



INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION
(of UNESCO)

CAPACITY-BUILDING SECTION

REPORT ON CAPACITY-DEVELOPMENT ACTIVITIES

July 2005 to May 2006

IOC capacity-development activities conducted since the 23rd Assembly in June 2005 are summarised in the Action Paper for the 39th Session of the IOC Executive Council, Paris, 21–28 June 2006 (IOC/EC-XXXIX/2 prov.). This document is a more detailed report.

This report is organised so that IOC capacity development activities can be examined vis-à-vis Resolutions XXIII-10 and XXIII-11 that refer to the Principles and Strategy for IOC Capacity-building and on the initial Implementation Plan for the IOC Strategy for Capacity-building, respectively. We report here the activities carried out within the Capacity-building Section of IOC. Major Capacity-building activities, such as ODINAFRICA, ODINCARSA or the Harmful Algae Bloom programmes, which are conducted within other sections, are available in the annual reports of Ocean Sciences and Ocean Observations and Services. Activities undertaken to enhance harmonisation of capacity-development activities within IOC are reported herein.

CONTENTS

	page
IMPLEMENTATION OF RESOLUTIONS XXIII-10 AND XXIII-11	1
1. Development of GOOS and operational tools that address regional concerns	1
2. Survey of existing capacity	2
3. Securing new sources of funding and human resources	2
4. Role of Regional Subsidiary Bodies	3
5. Developing a balanced work programme reflecting the full range of IOC activities	3
6. Leadership, team-building and proposal-writing workshops	4
7. Cross-sectoral collaboration	5
8. Consultative Group on Capacity-building	5
 ANNEX I	
Resolution XXIII-10,	
IOC Principles and Strategy for Capacity-Building	7
 ANNEX II	
Resolution XXIII-11,	
Implementation Plan for the IOC Strategy for Capacity-Building	9
 ANNEX III	
IOC Principles for Capacity-Building	10
 ANNEX IV	
Developing Capacity to Develop and Use Operational Products	
and Services to Address Societal Needs in Developing Countries:	
Enhancing the Contribution from IOC Capacity-Building	11
 ANNEX V	
Summary of Progress Report on Assessing Existing Capacities	
and Needs in the Western Indian Ocean Region	15
 ANNEX VI	
Activities within the Training Through Research Programme	
and Floating Universities	17
 ANNEX VII	
Acronyms	21

IMPLEMENTATION OF RESOLUTIONS XXIII-10 AND XXIII-11

The actions taken by IOC's Capacity-building Section during the period July 2005- April 2006 in response to Resolutions XXIII-10 and XXIII-11 are reported below.

1. Development of GOOS and operational tools that address regional concerns

Resolutions XXIII-10 and XXIII-11 noted “*the high priority to be given to the use of GOOS components to address regional concerns*”. The response of the IOC Capacity-building section to this directive is detailed below.

- a. The Capacity-building Section is managing the Italian-funded ADRICOSM-EXT project. This project is developing operational products and services in countries riparian of the Adriatic Sea. The section coordinated the initial workshop launching of ADRICOSM-EXT in September 2005, and further coordinated a data management workshop for ADRICOSM partners conducted by an expert of IODE. ADRICOSM has been providing near real-time data and forecasts of key variables for the Adriatic Sea online (<http://www.bo.ingv.it/adricosm/>). ADRICOSM-EXT was also presented at the 9th session of the GSSC.
- b. The first leadership workshop for heads of institute held in Maputo, Mozambique, 29 October to 1 November 2005 [see Item 6 below] was conducted by the section in co-sponsorship with WIOMSA. During this workshop demonstrations on coastal modelling and on tsunami hazard mitigation were presented. Coastal models were approved by the Assembly as a tool for capacity development, as they can utilise existing data streams to create operational products with societal applications. Such models have been successfully used by several marine science institutes to expand the services provided to local communities. The Danish Hydraulics Institute and WAPMERR presented state-of-art tools in coastal modelling and tsunami hazard mitigation respectively, to workshop participants.
- c. The 9th session of the GOOS Scientific Steering Committee (GSSC), held in Paris, France, 6-8 March 2006, provided an excellent opportunity to develop, present, and discuss plans for strengthening capacity of IOC Member States to create and use operational products and services. In particular, members of the GSSC were consulted on the viability of conducting a workshop on operational products and tools in East Africa. It was agreed that the workshop focus on transferring skills to use existing data-streams in combination with coastal models and Geographical Information Systems (GIS), would be helpful for local institutes to create operational products and services for a variety of stakeholders in the region. It was suggested that collaboration with NEPAD, GOOS Regional Alliances, and IOC field offices would be essential to address regional issues of relevance as well as well as to sustain the technical skills developed during the training. Annex IV details the proposed steps for organising this workshop. Funds are being sought to conduct these training workshops.
- d. The Capacity-building, ICAM and Ocean Mapping groups submitted a joint project COAST-MAP-IO, that was approved for funding by the government of Italy. The project will develop capacity to collect and use high-resolution near-shore bathymetric data to strengthen coastal resilience to ocean-based extreme events in the Indian Ocean. The project will be closely related to the major tsunami effort of the IOC.

