



Intergovernmental Oceanographic Commission (IOC)

**Contribution by UNESCO/IOC to the Report of the Secretary General to the 59th Session of the
General Assembly on Oceans and the Law of the Sea**

February 2004

CONTRIBUTION BY UNESCO/IOC TO THE REPORT OF THE UN SECRETARY GENERAL TO THE 59TH SESSION OF THE GENERAL ASSEMBLY ON “OCEANS AND THE LAW OF THE SEA”

MANDATE:

The 31st General Conference of UNESCO authorized the Director-General (a) to implement the corresponding plan of action in order to: (i) improve scientific knowledge and understanding of oceanic and coastal processes with a view to assisting UNESCO Member States in the design and implementation of sustainable policies for the ocean and coastal zones, through the organization and coordination of major scientific programmes, responding to the mandate of UNCLOS, UNCED/Agenda 21 and the Global Conventions of Climate Change and Biodiversity and regional conventions, and by reinforcing the capacity of developing countries particularly by targeting sub-Saharan Africa in the framework of the African Process and Programmes in the development of scientific mechanisms for an ecosystem approach; (ii) organize the collection of ocean and coastal observations, the modelling and the production of forecasts needed for the management and sustainable development of the open and coastal ocean, particularly by implementing the Global Ocean Observing System and its related pilot projects and regional components, and by increasing the capacities and participation and full involvement of developing countries; (iii) further developing the International Oceanographic Data and Information Exchange (IODE) system through the establishment of new national oceanographic data and information exchange facilities, the creation of needed capacities, particularly in developing countries, and the provision of access by a wide community of users to current ocean data and information in accordance with the existing United Nations Conventions and UNESCO's approach on data and information; (iv) to intensify the follow-up to the Pan African Conference on Sustainable Integrated Coastal Management (PACSICOM);

GLOBAL RESULT 1 International cooperation and coordination of programmes is promoted in research, services and capacity-building, in order to learn more about the nature and resources of the ocean and coastal areas

Achievements in 2003 In December 2003, IOC signed a Memorandum of Understanding with the Minister of Environment of Kenya that is responsible for hosting the Coastal and Marine Unit of the NEPAD Environment Initiative (COSMAR/NEPAD). IOC will provide technical and financial support to COSMAR/NEPAD with a view to develop an operational communication strategy and information –sharing tools in order for COSMAR to act as a clearing-house mechanism for African countries in need of technical assistance for the preparation and execution of coastal and marine projects. Furthermore, and following the endorsement of the “African Process on the Development and Protection of Coastal and Marine Environment in Sub-Saharan Africa”, at the WSSD, and its subsequent integration into the Environmental Initiatives of NEPAD, IOC has continued to develop the project proposal on the Regional Ocean Observing and Forecasting Systems for AFRICA (ROOFS-AFRICA), which is the implementation of the Global Ocean Observing System at the regional level in Africa, and the project on Shoreline Protection and Management aimed to provide science-based strategies and policies for protecting coastal habitats from the impacts of coastal erosion and climate change in North Western Africa (Cape Verde, Senegal, Gambia, Mauritania, and Guinea Bissau).

GLOBAL RESULT 2 New knowledge is applied for the improvement of management, sustainable development, the protection of the marine environment, and the decision-making processes of Member States of IOC

Achievements in 2003 The Earth Observation Summit (EOS), held in Washington DC, 30 July – 2 August 2003, was organised by the Government of United States of America to “Promote the development of a comprehensive, coordinated, and sustained Earth observation system or systems among governments and the international community to understand and address global environmental and economic challenges.” The inaugural meeting of an ad hoc Group on Earth Observations (GEO) followed the Summit. GEO's first meeting set in place the necessary follow-up machinery with a view to prepare a framework document in time for a Ministerial Conference on Earth observations to be held on 25 April 2004 in Tokyo and a complete plan in time for a further ministerial conference to be hosted by the European Union during the fourth quarter of 2004. IOC has been fully engaged in the process, co-chairing with representatives of Australia and the USA the International Cooperation subgroup of GEO. The GEO initiative should be seen as a promissory international forum ready to help developing countries to build capacities to

use Observation Systems for the integrated management of their environment, provided that the participation of developing nations grows up as the process develops.

Main Line of Action 1: Reducing scientific uncertainties about coastal and global ocean processes in the context of marine ecosystems

DESCRIPTION: IOC has been addressing, through its Ocean Science Programme, critical scientific uncertainties in relation to the management and sustainable use of the marine environment and the ocean's role in global change by facilitating, promoting and coordinating appropriate research and related capacity-building activities. New perspectives in marine environmental protection require new integrated approaches in research as well as management. An interdisciplinary science approach involving the understanding of coupled chemical, biological, physical, global and coastal ocean processes in an ecosystem context is now essential. The major challenge is the development of scientific mechanisms for an ecosystem approach to the management of marine and coastal environments, including fisheries. As an integral part of this challenge, there is an urgent need to develop robust, useful indicators of the health of ocean ecosystems.

