Intergovernmental Oceanographic Commission

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1

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A. IMPLEMENTATION OF RESOLUTIONS AND THEIR STATUS AS AT END JANUARY 1995

1. RESOLUTIONS ADOPTED BY THE TWENTY-SEVENTH SESSION OF THE EXECUTIVE COUNCIL, JULY 1994

Resolution EC-XXVII.1 Establishment of an IOC Regional Secretariat for the Sub-Commission for the Western Pacific (WESTPAC)

This Resolution is implemented. A post was established at the end of September.1994 through cost-sharing between USA and UNESCO on a 50/50 basis. The IOC Regional Secretariat for WESTPAC was formally opened by the Secretary General of the National Research Council of Thailand (NRCT), the Director PROAP, and the Secretary IOC on 29 November 1994.

Resolution EC-XXVII.2 Programme and Budget for 1994-1995

This Resolution has been implemented for 1994 and is being implemented as far as the activities for 1995 are concerned. The actions requested in the Resolution to recover the reduction in the 1994 funding were taken and the funds were recovered and utilized during the 1994 programme implementation.

Resolution EC-XXVII.3 Second Session of the Joint IOC-FAO *ad hoc* Intergovernmental Panel on Harmful Algal Blooms

DANIDA has provided a large grant for the establishment of a centre in Copenhagen.

Actions on Recommendations:

1. Staffing is still a problem. The United States has provided funds for half a post at P4 level, and a matching grant is being sought.

2. Has been implemented. The training programme is developing well.

3. Regional HAB centres are being established. The DANIDA-supported one is the first example, but steps are being taken in Spain to establish one there also.

4. Development of standards is being pursued in co-operation with the CEC.

5. Participation in WESTPAC developments is strong. Co-operation is established with donors active in the region.

6. Consultations have been held with FAO, but have so far not resulted in a fully satisfactory solution as to resources distribution. It appears likely that FAO will not continue its co-sponsorship. UNEP is interested in co-sponsoring the OSLR programme, and consultations are being pursued.

The Third Session of the Panel is being convened 6-9 June 1995 in Paris.

Resolution EC-XXVII.4 **The Marine Environmental Studies Laboratory (MESL) of the IAEA Marine Environment Laboratory, Monaco**

Consultations have been held with the co-sponsors involved in the tripartite agreement on co-operation between IAEA, IOC and UNEP. These have led to the implementation of an outside review of the MESL in the context of this co-operation. The review is being implemented in 1995. The Assembly will be informed of the results.

Resolution EC-XXVII.5 **Fourth Session of the Group of Experts in Marine Information Management**

Actions on Recommendations:

1. Regional information networks are gradually being established, but the lack of funds seriously hampers development. In view, *inter alia*, of GOOS and Internet, it is very important that increased support is provided.

2, 3 and 4 are gradually being implemented.

Resolution EC-XXVII.6 **First Planning Session of the IOC-WMO-UNEP Committee for the Global Ocean Observing System (I-GOOS)**

The actions are gradually being implemented. Details are provided in the main body of the report.

Resolution EC-XXVII.7 **Fourteenth Session of the International Co-ordination Group for the Tsunami Warning System in the Pacific**

Additional funding is forthcoming from Member States, but further efforts are required.

The important contribution of ICG/ITSU to the IDNDR has been brought to the attention of relevant organizations and the Director-General of UNESCO.

2. RESOLUTIONS ADOPTED BY THE SEVENTEENTH SESSION OF THE ASSEMBLY, MARCH 1993

The state of implementation of these Resolutions was reviewed in the Annual Report 1993, pages 1-6. In some cases the Resolutions still stand and further information concerning their implementation since the Annual Report for 1993 is provided here.

Resolution XVII-1 **Coastal Zone Activities**

The *ad hoc* IOC Group of Experts is working by correspondence. Many activities of IOC are addressing coastal zone problems. A comprehensive progress report is in preparation for the Assembly.

IOC is actively involved in the GESAMP Working Group on Integrated Coastal Area Management, together with several of the ICSPRO Agencies.

Resolution XVII-2 **Ocean Science in Relation to Living Resources (OSLR)**

Part A: has been implemented, but so far no meeting of the Intergovernmental Committee for OSLR has been called, due mainly to lack of senior OSLR staff in the IOC Secretariat.

Part B: is being implemented.

