS infrastructure (eg deep ocean moorings, ARGO floats, free drifting buoys, satellite-based ocean data, Ships of Opportunity data, etc).
- Computer based models that are used to study and predict the oceanography of the Indian Ocean are continually being developed, improved and applied as a result of the observational and analytical outputs of the IOP.
- The Perth Office provides strategic and operational input to IOP and integrating links with the beneficiaries of the IOP's work in the IOGOOS/SEAGOOS and WAGOOS/Australian regions. Dr Gary Meyers (formerly of CSIRO Australia and the immediate past Director of IMOS) was the founding Chair of IOP and is currently the Convenor of the IndOOS Resources Forum (below) that has been established as a complement to the IOP.
- IOP membership in terms of scientists and host institutions comprises:
    - Weidong Yu (co-chair) First Institute of Oceanography, Qingdao CHINA
    - Yukio Masumoto (co-chair) FORSGC, JAMSTEC, Tokyo, JAPAN
    - Ming Feng CSIRO Floreat Western AUSTRALIA
    - Raleigh Hood Horn Point Lab. Uni. Maryland USA
    - Tony Lee NASA Jet Propulsion Laboratory, Pasadena USA

• Charles Magori	Kenya Marine and Fisheries Research Institute, Kenya
• Jay McCreary (AAMP)	University of Hawaii, Honolulu, USA
• Michael McPhaden	NOAA, PMEL, Seattle, USA
• Gary Meyers	CSIRO, Hobart, AUSTRALIA
• VSN Murthy	National Institute of Oceanography, Goa INDIA
• W. de Ruijter	University of Utrecht, NL
• Debasis Sengupta	Indian Institute of Science, Bangalore INDIA
• Fadli Syamsudin	BPPT, Jakarta INDONESIA
• Gabriel Vecchi	NOAA-GFDL, Princeton USA
• Jerome Vialard	LOCEAN, Paris FRANCE
• Lisan Yu	Woods Hole Oceanographic Institution, Woods Hole, USA

- The IOP continues to develop the Indian Ocean Observing System (IndOOS) with the deep mooring network component of IndOOS (termed the '**RAMA'** array) now approximately 50% implemented (25 out of a 46 planned deep ocean monitoring moorings). This has taken place in the short space of time since IndOOS was specified through the IOP's 2006 Implementation Plan.
- The IOP's work has furthered the characterisation and predictability of oceanographic processes and associated coupled atmospheric/weather process over the Indian Ocean, many of which transmit and have a profound influence on the oceanography and climate (eg storms, cyclones, general wind patterns, rainfall, humidity, temperatures) of island and continental rim nations in the IOGOOS/SEAGOOS and Australian regions, including for example, south and northeast Asia, China and Japan. This is also highly relevant to Western Australian / Australian coastal and agricultural communities.
- It is notable that the Indian Ocean Dipole and Madden Julian Oscillation mechanisms manifest in the northern Indian Ocean under strong coupling to the ocean properties that the IOP are uncovering, characterising and modelling. These processes have strong influences on tropical cyclone activity and rainfall across Australia. The Madden Julian Oscillation (MJO), for example, has been found to influence rainfall as far across the country as over southeast Australia. The MJO has also been found to influence the ecology of the tropical Indo-Pacific, such as ocean chlorophyll levels.
- The IOP's work also has strong contextual relevance to marine industry, in respect to providing underpinning scientific understanding and long term monitoring of ocean processes (relevant, for example, to surface and sub-sea marine engineering design, maritime transport etc) and coupled atmospheric phenomena.
- The IOP-6 report will be made available on the web, as are all outputs (papers, reports, model outputs etc) the IOP's work.
- IOP generic information and outputs are available at the IOP webpage: http://www.clivar.org/organization/indian/indian.php and associated IndOOS data via http://www.clivar.org/organization/indian/IndOOS/obs.php

Sustained Indian Ocean Biogeochemical and Ecosystem Research (SIBER)

SIBER is a pilot project of IOGOOS, and will be jointly run under both IOGOOS and IMBER. IMBER = *Integrated Marine Biogeochemistry and Ecological Research*, an international program of IGBP-SCOR (IGBP = *International Geosphere-Biosphere Programme*; SCOR = *Scientific Committee on Oceanic Research* of the International

Council for Science). UNESCO IOC Perth Office facilitates and co-sponsors SIBER (with IMBER). SIBER's Scientific Steering Committee is to meet for the first time in Perth during 12-16 July 2010.

