

**Summary Proceedings of the
IOGOOS Workshop
&
Fourth Annual Meeting (IOGOOS IV)**

**Zanzibar, Tanzania
October 10 – 12, 2006**

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1. Introduction:

The IOGOOS Workshop and 4th Annual Meeting (IOGOOS-IV) was hosted by the University of Dar es Salaam, Tanzania at the Zanzibar Beach Resort Hotel in Zanzibar during October 10 -12, 2006. IOGOOS IV was organized jointly by the IOGOOS Secretariat, IOC Perth Regional Programme Office and University of Dar es Salaam, Tanzania. Thirty participants from eleven countries and IOC participated in the deliberations of IOGOOS IV. The list of Participants is attached as Annexure 1.

2. Opening Ceremony

Dr. Nyandwi, Institute of Marine Sciences, Tanzania welcomed all the participants to the Meeting. Dr. Neville Smith, Dr. Johnson Kazungu and Mr. William Erb gave the opening remarks. The Guest of Honour, Hon. Ms. Rahma Mshangama, Permanent Secretary, Ministry for Agriculture, Natural Resources and Environment of the Revolutionary Government of Zanzibar, delivered the Inaugural Address.

Mr. T. Srinivasa Kumar, Secretary, IOGOOS briefed on the structure of the meeting and proposed the vote of thanks. The Inaugural address by Hon'ble Ms. Rahma Mshangama and the Opening Remarks by Mr. William Erb are attached as Annexure 3 and Annexure 4.

3. Science Workshop:

Chair: Dr. Neville Smith (IOP) and Dr. Johnson Kazungu (Coastal GOOS)

The Science Workshop had eight invited presentations related to the work of the Indian Ocean Panel (IOP) and the Coastal GOOS. The following is a summary of the presentations.

3.1 BlueLink: Modelling and products for the Indian Ocean at near eddy resolving scales. Presented by Gary Meyers for Andreas Schiller

BlueLink is one of several ocean prediction and reanalysis projects under auspices of the international GODAE Program. Dr Meyers described a range of BlueLink products that are available and encouraged IOGOOS members to begin using them for regional applications. The products include:

- CSIRO Atlas of Regional Seas—a new high quality climatology of Indian Ocean thermal, salinity and nutrient-structure.
- Maps of sea level, currents and SST derived by direct analysis of satellite data
- Ocean model reanalyses based on model-data assimilation giving the three dimensional velocity, thermal and salinity structure for the period 1991 through to the present. High resolution is limited to the oceans in the Australian region and does not yet cover all of the Indian Ocean.
- Regional Ocean-Atmosphere Model designed to be nested in the BlueLink products to downscale oceanic structure to 2km over the continental shelf and near coasts.

3.2 Intraseasonal variability in the tropical Indian Ocean – Observations and simulation -By Yukio Masumoto

Intraseasonal variability in the eastern tropical Indian Ocean observed by mooring buoys and simulated in a high-resolution numerical model (OFES), both conducted by JAMSTEC, were presented, and possible influences of the intraseasonal variability on the Indian Ocean Dipole (IOD) events identified. The results suggest that the intraseasonal variability is one of the important components of the variations in the tropical Indian Ocean.

The large amplitude current variability is observed within the equatorial wave-guide, with the typical time-scale of 30 to 60 days for the zonal current variability and of 15 days for the meridional current variability. The 30 to 60 days zonal current variability is associated with the MJO in the atmosphere, while the 15 days meridional current variability is associated with the mixed Rossby-gravity waves excited by the local wind stresses. The energy of the mixed Rossby-gravity waves propagates downward along the ray-path to the bottom. The intraseasonal variability in the equatorial Indian Ocean may have strong impacts on the evolution of the IOD and its predictability, through changing the timing of the onset and decay of the IOD and preconditioning of the IOD.

3.3 Recent advances in understanding the role of the Indian Ocean in the climate system. Presented by Gary Meyers

Dr Meyers discussed recent papers on monsoon intraseasonal variation (MISO and MJO) in the near equatorial region and the Indian Ocean Dipole. Intraseasonal variation is the building block of the monsoons and affects seasonal prediction. The response of the ocean to intraseasonal wind and fluxes has been clearly observed by new moorings in the basin-scale array. But how the ocean feeds back to the atmosphere and plays an active role is still not known. A recent study by G. Vecchi (NOAA, GFDL) indicated that preconditioning by seasonal anomalies in heat storage (thermocline depth) can influence the strength of MISO/MJO wind and convection. Dr Meyers described two process studies (MISMO, Japan and CIRENE, France) that will observe air-sea interaction in the eastern and western equatorial Indian Ocean in late 2006, early 2007. The Indian Ocean Dipole (IOD) is an interannual anomaly involving variation in SST, wind, sea level and currents. Dr Meyers showed an analysis of upwelling in the eastern pole and argued that it is the key process in coupling ocean and atmosphere because thermocline depth anomalies such as Kelvin waves have a strong impact on SST. He presented a summary of El Nino, La Nina and positive or negative IOD years based on an upwelling index, and suggested this could be the basis for compositing biological and/or coastal data to separate ENSO and IOD impacts.

3.4 Report on Development of the ICG/IOTWS

Mr Erb reported on the development of the Intergovernmental Coordinating Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWS). The ICG/IOTWS has had three meetings: Perth 2005, Hyderabad 2005 and Bali 2006. It has formed six working groups that meet at ICG sessions as well as intersessionally.

- WG1: Seismic measurements, data collection and exchange
- WG2: Sea level data collection and exchange, including DART
- WG3: Risk assessment
- WG4: Modelling, forecasting and scenario development
- WG5: System of interoperable advisory and warning centres
- WG6: Mitigation, preparedness and response

A Secretariat for IOTWS has been established as part of the IOC Perth Regional Office in Perth, Australia with funds provided by AusAID. Dr Tony Elliot heads the Secretariat and Dr Jane Cunneen is the Programme Assistant. The role of the Secretariat is to coordinate all aspects of the intergovernmental process.

The IOTWS is developing on schedule with major components being built by Australia, India, Indonesia, Malaysia and Thailand. The IOC is the lead agency in the UN and it works in cooperation with a number of other UN agencies and countries. The individual countries of the region have primary responsibility for operation of the system and their goal is create a regional multi-lateral system.

Sea level observations from tide gauges and from deep-sea bottom pressure measuring buoys are critical elements of the IOTWS observing system and share technical, logistical and communication requirements with the IOTWS.