Part C: is being implemented. The Programme Office for Harmful Algal Blooms has been established in the Secretariat.

Resolution XVII-3 Conference on Coastal Change

The Conference is being held in Bordeaux, 6-10 February 1995, in co-operation with BORDOMER. The results will be presented to the Assembly.

Resolution XVII-5 Global Ocean Observing System (GOOS)

Recommendation GOOS I.3 and I.4 need further effort. No fully dedicated post for GLOSS has as yet been achieved.

Resolution XVII-8 Support to the IOC Programme on IODE

Considerable support from Member States has been provided for GODAR, as well as from CEC. However, in view of GOOS development, much additional effort is needed to establish adequate data and information exchange networks using various systems, including, in particular, Internet.

Resolution XVII-9 IOC Tsunami Programme

Support is forthcoming from a few Member States, which is, however, insufficient. The Tsunami project is included in the UNESCO Draft Medium-term Strategy 1996-2001 as a contribution to IDNDR. Public awareness of the role of the warning system has been much increased through the publication of educational material in several languages.

Resolution XVII-10 Training, Education and Mutual Assistance in the Marine Sciences (TEMA)

Co-operation with and support from national donor agencies are increasing, including DANIDA, SAREC, NORAD, CIDA. Likewise, there is an increasing level of interaction with UNDP and GEF, through regional projects and joint inter-agency training packages as part of Capacity 21 dedicated to integrated coastal area management in the so-called TRAIN-COAST project. However, there is a need for stronger efforts, and in particular, more support for IOC at the national level. The new GEF and UNDP policy is very clearly directed towards the role of individual Member States and the participation of NGOs. Without the strong backing of IOC at national level, we will not be included as a partner. This is particularly important to the strengthening of IOC regional programmes. Efforts are needed to increase the awareness of IOC at the national level.

The TEMA Action Plan has been gradually implemented. A new TEMA strategy is being prepared.

The staffing situation in the IOC Secretariat has potentially improved through the creation of a TEMA-related group of 2-4 professionals. The secondment by Member States of experts for regional programmes would be extremely valuable.

Resolution XVII-15 Regional Black Sea Co-operation Programme

A IOC regional Black Sea Co-operation Programme has been prepared by the regional Workshop, Varna, Bulgaria, 1994. A Regional Intergovernmental Meeting is now planned for 8-9 June 1995. The Executive Summary of the meeting will be delivered to the Assembly.

Resolution XVII-16 **International Conference on Marine Scientific Research and Integrated Coastal and Ocean Management for Sustainable Development**

This Resolution has been fully implemented. The results of the Conference, Lisbon, November 1994, including a Declaration, will be brought to the attention of the Assembly (see Annex I).

Resolution XVII-17 **1998 - The International Year of the Ocean**

This Resolution has been fully implemented. The International Year of the Ocean has been adopted by the UN General Assembly. It is included in the UNESCO Medium-term Strategy. Preliminary ideas for an IOC programme for 1998 will be presented to the Assembly. Consultations on this matter have been held with ICSPRO agencies.

Resolution XVII-18 **Implementation of UNCED decisions relevant to IOC**

The *ad hoc* Intersessional Working Group presented an interim report to the Twenty-seventh Session of the IOC Executive Council. A report will, likewise, be presented to the Assembly.

IOC is also reporting to the ACC Sub-Committee on Oceans and Coastal Areas on activities with respect to Chapter 17 of Agenda 21, which includes all ICSPRO agencies. A report has also been provided to the Commission on Sustainable Development. All other elements of the Resolution are gradually being implemented. The follow-up to UNCED represents a major framework for the IOC Medium-term Strategy. This includes actions related to the Framework Convention on Climate Change and the Convention on Biological Diversity.

Resolution XVII-19 **Programme and Budget for 1994-1995**

This Resolution is being fully implemented. Increased support from Member States is forthcoming. However, it could be wished that the rate of this increase was growing faster than it is!

Resolution XVII-20 ***Ad hoc* Study Group on IOC Development, Operations, Structure and Statutes (DOSS)**

An extensive report is delivered separately to the Assembly (Document IOC-XVIII/2 Annex 8). A major step in the overall implementation of the Resolution has been taken through the introduction of the New Arrangements for IOC, which will provide effective functional autonomy.