2. Survey of existing capacity

Resolution XXIII-10 instructed the Secretariat to “*conduct regional assessments of existing capacities to undertake marine scientific research and operational oceanography in accordance with the Principles and Strategy for Capacity-building*”. The response of the IOC Capacity-building section to this directive is detailed below.

Several marine-related institutes in the Western Indian Ocean region were visited after the Leadership workshop firstly between 6 November and 31 December 2005, and a second follow-up visit between 20 February and 5 March 2006. In Kenya, institutes visited were the Kenya Marine and Fisheries Research Institute (KMFRI), the Coastal Development Authority (CDA), and the Kenya Meteorological Department (KMD). Also visited in Nairobi were NEPAD Kenya office and UNEP. In Mozambique, institutes visited included the Instituto Nacional de Hidrografia e Navegação (INAHINA), the Instituto Nacional de Meteorologia (INAM), the Instituto de Investação Pesqueira (IIP), and the Department of Oceanography and the Department of Marine Biology of the Eduardo Mondlane University. In Tanzania, institutes visited included the Faculty of Aquatic Sciences and Technology (FAST) of the University of Dar Es Salaam, the Institute for Marine Sciences (IMS), and the Western Indian Ocean Marine Sciences Association.

Those visits were too short to allow an in-depth assessment of existing capacities in the region, and will be followed by a more extensive survey by experts from the region. However, they provided valuable up-to-date information and essential learning elements for the secretariat in tailoring capacity-development interventions that are more relevant and specific to local needs and realities. More broadly, the visits and discussions with scientists in their institutes have been instructive in identifying institutes with which effective partnerships can be built in developing regional capacity. Comparison with the more exhaustive surveys conducted earlier (Marine Science Country profiles) quickly showed that scientific capacity to conduct marine sciences has grown quite rapidly in the last decade, particularly in terms of qualification of researchers. The visits were also used to test the longer-term impact of the first Leadership workshop [see Item 6].

A summary of the information gathered and lessons learned during this exercise are in Annex V.

3. Securing new sources of funding and human resources

Resolution XXIII-10 instructed the Secretariat to “*pursue and secure new sources of funding and human resources support for the implementation of the Commission's Strategy for Capacity-building*”.

A proposal “Empowering developing countries to sustainably use their coastal resources: self-driven capacity-building” was approved for funding by the Swedish International Development Agency. This grant was invaluable in rolling out the initial implementation of the strategy that was approved by the Assembly.

Equally major support was contributed by Italy targeting the riparian states of the Adriatic Sea in the operational oceanography project ADRICOSM described above. The United States and France have also provided support for IOC Capacity-development.

A brochure presenting the IOC self-driven capacity-development for other potential sponsors has been prepared.

4. Role of Regional Subsidiary Bodies

Resolution XXIII-11 recognises *“the role to be played by IOC Regional Subsidiary Bodies”*.

The IOC Regional Subsidiary Bodies (RSBs) have always played the key role in implementing capacity-development activities in their regions, through their contacts and the promotion of these activities at regional meetings. The Capacity-building section has increased its involvement in the activities of RSBs through attendance of some regional meetings - IOCWIO-VI in Maputo, Mozambique, 2-5 November 2005, and IOCARIBE-IX in Cartagena, Columbia, 19-22 April 2006.

The first leadership workshop in Maputo, Mozambique, 29 October to 1 November 2005, was conducted in the same facilities and immediately prior to IOCWIO-VI. Several participants of this meeting also participated in the leadership workshop. The IOCWIO Secretariat coordinated the workshop, promoted the event in regional meetings, and arranged for key regional entities participation at the workshop. These efforts resulted in Western Indian Ocean Marine Science Association (WIOMSA) becoming co-sponsors of the workshop.

At the time of going to press, the IOCARIBE office is also providing important support for the organisation of the first leadership workshop for heads of institutes in Kingston, Jamaica.

5. Developing a balanced work programme reflecting the full range of IOC activities

Resolution XXIII-11 recognises *“the need to develop an effective and balanced work programme based on the initial Implementation Plan that reflects the full range of IOC activities”*.

Activities were planned with due regard to the capital constituted by the successful programmes of all IOC sections. The Capacity-building section has sought to further increase the quality and efficiency of communication with other sections. The Capacity-building section focus on developing skills of organisational leaders and individuals in management, leadership and team-building complements well the more technical skills transfer of other programs. Leadership and team-building skills were given high priority in the initial Implementation Plan, as they excellently complement the programs of other sections that develop more technical skills. Further detail is provided in the following paragraphs.