3.5 Impacts of Global Climate Change on Coastal Ecosystems and their Possible Survival Through Genetic Variability: Case Study on Coral Reefs by David Obura

The coincidence in late 1997, of positive phases of the ENSO and the Indian Ocean Dipole resulted in warm doldrums conditions throughout the WIO. Affecting the region during its 'summer' period a warm pool of water formed in January/February 1998, south of the oceanic islands of Reunion and Mauritius, migrating north and west with the Inter-Tropical Convergence Zone (ITCZ), influencing Madagascar, the East African coast and the Seychelles, then the Maldives and north-west IO in May 1998. At affected locations, sea surface temperatures exceeded long term maxima by $>1^{\circ}\text{C}$ for over 2 months, associated with unusually calm clear conditions.

The result was a mass bleaching and mortality of corals throughout the region, except in Mauritius and Reunion where a cyclone shielded the islands and caused water mixing. Scientists recorded bleaching levels averaging 50-80%, and to near 100% in the worst impacted reefs from February to May 1998, and similar levels of mortality within a few months. Overall coral cover decreased by about 66%, with progressive recovery being recorded each year since then. Coral species diversity decreased by approximately 30% on study reefs in Kenya. Differences in the resistance and resilience of corals to thermal stress – between sites and regions and at intra- and inter-specific levels is a major area of research to better understand past events and predict future vulnerability.

The role of genetic variability in the responses of corals to thermal stress is a topic of active research. With two genomes interacting, coral and zooxanthellae, there may be greater scope for acclimatization and adaptation than is currently recognized. Without rapid adaptation, scientists predict that global warming trends will exceed the

bleaching thresholds of corals with return times of 1-5 years within 20-50 years, in the major coral reef biomes. If this is the case, the prognosis for coral reefs is poor. However, many factors may alter this prediction including adaptive capacity of corals and/or zooxanthellae, and other physical or climate variables decreasing the expected rise in sea surface temperatures.

Based on the above findings, the following were presented as feasible projects linking the Coastal Ecosystems and Climatology/Oceanography components of IOGOOS to improve projections for climate change impacts on coastal ecosystems:

- Reanalysis of 1997-98 ENSO/IOD and coral bleaching events, in isolation or in comparison with other years in which mild or no bleaching were observed. Multiple scales could be considered:
 - i. Ocean scale - East Africa, islands, South Asia, Andaman Seas
 - ii. Meso scale - East Africa mainland coast - linear sequence
 - iii. Small scale - 50 km extent – e.g. Mafia archipelago, Kiunga.
- Climate vulnerability of coral reefs assessment based on key sites (for example, 5-10 in the ocean basin), combining the small scale findings of the above suggestion and providing a further layer of integration among keystone coastal ecosystems in the Coastal Ecosystems pilot project.
- Generation of specific products needed to support components of a climate vulnerability analysis of coral reefs such as connectivity models at ocean-basin, meso-scale and with coastal/tide interactions to give information on forcing functions, recruitment/dispersal and sedimentation/pollution dispersal.

3.6 Coastal Remote Sensing Applications by Dr. Shailesh Nayak

Coastal zone has been receiving an increasing importance in view of its high biological productivity, wealth of species and genetic diversity, fluvial discharge, high rates of population growth and development of trade, industries and commerce. These activities led to degradation of ecosystems, diminishing living resources and deteriorating water quality. The episodic events such as cyclones, floods and tsunamis also modify the shoreline and affect coastal ecosystem. The sea level rise will significantly affect the coastal zone. It is necessary to have up-to-date and reliable information on coastal and marine ecosystems, geomorphic processes and water quality. Remote sensing and GIS help in creating inventory and organization of comprehensive scientific data base on coastal habitats, landforms, shoreline, land use, coastal topography and bathymetry, assessment of living resources and coastal processes. These data sets are also useful for the management of disasters. The GIS-based models help in decision making process. The observational requirement includes satellite and aerial remote sensing and in situ platforms such as moored, drifting, floating profilers.

Remote sensing has helped in mapping extent and condition of the vital habitats such as coral reef and mangroves. It is also possible to community level zonation of mangroves and eco-geomorphological mapping of the coral reefs using high resolution data. This helps immensely in assessment of biodiversity as well as health. The repetitive nature of the satellite data allows to map the changes (short-term, long-term and seasonal) in the condition of ecosystem. Several case studies have been

carried out along the Indian coast using the Indian Remote Sensing Data. The impact of cyclone and tsunami has been well documented.

Multi-date satellite data have used to map shoreline change and landforms. The areas under erosion, deposition, shifting of river mouths, shoals, growth of spits can be easily mapped with a high planimetric accuracy. The ocean colour and microwave data provide valuable information on the movement of sediments. This information is useful for planning protective structures.

The ocean colour data is useful in quantifying ocean carbon flux and understanding how it is controlled and why it varies from year to year. It also provides a synoptic, observational link between the development of the ocean ecosystem and the physics of the mixed layer and helps in assisting with the scientific analysis and management of the coastal zone, including fisheries management. An approach has been developed through integration of SST with chlorophyll to identify potential fishing grounds. Features such as fronts, eddies, rings, gyres, meanders and upwelling regions were used for forecast. It was observed that 70-90 per cent success rate (reliability) and 70-200 per cent increase in catch was achieved when this information has been used by fishermen.

Climate change may affect coastal ecosystems through warmer SST, altered circulation patterns, changing storm frequency and rising sea levels. It is necessary to determine present status of ecosystems and predict future conditions. Long-term systematic data (about 30 years) on marine environment is available for understanding of the coastal and marine environment.

3.7 GOOS/GEO Chlorophyll Pilot Project Chlorophyll Global Integrated Network (ChloroGIN) by Dr. Stewart Bernard

The Chlorophyll Pilot Project is a GOOS/GEO demonstration project, also sponsored by POGO and IOCCG. The project uses the currently running ANTARES project as a model, and will provide near real-time and archived remotely sensed and in situ measurements of chlorophyll as core products. At a time when the stewardship of the oceans relies on an ecosystem-based approach to management, opportunities are emerging for observing the ocean ecosystem at unprecedented scale at the global level, in a systematic and sustained manner, using satellite data. At the same time, it is well-recognised that combining satellite data with in situ observations in a judicious manner allows extension of applications to domains inaccessible by either method in isolation.

The need in this context is for establishing a network of observations that rely on existing technology and well-established methods for making the measurements. The approach has to be simple and fast, to allow routine measurements over long-time scales, and which would not exclude some countries from participating, on the basis of high technological requirements or high operational costs. A full description of the proposed network will be contained in the GOOS/GEO Chlorophyll Pilot Project report from the September 2006 Plymouth Marine Laboratory meeting, expected to be available November 2006.

3.8 Coral Reef Targeted Research (CRTR) Project and possible contribution to IOGOOS activities by Dr. Christopher Muhando

He has briefed on the CRTR Project and its sub-projects and gave an introduction about the objectives, goals and research of the project. He also stated that CRTR Project through CoE (Institute of Marine Sciences) is open and ready for collaboration with IOGOOS on any issues related to Coral reef environment and health.