B. PROGRAMME ACTIVITIES

1. OCEAN SCIENCE

1.1 OCEANS AND CLIMATE

Joint Scientific Committee for the World Climate Research Programme

Since the Twenty-Seventh Session of the Executive Council of July 1994, two major personnel changes have occurred. Professor Pierre Morel, Director of the WCRP since its inception, retired and was replaced by Professor Hartmut Grassl. Dr Gordon McBean, Chairman of the Joint Scientific Committee, completed his term of office and was replaced by Dr. W. Lawrence Gates. The JSC met with the newly installed leadership in August 1994 to formulate measures to guide and hasten the development of the CLIVAR initiative. The CLIVAR Scientific Steering Group, in its subsequent meeting in September 1994, responded to these measures and took action to put the finishing touches on its Scientific Plan. The finished document was scheduled to be reviewed by the JSC at its meeting in March 1995 and distributed widely to the ocean climate community thereafter. The intention is to launch CLIVAR and broaden community input into further planning by conducting a schedule of workshops and meetings.

TOGA

The ten-year TOGA programme officially came to a successful close at the end of 1994. Except for the TOGA Coupled Ocean Atmosphere Response Experiment (COARE) the data are all available on CD ROMs. Some limited support, however, will continue to be needed for COARE, in order to digest the enormous amount of diverse data acquired and make it available to future researchers. A decision was reached to also continue to fund the TOGA observation system from research budgets of Member States as an interim measure while GOOS/GCOS prepare for transition of the system to operational status. Follow-on research to take advantage of the progress made by TOGA in improving seasonal to interannual climate forecasts will be incorporated in CLIVAR planning.

WOCE

The WOCE programme is well into its intensive observational phase which is scheduled to be completed in 1997. While completion of most of the planned global survey lines is assured, some critical lines are still in search of sponsors. Commensurate with the excellent progress in achieving the observational goals, the WOCE SSG has taken steps to downsize its administrative structure and field operations planning groups. Planning emphasis is now shifting toward the next phase of WOCE, i.e., data synthesis and analysis. Consideration is also being given to conducting an independent mid-term review of WOCE. A meeting of the Intergovernmental WOCE Panel (IWP) is scheduled for 8-9 June 1995 to address these matters as well as the downstream resources envisioned by the SSG as essential for WOCE to successfully reach its stated objectives.

OOSDP

The OOSDP completed its assigned task on time, in December 1994, i.e., to formulate the conceptual design of an ocean climate observing system, that will serve as the basis for the climate module of GOOS and the ocean component of GCOS. The OOSDP final report (Document IOC/JSC-OOSDP-X/3) was delivered to the JSC, I-GOOS, J-GOOS and GCOS-JSTC and given wide distribution to the ocean climate community. Based on an interpretation of the conclusions and recommendations in the report, I-GOOS is developing a strategy, in consultation with J-GOOS, GCOS-JSTC and JSC for steps leading to a phased implementation.

CO_2 PANEL

Interaction with SCOR-JGOFS continues to be maintained through the very active Joint IOC-JGOFS Advisory Panel on CO_2. Establishment of a sound international calibration base for ocean carbon measurements has been a prime objective. Towards this end the Panel conducted an international intercalibration workshop in June 1994 to determine the limits of comparability of CO_2 measurements taken by investigators using different instrumentation from around the world. Further, recognizing a serious international deficiency in available standards material for stable carbon isotopes, the Panel opened a dialogue with the International Atomic Energy Agency (IAEA) with regard to standardization of ocean carbon stable isotope measurements. A ready supply of stable carbon isotope standards is a prerequisite to achieving high quality ocean CO_2 data calibrated uniformly to known standards. A report entitled "CO_2 and the ocean: a review of the state of knowledge" was prepared by the Panel for use as the principle background document for the Second Malta meeting (see item 7.1). The Panel has also taken steps to inventory all available CO_2 data in the hands of investigators worldwide and to assist in organizing the first international ocean CO_2 symposium in January 1996.

1.2 OCEAN SCIENCE IN RELATION TO LIVING RESOURCES

Since the end of 1993, the OSLR Programme has been without a Technical Secretary. This lack has impeded the development of the OSLR Programme.

A new Associate Expert was seconded by Italy for the OSLR Programme from May 1994. At the Twenty-seventh Session of the Executive Council, Paris, 5-12 July 1994, the United States confirmed a partial financing of a post as Technical Secretary OSLR.