STRATEGY : The Ocean Science Programme will be developed further to address global interdisciplinary science issues and to provide specifically an enlarged knowledge base on the response of ocean ecosystems to human-induced and natural changes in the chemical and physical environment, including those induced by climate change and variability. The IOC Ocean Science Programme will: (i) participate in and co-sponsor global programmes that address a wide spectrum of scientific issues related to the ecosystem approach to the management of marine and coastal environments; (b) investigate specific scientific issues that require in-depth study by convening study groups, panels and small ad hoc groups that are sponsored either jointly with the existing or emerging global programmes or initially by IOC alone; (c) ensure that all of its activities are pertinent to regional concerns and involve participation of scientists from developing nations; (e) further strive for all its activities to respond to the scientific needs of the international global and regional conventions and programmes; and (f) globally disseminate the scientific knowledge base thus developed through reports, publications, symposia, Internet-based web-sties, workshops and training activities. In the framework of the Integrated Coastal Area Management (ICAM) programme and other IOC programmes addressing coastal issues (such as harmful algal blooms (HABs) and Coral Reef Monitoring), intersectoral projects will be developed in the area of water resources in coastal regions, integrated river basins management, the use of ICAM approaches to coastal biosphere reserves, and the development of coastal urban pilot projects, together with IHP, MAB, CSI, and MOST.

RESULT: **Gaps and weak links are identified in the present carbon cycle observation system, scientific solutions for filling of these gaps are developed for GOOS and the global research community**

International and intergovernmental cooperation in monitoring, modelling, assessing, and forecasting ocean and climate conditions were facilitated. A Background Report on A Global Ocean Carbon Observation System is published (GOOS Report No. 118; IOC/INF 1173), WOCE Atlases for each ocean basin marking the end of this 10 year ocean observation programme is also published,; and a web site for a watching brief on CO₂ sequestration in the ocean is developed.

Achievements in 2003 Within the IGOS Partnership, the Integrated Global Carbon Observation Theme is in final revisions and should be published in early 2004. A Watching Brief on ocean carbon sequestration produced by IOC is available on the CO₂ Panel web site. IOC and SCOR will co-host an international symposium on ocean carbon sequestration, to be held in 2004. The Second Report on the Adequacy of the Global Observing Systems for Climate in Support of the UNFCCC was completed. The Global Carbon Project and the CO₂ Panel developed a joint pilot project, "The International Ocean Carbon Coordination Project", to coordinate ocean carbon observations. The IOCCP has held 1 workshop and 1 intercomparison experiment for pCO₂ systems during 2003.

RESULT:

Research, monitoring and assessment for improved understanding of the responses of the marine ecosystem to global change are facilitated

A significant progress has been achieved on linking physical indices to pelagic fish stocks. A GEF Targeted Research programme on climate change impacts on coral reef ecosystems was initiated jointly with the World Bank. Significant progress was achieved in developing indicators for the health of benthic communities. A programme was initiated through TTR with a specific focus on the complex systems such as cold seeps, hydrothermal vents. Understanding of the factors regulating the dynamics of HABs in the context of physical and chemical forcing, ecosystem dynamics and human influences are improved and the GEOHAB science plan was finalized. The work of the IOC/SCOR Working Group on Quantitative indicators for Fisheries Management progressed satisfactorily; an international symposium on ecological indicators will be held from 31 March to 3 April 2004, at the UNESCO Headquarters in Paris. The IOC formed a Working Group that will develop the next generation global models to forecast the effects of human activities on nutrient inputs to coastal marine ecosystems.

Achievements in 2003

Advances were made in the production of a comprehensive IOC/GLOBEC review and scientific framework for the use of environmental indices to help hindcast/nowcast and forecast changes in the abundance and distribution of pelagic fish in selected areas. The GEF Coral Reef Targeted Research & Capacity Building project was approved for execution jointly by IOC and University of Queensland, Australia in 2004-2009. A draft research plan was completed by the IOC Working Group on Coral Bleaching Indicators. A Web site with a Database on marine benthos and environmental conditions from selected coastal areas of the world is in preparation and will be available in 2004. GEOHAB will develop its Core Research Plan during 2003-2004. The working group on nutrient inputs to coastal marine ecosystems met for the first time and will publish its results in 2004.

RESULT:

Capabilities of Member States for ICAM increased through studies of human communities and ecosystem interactions, in coastal areas, and in particular in coastal urban environments

Several ICAM guidelines are published. In cooperation with LOICZ three regional BASINS studies have been compiled and published in 2002, they include Africa, South America, and The Caribbean region. Pilot site implementations have started in Africa (Senegal, Morocco, Kenya, Tanzania) in November 2002. A global synthesis on coupled interdisciplinary dynamical processes in the coastal oceans was initiated. This will be published in 2004 as the volumes 13 and 14 of THE SEA.

Achievements in 2003

A new ICAM Technical series was launch with the publication of a reference Guide on the use of indicators for ICAM (ICAM Dossier No 1, June 2003). Interdisciplinary approaches to coastal processes have been promoted through the advancement of the joint IHP/IOC/IAEA programme on Submarine Groundwater Discharges, and the LOICZ Basins Pilot projects. In 2003, an international SGD field experiment was conducted in Brazil and a SGD Guide was published, jointly with IHP, in December 2003. A new international IOC-led project on indicators for ICAM was established, supported by US and Canada. Support to the NEPAD process, as a follow up of PACSICOM, and the African Process were strengthened through the development of a regional project on Shoreline Protection for 5 African countries. A Memorandum of Understanding has been signed with the Government of Kenya in order for IOC to assist the NEPAD Coastal and Marine Coordination Unit. Various training activities have been implemented at regional level..