4 Election of Officers and IOGOOS Annual Meeting:

Chair: Dr. Neville Smith

Dr. Neville Smith, in his opening remarks, welcomed all the Members to the Annual Meeting and briefed the meeting on the progress of IOGOOS initiatives. He also briefed the meeting on the status of the positions for which elections will be held. He congratulated the outgoing Chair Dr. K. Radhakrishnan and Officers Dr. Johnson Kazungu and Prof. Anthony Forbes for their excellent contributions to IOGOOS. Mr. William Erb was appointed as the Nominations Officer to manage the nominations for the election.

4.1 Election of Officers:

As per Article 6.2 of the IOGOOS MoU, "Officers shall be appointed for a term 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".

The following are the present Officers of IOGOOS:

- Dr. K. Radhakrishnan, Chair and Officer representing Central Indian Ocean – Appointed in November 2002 and Term ending in November 2006
- Dr. Neville Smith, Officer representing Eastern Indian Ocean – Appointed in November 2002 and Term ending in November 2006
- Dr. Johnson Kazungu, Officer representing East Africa – Appointed in November 2002 and Term ending in November 2006
- Prof. Anthony Forbes, Officer representing Southern Africa – Appointed in November 2002 and Term ending in November 2006
- Dr. Mitrasen Bhikajee, Officer representing Indian Ocean Islands – Appointed in April 2004 and Term ending in April 2008

The IOGOOS Secretariat sent a Communication to the Officers seeking their opinion on election and requesting their willingness to continue, if there is unanimous agreement of all Members:

- Dr. Radhakrishnan indicated he wished to step down as Chair and as an Officer.
- Dr. Johnson indicated he wished to step down as an Officer.
- Dr. Anthony Forbes has been out of contact (retired) and it is assumed he no longer wishes to serve as an Officer.
- Dr. Mitrasen Bhikajee is willing to continue (term ending in 2008).

- Dr. Neville Smith is willing to step aside; however, could continue if situation demands.

The IOGOOS Secretariat notified the vacancies of Chair and Two Officers and requested nominations from interested Members.

During the Meeting, the following persons were elected, by consensus, as the Chair and Officers of IOGOOS:

Dr. Shailesh Nayak was elected as the Chair of IOGOOS to replace Dr. K. Radhakrishnan.

Dr. Alfonse Dubi and Dr. Somkiat Khokiattiwong were elected as IOGOOS Officers to replace Dr. Johnson Kazungu and Prof. Anthony Forbes

Upon the request of IOGOOS, Dr. Neville Smith consented to continue as an IOGOOS Officer for another Term

The new Chair was requested to send letters of appreciation to Dr. Radhakrishnan, Dr. Johnson Kazungu and Prof. Anthony Forbes for their contributions to IOGOOS.

4.2 Secretariat Report of Activities since August 2005:

Mr. Srinivasa Kumar, Secretary, IOGOOS presented an overview of the activities of the secretariat. The detailed report is attached as an Annexure. The meeting appreciated the efforts of the IOGOOS Secretariat and thanked INCOIS for its continued strong support for the Secretariat.

The following actions were identified:

Manpower: The names and contact details of the persons working at the IOGOOS Secretariat need to be put up on the IOGOOS Website to enable better communication and coordination with the Members.

IOGOOS and ICG/IOTWS: To ensure better coordination between ICG/IOTWS and IOGOOS, it was suggested that the Chairman, IOGOOS report on relevant activities of IOGOOS at the ICG Meetings. The Secretariat is to contact the Members of IOGOOS who are also Members of the ICG/IOTWS Working groups and enquire whether they are willing to report on behalf of IOGOOS.

IOGOOS Website: The Secretariat was requested to make a Flyer/Brochure on the facilities offered by the IOGOOS Website and publicise the website so that it is more widely used.

Progress Reports: The Meeting suggested that it was desirable to get 6-monthly progress reports from the IOGOOS project coordinators to the secretariat.

Annual Dues: The Meeting suggested that, the Membership fee for the last year be waived and that the IOGOOS secretariat should send out invoices for the Membership fee for 2006-07 as soon as the new banking procedure is approved.

4.3 Accounts and Financial Summary:

The secretariat submitted an audited financial statement of the IOGOOS Accounts to the Annual Meeting. Dr. Johnson Kazungu was appointed to review the Financial Statements. Dr. Johnson Kazungu reported and certified that the accounts were in order.

4.4 Dates and Venue of the next Annual Meeting:

The meeting accepted the offer from Dr. Somkiat Khokiattiwong to host the next Meeting in Phuket, Thailand, tentatively in the first week of October/November. The IOGOOS Secretariat was requested to interact with the host and finalise the dates at the convenience of the host. The Meeting appreciated the offer of Dr. Vahid Chegini to host the meeting in Iran in 2008.

The meeting ended with thanks to the Chair.

5 Progress Reports from the IOGOOS Working Groups:

Chair: Dr. Neville Smith

5.1 Update on IOP activity by Dr. Gary Meyers

Dr Meyers presented an overview of the implementation plan for sustained observations for climate research and operational prediction. The mooring array is composed of 44 moorings to observe weather and upper ocean parameters and three moorings to observe the deep equatorial currents. The rationale for the array was discussed. At the present time the three deep moorings and nine of the surface moorings are active, located near 80E and 90E. An additional three moorings are scheduled for implementation in late 2006/early 2007, including one in the western Indian Ocean. Implementation of a mooring south of Java is under discussion. Challenges in implementing the full array are: vandalism by fishers and commitment of ship time. Maintenance of the full array will require about 142 days of ship time per year. About 400 Argo floats are now active in the Indian Ocean out of 480 required for full implementation. Floats to complete the array are available but ships to take them to the void locations are lacking. Implementation of all the XBT lines is on track except IX10 (lacking a principal investigator) and IX08 (lacking useful shipping.) The XBT line IX07 was dropped because it is redundant and not as effective as IX08 for monitoring inflow to the western boundary current system. NOAA and NIO are working together to implement IX08. Dr Meyers reported progress (though limited) in coordinating IOP activity with IOTWS.

5.2 Update on the Project on Coastal Keystone Ecosystems by Dr. Greg Wagner

- Issues of project implementation were discussed during a breakout session at the Fourth WIOMSA Scientific Symposium held at Grand Baie, Mauritius, 29 August – 3 September 2005.