Harmful Algal Bloom Programme

The Harmful Algal Bloom Programme Office was established at the IOC Secretariat, UNESCO Headquarters in Paris in 1993, and is presently staffed with two Associate Experts seconded by Denmark.

During 1994, the Harmful Algal Bloom Programme Office has distributed information on the Programme, together with several reference books and proceedings from conferences in relation to HAB, kindly donated by the publishers and the organizers, to more than 100 libraries or scientists, especially from developing countries.

Since the Second Session of the Joint IOC-FAO Intergovernmental Panel on Harmful Algal Blooms, Paris, 14-16 October 1993, three of the intersessional Task Teams on: Aquatic Biotoxins; Taxonomy, and Management and Monitoring have developed their activities. The Task Team on Aquatic Biotoxins includes representatives of GEEP, GEMSI and GESREM.

The IOC newsletter "Harmful Algae News" has a growing number of subscribers. As of 15 November 1994 the total number was over 2,000. Dr. T. Wyatt is the Editor of the newsletter.

A HAB Training and Capacity Building Programme, the TEMA component of the Harmful Algal Bloom Programme, is being developed. The training programme includes taxonomy, toxin chemistry, design and implementation of monitoring systems, management and mitigation techniques, and individual training.

As the second activity within the training component of the Harmful Algal Bloom Programme, an IOC-WHO-FAO Training Course on Qualitative and Quantitative Determination on Algal Toxins was held at the Friedrich-Schiller University of Jena, Germany, 18-28 October 1994, co-sponsored by the Mediterranean Action Plan. More that 65 applications were received for the ten places available.

The ICES-IOC Working Group on Dynamics of Harmful Algal Blooms met 8-12 May 1994, in Vigo, Spain, and held a joint meeting with the ICES Working Group on Shelf Seas Oceanography. In addition to its terms of reference, the Working Group took initiatives regarding an overview of HAB monitoring programmes as a contribution to an IOC document with global coverage; recommended strengthened ICES involvement in the HAB Programme; and establishment of a HAB Database. The Working Group is co-sponsored by IOC.

An ICES-IOC Workshop on Intercomparison on *In Situ* Growth Rate Measurements (Dinoflagellates) was held in Aveiro, Portugal, 25-29 July 1994. 34 scientists participated in the Workshop.

An IOC Regional Science Planning Workshop on Harmful Algal Blooms was organized in Montevideo, Uruguay, 15-17 June 1994, with the aim of reviewing the state of the art concerning research and control of Harmful Algal Blooms in South America and identifying research priorities in the region. Among the training priorities, the total absence of specialists in High Performance Liquid Chromatography (HPLC) for toxin analysis in the region was highlighted and identified as a training priority. A need to train experts in other disciplines (oceanography, physics, modelling) to undertake future multidisciplinary projects, was also identified.

An IOC-WESTPAC Harmful Algal Bloom, River Input, and Shelf Circulation Seminar was organized in Bali, Indonesia, 20-21 November 1994, when 16 participants were present.

The Continuous Plankton Recorder Programme

The Assembly, at its Seventeenth Session, Paris, 25 February-11 March 1993, decided to continue support of the Continuous Plankton Recorder (CPR). The IOC supported the CPR with a contract of US $ 16,000 a year in the biennium 93/94.

Global Ocean Ecosystem Dynamics

The purpose of the PICES-IOC-SCOR-ICES Strategic Planning Conference, Paris, 18-21 July 1994, was to obtain input on a draft science plan; to incorporate the points raised by national and regional programmes, and to set the stage for a GLOBEC implementation meeting.

A meeting on Small Pelagic Fish and Climate Change (SPACC) Programme of GLOBEC was organized in La Paz, Baja California, Mexico, 20-24 June 1994. 54 scientists from 14 countries participated in the first SPACC Meeting. The objective of the SPACC Programme is to understand the effect of climate change on pelagic fish population dynamics through comparisons among ecosystems supporting these populations. IOC co-sponsored the meeting with US $ 8,000.

Large Marine Ecosystems

An International Symposium on the Large Marine Ecosystems (LMEs) of the Pacific Ocean was held in Qingdao, R.P. China, 8-11 October 1994. The Symposium was organized by the Yellow Sea Fisheries Research Institute of the Chinese Academy of Fishery Sciences and supported by NOAA, IUCN, IOC, and the National Natural Science Foundation of China, Chinese Fisheries Society. 80 scientists from 15 different countries participated in the Symposium.