Main Line of Action 2: To further develop, within the GOOS and GCOS, the monitoring and forecasting capabilities needed for the management and sustainable development of the open and coastal ocean

DESCRIPTION: The IOC, leading a partnership with WMO, UNEP and ICSU, began implementing GOOS in 1998. GOOS is part of an Integrated Global Observing Strategy (IGOS), with the space agencies of the world as partners. GOOS has an open ocean subsystem to improve weather and climate forecasting, and a coastal one to provide information needed to manage and restore healthy coastal ecosystems and living resources; forecast and mitigate the effects of natural hazards; enable safer and more cost-effective marine operations; and protect public health. The open ocean one is the ocean component of GCOS, which is co-sponsored by IOC, UNEP and FAO and led by WMO. GOOS produces data and information meeting the needs of many users. It has subsystems for observations, data communications and management, and modelling and applications. The growing observation network comprises remote-sensing from satellites; coastal instruments including tide gauges; buoys, drifters and other platforms; ships of opportunity (including commercial ferries); and long time series records of variability. The initial GOOS incorporates existing operational elements. It is growing by developing pre-operational pilot projects to demonstrate utility and cost-effectiveness; building capacity for developing countries; stimulating enabling research; and interacting with users to determine the most useful products. Much of the application of GOOS will take place through the new Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM). The development and implementation of monitoring and forecasting capabilities needed for the management and sustainable development of the open ocean and coastal seas will assist with Eradication of Poverty and the development of New Information and Communication Technologies as follows: (i) the development and implementation of forecasting systems will improve short and long term prediction of precipitation (hence water supply) on the adjacent land, with profound implications for terrestrial ecosystems; (ii) the monitoring of living marine resources will facilitate the management, preservation and sustainable development of marine ecosystems, so enhancing the scientific basis for the protection of the environment and sustainable use of natural resources; (iii) the monitoring of natural variations and the effects of human activities on the marine environment and ecosystems of the coastal ocean will contribute to sustainable development, including human health, and safe and efficient marine operations, for coastal and island states; (iv) the monitoring and forecasting of natural hazards such as hurricanes, cyclones, typhoons, storm surges and tsunamis will contribute to the development of mitigation strategies for mostly poor coastal communities in developing countries, helping to diminish poverty; (v) the integration of marine data collected in situ, and remotely sensed from satellites, and the assimilation of these data into forecasting models will demand vast improvements in the capacity and coordination of data and information management and communication systems.

STRATEGY : Strategy: The strategy includes the implementation of pilot projects to demonstrate and validate the GOOS concept; the involvement of more developing countries in the implementation of GOOS; a better ability of regional groups of countries to participate in and benefit from GOOS; an expanded implementation by incorporating national activities; and solicitation of increased extra-budgetary support. In the context of natural disaster prevention, a special effort will be made to develop intersectoral activities relating to prevention of ocean-induced hazards affecting coastal communities, through investment in El Nino forecasting and the reinforcement of tsunami warning systems. Because the design of the open ocean component of GOOS by the Ocean Observations Panel for Climate (OOPC) is jointly shared with the World Climate Research Programme (WCRP), the activities of the OOPC, including its work on the Global Ocean Data Assimilation Experiment (GODAE) and the Argo profiling float Pilot Project, are dealt with under the climate element of Main Line of Action I. Results expected at the end of the biennium: · Growth of the observing system, especially through the advent of more national contributions; · Improvement in the scope, quality and timeliness of products and services for the wider community; · Successful development of pilot projects designed to test new

elements of the observing system; · Expanded regional GOOS programmes tied closely to UNEP regional programmes; · Improved approach to ocean data management.

RESULT: The Global Ocean Data Assimilation Experiment (GODAE), and the Argo expanded project to use profiling floats for a first-time global collection of upper ocean thermal and salinity data, through projects in all oceans

The Global Ocean Data Assimilation Experiment is designed to test the ability of the community to integrate in situ and remotely sensed ocean data and assimilate them into advanced numerical models to accurately represent the behaviour and present state of the ocean at a fine scale, and to forecast its future behaviour globally. One key element of GODAE is the Argo profiling float programme, which will seed the ocean with 3000 profiling floats to measure the temperature and salinity of the upper 2000 metres of the ocean and transmit the data back to base by satellite, as the basis for the first ever truly global monitoring of subsurface ocean properties. These data are essential to improve ocean and climate forecasts.

Achievements in 2003 The largest GODAE pilot project is the Argo project to seed the ocean with 3000 profiling floats that will all be operational during the period 2003-2005. Argo will provide the first ever global coverage of the temperature and salinity of the upper ocean, which is badly needed to improve numerical models and forecasts of the behavior of the ocean, weather, and climate systems.. At the end of December 2003 there were 1000 Argo floats in the water. Completion is scheduled for 2006. The Argo Data Management Team met in Monterey, California, Nov 4-7. And the 1st Argo Science Workshop took place in Tokyo from Nov 12-14. Progress is good, though there are still more deployments in the northern hemisphere than in the southern. Efforts are needed to ensure that Argo designs are rugged and robust, and to establish and maintain a viable production base for producing floats. Improvements are needed in smoothly disseminating and distributing Argo data and information. Argo is now sufficiently large that it requires a properly funded infrastructure rather than best efforts made on a voluntary basis, as before.