- There was extensive email correspondence with all interested participants from more than 10 countries in order to develop contacts with the appropriate institutions in each country and to get input into the proposal.
- This culminated in holding a Pre-project Planning Workshop in Phuket, Thailand, 17-19 February 2006, which was attended by 2-4 people from each of 8 countries who were experts in coral reefs, mangrove forests, seagrass bed or remote sensing and many of whom were from government institutions. From this workshop, we received the following inputs:
 - standardization of methodologies for data collection,
 - work plan and timeframe,
 - overall project implementation and
 - country implementation plans, including designation of lead implementing institutions and individuals, study sites, budget and training needs.
- Immediately following this workshop, the project was presented at the conference on Post-Disaster Assessment and Monitoring of Changes in the Coastal, Ocean and Human Systems in the Indian Ocean and Asian Waters also held in Phuket, Thailand, 20-23 February 2006.
- Since the Pre-Project Planning Workshop a lot of the input has been incorporated into the overall proposal, though more work is needed to fully capture those extensive inputs.

Through these meetings as well as workshops held in previous years, valuable input has been received from a large number of people from many countries and many organizations having a wide range of expertise who, in addition, have shown their support for the project.

5.3 Update on Capacity Building Initiatives for Ocean Data and Information Management by Dr. Zaker

Dr N. H. Zaker Chairman of IOCINDIO and Coordinator of ODINCINDIO presented a detailed report on history, achievements and advances of ODINCINDIO project. ODINCINDIO project was first initiated at IOGOOS I meeting in 2002 and the meeting recommended the development of an ODIN project for IOCINDIO, complementing ODINAFRICA. The proposal for the establishment of ODINCINDIO was proposed to IODE17 in 2003 by the Chairman of IOCINDIO. It was supported by IOCINDIO Member States, IOGOOS, ROPME and was discussed in IOGOOS Workshop on data and information management in Hyderabad in 2003. Later it was recognized as the capacity building tool of IOGOOS on MDM and MIM in IOGOOS meeting II, 2004. It was also discussed in ODINCINDIO planning meeting in Tehran in 2004 and was approved by IODE 18 and IOC assembly in 2005. ODINCINDIO has become operational since 2005 and since then several workshops and training courses under this project has been conducted in IODE office including :ODINCINDIO Marine Data Management Training Course, October 2005; ODINCINDIO Marine Information Management Training Course, February 2006; ODINCINDIO Data Management Training Course, May 2006. Dr Zaker also briefed the meeting on the strong support of IOCINDIO VI meeting, 2005 of ODINCINDIO as the joint activity of IOCINDIO, IODE and IOGOOS. The meeting welcomed the

successful achievements of ODINCINDIO and highly supported the close collaboration of IOGOOS, IOCINDIO and IODE on this project.

6 Break out session of Working Groups and the Proposed Work Plan

Dr. Neville Smith briefed the Meeting on the Terms of Reference of the Working Groups. He suggested that the Working groups need to develop and discuss work plans for the next two years in the context of the terms of reference for IOGOOS, on the activities related to (a) Observing system, (b) Applications & operational services (c) Data and information management (d) Capacity building (e) Supporting research and (f) Cooperation specifically identifying the role of IOGOOS, as well as the time schedule and resources required to pursue the work plan.

The working group deliberations and the Work plans proposed are as follows:

6.1 Group 1 Indian Ocean Panel [Chair: Dr. Gary Meyers]

The questions discussed were:

- How can IOP activities (large scale oceanography and climate) connect with African activity?
- Ocean reanalysis and climate model results linked to coastal IOGOOS: How to get the products out?
- IOC/IOGOOS science programs: How can the region become active in the science?

The participants identified three possible projects that address these questions:

a). Easy access/small data sets: Goal—provide the ocean re-analysis and/or climate prediction data required for two or three specific projects in an archive and format that will be user friendly. The data will be targeted specifically for IOGOOS members/associates.

Actions:

- IOGOOS Secretariat announces opportunity and call for proposals.
- IOGOOS Chairman, IOP Chair and possibly a Panel select the projects, taking account of common need for data.
- Chair of ODIN-INCINDIO responsible for assembly of data set.

Resources: \$3-4K for data assembly. Projects to be funded by national resources.

b). From ocean reanalysis/prediction to coastal applications: Goal—train IOGOOS members/associates how to use downscaling models and tools. The practice and application of downscaling requires research to make the model as correct as possible.

Actions:

- IOP chair writes expression of interest to Ehrlich Desa (IOC in charge of capacity building).
- IOGOOS and IOP Chairs find someone in the modelling community to take charge of the project (e.g. write proposal).
- Submit proposal to IOC before March 2007 for a training session in late 2007 or 2008.

Resources: Full cash-funding from IOC required and possibly in kind funding from modelling groups.

c). Large-scale applications of reanalysis for coral bleaching/fishing problems:

Goal: Application for understanding and management of bleaching and pelagic fisheries.

Actions:

- IOP chair discuss possible projects with David Obura (corals) and John Gunn (tuna fishery) to identify project leaders.
- Project leaders write research plan and obtain resources for the projects.

Additional issues:

- IOGOOS members want to participate in global research programs but national funding is lacking because it is always directed to local coastal problems. Programs like POGO provide resources for visits, but not research projects per se. Funding for research may be available from APN for the SE Asia region and from EU for western Indian Ocean. IOGOOS needs to develop a strategy to access these funding resources.
- IOGOOS needs to develop a strategy to maximize IOGOOS members/associates participation in IOC training programs
- IOGOOS needs to develop a strategy to convert regional research projects to operational activity.

6.2 Group 2 Coastal Pilot Projects [Chair: Dr. Johnson Kazungu]

a). Keystone Coastal Ecosystem Project

- For the ecosystem project, it was suggested that perhaps we should start small and set up a pilot project.
- While beginning with a pilot test, the project should remain as an integrated whole.
- Suggested that India and Tanzania could start with pilot testing.
 - Make available coarse resolution datasets for Chlorophyll and SST for the pilot sites.
 - Availability of other high resolution satellite data sets for the pilot sites from the Indian satellites to be explored.
 - Consider the suggestion that India could host the Remote Sensing. Training in Hyderabad probably along with the coordinators meeting
- The suggestion about Tanzania and India will be discussed with the identified project coordinators, who may also consider requests from other countries.
- Use the ocean-climate data to reanalyze the 1998, bleaching event.
- Identify and link with existing projects that are monitoring in each country.
- Support required from IOGOOS:
 - When the proposal is finalized it should be forwarded to donors through the IOGOOS Secretariat.
 - IOGOOS help in organizing meetings.
 - Publicize the project activities through the Website.

- The project should be presented at the Regional GOOS Forum in Nov 2006, as a coastal pilot project which could be emulated elsewhere.
- Look at guidelines from Coastal GTOS (Dan Baird). Our project fits into that plan.
- In the various trainings, work with other programs to offer the training.