Ocean Operation and Services: In addition to the efforts carried out for the development of GOOS and operational tools [see Item 1 above], there was also interaction with the Data and Information group. Within the ADRICOSM project, a data management workshop was organised in harmonisation with activities the IODE programme. The training was conducted by an expert from IODE, participants from ADRICOSM were trained in the use of essential IODE tools, and the workshop provided an opportunity to enhance the compatibility of ADRICOSM data with the formats used by IODE. The Capacity-building section attended the ODINAFRICA seminar in Ostend, 24-26 April 2006 to explore further possibilities for harmonisation and synergies with IODE.

Ocean Sciences: Technical skills transferred through the capacity development work programme will be directly usable in Integrated Coastal Area Management (ICAM) projects as they promote the use and application of coastal models for scientific planning of the coastal zone. The first leadership workshop in Maputo (see Item 6 below) emphasised this aspect as a tool that empowers heads of institutes to demonstrate use of science in formulating policy. It is in this context that harmonisation and complementarities are being explored with ICAM, beginning with the assessment studies of existing capacity in Member States.

The successful on-going Training Through Research (TTR) program jointly conducted by Universities of Moscow and Southampton, has been taken as a model for replication and adaptation. The University of Sydney has taken the lead and has just completed the equivalent of the second Asian Training Through Research cruise for students from several countries in SE Asia, Australia, and the Pacific islands. We are also encouraging this process through allocation of funds and creation of an IOC Chair to coordinate the process. Following the Strategy for Capacity-building, we are also seeking openings to start a coastal TTR program in some regions.

6. Leadership, team-building and proposal-writing workshops

Resolution XXIII-11 instructed the IOC Executive Secretary to *“implement the work programme through:*

- (i) innovative leadership workshops for heads of institutions in realizing their vision for capacity-building;*
- (ii) team-building workshops to develop regional networks of scientists; and*
- (iii) regional workshops to draft project proposals addressing high-priority regional issues with clearly defined deliverables and associated performance indicators”.*

The first leadership workshop for heads of marine-related institutes was held in Maputo, Mozambique, 29 October to 1 November 2005. Directors and scientists from Kenya, Tanzania, Mozambique, South Africa, Seychelles and Madagascar participated. All participants were enthusiastic about the workshop, and emphasized that this type of training was long overdue in the region. The challenging part now rests with the heads of institutes to apply these skills within their institutes. This is an on-going process and it will take some time before the first results can be evaluated. However, during a follow-up visit to the region in February-March 2006, it was noted that several directors had begun addressing one or more of the following: involving their scientists in the change process through planning long-term science programs; instituting structural changes in their institutes; and sharing workshop learning elements with their colleagues. All participating directors also expressed the need to continue the workshop series and be replicated for their scientists.

The first leadership workshop in the Caribbean region will be conducted in Kingston, Jamaica, and in our own learning process, the Capacity-building section has left selection of the date and tailoring the contents of the workshop to mirror concerns of small island states, to be decided by the participants.

The funds provided from SIDA will be used to conduct a series of leadership, team-building and proposal writing workshops with due regard being given to the necessity of conducting workshop for different linguistic and cultural groups. At the time of going to press, the consultants who will conduct this series of workshop are being carefully selected by an independent evaluation panel formed of expert from different regions and from different sectors of UNESCO.

The Capacity-building section is also seeking funds to conduct the series of training workshops as described in item 1 above.

7. Cross-sectoral collaboration

Resolution XXIII-11 instructs the Executive Secretary to implement the work programme also through “*collaboration with UNESCO’s cross-sectoral capacity-building activities*”.

Many activities were implemented in close collaboration with UNESCO/IOC Chairs (and prospective Chairs as well). The Chairs provided critical inputs in many instances, and their participation has raised the visibility and profile within local communities and to local decision-makers of the UNESCO Chairs programme, a major cross-cutting programme of UNESCO. This collaboration included a research grant provided to the Chair in Oceanography in Maputo, Mozambique, and the organisation of the first leadership workshop in close collaboration with this chair. This also included collaboration with the Chair in Oceanography in Moscow for the Training Through Research programme and the Baltic Floating University (see Annex VI). The Capacity-building section also took an active role in the evaluation of a proposal for the establishment of a new Chair in marine-related sciences in Sudan. Discussions were held with the head of the UNITWIN and UNESCO Chairs programme and further avenues for collaboration identified that will be explored in the near future. The proposal for a Chair at the University of Sydney has been received and is being actively considered act as the coordinator of the Asian equivalent of the TTR program.

Cross-sectoral collaboration is also on-going with the Internal Oversight Services (IOS) Section of UNESCO in the matter of selection of HRM consultants for the Leadership and team-building workshops. We are also consulting with IOS in defining quantifiable capacity development indicators for the various activities of the section.

8. Consultative Group on Capacity-building

Resolution XXIII-11 instructs the IOC Executive Secretary to “*form a Consultative Group on Capacity-building to advice on criteria for the establishment of priorities and methodologies for assessment*”.

Nominations for this group were requested to Member States through a circular letter, and the group is being finalised by the Executive Secretary to establish a geographically- and discipline-balanced membership.