RESULT: Implementation of an ocean carbon observing system

To provide carbon data in support of climate studies and climate forecasts it has been agreed that there should be a global carbon monitoring programme for the ocean. Carbon observations are beginning to be made by ships and buoys, and plankton observations of the ocean surface (representing carbon) are being made by ocean colour sensors on satellites. These data are being brought together with terrestrial data through an Integrated Global Carbon Observing Theme by the IGOS Partners.

Achievements in 2003 In order to ensure that global observations are made in a coherent and integrated way, and that the space agencies' plans for global observation are consistent with those of GOOS, the IOC, like other UN agencies (WMO, UNEP, FAO, UNESCO) and the International Council for Science (ICSU), is an associate member of the Committee on Earth Observation Satellites (CEOS), and, with CEOS and these other agencies, is a member of the Partnership for an Integrated Global Observing Strategy (IGOS)(<http://igospartners.org/>). IOC has assisted the IGOS-P to develop three theme documents setting out the challenges in developing space-based and in situ observations of particular parts of the earth system. These documents are: the "Ocean Theme", published in January 2001; the "Integrated Global Carbon Theme", published at the end of 2003; and the "Coastal Theme", which is a work in progress and involved a meeting in Hamilton, New Zealand on Nov 4-6. The Carbon Theme document sets out the plans for a land and ocean carbon observing system, implementation of which has now begun.

RESULT: Publication of the integrated coastal GOOS design to guide Member States in GOOS implementation

The Coastal GOOS design plan is intended to describe an end-to-end monitoring and forecasting system for coastal seas, to guide Member States in implementing GOOS in coastal waters

Achievements in 2003 Advice on GOOS development comes from two main design panels: one (the Coastal Ocean Observations Panel, or COOP) deals with all aspects of coastal seas, and the other one (the Ocean Observations Panel for Climate, or OOPC) deals with open ocean physical and biogeochemical processes. The advice helps Member States to implement GOOS in their own waters. OOPC and COOP plans were highlighted in a special session as part of the IUGG/IAPSO conference in Sapporo, Jul 21-22. The Integrated Coastal GOOS Design Plan was published in June 2003. COOP is following this with development of a Coastal GOOS Implementation Plan, work on which began at the 5th session of the panel, Mazatlan, September 30 - October 3. Drafting continued at a COOP Implementation Plan drafting workshop, in Dallas, Dec 15-17, and will be completed in summer 2004.

RESULT: Expansion of GOOS by incorporating appropriate parts of national observing systems

Many nations collect ocean observations. Some of these observations may be valuable for use in the global ocean observing system, so individual countries are being asked to donate (or make available) relevant datasets or data subsets to be exchanged as part of the GOOS.

Achievements in 2003 Work by a Consultant based at the University of Delaware (USA) continued with the object of cataloguing national contributions to GOOS. A report will be made to the 7th session of the GOOS Steering Committee in April 2004.

RESULT: Expanded access to and application of remote-sensing technology as a contribution to building the capacity of developing countries to participate in and benefit from GOOS

Remote sensing of the ocean surface by a wide and growing variety of sensors on orbiting satellites is a fast growing source of ocean information. It is important that developing states make as much use as possible of this data, which is obtained by satellite overflights of their territories. Many Member States do not realise what is available, and/or have limited access to it. GOOS is working with the space agencies and nations concerned to improve access to these data and provide training in their use to produce products useful for decision makers.,

Achievements in 2003 Capacity Building to enable developing countries to participate in, contribute to and benefit from GOOS is a key plank in the GOOS strategic plan. Much of the capacity building effort has been focused on the continuing development of the GOOS Regional Alliances (GRAs), and on implementation of the GOOS Capacity Building (CB) Panel Action Plan (<http://ioc.unesco.org/goos>), key elements of which are: to increase access to and training in the use of remotely sensed ocean data from satellites; to increase access to and training in the use of numerical models; and (with IODE and JCOMM) to improve data and information management in support of GOOS. These remote sensing and modeling aspects form key elements of the ROOFS-AFRICA proposal recently adopted by NEPAD. In addition remote sensing forms the core of the UNESCO Cross Cutting Project on Water Resources and Ecosystems in Africa, for 2002-2003, which is managed by the GOOS Project Office. The Project involves 11 countries in Africa. During the year they continued to work on developing national strategies for remote sensing, with the aid of consultants from remote sensing organisations.. To facilitate the development of a coherent strategy for training and education in the use and application of remote sensing data from space, IOC joined the CEOS Working Group on Education and Training (WGEdu). This led to the development of an IOC strategy for remote sensing in capacity building, which was approved by the IOC Assembly at its meeting in June. The WGEdu participated in a CEOS workshop on capacity building in support of sustainable development, held in Stellenbosch, October 2-3, to solicit advice from African scientists on the development of a set of Principles for Capacity Building in the space sector. The CEOS Plenary meeting at Colorado Springs in November endorsed these Principles. Part of the IOC strategy for remote sensing involves working with the UNESCO Bilko programme for learning in remote sensing. Several discussions were held with the Bilko team during the year to formulate a programme for training, especially in Africa, to begin in 2004. Bilko representatives gave presentations at the IOC Assembly (June) and the Johannesburg ROOFS-AFRICA workshop (October).