The Work Plan for November 2006 to June 2008 for the project is as follows:

Time	Activity	Responsible
Oct 06 – Jan 07	Email correspondence to get final details from the countries, e.g., sites and budget	Greg and other coordinators
Oct 06 – Jan 07	Identify potential donors	Coordinators and IOGOOS secretariat
Oct 06 – Jan 07	Develop details of Phase 0 (pilot testing in Tanzania and India) of the proposal	Coordinators
Feb/Mar 07	RS Training (3-4 days)(1 from each of the 8-9 countries)	Shailesh
Feb/Mar 07	Coordinators Meeting (Hyderabad-4 days) <ul style="list-style-type: none"> • Finalize proposal • Write letters to potential donors • Prepare different versions of the proposal according to formats required by the donors 	Greg, Shailesh, other coordinators, IOGOOS secretariat
Mar 07	Submit the proposal to various donors	IOGOOS secretariat
Apr 07	Planning and preparation of training materials	Coordinators
May 07	Implement Phase 0: pilot test the training of all components (coral reefs, mangroves, seagrass beds and remote sensing) in Dar es Salaam and conduct monitoring in Dar es Salaam in Tanzania and Gulf of Mannar in India.	Greg and other coordinators
Jul 07	Report written for Phase 0	Coordinators
Apr – Jul 07	Integrate the various funding sources that hopefully will have been found, both internationally and nationally within some countries, and coordinate the various players so that everyone knows who's funding what and who's doing what. <ul style="list-style-type: none"> • This may require another meeting, besides email correspondence. 	Coordinators
Aug 07	Launch main project with an International Training of Trainers for all components in Dar es Salaam	Greg and other coordinators

Sep 07 – Mar 08	National Training of Trainers and Monitoring Session I within each country	All national coordinators
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b). Chlorophyll Project

- Chlorophyll pilot study: IOGOOS Secretariat could contact Pogo regarding the project and endorse the utility of such a network and the requirement of remotely sensed chlorophyll data sets on a routine basis for meeting the IOGOOS coastal pilot projects.
- Data from the IOP for the chlorophyll project can be shared freely.

c). Coastal Erosion and Prawn Pilot Projects

- The coordinators of these projects did not turn up for the meeting. It was also noted that there was no progress in the activities identified in the previous annual meetings. Considering this the meeting decided that these projects are to be abandoned unless other scientists have the interest to take over and coordinate them. As such, the action decided was for the IOGOOS Secretariat to contact the project coordinators and determine new leaders or termination of the project. Complete action by February 2007, and report to membership.

6.3 Group 3 Remote Sensing (Chair: Dr. Shailesh Nayak)

Daily Images of (a) MODIS Chlorophyll-a, (b) MODIS SST and (c) Turbidity (Kd 490) are identified as the general remote sensing products that need to be provided to the IOGOOS Members.

Further, access to specialised Remote Sensing Products such as Normalized Difference Vegetation Index (NDVI), available from MERIS data is desired. Links may be provided to sources of Remote Sensing Data Products.

The following Training Programmes are proposed:

Sl. No	Subject	Duration	Host and Time
1	Use of processed data products	3 to 5 Days	India (March 2007) S.A (May 2007) AIT (To be explored)
2	General remote sensing data processing and analysis	One Week to 10 Days	India (March 2007)
3	Keystone Ecosystem Project involving Satellite Data Interpretation, field truths, etc	One Week to 10 Days	Tanzania (August 2007)

It was proposed to explore funds from (a) IOC (BILCO), (b) POGO/IOC/SCOR and (c) ASLME for this purpose.

Role of IOGOOS Secretariat

- Facilitating the Training Programmes
- Interface with Chlorophyll Pilot Project, POGO, etc

6.4 Group 4 Ocean Data and Information Management (Chair: Dr. N H Zaker)

The deliberations of this group focused mainly on the capacity building initiatives in Ocean Data and Information Management. It was suggested that a more comprehensive data and information management plan should be evolved by ensuring wide participation of the data managers from the region and drawing upon the results of the Hyderabad Workshop of December 2003. To kick start such an activity it was suggested that the IOGOOS Secretariat corresponds with Mr. Peter Pissierssens of IODE to organize a session for the Data Managers from the Indian Ocean region at the forthcoming IODE meeting scheduled to be held in March 2007. Further, the meeting noted that 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.

The following capacity building requirements were identified by the Working Group.

Basic Training Courses

- Advanced training course on marine data management: 2007.
- Advanced training course on marine information management: 2007.
- Training course on marine biodiversity data management: 2008.

Data management and related capacity building for specific IOGOOS projects

- Workshop on marine RS/GIS data management in relation to IOGOOS projects: 2007.
- Workshop on DM and Modeling in relation to IOGOOS projects: 2007.
- Workshop on sea level data management in relation to IOGOOS projects: 2008.
- Expert Exchange and visiting scientists in relation to IOGOOS projects: 2007-2008.

The meeting noted that the above capacity building initiatives map well with the training requirements of IOGOOS' Remote Sensing Working Group, Ocean and Climate Working Group, as well as the Coastal Working Group. Hence it was suggested that all these initiatives be well coordinated. Funding for this training is to be drawn from IOGOOS and ODINCINDIO initiatives.

7 Preparations for the GOOS Regional Forum [Chair: Mr. William Erb]

Mr. William Erb briefed the meeting on the objectives, agenda and various issues concerning the upcoming GOOS Regional Forum to be held in Capetown during November 14-17, 2006. He discussed in detail the paper entitled “Report of the Joint JCOMM-GSSC-GRA ad hoc Task Team” that is of particular interest to IOGOOS, as it defines the relationships between various GOOS committees and bodies and their respective responsibilities. He pointed out the issues of concern and it was decided that the views of IOGOOS be sent to the Chair of I-GOOS and the GRA Chairs participating in the Forum.

Discussions were also held on other meeting issues such as the Global Coastal Network and how the IOGOOS initiatives might map to such a network. It was decided that the IOGOOS Chair should make a presentation to the Forum on the IOGOOS activities and interests.

8 Presentations by IOC Agencies, Regional Bodies

Mr. Mika Odido made a presentation on IOC activities in Africa and the possible areas of collaboration with IOGOOS. The areas of collaboration proposed include participation in activities such as Downscaling of the Ocean Models to the Coastal Regions and Reanalysis products.

Dr. Nasser H Zaker, chair of IOCINDIO made a detailed presentation on the activities of IOCINDIO and the ODINCINDIO. He proposed increased participation of IOGOOS in the activities of ODINCINDIO.

9 Finalisation of Work Plan

The work plan proposed by the Working Groups and listed in detail in Section 6 above, was approved by the meeting. A few additional action items are listed below. The Work Plan could be grouped under the following headings:

9.1 Observing System Activities

- a. The ongoing Indian Ocean (Climate) Observing System activities that are being pursued by the Indian Ocean Panel are progressing well and are direct contributions of IOGOOS to the Observing System activities in the Indian Ocean. These activities will be pursued and a meeting is being planned in 2007.
- b. IOGOOS role and contributions to the Global Coastal Network (GCN): Several nations are compiling national reports to IOGOOS scheduled in 2007, part of which will cover the Indian Ocean. The meeting suggested that an audit could be coordinated from IOGOOS as a basis for a more targeted activity in the future. This audit could cover national programmes in coastal monitoring, in-situ and remote sensing activities, data products, modelling and prediction activities, Data and Information Management, etc. Dr. Vahid Chegini

volunteered to coordinate this survey with inputs from Dr. Neville Smith on the format of the questionnaire.