- SIBER has formed as an international science alliance of bio-geochemists and ecologists, generically akin to the IOP but focussing on complementary bio-geochemistry and ecology for the Indian Ocean.
- UNESCO IOC Perth Office has supported SIBER's two key formative science planning meetings (2006 and 2007, respectively, in Goa, India) and brokered/sponsored the involvement of Western Australian and Australian marine scientists in SIBER.
- A Western Australian scientist (Dr Lynnath Beckley, Murdoch University) is nominated to be an inaugural member of the international SIBER Scientific Steering Committee. The Committee (in draft) comprises:
    - Raleigh Hood, USA
    - Wajih Naqvi , India
    - Jerry Wiggert, USA
    - Tim Rixen, Germany
    - Mike Landry, USA
    - Catherine Goyet, France
    - Adnan Al-Azri, Oman
    - David Vousden, South Africa
    - Lynnath Beckley, Australia
    - Greg Cowie, UK
    - Hiroshi Kitazato, Japan
    - Dwi Susanto, Indonesia/USA
- Partially through the engagement of Australian scientists in SIBER, focus and attention was brought to bear on boundary currents that dominate the East Indian Ocean rim (ie South East Asia and Western Australia).
- SIBER's draft science plan consequently addresses processes in the East Indian Ocean that are highly relevant to Western Australia. These include (Theme 1, below) the Leeuwin Current and its cross-shelf dynamics (eg its eddies), the Leeuwin Undercurrent, and the bio-geochemistry and ecology of dynamically related ocean processes, and (Theme 1, below) the Indo-Pacific Throughflow, which influences the ocean and coastal ecology off NW Western Australia.
- SIBER's six overarching science themes focus on:
    1. *Boundary currents: upwelling, filaments, eddies, cross-shelf transport;*
    2. *Equatorial circulation, Indo-Pacific Throughflow, climate change influences;*
    3. *Primary production: controls and fate, marginal seas, grazing, Si & Fe-limitation, N2 fixation, benthic-pelagic coupling;*
    4. *Bio-geochemical differences: Arabian Sea vs Bay of Bengal;*
    5. *Climate change monitoring in the Indian Ocean through bio-geochemical studies; and*
    6. *Role of higher trophic levels on bio-geochemical and ecological processes.*
- The IRF (below) will also assist SIBER, in a complementary manner to the way in which it will support the IOP. In this context, there will be important synergy between IOP and SIBER. This refers to SIBER potentially being able to lever resources, such as bio-geochemical ocean observing infrastructure affixed to IOP's physical oceanography moorings and related infrastructure. It

also refers to the piggy-back possibilities of running SIBER's own field pursuits aboard vessels which are programmed to service IOP's arrays.

Indian Ocean Observing System (IndOOS) Resources Forum (IRF)

The IRF is established under the auspices of IOGOOS and receives sponsorship and facilitation through the UNESCO IOC Perth Office. IRF will meet for the first time in Perth on 15 July 2010.

- The IRF will comprise an international group of leaders from the IndOOS stakeholder community, derived from institutions and Governments that have the capacity to assign operational resources to IndOOS and/or facilitate resourcing for IndOOS.
- A key objective of the IRF will be to facilitate the identification and alignment of institutional resources (eg ocean observing infrastructure, scientific capacity, vessel support) for the implementation program of the IOP (and SIBER) in response to the high priority operational needs as they continue to build IndOOS.
- Invited members derive from Australia, India, South Africa, China, France, India, China, France (science sector and UNESCO), Indonesia, IOC UNESCO, Indonesia, Japan, South Africa, USA:
    - Dr. Tim Moltmann, Director, Integrated Marine Observing System, Australia.
    - Dr Shailesh Nayak, Secretary, Ministry of Earth Scie4nces, India.
    - Dr. David Vousden, Director, Agulhus and Somali Current Large Marine Ecosystems project, South Africa.
    - Mr. Lin Shanqing, Director-General, Office of Ocean Forecast, Department of Ocean Forecast and Disaster Mitigation, State Oceanic Administration of China.
    - Mr Jun Chu, Director, Office of Ocean Forecast, Department of Ocean Forecast and Disaster Mitigation, State Oceanic Administration of China.
    - Dr. Patrick Monfrey, Directeur-adjoint, l'Institut National des Sciences de l'Univers, Section Ocean-Atmosphere, France.
    - Dr. Wendy Watson-Wright, Assistant Director General UNESCO; Executive Secretary IOC/UNESCO, France.
    - Dr. Ridwan Djamaluddin, Director, BPPT, Indonesia.
    - Dr. Shiro Imawaki, Executive Director, Japan Agency for Marine-Earth Science and Technology, Japan.
    - Dr Linda Makuleni (re delegate, to be advised) CEO, South African Weather Service, South Africa.
    - Dr. Chester Koblinsky, Director, Climate Program Office, National Oceanic and Atmospheric Administration, USA.
- UNESCO IOC Perth Office provides operational support and strategic coordination (including sponsorship funds) to underpin the IRF's work and its meetings (which are planned to be biennial). This includes support for the post of Convenor for the IRF. The inaugural Convenor is Dr Gary Meyers of Australia.