The issue of how to adapt the Large Marine Ecosystem approach to the East African Region was addressed by the IOCINCWIO Group of Experts on Ocean Science in Relation to Living Resources at its First Session in Mombasa, Kenya, 13-17 September 1994. The Group recommended the formulation of an LME core monitoring programme, including a Continuous Plankton Recorder (CPR)/Undulating Oceanographic Recorder (UOR) sampling strategy to measure variability in LME health; and the preparation of an inshore sampling programme to measure species abundance, biodiversity and stock levels, and to gather data on fish age, growth and size.

IREP-PREP

As a part of the International Recruitment Programme (IREP) an IOC-FAO Prawn Recruitment Project (PREP) Workshop on DataBase Management and Analysis was held in Malaysia, 31 October - 4 November 1994 when 14 participants took part.

Development of the GOOS module

The developments of the Marine Living Resources Module for GOOS will be further discussed at the Second Session of the joint IOC-ICSU-WMO Scientific and Technological Committee for GOOS (J-GOOS), to be held in April 1995.

Seagrass-Bed Survey

About 250 replies from research and management-oriented institutions dealing with seagrass bed ecosystems from around 90 countries were received as a response to a questionnaire sent out in August 1993. A first edition of an International Directory of Seagrass-Bed Institutions (a guide to scientists and policy-makers) will be published in early 1995. This document contains information on current research, training and management activities on seagrass bed ecosystems worldwide. The Directory will be available on computer diskette. The establishment of a global network involving both researchers and decision-makers is envisaged.

Marine Mammals

IOC was represented at the Sixth Meeting of the Joint IOC-FAO-IATCC-UNEP-GREENPEACE-WDCS-IUCN-WWF Planning and Coordinating Committee of the Global Marine Mammal Action Plan (MMAP), held in Crowborough, UK, 29 June-4 July 1994. Within the context of IOCINCWIO activities, a pilot research activity on the dugong's *(Dugong dugong)* geographical distribution and dugong/seagrass interactions in East Africa is being developed, as part of a more comprehensive initiative on marine biodiversity.

Register of Marine Organisms

A project is being carried out aimed at developing a register of marine organisms - a common base for compiling biodiversity inventories. The project is a joint effort of IOC, the National Natural History Museum, Leiden, Netherlands, and the Expert Center for Taxonomic Identification (ETI), Amsterdam, Netherlands. A first version of the register (on computer diskette) at the family level, was sent to institutions specialized in taxonomy in November 1994. The project will lead to the preparation of a CD-ROM-running register of marine organisms at the species level. This product will be available to the scientific and decision-making communities, and may be especially useful in those countries where libraries are scarce or absent. It will also help countries to compile marine biodiversity inventories at the national level, as envisaged by the Convention on Biological Diversity, and is thus a contribution of IOC to the Convention.

Outlook

The OSLR Programme covers almost all the scientific aspects concerning marine living resources. In spite of the absence of a Technical Secretary in 1994, the programme is still developing and adjusting itself, in the light of a new conceptual approach (i.e. the LME one) and legal instruments (i.e. the Convention on Biological Diversity). It may be advisable for Member States to consider national scientific programmes and activities in order to make them converge more and more into OSLR. Such an integrated and geographically comprehensive programme could then more efficiently act as a tool for developing international and regional co-operation activities. Another concern is that of having National Commissions acting as efficient centers for the collection of recommendations developed by national scientific communities, in order to further elaborate activities within OSLR in such a way that they could also be useful for the development of marine environment

policies at the national level, on the basis of specific problems of the marine environment (i.e. pollution phenomena) and needs (i.e. need for training in specific disciplines).

Since the Harmful Algal Bloom Programme Plan was adopted by the Seventeenth Session of the IOC Assembly in February-March 1993, many activities within the different elements have been, or are being developed. The importance of the Programme was shown at the last Executive Council, and many Member States have been able to develop national and regional programme activities, initiated and catalyzed by the International IOC-FAO HAB Programme. The strategy of developing Scientific and Communication Centres will give the developing countries a possibility to be very close to the scientific community with help and guidance from the established IOC Harmful Algal Bloom Programme Office. The development of a HAB Training and Capacity Building Programme will guide the Member States and decision-makers to identify resources for training activities, and in which regions these activities are needed.