- c. IOGOOS role and contributions to the coastal ocean beyond the Global Coastal Network(GCN): The coastal ecosystem pilot project, the Indian Ocean elements of ChloGIN and the remote sensing activities of IOGOOS have been identified as the IOGOOS contributions to the coastal ocean beyond the GCN. The work plan for these elements is given in section 6.2 above.

9.2 Applications and Operational Services:

A few activities are directly enhancing operational services:

- a) Applications of ocean climate reanalyses and climate change projects through downscaling (coral reefs and fisheries applications): The work plan for this activity is given in section 6.1 above.
- b) Downscaling ocean analysis and prediction: The long-term objective is to develop an IOGOOS project on coastal modelling. It is planned to have an Indian Ocean Workshop (School) on “Ocean Weather” jointly with IOC capacity building and training actions as well as with the JCOMM task team on operational oceanography (GODAE). It is proposed to develop a prospectus/outline, also including the data and information components of ODIN. The work plan is given in section 6.1 above.
- c) ChloroGIN Project
- d) Transfer of Technology Examples

9.3 Data and Information Management: The work plan for data and information management is given in section 6.4 above. The meeting reiterated that the activities proposed need to align with the following projects:

- a) Database activities associated with coastal ecosystem project.
- b) Remote sensing workshops including data management and GIS elements.
- c) Downscaling projects with data and information management elements.
- d) Joining with IOTWS sea level training that will benefit both climate and coastal applications.

9.4 Capacity Building and training: The meeting suggested that IOGOOS should pursue activities that facilitate expert/scientist exchange/visits and conduct a survey of facilities, experts, and activities in the region. The results of such a survey could be published on the IOGOOS Website.

9.5 Support Coastal Research/Observing: IOGOOS has strong programmes in climate, coastal ecosystems as well as remote sensing. IOGOOS could play a potentially strong role in coordinating coastal research/observing.

9.6 Co-operation: Participation of IOGOOS on the GOOS Regional Forum and the proposed collaboration between the IOP and SIBER. IOGOOS Chair was requested to write to Dr. Rayleigh Hood on collaboration between SIBER and IOP (Draft from Gary Meyers).

10.0 Closing: The meeting closed with a formal thanks to the hosts for hosting a successful and pleasant meeting.

List of Participants

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**Agenda for the IOGOOS Workshop and Fourth Annual Meeting
(IOGOOS-IV)**

October 10 – 12, 2006 at Zanzibar, Tanzania

Venue: Hotel Zanzibar Beach Resort

<u>October 9, 2006 (Monday)</u>											
Arrival, Registration, Informal Meetings											
<u>October 10, 2006 (Tuesday)</u>											
0830 to 0900 Hrs	Registration										
0900 to 1000 Hrs	<p>Opening Ceremony</p> <p>Welcome Speech by Dr. Nyandwi</p> <p>Opening Remarks by Dr. Neville Smith, Acting Chair, IOGOOS</p> <p>Opening Remarks by Dr. Johnson Kazungu, IOGOOS Officer</p> <p>Opening Remarks by Mr. William Erb, Head, IOC-Perth Office</p> <p>Vote of Thanks by Secretary, IOGOOS</p>										
1000 to 1030 Hrs	High Tea; Press Briefing										
1030 to 1230 Hrs	<p>Science Workshop (4 invited talks related to the work of IOP)</p> <p>Chair: Dr. Neville Smith</p> <table border="1"> <thead> <tr> <th>Proposed Title</th> <th>Speaker</th> </tr> </thead> <tbody> <tr> <td>Blue Link: Modelling and products for the Indian Ocean at near-eddy resolving scales</td> <td>Dr Gary Meyers</td> </tr> <tr> <td>Observation of intraseasonal variability in the ocean and/or results from the Ocean Model for the Earth Simulation System (OFES)</td> <td>Dr. Yukio Masumoto, JAMSTEC</td> </tr> <tr> <td>Recent advances in understanding the role of the Indian Ocean in the climate system</td> <td>Dr Gary Meyers</td> </tr> <tr> <td>Status of the Indian Ocean Tsunami Warning System</td> <td>Mr. William Erb</td> </tr> </tbody> </table>	Proposed Title	Speaker	Blue Link: Modelling and products for the Indian Ocean at near-eddy resolving scales	Dr Gary Meyers	Observation of intraseasonal variability in the ocean and/or results from the Ocean Model for the Earth Simulation System (OFES)	Dr. Yukio Masumoto, JAMSTEC	Recent advances in understanding the role of the Indian Ocean in the climate system	Dr Gary Meyers	Status of the Indian Ocean Tsunami Warning System	Mr. William Erb
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1230 to 1300	Discussion										
1300 to 1400 Hrs	Lunch										
1400 to 1600 Hrs	<p>Science Workshop (4 invited talks related to the work of Coastal GOOS)</p> <p>Chair: Dr. Johnson Kazungu</p> <table border="1"> <thead> <tr> <th>Proposed Title</th> <th>Speaker</th> </tr> </thead> <tbody> <tr> <td>Impacts of Global Climate Change on Coastal Ecosystems and their Possible Survival Through Genetic Variability</td> <td>Dr. David Obura, CORDIO Eastern Africa</td> </tr> <tr> <td>Escalating Human Impacts on Coastal Ecosystems and Management Responses in the Indian Ocean</td> <td>Dr. Magnus Ngoile</td> </tr> <tr> <td>Coastal Remote Sensing Applications</td> <td>Dr. Shailesh Nayak</td> </tr> <tr> <td>Chlorophyll Pilot Project</td> <td>Dr. Stewart Bernard</td> </tr> </tbody> </table>	Proposed Title	Speaker	Impacts of Global Climate Change on Coastal Ecosystems and their Possible Survival Through Genetic Variability	Dr. David Obura, CORDIO Eastern Africa	Escalating Human Impacts on Coastal Ecosystems and Management Responses in the Indian Ocean	Dr. Magnus Ngoile	Coastal Remote Sensing Applications	Dr. Shailesh Nayak	Chlorophyll Pilot Project	Dr. Stewart Bernard
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1600 to 1630 Hrs	Discussion										
1630 to 1700 Hrs	Coffee/Tea										
1700-1830 hrs	<p>Election of Officers</p> <p>IOGOOS IV Annual Meeting</p>										
1900-2030 hrs	Dinner										

October 11, 2006 (Wednesday)