RESULT: Fully tested GODAE models ready to assimilate Argo data between 2003-2005

See also result 1. GODAE models are being developed for example through the French MERCATOR project

Achievements in 2003 New components of GOOS are being tested through pilot projects. One of these is the Global Ocean Data Assimilation Experiment (GODAE), which is developing new models of ocean circulation, creating new ways of integrating remotely sensed (satellite) and ocean in situ data, and assimilating these data into those models. Progress with GODAE can be monitored, and GODAE products can be accessed through the US GODAE Server operated by the U.S. Navy in Monterey, California (<http://www.usgodae.fnmoc.navy.mil/>), and through the French MERCATOR project (<http://www.mercator.com.fr/en/>). The International GODAE Steering Team met at its 8th session in Miami, Nov 5-7.

RESULT: A functioning set of coastal GOOS pilot demonstrator projects

The coastal panel will develop and implement with Member States a functioning set of coastal GOOS pilot demonstrator projects

Achievements in 2003 Plans for these projects have been outlined as part of the Coastal GOOS Design Plan, and will be fleshed out as part of the Implementation Plan that is due for publication in summer 2004.

RESULT: Effective functioning of JCOMM in support of GOOS goals

JCOMM will oversee the operation of key elements of the GOOS Initial Observing System, including:(i) the PIRATA project, whose buoys collect data from the equatorial Atlantic for to weather and climate forecasting in Brazil and west Africa;(ii) the TAO project, whose buoys are part of the ENSO observing system that underpins forecasts of El Nino; (iii) the GLOSS project, whose sea level gauges collect data to calibrate satellite altimeters, and to underpin climate forecasts;(iv) the Ship of Opportunity Programme (SOOP) implementation panel, whose ships collect subsurface data along shipping lines;(v) the Data Buoy Cooperation Panel, whose members deploy drifting buoys to collect upper ocean and meteorological data worldwide. JCOMM will convert design advice from OOPC into practical guidelines for the implementation of met-ocean services by Member States, working through groups on marine climatology, services, maritime safety, wind waves and storm surges, sea-ice, ship and buoy observations, and sea-level observations (via the GLOSS programme). JCOMM will convert OOPC advice on data management into reality through its data management coordination group, which will advise on actions required to implement, maintain and make available to users a fully integrated high quality ocean/atmosphere data stream. JCOMM will also plan, initiate and implement a capacity building programme, by implementing the JCOMM Capacity Building Strategy.

Achievements in 2003 GOOS is being implemented by Member States following the GOOS design and coordinating their actions through the Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM), and its technical sub-groups, which are overseen by the JCOMM Management Committee (JCOMM-MAN). JCOMM is responsible for day-to-day management of many of the observing system elements. The JCOMM Operations Centre in Toulouse continued to improve the provision of services on ship and buoy and float data to the wider community. Meetings of the JCOMM subgroups in the last six months are as follows:
Task Team on Resources, Paris, Feb 3-4;
Southeast Asian ocean Forecasting Models inter-comparison Workshop, Kuala Lumpur, Feb 19-24
GLOSS Training Workshop on Sea level Data Analysis, Valparaiso, Apr 7-18;
Expert Team on Waves and Surges Forecast, Dartmouth, Canada, June 11-14;
VOSCLim-IV, London Jul 21-22
PMO-II, London, Jul 23-25;Ship Observations Team, London, Jul 28- Aug 1;
Tropical Cyclone Prediction Workshop, Kuantan, Malaysia. Sep 15-20;
Planning for JCOMM-II, Geneva, Sep 23;
GLOSS-VIII, Paris, Oct 13-17;
Data Buoy Cooperation Panel and Joint Tariff Agreement meetings, Angra dos Reis,

Brazil, Oct 20-29;
CLIMAR-II and Brussels 150th Celebration Conference, Brussels,. Nov 17-20;

RESULT: **Effective functioning of the newly formed regional GOOS bodies**

There are a number of GOOS regional bodies with specific interests in a common body of water. The GOOS Project office works with them to ensure that they can function effectively and are developing according to GOOS Principles so as to contribute to the overall global observing system.