IOC has participated in the major intergovernmental events related to the Convention on Biological Diversity, namely the Second Session of the Intergovernmental Committee to the Convention on Biological Diversity, Nairobi, Kenya, 20 June-1 July 1994; and, the First Conference of the Parties to the Convention on Biological Diversity, Nassau, Bahamas, 28 November-9 December 1994. Several activities are being developed within the context of the OSLR Programme, both at the global level (Register of Marine Organisms; Directory of Seagrass Bed Institutions), and at the regional level (Development of a Pilot Research Activity on Seagrass/Dugong Relationships in East Africa), plus a number of taxonomy-oriented training activities. The participation of IOC in marine biodiversity-related activities will require increasing efforts in the coming years.

1.3 OCEAN SCIENCE IN RELATION TO NON-LIVING RESOURCES

The activities in this programme have concentrated on the preparations for the Coastal Change Conference, Bordeaux, 6-10 February 1995, as a co-operative event between IOC and BORDOMER, and with co-sponsorship of SCOR. These preparations have included several consultations, and meetings of a scientific committee and an organizing committee. IOC's partners in the UN system have been invited to participate.

Other OSNLR-related activities have been carried out within regional programmes, including workshops on Coastal Zone Management Aspects in the Caribbean and in Pakistan; a Workshop on Coastal Zone Erosion and Sea-level Changes in East Africa, Zanzibar, Tanzania, February 1994, and a Symposium on the Results of the Regional Cruise, 1990, in the IOCEA region on the Sedimentary Budget of the Gulf of Guinea, Lagos, Nigeria, May 1994. Details of these activities are presented in the respective regional programmes.

1.4 OCEAN MAPPING

Following the secondment by the Russian Federation of an expert for this programme in 1994, and in view of the entering into force of the United Nations Convention on the Law of the Sea (UNCLOS), a comprehensive report is provided.

IOC activities in international ocean mapping began in 1969 after the endorsement by the UN General Assembly of the Long-Term and Expanded Programme of the Oceans. The first activity was the compilation of a Geological and Geophysical Atlas of the Indian Ocean taking advantage of the data collected through the International Indian Ocean Expedition. This Atlas was published in 1975 by the Academy of Sciences and the Main Administration of Geodesy and Cartography of the former Soviet Union. At present, IOC contributions to the ocean mapping activities fall within three categories: GEBCO, GAPA and regional ocean mapping activities.

GEBCO

Major achievements of GEBCO over the past years have been the digitization of the contours of the 5th Edition and the preparation of the GEBCO Digital Atlas. Now the "GEBCO Digital Atlas

(GDA)" is ready for general release on magnetic tape in GF3 format, to be supplemented by the digitized Gazetteer of Geographical Names of Undersea Features. The complete dataset was issued on Compact Disc (CD-ROM) during 1994. This provides the results of the interpretative contouring in a computer compatible form so that they can be widely used and flexibly manipulated. It is believed that, by about 1995, sufficient new data will have been acquired to justify the printing of a 6th Edition of GEBCO. GEBCO is the only global - bathymetric database of ocean contours in which the control is precisely shown and in which confidence in given contours can be readily assessed.

The Ninth Meeting of the GEBCO Officers was held at the Canadian Hydrographic Service, Ottawa, 30 May-1 June 1994 (Document IOC-IHO/GEBCO Officers-IX/3). The meeting reviewed the matters arising from the 14th session of the GEBCO Guiding Committee, May 1993, including, *inter alia*, an archive relating to the deepest depths in the deep trenches, proposed surveys in the Arctic and the project on "Global Mapping for the Global Environment".

It was reported at the meeting that the IHO-IOC Gazetteer of Geographical Names of Undersea Features (Publication B-8) would be maintained and regularly updated in digital form only. A second edition (on floppy disk) was published later in 1994.

It was also reported that the release of the GEBCO Digital Atlas (GDA) on CD-ROM is the culmination of the 5th Edition of GEBCO, and an operation updating procedure with a worldwide network of keen and motivated people locating data for "switching in" to the GDA is in place. At present, GEBCO digital products consists of (i) the GDA-contours; (ii) IHO DCDB-soundings; and there is now a clear need for (iii) a gridded dataset with the GEBCO stamp of approval for the use of modelers; the initial objective was identified as the creation of a 5' uniform grid compatible with the GEBCO Digital Atlas. The GEBCO charts are available from the Canadian Hydrographic Service, the International Hydrographic Bureau and Mr. Desmond Scott, Permanent Secretary GEBCO; the GEBCO Digital Atlas is available on a CD-ROM from the British Oceanographic Data Center, U.K.