ANNEX I

**Resolution XXIII-10:
IOC Principles and Strategy for Capacity-Building**

The Intergovernmental Oceanographic Commission,

Noting Resolution EC-XXXVII.9, requesting the IOC Executive Secretary to produce a final draft Strategy for Capacity-building, based on comments received from Member States on the original draft presented, and in response to IOC Circular Letter No. 2119,

Noting further the high priority to be given to the use of GOOS components to address regional concerns,

Endorses the Principles and Strategy for Capacity-building given in document IOC/INF-1211 prov.;

Instructs the IOC Executive Secretary to:

- (i) conduct regional assessments of existing capacities to undertake marine scientific research and operational oceanography in accordance with the Principles and Strategy for Capacity-building;
- (ii) pursue and secure new sources of funding and human resources support for the implementation of the Commission's Strategy for Capacity-building.

Identified funding (2006–2007): US\$ 20,000 from MLA 3*

US\$ 92,000 from Extra-budgetary resources for staffing and liaison to be identified

US\$ 300,000 from Extra-budgetary resources (US\$ 50,000 each for IOCARIBE, IOCEA, IOCWIO, IOCINDIO, WESTPAC & Black Sea) for baseline assessments

* This funding depends on the approval of the IOC budget for 2006–2007 by the UNESCO General Conference at the level currently reflected in the draft 33 C/5 (Draft Programme and Budget for 2006–2007).

ANNEX II

Resolution XXIII-11: Implementation Plan for the IOC Strategy for Capacity-Building

The Intergovernmental Oceanographic Commission,

Noting Resolution EC-XXXVII.9 in which the IOC Executive Secretary was instructed to develop an Implementation Plan for Capacity-building based on regional inputs from an Expert Workshop and to undertake an assessment of the capacity-building programmes that have been carried out by IOC over the last five years,

Noting further the high priority to be given to the use of GOOS components to address regional concerns,

Recognizing that the Implementation Plan produced is in accordance with the associated Principles and Strategy for Capacity-building, and the role to be played by IOC Regional Subsidiary Bodies,

Recognizing further the need to develop an effective and balanced work programme based on the initial Implementation Plan that reflects the full range of IOC activities,

Accepts the initial Implementation Plan for the IOC Strategy for Capacity-building as given in Document IOC/INF-1212;

Instructs the IOC Executive Secretary to implement the work programme through:

- (i) innovative leadership workshops for heads of institutions in realizing their vision for capacity-building;
- (ii) team-building workshops to develop regional networks of scientists; and
- (iii) regional workshops to draft project proposals addressing high-priority regional issues with clearly defined deliverables and associated performance indicators;
- (iv) collaboration with UNESCO's cross-sectoral capacity-building activities;

Instructs further the IOC Executive Secretary to form a Consultative Group on Capacity-building to advise on criteria for the establishment of priorities and methodologies for assessment.

Identified funding (2006–2007):	US\$ 16,000 from MLA 3*
	US\$ 660,000 from extra-budgetary resources

* this funding depends on the approval of the IOC budget for 2006–2007 by the UNESCO General Conference at the level currently reflected in the draft 33 C/5 (Draft Programme and Budget for 2006–2007).

ANNEX III

IOC PRINCIPLES FOR CAPACITY-BUILDING

Below are the principles of Capacity-building that were endorsed by the XXIII Assembly

- (i) IOC Capacity-Building interventions need to be imbedded in on-going regional projects that contribute directly to the larger IOC mandate:
“to promote international cooperation on protection of the marine environment and preservation of human life and property in the ocean and coastal areas and work towards sustainable development”
- (ii) IOC Capacity-Building programmes should be structured based on proposals drafted by regional scientists who define and determine their own capacity-building programmes. The proposals should:
 - Identify areas for regional collaboration;
 - Seek partners through clear enunciation of their requirements; and
 - Seek funds in a “business” mode, by delivering products of public good.
- (iii) Capacity-building interventions should be structured to have enduring long-term impacts. This requires interventions both in “know why” and in “know how”.
- (iv) Interventions should target development of both research and operational capabilities.
- (v) Capacity-building at IOC needs to be approached in a holistic manner involving as appropriate decision-makers, directors of institutes, scientists, technicians, and civil society.
- (vi) Interventions must be treated as investments. Active contact should be maintained with participants. Strategic partners, collaborating institutions, key decision makers, sponsors/funding organizations, and thought leaders in relevant scientific disciplines are also important elements in Capacity-Building and active contact needs to be maintained with all of them.
- (vii) IOC Capacity-building interventions must optimise limited resources and reduce/eliminate duplication and overlap. This requires liaising closely with other agencies that also provide Capacity-Building services, to improve coordination and increase efficiency. IOC will also ensure that it applies Best Practices in Capacity-Building to every intervention that it sponsors.
- (viii) A majority of Capacity-building initiatives will focus on developing regions.
- (ix) IOC Capacity-building Strategy will be focused and address prioritised needs of Member Countries within the regional/global framework. (The implication of this principle is that with limited resources, IOC Capacity-building cannot and should not address every need).
- (x) We now identify IOC Capacity-Building programmes, partners and regional entities that can be used in the Strategy for Capacity-Building.