Achievements in 2003 In order to facilitate the implementation of GOOS, groups of Member States with common interests in particular sea areas are encouraged to develop GOOS Regional Alliances (GRAs). The IOCARIBE-GOOS Steering Team (for the wider Caribbean area) met in association with the Oceanology International meeting in New Orleans (Jun 4-6) and held an IOCARIBE-GOOS symposium as part of the conference. Plans are now being developed for an IOCARIBE-GOOS modeling workshop early in 2004. Indian Ocean GOOS met in Colombo, Sri Lanka, Dec 8-10, to hold a Data Management Capacity Building Workshop. EuroGOOS continued operation of its Baltic Operational Oceanographic System (BOOS) and its Northwest Shelf Operational Oceanographic System (NOOS), and began editing the Proceedings of the 3rd EuroGOOS Conference on Operational Oceanography in Athens (December 2003) for publication in January 2004. Through planning meetings in Stellenbosch (Oct 2-3), and Johannesburg (Oct 27-20) representatives of GOOS-AFRICA refined a proposal for a comprehensive and integrated Regional Ocean Observing and Forecasting System for Africa (ROOFS-AFRICA), which was submitted to and adopted by NEPAD at the NEPAD donors meeting in Algiers (Nov 15-16). Initial funding for one part of the ROOFS-AFRICA proposal (mainly for some of the tide-gauges) was sought through the ODINAFRICA-III proposal developed by IODE and GOOS-AFRICA for consideration by the Government of Flanders (Brussels, Sep 8-9). The Pacific Islands GOOS held a remote sensing training workshop in Fiji on Sept 30-Oct 3, and a teacher-training workshop was held in Apia for the SEREAD programme (bringing Argo to schoolchildren in the Pacific), on Sept 19-Oct 6. The 8th session of the NEAR-GOOS Coordinating Committee (for the North-East Asian Region) met in Beijing from Dec 8-10, to review, modify and approve a new draft strategic plan.

RESULT: **Creation of an initial GOOS for the Indian Ocean**

It was considered necessary to get all Indian Ocean nations working together to observe the Indian ocean in a coordinated manner, so as to enable all to benefit from a common pool of information.

Achievements in 2003 The first Indian Ocean GOOS Conference took place in Mauritius (November 4-9, 2002). Planning for and implementation of GOOS developments in the Pacific and Indian Oceans have continued to be ably supported by the IOC Regional Programme Office, for GOOS, in Perth, Western Australia. Indian Ocean GOOS met in Colombo, Sri Lanka, Dec 8-10, to hold a Data Management Capacity Building Workshop. Planning is now underway for an Indian Ocean climate conference to develop an Indian ocean observing system for climate.

Main Line of Action 3: To further develop and strengthen the IODE system as a global mechanism to ensure open and full access to ocean data and management of relevant information for all

DESCRIPTION: The IOC's International Oceanographic Data and Information Exchange (IODE) was established in 1961 to enhance marine research, exploitation and development by facilitating the exchange of oceanographic data and information between participating Member States and by meeting the needs of users for data and information products. Over the past 40 years the IODE system has developed into a worldwide network of over 60 Designated National Agencies, National Oceanographic Data Centres, Responsible National Oceanographic Data Centres and ICSU's World Data Centres. This network has been able to collect, control the quality of, and archive millions of ocean observations, and has provided services for its users in the Member States. At the IOC the IODE programme is managed by the Ocean Services Section. A second component of the Ocean Services Section concerns Ocean Mapping. The main goal of the Ocean Mapping Programme (OMP) is to cover the world ocean with bathymetric and geological/geophysical charts in order to provide decision-makers, scientists and a wide range of users with information about bottom relief and geological parameters of the open part of the World Ocean and in exclusive economical zones. OMP products provide a useful framework for many IOC programmes. The third component of the Ocean Services section concerns the International Tsunami Warning System (ITSU) and other IDNDR-related activities. Tsunamis are a threat to life and property to all coastal residents living near the ocean. Since the establishment of the Tsunami Warning System in the Pacific, dozens of destructive tsunamis took place in the Pacific and its adjacent seas resulting in significant casualties and/or property damage. The IOC efforts in natural disaster warnings are based on the principle of disaster prevention through utilizing modern technology in collecting seismological and hydrological data and disseminating it rapidly to the most remote places, increasing public awareness and managing potential risks.

STRATEGY : In recent years new technologies have evolved that will enable the data centres to offer better, more comprehensive and faster services and products to its growing user communities. The application of these technologies to oceanographic data and information management requires the development of sophisticated new applications and standards. Whereas IOC has provided substantial support, through its TEMA component of IODE, to assist developing countries in the establishment of national oceanographic data and information exchange facilities, the "digital divide" between developing and developed countries requires a rapid response by the IODE programme to ensure developing countries can actively and fully participate in the evolving knowledge society. IODE will help establish, maintain and strengthen cooperation with ocean research and monitoring programmes to ensure that data and information needs of these communities are met. This will also involve collaboration with operational oceanography programmes such as GOOS and the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM). Global data and information heritage will also be safeguarded by ensuring a continuous archival and availability of these data and information.

RESULT: **IODE: Effective and easily accessible systems for submission of, and access to ocean data and information**

It includes: -Effective and easily accessible systems for the submission of data by scientists (or by data collection instruments) to the IODE system- Effective and easily accessible systems for data access by users (scientists and others)- Assistance by IODE data centres to scientists in the development of data and information management plans at the science project planning level- Assistance by IODE data centres to scientists in the planning and implementation of data products- Effective involvement of the IODE data centre community in the scientific programme development ensuring a comprehensive data management plan- Improved global network of ocean data centres facilitating access to data, metadata and information by the widest possible range of users- Implementation and further development of

projects such as GODAR, GTSP, ASFA, GLODIR, SSSL.