The meeting also discussed the implications for GEBCO of the entering into force of the UN Convention on the Law of the Sea on 16 November 1994. The GEBCO Community is prepared and willing to contribute its expertise in support of the implementation of UNCLOS through IOC and IHO.

In addition, the composition of the GEBCO Guiding Committee and its Sub-Committees, and the revised terms of reference for the Guiding Committee for GEBCO were considered.

GAPA

International Geological-Geophysical Atlases of the Atlantic and Pacific Oceans (GAPA) is another endeavour of IOC in ocean mapping. The Atlantic Ocean Atlas was published in 1991 and has now been fully distributed to contributors and to IOC Depository Libraries, and placed on sale. The main atlas sections, consisting of maps on both 1:30 M and 1:10 M scales cover bottom topography, magnetic total intensity anomalies, free-air gravity anomalies, sea surface heights, geothermal data, earthquake epicenters and thickness of sedimentary cover. Larger scale maps are provided for regions, e.g. the Mid-Atlantic Ridge, the Caribbean Sea and others for detailed study (usually bottom topography, magnetic and gravity anomalies, and thickness of sediments, etc).

The companion atlas for the Pacific Ocean is now ready for publication. It is expected that it will appear in 1995, and the Russian Geochemistry Institute is the responsible organization for the compilation, printing and publication of the atlas. The introductory and main sections of this atlas will be similar to those provided in the Atlantic Ocean atlas. The Pacific Ocean regions selected for detailed study, for which larger scale maps will be provided, are the Okinawa Trough, the Gulf of Alaska, the East Pacific Rise, the South China Sea, the Sea of Japan, the Japan Trench, the Sea of Okhostsk, the Bering Sea and the New Zealand region.

Regional Ocean Mapping Projects

Five regional ocean mapping projects are at present operational:

(i) International Bathymetric Chart of the Mediterranean and its Geological-Geophysical Series (IBCM, 1973)

A second edition of the International Bathymetric Chart of the Mediterranean is planned for publication (the first edition was printed and published by the Head, Department of Navigation and Oceanography of the former Soviet Union, on behalf of IOC, in 1982) upon completion of the five Geological-Geophysical Series. This is now tentatively scheduled for 1995-96. Progress has also been achieved in the geological and geophysical series within which the Plio-Quaternary chart was published in 1994.

An informal consultation of the IOC Editorial Board for the International Bathymetric Chart of the Mediterranean and its Geological/Geophysical Series (IBCM), was held in Paris on 4 July 1994.

(ii) International Bathymetric Chart of the Caribbean Sea and Gulf of Mexico (IBCCA, 1986)

The Second Meeting of Officers of the Editorial Board for the International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico (IBCCA) was divided into two sessions: the first in Boulder, Colorado (USA), 15-16 December 1993, and the second in Mexico D.F., 3-4 February 1994. In the absence of the Vice-Chairman of the Editorial Board who was unable to attend because of difficulties in obtaining a visa, the officers reviewed the progress on the compilation of the IBCCA chart, particularly the reconciliation of contours between sheets 1-06 (Mexico), 1-02 (USA) and 1-07 (Cuba) in order to avoid problems with matching contours with adjacent IBCCA sheets.

A proposal on the establishment of the IBCCA data base was made by Cuba. Copies of the proposal were sent to the members of the Editorial Board and Dr. Peter Hunter, GEBCO point of contact for matters of format, resolution and data handling.

The Fifth Meeting of the Editorial Board for IBCCA was held in San Jose, Costa Rica, 21-22 November 1994.

The Editorial Board expressed its gratitude to Lic. Nestor Dutch Gary for his enthusiastic work and recognized the excellent conduct and management of the Editorial Board of the IBCCA Project since its creation in 1986 until the fourth meeting. A suggestion was made to invite France, through the Secretary IOC, to take responsibility for sheets 1-10 and 1-16 of IBCCA.

Mexican cartographic capabilities are being enhanced into a digital production environment. The development of computer aided cartography is being effected in parallel with traditional methods. Next year will see a transition from manual to automatic methods.

Bathymetric compilations of sheets 1-07 and 1-08 will be completed in the first quarter of 1995.