ANNEXURE 4

IOGOOS Workshop and Seventh Annual Meeting (IOGOOS-VII)
July 12 – 16, 2010 at Perth, Australia
Agenda Item (iii) of the Annual Meeting

IOGOOS Secretariat Report (December 2008 – June 2010)

Sl. No.	Item	Status / Progress
1.	**IOGOOS Annual Meeting**	
1.1	IOGOOS VI Report	• Finalised and circulated the IOGOOS VI Annual Report.
1.2	The IOGOOS Secretariat was requested to interact with the potential hosts to finalise the venue and the dates of the next Annual Meeting	• Action Completed
1.3	Conduct of IOGOOS VII	• Circular, Invitations, Agenda, Funding for IOGOOS VII. • Funding from IOC Perth Office (AUD 15, 000) to partially / fully sponsor 05 participants.
2.	**Capacity Building**	
2.1	IOGOOS Secretariat was asked to approach IOC / UNESCO for Capacity Building under the framework of IOGOOS projects	• "International Capacity Development Program: Seminar and Proposal-writing workshop for Marine related Institutions at Universiti Malaysia Sabah, Malaysia during December 10 – 14, 2008. IOC UNESCO has sponsored 05 Participants from IOGOOS Coastal Projects. • COAST MAP IO Workshop on Drafting Project Proposal to International Financial Institutions held at Hyderabad, INDIA during November 4-7, 2009. 17 participants from 11 countries have participated in the meeting out of which 08 representatives from IOGOOS member countries. • IOGOOS, through IOC/UNESCO

		Perth Office has sponsored 05 delegates from the Indian Ocean Rim countries for their participation in the SAFARI (Societal Applications in Fisheries and Aquaculture using Remotely-sensed Imagery) International Symposium on "Remote Sensing and Fisheries" held at Kochi, India during February 15-17, 2010 and ChloroGIN General Meeting during February 18 – 19, 2010. • Circulated the announcement of C V Raman International Fellowship for African Researchers, announced by Department of Science and Technology (DST), Govt. of India, to the IOGOOS Members from the African Countries.
3.	**IOGOOS Projects**	
3.1	Secretariat to provide a critical review and assessment of all feasible existing and proposed IOGOOS projects as well as unfeasible existing or proposed projects at the next IOGOOS meeting, to facilitate decisions that would need to be made by members on continuance or otherwise of all projects, with a view to then revising and updating the project listing on the IOGOOS website	• Key stone Ecosystem project need to be dropped or either need to identify an active leader. • Shoreline change project has becoming in-active due to no response from the Member countries. PL may be tasked for coordination with the member countries for their participation. • Chlorophyll_a Mapping project is progressing well. The Progress will be made by Dr. T. Srinivasa Kumar.
4.	**Governance**	
4.1	Reflect the creation of Co-secretary post and renewal of Chair position with Dr. Shailesh Nayak.	• Action Completed
4.2	The Chair tasked the Secretariat to (i) coordinate a letter of thanks and appreciation (through the Chair) to Dr Smith on his retirement as IOGOOS Officer and (ii) coordinate the process for Dr Smith's replacement out of session, before the next IOGOOS meeting	• Action Completed. • Notified the vacancy of Dr. Neville's position. Nominations are tabled for discussion under Item No. xiii of IOGOOS Annual Meeting.