Achievements in 2003 The MEDI metadata directory is a global inventory of data holdings held in the IOC Member States and agencies. During the year, training in the use and installation of the MEDI metadata authoring tool was provided to data centres participating in the ODINAFRICA project, the ODINCARSA project and for the Black Sea and Caspian Sea countries. The MEDI software was installed in data centres in Africa, South and Central America and Caspian Sea region. During the year, a total of 177 dataset descriptions were submitted by member states to the MEDI metadata repository, which is hosted by IOC/IODE at <<http://ioc.unesco.org/medi/>>. The EU MarineXML project, 'Marine XML: A Pre-standardization Development for Marine Data Interoperability Using XML', officially commenced in February 2003. The project has the aim to align the development of a MML with other related standards and demonstrate a prototype MML in a test-bed environment. Crucially this project will also provide a mechanism for the on-going development of the standard when the project completes in 24 months time. Given the large number of existing standards, the immediate aims of the project are to model how these standards inter-related with each other and with the requirements of the marine community such that the basis for a XML specification can be realised. IOC, through the IODE programme is responsible for the disseminate the developments and findings of MarineXML to interested stakeholders and organizations, development an Exploitation Plan for identified exploitable project deliverables, and to ensure the post-project development and standardization of a MML. The Second Session of the ICES-IOC Study Group on the Development of Marine Data Exchange Systems using XML (SGXML) was held in Gothenburg, Sweden from 26-27 May 2003. The Group developed a set of Action Items for the intersessional period that focus on three areas of interest: (i) Metadata Investigation, (ii) Parameter Dictionaries, and (iii) Point Data Investigation. The Group also developed a Vision for SGXML: The ICES-IOC SGXML will utilize or establish international standards to promote the seamless exchange of data from distributed data sources, by using a single parameter dictionary, well-defined and explicitly tagged metadata, and a common XML data structure, packaging all content and providing to the client datasets and software tools that are platform independent or web enabled. Details of both these Marine XML initiatives are available on the Marine XML community portal web site hosted by IOC at <<http://www.marinexml.net/>>.

RESULT: IODE: Ocean data and information capacity building to ensure access for all

It includes: - Establishment and strengthening of additional oceanographic data and information centres, especially in developing countries- Training of oceanographic data and information managers, especially in developing countries through specialized group training activities or individual travel/study grants (internships)- Development of 'Ocean Data and Information Networks' (ODIN) in the different regions, following the successful model already being implemented in Africa within the framework of the ODINAFRICA project (2000-2004). - Provision of internet access to oceanographic data and information centres in developing countries- Comprehensive CD-ROM and Internet based 'IODE OceanTeacher' as a training tool and self-training support system for Oceanographic data and information management capacity building- Additional National Oceanographic Data Centres, especially in developing countries, with trained staff, required equipment and Internet access

Achievements in 2003 The following training courses were held as part of the ODINAFRICA-II program for ocean data management: (a) A special remedial workshop was held in Accra, Ghana from 14-18 April 2003, and was attended by seven students from six countries (Bénin, Cameroon, Côte d'Ivoire, Ghana, Guinée, Nigeria). A set of intersessional assignments was formulated that included a wide range of specific dataset measures and products that will be assigned regularly through the recently established ODINAFRICA.net communication network; (b) A special workshop was held in Tulear, Madagascar from 30 June to 11 July, 2003. The workshop addressed the specific marine data identification, reformatting, and analysis methods needed by Madagascar's National Oceanographic Data Centre to develop a new national marine atlas. A remedial course (held simultaneously) addressed the training needs of the ODINAFRICA-II student from Comores who requested "one-on-one" training to reach

parity with the other students; (c) The ODINAFRICA-II Training Course in Marine Data Management was held in Maputo, Mozambique between 11 and 22 August 2003, and was organised by the Instituto Nacional de Hidrografia e Navegação (INAHINA). Ten students attended the workshop from marine institutions and universities in Mozambique; (d) The third and final ODINAFRICA-II Training Course in Marine Data Management was held in Brussels, Belgium between 1 and 5 September 2003, and was attended by 13 data managers from National Oceanographic Data Centres in Africa. The data management aspects of the implementation of the ODINAFRICA-II project were reviewed in order to identify the successes and failures and to consider actions to be taken to progress the implementation of the third phase of ODINAFRICA. More information on ODINAFRICA can be obtained from the Web site <<http://www.odinafrica.net>> (hosted by IOC/IODE).

RESULT: **IODE: Global referral system for ocean data and information**

The OceanPortal is a global referral system providing links to thousands of web sites and related documents relevant to ocean data and information. The system will provide not only a catalogue of URLs of such web sites but will also include a searchable index of the web sites content. Submissions to the catalogue will be quality controlled by experts.

Achievements in 2003 During 2003 the development of regional ocean community portals was continued as part of the cross-cutting project. Support was provided to editors in Africa and Caribbean/South America regions to enable them to collect, edit and publish relevant information on the two portals (<http://www.africanoceans.net> and <http://www.portaloceanico.net>) as well as to publish paper-based newsletter. Both Internet-based portals were launched in April 2003 and visits are increasing rapidly.