ANNEX IV

DEVELOPING CAPACITY TO DEVELOP AND USE OPERATIONAL PRODUCTS AND SERVICES TO ADDRESS SOCIETAL NEEDS IN DEVELOPING COUNTRIES: ENHANCING THE CONTRIBUTION FROM IOC CAPACITY-BUILDING

(note presented at the Ninth Session of the Global Ocean Observing System Scientific Steering Committee (GSSC-IX) Paris, France, 6 – 8 March 2006)

This note provides background information for the discussion of the Capacity-building item. It contains certain recommendations from preliminary exchanges between GOOS and IOC Capacity-building. Guidance from the GSSC is sought particularly for the organization of the upcoming workshop on operational products and tools in East Africa.

CURRENT IOC CAPACITY-BUILDING ACTIVITIES FOR OPERATIONAL PRODUCTS AND SERVICES

The 23rd Assembly of IOC instructs the Capacity-building Section to “give high priority to the use of GOOS components to address regional concerns” (Resolutions XXIII-10 and XXIII-11).

IOC’s approach is “self-driven” Capacity-development as approved by the Assembly. In this frame directors of institutes play a key role. They will be informed of existing products in GOOS, remote-sensing and GIS, and the choice of which operational products to develop in priority for their region, as well as training focus, should be left to them whenever possible.

IOC is developing capacity for operational oceanography in the Adriatic Sea through the coordination of ADRICOSM. Through this project, countries across the Adriatic Sea will strengthen their capacity to use and provide near-real time observations for operational forecasting. IOC’s role includes ensuring that capacity developed in countries on the Eastern Adriatic is self-sustainable, and that this project interfaces effectively with GOOS and other IOC activities such as IODE.

IOC is developing capacity to collect and use high-resolution near-shore bathymetric data for strengthening coastal resilience to ocean-based extreme events in the Indian Ocean (COAST-MAP-IO project). Through this the Capacity-building Section is contributing to the development of a multi-hazard warning and mitigation system, a high-priority for many developing countries, which should become an important component of GOOS.

IOC Capacity-building received funding for workshops that can make a strong contribution to the wider use of GOOS products and services. This financial support from the Swedish International Development Agency (SIDA) is not focused on operational products per se, but on another important IOC Assembly instruction on leadership, team-building and proposal writing workshops. However, the project does include training on GIS, remote-sensing and operational products and services, and should be implemented in ways that will *strengthen the capacity needed to develop and apply GOOS products and services to societal needs in developing countries.*

UPCOMING WORKSHOP ON OPERATIONAL PRODUCTS AND TOOLS IN EAST AFRICA

IOC is seeking guidance and partnership in preparing this workshop to be held in East Africa in the coming months. These workshops on “Operational Products and Tools” are seen as a key in the contribution of IOC Capacity-building Section to the development and use of operational products and services in the developing world. *IOC is planning to conduct the first such workshop in the next few months in East Africa.*

Coastal models are seen as an excellent tool in interfacing societal needs in the developing world and GOOS as well as Geographical Information Systems and Remote Sensing, all tools that the 23rd IOC Assembly instructed the Capacity-building section to conduct training for. Coastal models and GIS can play a key role in transforming existing data-streams from satellite observations into operational products and services. With coastal models, which can be run on computing capacity available in developing countries, marine scientists are empowered to provide science-based answers to specific questions of decision-makers, and present their results more vividly. *Hence an important component of this workshop should be training in the use of these models in combination with existing data-streams.*

Similar and follow-up workshops are also planned in this and other IOC regions. These will provide excellent opportunities to strengthen the links between GOOS, particularly GRAs, and IOC capacity development activities in the developing world. Plans should be discussed for allowing GRAs to take the lead in organizing follow-up exercises. Since coastal marine issues are usually important for developing countries, IOC will seek guidance particularly from the coastal GOOS community.

Preliminary outline of the workshop

An initial outline of the workshop is proposed here for discussion. In addition to changes following discussion at the GSSC-9 meeting, this outline should be updated after discussions with directors of marine science institutes in East Africa during a visit in the region immediately prior to the GSSC meeting, from 20 February to 3 March 2006, as well as with input received from LMEs in the region, GOOS Africa, and government agencies responsible for the coastal zone planning and resource management.

1. Two groups of oceanographers, not exceeding 20 per group, are selected to attend two-weeks training courses. The scientists will be selected from nominations by their directors for training in coastal modeling, and training in remote sensing and GIS.
2. The workshops will begin with a half-day awareness program on the variety and types of operational products suitable for addressing selected priority regional needs. This presentation should focus on a small group of products and/or services that were selected prior to the workshop for their applicability to coastal modeling and decision-making in the regional context. *This group could include existing products and services that can be developed from available data streams in the region.* Advice from the GOOS community and in particular the COOS group is especially needed for this item.
3. The two groups of trainees then separate for one week during which one group receives training in coastal modeling and the other group is trained in GIS applications.