0900 to 1030 Hrs	<p>Updates from Working Groups</p> <p>Chair: Dr. Neville Smith</p> <table border="1"> <tbody> <tr> <td>Indian Ocean Panel (IOP) Activities</td> <td>Dr. Gary Meyers</td> </tr> <tr> <td>Coastal Ecosystems</td> <td>Dr. Greg Wagner</td> </tr> <tr> <td>Capacity Building Initiatives for Ocean Data & Information Management</td> <td>Dr. N. H. Zaker</td> </tr> </tbody> </table>	Indian Ocean Panel (IOP) Activities	Dr. Gary Meyers	Coastal Ecosystems	Dr. Greg Wagner	Capacity Building Initiatives for Ocean Data & Information Management	Dr. N. H. Zaker
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Capacity Building Initiatives for Ocean Data & Information Management	Dr. N. H. Zaker						
1030 to 1100 Hrs	Tea Break						

1100 to 1230 Hrs	Break out session of Working Groups Group 1 Indian Ocean Panel Group - Dr. Gary Meyers Group 2 Coastal Pilot Projects - Dr. Johnson Kazungu
1230 to 1300 Hrs	Short Plenary Summaries - Dr. Gary Meyers/Dr. Johnson Kazungu
1300 to 1400 Hrs	Lunch Break
1400 to 1530 Hrs	Break out session of Working Groups Group 3 Remote Sensing Group - Dr. Shailesh Nayak) Group 4 Ocean Data and Information Management Group - Dr. N H Zaker)
1530 to 1600 Hrs	Tea Break
1600 to 1630 Hrs	Short Plenary Summary – Dr. Shailesh Nayak/Dr. N.H. Zaker
1630 to 1730 Hrs	Preparations for the GOOS Regional Forum - Mr. William Erb
1730 to 1800 Hrs	Discussion – Annual Meetings resumed
1800 to 1830 Hrs	Tea Break

October 12, 2006 (Thursday)

0830 to 0900 Hrs	Activities of IOC in Africa – Dr. Mika Odido
0900 to 0930 Hrs	Actitivits of IOCINDIO – Dr. N. H. Zaker
0930 to 1030 Hrs	Discussions on the Work Plan
1030 to 1100 Hrs	Tea Break
1100 to 1200 Hrs	Finalisation of Work Plan
1200 – 1230 Hrs	Schedule of Work; Next Meeting
1230 – 1300 Hrs	Conclusions/ Recommendations

**Inaugural Address by Hon. Ms. Rahma Mshangama, Permanent Secretary,
Ministry for Agriculture, Natural Resources and Environment of the Revolutionary
Government of Zanzibar**

Representatives of IOC
High Officers of IOGOOS
Distinguished Participants,
Ladies and Gentlemen,

Good Morning,

It is a great honour for me to have the opportunity to officiate and participate in this fourth workshop and annual meeting of the Indian Ocean Global Ocean Observing System (IOGOOS). Allow me to express my deep appreciation to the local organizers for having invited me to this occasion. I am also very pleased that this Workshop and 4th Annual Meeting is hosted by the Institute of Marine Sciences here in Zanzibar. This is a great privilege for Zanzibar and on behalf of the Revolutionary Government of Zanzibar, I would like to thank the Institute of Marine Sciences for having accepted this task and also I wish to take this opportunity to welcome you all to this beautiful spice island of Zanzibar. I am sure you will enjoy your stay here throughout the workshop.

Distinguished participants, it is also appropriate I feel, that a meeting addressing issues related to the state of ocean and its influence on the marine and coastal ecosystems and resources including human life is held on an island. I am told that your last workshop and annual meeting was held in Bali, Indonesia from where we all remember of the tsunami tragedy in 2004. Since then, the need for having sustained observations of the ocean and its oceanographic processes has grown especially in our developing countries where we lack the required sophisticated facilities leave alone our uncertain ability to confront such kind of natural disasters. Before the tsunami event, the Indian Ocean region, which accounts for about 30% of the global population had not been given enough attention in terms of the predictions of the natural disasters and their possible management strategies. At the same time, our coastal populations and infrastructure development have been growing. The livelihood of the large part of the population profoundly influenced by the oceanographic processes of the Indian Ocean, which is characterized by fragile environment that is sensitive not only to the climate change but also to other natural disasters and the human impact.

Ladies and Gentlemen,

As scientists, policy makers and members of the government, we face the challenges of being uncertain of how we manage the impacts of the ocean system processes. Our governments and policy making bodies need to understand the ocean and coasts to make informed decisions that save lives and protect living habitats and resources in our region.

Ladies and Gentlemen,

I am informed that the primary role of the IOGOOS is to provide an organizational framework for planning, coordination, effective implementation and promotion of appropriate regional and sub-regional ocean and coastal observing systems and services of the Global Ocean Observing System (GOOS) in the Indian Ocean. I have learned from the local organizers that excellent coastal and oceanographic science researchers,

scientists and managers from all over the Indian Ocean region, have come to this workshop to discuss a wide range of ocean observatory systems and processes with the view to deliberating on the means to sustain and protect marine and coastal ecosystems and resources, minimizing loss of life and property while avoiding environmental disasters. This requires availability of reliable and sustained information. The Indian Ocean Global Ocean Observing System (IOGOOS) has clear mandates to respond to these needs and challenges. I am particularly interested on this because this is where the justification for the participating agencies to provide financial and time commitments is built. We therefore need the information and guidance from you.

Ladies and Gentlemen,

This workshop is a great occasion for you experts from different corners of the region to have an opportunity to meet and share your views and experience. I believe that the three days of the workshop and annual meeting will yield pertinent knowledge which can be applied to successful policy planning for the management of the oceanographic processes and mitigation of marine and coastal disasters. I hope that the output of this meeting will also be followed by the improvement of capacity building of our local scientists, especially in the field of Operational Oceanography. Indeed, I believe the IOGOOS meeting, having taken place in Eastern Africa, will revive our enthusiasm and effective role in the implementation of the ocean observing system programme being developed for each individual country, but also at the regional level as well.

Ladies and Gentlemen,

The level of organization of this workshop and the number of participants show a great devotion of IOGOOS to its aims and objectives of enhancing, promoting and facilitating the ocean observing system in the region. Thus, I commend your keen and enthusiastic commitment in devising mechanisms to save this environmentally distracted world. I commend IMS for coming out and co-sponsor this important activity.

I once again thank you for choosing Zanzibar and let me wish you fruitful and meaningful discussions, interactions and deliberations. At the same time please also enjoy Zanzibar's many attractions and hospitality.

Finally, I now have the great pleasure to declare this IOGOOS Workshop and 4th Annual Meeting Open.

Thank You.

Opening Remarks by Mr. William Erb.