RESULT: **IODE: Regional ocean community portals**

Global Community Portals will be developed for Africa, Caribbean and South America and Western Pacific, focusing on ocean science, services and management. The IODE programme will coordinate portal content for ocean data and information related content and will provide technical backstopping for content relevant to the other IOC sections. This is a cross-cutting project in UNESCO

Achievements in 2003 The Ocean Data and Information Network for the Caribbean and South America regions (ODINCARSA) continued this year with the second ODINCARSA Training Course in Marine Data Management which was held in Cartagena, Colombia between 13 and 17 October 2003, and hosted by the Centro de Investigaciones Oceanográficas e Hidrográficas (CIOH). Students attended the course from Argentina, Brazil, Chile, Colombia, Cuba, Ecuador and Perú. The key objective of the training course was to establish a core group of trained data management instructors with the ability to teach the OceanTeacher system. A total of nine data managers were certified to provide future training for the ODINCARSA region. Four instructors were identified who could provide the training in both Spanish and English. The group discussed additional training material that could be included in OceanTeacher and agreed to provide a Spanish translation of OceanTeacher. More information on ODINCARSA can be obtained from the Web site <<http://www.odincarsa.net>> (hosted by IOC/IODE).

RESULT: **OCMAP: regional bathymetric charts**

Development of 6 regional international bathymetric charts such as IBCM, IBCWP, IBCWIO, IBCEA, IBCCA, and IBCAO as a contribution to GEBCO- information concerning the relief of the World Ocean and its geological/geophysical parameters provided to decision-makers and scientists

Achievements in 2003: The second Session of the IOC Editorial Board for the International Bathymetric Chart of the East South Pacific took place in Lima in October 2003. The Assembly Diagramme for the above mentioned Chart was approved by the members of the Editorial Board. The progress on the compilation of the bathymetric plotting sheets was achieved. The Drafts of the Sheets 5 and 6 printed by Chile were submitted to Editorial Board and approved. The significant progress in data compilation has reached by Peru and Ecuador. Training programme for the technical group of the region was designed. It was agreed that National Geophysical Data Center NOAA

USA would provide training in marine cartography in the beginning of 2004. Head Department of Navigation and Oceanography of Russian Navy published the Geological Geophysical Atlas of the Pacific Ocean (GAPA). Therefore more the 20 years work has been accomplished.

RESULT: ITSU/IDNDR: Tsunami warning system development

- Further strengthening of the tsunami warning system in the Pacific to become effective for the Pacific, as well as local tsunamis.- Development of new tsunami warning systems in other regions based on the experience gained in the Pacific.- Continuation of co-operation with IUGG and ICSU, as well as with ISDR in the area of tsunami mitigation.- Improve capabilities of Member States in the tsunami preparedness.

Achievements in 2003: The ITSU Programme continued its support to the International Tsunami Information Center (ITIC), Honolulu, Hawaii. The Center produces the ITSU Newsletter, implements the ITSU Training Programme and coordinates the ITSU information dissemination programme (expert and general public level). The 2003 ITSU Training Programme (ITP) was held 4-15 August 2003 at the International Tsunami Information Center (ITIC) in Honolulu, Hawaii, involving participants from Indonesia and Chile. In the training programme, there was an increased focus on how to prepare for the local or regional tsunami threat; specific activities included discussions on the operations of the local tsunami warning system with PTWC, and visits to the Hawaii State Civil Defense and Hawaii County Civil Defense agencies. The Nineteenth Session of the International Co-ordination Group for the Tsunami Warning System in the Pacific (ITSU-XIX) was held in Wellington, New Zealand between 29 September and 2 October 2003 under the Chairmanship of Mr. François Schindelé. The Session was attended by 34 participants from fifteen ICG/ITSU Member States, two organizations and two observers from other countries. The Session reviewed progress made during the inter-sessional period 2001-2003 and drafted its work plan for the period 2004-2005. This work plan will focus on (i) continued support for the International Tsunami Information Centre (ITIC); (ii) support for the development of the Global Tsunami Data Base (GTDB) and the new Integrated Tsunami Data Base (ITDB) consisting of the WinHTDB graphic shell and a Tsunami Travel Time (TTT) module; (iii) finalization of the Tsunami Information Kit; (iv) support for the newly established Working Group on a Comprehensive Tsunami Hazard Reduction Programme (TROIKA); (v) support the newly established Working Group on the Central American Pacific Coast Tsunami Warning System (CAPC-TWS); and (vi) support the newly established Working Group on the Tsunami Warning System in the Southwest Pacific and Indian Ocean (SWP-TWS). The Group requested a budget of US\$ 141,500 for the biennium 2004-2005 to accomplish the work plan. The Group further decided to (i) study possibilities for cooperation with JCOMM; (ii) increase the duration of its ITSU Training Programme held in Hawaii (ITP-Hawaii) to three weeks, and establish an international component (ITP-International) for in-country assistance to Member States; (iii) establish a "Pool of Experts" to assist Member States with expert missions; (iv) accept the "Tsunami Hazard Zone" and "Tsunami Evacuation Route" signs and submit these to ISO; (v) recommend formal collaborative links with the Circum-Pacific Council; (vi) reduce the frequency of the Tsunami Newsletter to 4 issues per year; (vii) redefine the terms of reference of the IOC-ITSU and ITIC web sites; (viii) recommend close(r) collaboration with GLOSS, ISDR and with CEPREDENAC. The Group further revised the ITSU Master Plan Conclusions adding focus on the acquisition of data in real-time and optimising the network to ensure accurate warning issuance and minimization of false warnings. The Group requested to urgently proceed with the Review of the ITSU Programme in 2004. The Group re-elected Dr. François Schindelé and Dr. Charles McCreery as Chair and Vice-Chair of ITSU respectively.