4. At the end of Week 1, the groups reconvene for a joint day session where the tools learnt during the week are discussed in a joint session and a refresher lecture is given on the finer details of selected GOOS products.
5. Week 2 continues the training for the modeling group, while the other group receives training in processing remote sensing data.
6. At the end of Week 2, the groups reconvene for a joint day session. At this joint session, there would be a greater level of appreciation of selecting available operational products and/or developing them from available data with recently acquired skills.
7. The joint sessions end with a wrap-up set of lectures on the science that underpins solutions to local needs.
8. It is being considered to back-to-back this workshop with a professionally conducted proposal-writing workshop that will involve at least some of the trainees in drafting proposals for funding.

SOCIETAL NEEDS IN EAST AFRICA: IDENTIFYING AND DEVELOPING SUITABLE OPERATIONAL PRODUCTS

The program described herein would greatly benefit from discussing priority marine issues in the region and the type of GOOS products that are available or could be developed to help address these issues. Various programs and bodies have identified a number of such priorities: some are provided below *in the hope that a number of existing and/or rapidly developable GOOS products applicable to these issues will be proposed during the meeting.*

The New Partnership for Africa Development (NEPAD) Environment Programme, Coastal and Marine Sub-theme, identifies a number of key issues that include:

- coastal erosion
- management of key ecosystems and habitats
- pollution, sustainable use of living resources
- tourism

GOOS experts have put forward the following priorities in preliminary discussions of the marine-related priorities in the region:

- exposure to waterborne pathogens from sewage
- coastal erosion and flooding
- coastal mariculture

Consultations with regional experts by IOC have identified the following as high priorities during the formulation of the initial implementation plan for IOC Capacity-building:

- Water and sediment analysis
- Models for coastal management systems
- Coastal zone vulnerability indices and mapping
- Applications of remote sensing (ocean circulation, living resources, water quality, coastal erosion, forecasting ocean weather/climate)
- Exchange programs – regionally and inter-regionally of students and lecturers

Other urgent and critical needs identified in this process were:

- Development of teaching curriculum, methods and tools
- Short-term fellowships to attend training, ship-board and conferences
- Scholarships for long-term training at MSc and PhD levels
- Applications of GIS to Coastal Management
- Strengthening teaching and research infrastructure
- Data and Information management
- Installation and upgrade of coastal observing systems
- Workshops on Sea-level data analysis and interpretation
- Monitoring and assessment of Harmful Algal Blooms

ANNEX V

SUMMARY OF PROGRESS REPORT ON ASSESSING EXISTING CAPACITIES AND NEEDS IN THE WESTERN INDIAN OCEAN REGION

The discussions held at marine sciences institutes have highlighted important issues that should be taken into account in formulating IOC efforts to contribute to the development of capacity in the region, of which the main conclusions are summarised here. The complete progress report on this activity, including figures obtained from the institutes, will be circulated after approval from relevant authorities.

Capacity to conduct marine sciences generally appears to be growing quite rapidly in the region. Comparison with the previous surveys¹ indicates that:

- Growth in qualification of researchers has been impressive since the 1997 surveys, with the number of researchers with PhDs more than doubling for the institutes for which data allows comparison
- Growth in number of researchers has generally been less rapid
- The interest of governments in the region for marine sciences has been increasing and this should translate into further increase in support in the near future
- Most of the institutes visited had new facilities under construction indicating an increase in government support across the countries visited

Infrastructure may be the most severe limitation and training activities should be harmonised with infrastructure development, as was apparent during many site visits and from discussion with directors, researchers and technicians. Some of the key equipment and infrastructure issues common to most institutes visited include:

- With the success of national, regional and international training and education programmes, there is a tendency now to have more serious limitations with equipment and instruments than with expertise. These limitations hinder the application and sustainability of the human capacity developed with training, as the lack of modern instruments is a major cause of “brain-drain” to UN and other agencies
- Available instruments are often very old and maintenance is difficult and costly
- The lack of large research vessel in the region is a serious limitation as researchers can consequently only study a thin portion of their countries Exclusive Economic Zone. This is a particularly pressing need with the upcoming UNCLOS deadline for delimitation of the continental shelf.

There are many training needs common to most institutes in the region. Those revealed in interviews and discussions include:

- The lack of systematic programme to provide reliable support to post-graduate students in the region has been a significant impediment to the further development of capacity

¹ Marine Science Country Profiles for Kenya, Mozambique and Tanzania, UNESCO-IOC and WIOMSA, 1998 respectively. Available in electronic form from IOC upon request.