The Honorable Ms Rahma Mshangama, Dr Nyandwi our host, Members of IOGOOS and invited guests. Good morning or SABALKHERI, as the people in Zanzibar would say. I join others in thanking the Institute of Marine Science in Zanzibar for inviting us here to this beautiful island and for their hard work in making the arrangements for our meeting.

As always Srinivas Kumar, the Secretary of IOGOOS has organized, in an outstanding fashion, all the meeting plans and documentation required to set the stage for our discussions. He has received excellent support from Dr Dubi and his staff, particularly Dr Nyandwi.

We have three short days to discuss many issues which will require the involvement of everyone present, we are short in numbers but hopefully high in energy and enthusiasm.

IOGOOS has become a victim of the 2004 tsunami like many others in region. Many of the people responsible for IOGOOS have been forced to focus on the tsunami issue during the past two year, and they have been diverted away from our GOOS activities. I see this meeting as our opportunity to turn this around and to step up our action and planning to return IOGOOS to the lofty position it previously held in the GOOS community, and more importantly to delivering products and services to the people of the region.

We are meeting here without Dr Radhakrishnan, who has led our organization since its inception. Rahda contributed greatly in making IOGOOS a full grown GOOS. At this meeting we will elect a new Chair and two other new officers. It is important that we make these choices wisely and that those interested identify this interest early in the process.

Thank you all for making the long journey to Zanzibar and my best wishes for a successful meeting.

Action Taken Report from IOGOOS Secretariat

S.No.	Action	Status
1	<p>Annual subscription of Members:</p> <p>The Meeting reviewed the membership dues for 2003-04 and 2004-05, and advised to remind all by fax and further recommended that (i) membership would cease if the dues is for more than 2 years (ii) however they could continue to participate as Observers</p>	<ul style="list-style-type: none"> • Invoice for the Annual Membership Fee for the Year 2006-07 was not sent out from the Secretariat awaiting FCRA approval from the Government. • Application has been filed in March 2006. Accounts have been audited by Chartered Accountant and are ready to be submitted to the Government by October 2006. Approval is expected shortly after the Submission • Dues received from 1 Member for 2003 – 04 and 2004 - 05
2	<p>Withdrawal from the GRAND Project</p> <p>The Members noted the efforts put in by IOGOOS Members & IOGOOS Secretariat over the last two years for the GRAND Project. After detailed assessment of its utility vis a vis the efforts put in, it was considered appropriate to withdraw from the GRAND Project. On behalf of IOGOOS, Chairman was authorized to communicate the same to the GRAND Secretariat.</p>	<ul style="list-style-type: none"> • Official Communication sent out to the GRAND Secretariat in February 2006 • Received a communication from GRAND Advisor Coordinator in February 2006 suggesting to wait for the projects' natural completion within 5 Months • As per the contract obligation, INCOIS prepared the Audited the Financial Statements of GRAND for the past three years and FORM C ready to be sent out to the GRAND Secretariat, after which action will be taken to return the Funds
3	<p>Manpower</p> <p>Noting the need to sustain a proactive secretariat and keeping in view the need for close follow up of the upcoming activities of the IOGOOS; the meeting urged the host institution to immediately deploy at least two additional full time manpower to assist the</p>	<ul style="list-style-type: none"> • Mr. E. Pattabhi Rama Rao, Scientist, INCOIS has been assigned to assist the IOGOOS Secretariat in the Ocean Data and Information management activities • In addition 2 scientists from INCOIS have been assigned recently to assist part-time in the activities of the IOGOOS Secretariat, especially for the development and maintenance of the

	Secretary.	IOGOOS Website.
4	<p>IOGOOS and ICG/IOTWS</p> <p>IOGOOS persons to participate in the Sea level and Mooring Working Groups of the ICG/IOTWS as well as Modelling Workshop of ICG/IOTWS</p> <p>Communications and close working between IOGOOS and ICG Secretariats</p>	<ul style="list-style-type: none"> • INCOIS hosted the ICG/IOTWS Meeting in December 2005 in close coordination with the ICG Secretariat. • Facilitated the participation of participants from the Indian Ocean region involved in IOGOOS activities in the Modelling Workshop. • IOGOOS nomination to the ICG Working Group dealing with Sea-level and Moorings is pending
5	<p>IOGOOS Website</p>	<ul style="list-style-type: none"> • Discussion forum Developed the interface on IOGOOS Website and made it online http://www.incois.gov.in/Incois/iogoos/forumlogin.jsp • Developed separate pages on the IOGOOS Website for all IOGOOS initiatives <p>Developed interface for data management for the IOP's Indian Ocean Observing System (indOOS) on the IOGOOS Website. Argo Gridded Datasets for the Indian Ocean being served using the Live Access Server http://www.incois.gov.in/Incois/iogoos/home_indoos.jsp</p>
6	<p>General</p> <p>Secretariat was instructed to include the address of IOGOOS Secretariat in the Letterhead, mail hard copies of IOGOOS II Report to all the participants and circulate the action taken report well in advance before the annual meeting.</p>	<ul style="list-style-type: none"> • Address of the secretariat included in the Letterhead • Hard copies of IOGOOS II, III as well as the IOP Implementation plan have been mailed to the Participants • Action taken report circulated by e-mail to the Officers before the Annual Meeting
7	<p>Other</p>	<ul style="list-style-type: none"> • Secretary, IOGOOS and Prof. Merv Lynch made a presentation on the Remote Sensing Capacity Building plans of IOGOOS during the IOCCG

		<p>Meeting held at South Korea in January 2006. The plan was endorsed by the IOCCG</p> <ul style="list-style-type: none"> • Interactions with Dr. Peter Pissierssens of IODE for the Data and Information Management Initiatives of IOGOOS • Assisted in organizing the Pre-Project Planning Workshop for the IOGOOS Pilot Project on Coastal Keystone Ecosystem Monitoring held at Thailand in February 2006
8	<p>Preparations for the Annual Meeting:</p>	<ul style="list-style-type: none"> • IOGOOS Secretariat circulated the request to all IOGOOS Members & Potential Members to host IOGOOS IV. Tanzania, Kenya and Iran have come forward to host the Meeting. Considering that Tanzania has offered to host the Meeting during IOGOOS III, the meeting has been planned in Tanzania. Iran and Kenya were informed that their offer would be considered for other forthcoming IOGOOS Meetings. • Notification and Invitations for IOGOOS – IV were sent out • Interactions with Local Host, Participants, IOC-Perth, Funding Arrangements, Logistics, etc • Preparation of Agenda, Financial Statements, etc.



Opening Speech by Hon. Ms. Rahma Mshangama, Permanent Secretary, Ministry for Agriculture, Natural Resources and Environment of the Revolutionary Government of Zanzibar during IOGOOS IV Annual Meeting.



Participants of IOGOOS IV Annual Meeting and Science Workshop