4.3	IOGOOS Officers	• The secretariat sent out the status paper and requested nominations for the positions of IOGOOS Chair and Officer. The status is attached as Annexure – 1. Will be discussed as Agenda Item xiii of the Annual Meeting.
4.4	IOGOOS Members	• Sultan Qabbus University, Sultanate of Oman is willing to become an IOGOOS Member. However, the SQU has requested for a change in nomenclature. Instead of calling "MoU" , they would like to call as "Agreement" so that they could obtain necessary approvals. • Bay of Bengal Large Marine Ecosystem (BOBLME), a project of FAO, is willing to become an Associate Member.
5.	**Finance**	
5.1	Membership Fees for 2009-10	• Sent out requests to Members for remittance of the Annual Membership fee for the period 2009-10.
5.2	Audit	• Completed Financial Accounting and Audit for the Period December 2008 – June 2010). • Statement of Account is being submitted for verification and approval. The status of the funds is tabled at the meeting as Agenda Item xi of the Annual Meeting for verification and endorsement.

Specific actions with respect to IOP, SIBER, Modelling and Remote Sensing project initiatives will be presented by the respective project leaders

Annexure I of IOGOOS VII Action Taken Report

Notification for the position of IOGOOS Chairman and Officers

Agenda Item xiii of the Annual Meeting

Rules for Nomination of IOGOOS Chair / Officers:

- The Officers should be broadly representative of the regions of the Indian Ocean. viz. Central Indian Ocean, East Africa, Eastern Indian Ocean, Southern Africa and Indian Ocean Islands
- Officer shall serve in an individual capacity for a period of 2 years, up to a maximum of two terms. With the unanimous agreement of all members, in exceptional cases, an Officer can be extended for a further term of 2 years.
- If an Officer does not attend two consecutive Annual Meetings, the position of that Officer will be considered vacant and an election will be conducted for the position.
- If an Officer resigns, the position shall remain vacant until the next Annual Meeting. However, if the Chair is unable to serve, one of the Officers will be nominated by the Officers, to act as a Chair, till next Annual Meeting.
- IOGOOS Secretariat shall notify to all Members about the vacancies of the posts (Chair / Officers) and request nominations from members for the position of Chair of IOGOOS and for other Officers three months prior to the Annual Meeting.
- Nominations should be forwarded through the IOGOOS Member Institutions.
- In the event of more nominations than vacant Officer Positions, an Election Return Officer, who is not a voting Member, shall be appointed, to oversee the election. Each member shall have a number of votes equal to the number of vacancies.

IOGOOS Chair and Officers: The following is the status of the Tenure of Chair and Officers of IOGOOS:

Term	2002 - 2004	2004 - 2006	2006 - 2008	2008 - 2010	2010 - 2012	Nominations Received
Chair	Dr. K. Radhakrishnan	Dr. K. Radhakrishnan	Dr. Shailesh Nayak	Dr. Shailesh Nayak	Eligible for Extension for two year term, with the unanimous agreement of all members, in exceptional cases. However, **Dr. Shailesh Nayak willing to step down**	Dr. Mitrasen Bhikajee, Mauritius

Officer	Dr. Johnson Kazungu	Dr. Johnson Kazungu	Dr. Alfonse Dubi	Dr. Alfonse Dubi	Eligible for Extension for two year term, with the unanimous agreement of all members, in exceptional cases. **Willing to continue**	NA
Officer	Prof. Anthony Forbes	Prof. Anthony Forbes	Dr. Somkiat Khokiattiwong	Dr. Somkiat Khokiattiwong		NA
Officer	Dr. Harry Ganoo	**Dr. Mitrasen Bhikajee**	**Dr. Mitrasen Bhikajee**	**Dr. Mitrasen Bhikajee**	**To be Elected.**	**Dr. Andreas Schiller, CSIRO & Dr. T. Srinivasa Kumar, INCOIS, India**
Officer	**Dr. Neville Smith**	**Dr. Neville Smith**	**Dr. Neville Smith**	**To be Elected.**	**To be Elected.**	

- Nominations have been invited from interested Members for the position of IOGOOS Chair and Officers
- Received one nomination for the post of IOGOOS Chair (Representation from Islands Region)
- Received two nominations for IOGOOS Officer vacancies:
  - One representing Eastern Indian Ocean (Dr. Andreas Schiller)
  - One representing Central Indian Ocean (Dr. T. Srinivasa Kumar)