- Some of the areas where training is most commonly needed is in remote sensing and a number of specific GIS applications
- Interest was high for new IOC initiatives focussing on leadership and proposal-writing skills, and feedback on the leadership workshop in Maputo was excellent
- A critical aspect of human capacity that has often been neglected in training programmes is training for laboratory technicians

ANNEX VI

ACTIVITIES WITHIN THE TRAINING THROUGH RESEARCH PROGRAMME AND FLOATING UNIVERSITIES

15th Training Through Research Cruise

The cruise was carried out between 6 June - 5 August on board the RV *Professor Logachev* (Russia). Participants in the cruise were 30 researchers and 50 students from fourteen countries of Africa, Asia and Europe (Belgium, China, Germany, Georgia, Italy, Morocco, Mozambique, Norway, Portugal, Russia, Spain, Switzerland, Turkey and UK). The cruise focused on geological processes and ecosystems on the European and North African margins. In addition to other sources, the cruise was co-funded by and subsequently contributed to a major European project “Hotspot Ecosystem Research on the Margins of European Seas” (HERMES, <http://www.eu-hermes.net>).

The shipboard training programme included daily lectures, seminar presentations and two shipboard students’ conferences at which a challenging opportunity was given to the students to present their current research topics.

The equipment used for research and training included: a single-channel high-resolution seismic system with airgun sources, an OKEAN long-range side-scan sonar, a hull-mounted 3.5 kHz profiler, a MAK deep-towed system containing a high- to middle-resolution side-scan sonar and a 5.1 kHz sub-bottom profiler. A 6-m gravity corer, a box corer, a kasten corer, a CTD system, an under-water digital TV camera, a TV-controlled grab, a dredge and a ROV system (in the Black Sea only) were also used for more detailed studies.

The main research results of the TTR15 cruise are as follows:

Slope systems were investigated on each leg of the TTR15 cruise. The relatively unexplored Georgian slope in the eastern Black Sea was covered with seismic lines and deep towed sidescan sonar. In the Tyrrhenian Sea the turbidite systems east of Sardinia and north of Sicily were investigated.

A new field of carbonate mounds was mapped off Morocco. It seems that coral colonies here benefit from a combination of several environmental factors. Outcrops of mud breccia, rich in rock clasts, provide the hard substrate necessary for settlement and nutrients are delivered by a bottom current, possibly related to Mediterranean outflow water. The existence of the bottom currents is confirmed by bedforms observed on sidescan sonar records. Cores containing dead corals were taken on the Pen Duick Escarpment on the Renard Ridge. An underwater video survey along the Vernadsky Ridge in the Gulf of Cadiz did not show the live corals that were expected.

Many mud volcanoes were studied in both the Black Sea and the Gulf of Cadiz. New high-resolution reconnaissance information was obtained on several known mud volcanoes in the Gulf of Cadiz (Mercator, Gemini, Kidd, Tangier, Adamastor, Olenin and Meknes) and diapiric ridges (Vernadsky Ridge, Pen Duick Escarpment) with high-resolution deep-towed sidescan sonar, bottom samplers and an underwater video recording system. Several uninvestigated high backscatter features were groundtruthed for the first time. Some of these features have a corresponding bathymetric expression and three of them were proven to be mud volcanoes. On the Vernadsky Ridge there was an extensive development of methane-derived carbonate crusts and chimneys. A 5 m diameter chimney-like feature suggests a truly dramatic scale of hydrocarbon-rich fluid seepage occurring in the past in the area.

The detailed studies of the above structures were specifically aimed at investigations of the faunal assemblages of fluid seepage sites in new areas of the Gulf of Cadiz. Also several known structures were revisited for more detailed work and to obtain more samples for quantitative information on active sites. The preliminary results of these studies, and particularly the one conducted on the Meknes mud volcano and surrounding area, clearly demonstrate that changes in the sedimentary geology are accompanied by changes in the benthic assemblage. Samples from several of the studied seep sites collected specimens for chemosynthetic endosymbiont identification and for genetic and stable isotope studies. A new field of carbonate chimneys was discovered on the slopes of the Portimao Canyon during an underwater camera run across its head. The field was successfully sampled with a dredge. Apart from the typical dolomite chimneys it also contained several previously unknown types which were possibly built of aragonite and are therefore thought to be in the early stage of their development. They were in a deeper setting than previous chimney occurrences.

Samples for microbial analysis were taken on and near mud volcanoes in the Gulf of Cadiz. Massive gas hydrates were recovered in the Black Sea, as well as records of oil and gas seepages.

The biology of the head of a canyon in the Gulf of Cadiz, swept by particularly strong currents, was investigated. The study consisted of a long underwater camera run along a branch of the Portimao Canyon in order to investigate the faunal distribution. The canyon has cut back into an area swept by the Mediterranean Undercurrent. The TV run was intended to track the changes in faunal communities from the area affected by the Undercurrent to the area below depths of 1200 m, where the current was not present. The preliminary results of the video record analysis not only confirm the presence of such changes but also highlight the significant level of pollution in the canyon axis where various types of man-made objects are seen (e.g. bottles, tins, plastic bags etc.).

The cruise research results were presented by the participants and further discussed at a post-cruise conference (Moscow, 31 January-3 February 2006).

Baltic Floating University (BFU) operations in 2005

Launched in 1993 as part of UNESCO's Floating University scheme and co-sponsored by the Helsinki Environmental Commission (HELCOM), the BFU project has been executed since 1996 as part of the TEMA Programme and contributes with the research results to the ICAM Programme of IOC. The Russian State Hydro-meteorological University (RSHU, St. Petersburg) acts as its leading executor. The main particularity of the BFU work is combination of research undertaken from a sailing catamaran "Centaurus" in the coastal waters and from a bigger research vessel "Sibiriakov" for studying the open Baltic Sea.

Six students from RSHU, professors and experts from a number of research institutions of St. Petersburg and eight students from Latvia, Lithuania, Slovakia, Ukraine, Spain and the United Kingdom took part in the BFU-2005 cruise (3-16 August). This interdisciplinary expedition was carried out with the objective to collect data for the HELCOM long-term monitoring program and to provide students with training in oceanography and environmental science through lectures, data collection, analysis and interpretation. An annual mid-cruise research seminar took place on 12 August in Stockholm. A round-table students' discussion was organized for elaborating proposals for the coastal zone policy in the eastern part of the Baltic Sea.

In parallel and in co-ordination with the “Sibiryakov” cruise a variety of environmental data were collected from the sailing catamaran “Centaurus”. A new regional project “Learning network on coastal sustainable living in the Baltic Sea region” (LEARN COAST) started. The project is supported by the Nordic Council of Ministers and the Research Council of Norway. Its main objective is to organize and carry out an Innovative Marine Summer School for students from the Baltic countries focused on coastal sustainable living. Ten students from the “Centaurus” took part in the Summer School in Nykobing (Denmark).

University of the Sea activities

The University of the Sea is a ship-based training and research program for students and young marine scientists from across the Asia-Pacific region. The first cruise took place in the Coral Sea – Arafura Sea region onboard the French research vessel *Marion Dufresne* between June 24 and July 8, 2005. The ship sailed from Port Moresby (PNG) to Darwin (Australia). During this two-week period, twenty students representing ten countries [Australia, P.R. China, East Timor, Indonesia, Japan, Malaysia, New Zealand, Papua New Guinea, the Philippines and Sri Lanka] got “hands on” practical experience in both marine data collection and marine research problem solving.

The University of the Sea worked in conjunction with a previously planned research program, which was formulated and funded by IMAGES - the international paleoceanography scientific program.

The two principal research aims of the expedition, named MD148 PECTEN, were:

1. to analyse past climate change and ocean conditions as recorded in sediment cores from the continental shelf, slope and abyssal sea floor in the Gulf of Papua (northern Coral Sea) and Arafura Sea, and,
2. to determine the processes and rates of sedimentation at the critical interface on the sea floor between sediments from Papua New Guinea and the corals of the northern Great Barrier Reef so that adjacent buried systems bearing hydrocarbons can be better modelled.

This unique opportunity for practical training enabled University of the Sea students to gain skills in navigation, multibeam mapping, seismic profiling, plankton sampling, and seafloor sampling using box, piston and gravity coring. Students learned how to map and sample both the shallow shelf (<200metres) and deep sea floor.

In the short time since the establishment of the University of the Sea it has attracted considerable support, both in terms of funding and the number of institutions that wish to be included in the program. In order to facilitate broad participation the Asia Pacific Neighbours Network was established. The network now includes 10 Australian universities, the University of Papua New Guinea, the University of Tokyo, the Korean Ocean Research and Development Institute, Tongji University China, the Partnership for Observation of the Global Oceans Canada, the National Institute of Oceanography Goa, the University of the South Pacific, SOPAC and the Indonesian Research Centre for Marine Technology.

The University of the Sea is supported by the French Polar Institute, who host the program onboard the research vessel, *Marion Dufresne*. Financial support comes from the Toyota Foundation, the Asia Pacific Network for Global Change Research, the Australian Marine Geoscience Office (MARGO) and the ARC Network for Earth System Science.

ANNEX VII

ACRONYMS

ADRICOSM	ADRIatic sea integrated Coastal areaS and river basin Management system pilot project
CDA	Coast Development Authority
DHI	Danish Hydraulics Institute
FAST	Faculty for Aquatic Sciences and Technology
GIS	Geographical Information System
GOOS	Global Ocean Observing System
GSSC	GOOS Scientific Steering Committee
HRM	Human Resource Management
ICAM	Integrated Coastal Area Management
IIP	Instituto de Investagação Pesqueira
IMS	Institute of Marine Sciences
INAHINA	Instituto Nacional de Hidrografia e Navegação
INAM	Instituto Nacional de Meteorologia
IODE	International Oceanographic Data Exchange
IOS	Internal Oversight Services
KMD	Kenya Meteorological Department
KMFRI	Kenya Marine and Fisheries Research Institute
NEPAD	New Partnership for Africa Development
RSB	Regional Subsidiary Bodies
SIDA	Swedish International Development Agency
TTR	Training Through Research
WAPMERR	World Agency for Planetary Monitoring and Earthquake Risk Reduction
WIOMSA	Western Indian Ocean Marine Sciences Association