Sheet 1-09 is printed and a draft color-print of sheet 1-04 was presented during the fifth meeting of the Editorial Board. Sheets 1-01, 1-02 and 1-03 will be ready for submission to the Chief Editor in late 1995.

Sheets 1-05 and 1-06 are complete and are being edited.

Digital compilation of sheet 1-15 and part of sheet 1-14 were prepared in digital form, under the responsibility of Venezuela, but automatic measures will continue next year.

(iii) International Bathymetric Chart of the Central Eastern Atlantic (IBCEA, 1990)

The First Meeting of the Editorial Board for IBCEA was held in Lagos, Nigeria in February 1990. Due to shortage of funds in 1992, the Second Session was postponed to a later date. The Institute of Hydrography of Portugal has begun the compilation of sheet n° 1; the French Hydrography and Oceanography Service has completed the compilation of sheets 8 and 9, and the final version of sheet 8 is being printed.

(iv) International Bathymetric Chart of the Western Indian Ocean (IBCWIO, 1989)

The Editorial Board for IBCWIO held its first meeting in Madagascar in 1989. At the end of 1991, the source materials on hand for evaluating the IBCWIO consisted of 202 plotting sheets, contour plans, working charts.

After some delays in the implementation of the project, including the postponement of material evaluation scheduled in 1992 due to the shortage of funds, the Third Session of the IOC Editorial Board for the International Bathymetric Chart of the Western Indian Ocean was held in Zanzibar, Tanzania, 3-7 October 1994. Data have been received from various sources, and strong national support has been forthcoming. The project was greatly advanced through the meeting.

(v) International Bathymetric Chart of Western Pacific (IBCWP, 1993)

Intersessional activities have basically consisted of the implementation of the result of the First Session of the EB-IBCWP, Tianjin, China, 12-15 October 1994.

The Workshop on Data Sources and Map Compilation is being planned for 1995.

In accordance with decisions taken at the First Session, letters with background material were sent in January 1994 to the Philippines, Indonesia and New Zealand, inviting them again to nominate a member to the Editorial Board of IBCWP. In response to this invitation, the Philippines nominated Lt. Efren P. Carandang from the National Mapping and Resources Information Authority (NAMRIA) as a member of the Editorial Board. This nomination has been approved in consultation with Mr. Desmond Scott, Chair CGOM, the Secretary IOC, and Dr. Hou Wenfeng, Chief Editor of IBCWP. An earlier nomination of Capt. Nakorn Tanuwong from the Hydrographic Department, Royal Thai Navy by Thailand was also approved through the same procedure. The number of members of the Editorial Board has now increased from 8 to 10.

In accordance with the decision of the first session of EB-IBCWP, a visit by Mr. Chris Johnston to New Zealand was arranged in November 1994, with a view to liaising with New Zealand in regard to the implementation of the activities in Sub-region 5.

On 24 September 1994, the National Committee for IOC of Vietnam sent a letter informing that following the First Session of EB-IBCWP, Vietnam will take the responsibility for compiling, printing and publication of six sheets within subregion 3 (3-1, 3-6, 3-10, 3-11, 3-12, 3-16).

The meeting of the Officers of EB-IBCWP was held in Bali, Indonesia, 20-21 November 1994. At the invitation of IOC, SOPAC and New Zealand, who were unable to attend the first session of EB-IBCWP in Beijing, October 1993, sent their representatives to the Meeting. Both representatives expressed the willingness of their organizations to participate in the IBCWP Project and to contribute data within their scope of responsibility. The new

Member of the Editorial Board from the Philippines also participated in the Officers Meeting and expressed his country's readiness to participate in, and contribute data to the Project.

At the Meeting, Russia submitted four plotting sheets and the accompaning data of Sub-region 1 to the Chief Editor.

The Meeting reviewed with satisfaction the progress made during the intersessional period, and decided that the next formal session of the Editorial Board should be held within six to eight months, preferably to be preceded by the Workshop on Data Sources and Map Compilation.

1.5 MARINE POLLUTION RESEARCH AND MONITORING (GIPME/MARPOLMON) AND RELATED PROGRAMMES

Actions and activities in fulfillment of the overall objectives and targets of the GIPME programme in 1994 were implemented in accordance with the Decisions of the Seventeenth Session of the IOC Assembly concerning GIPME as well as the provisions of previous Resolutions passed by the Assembly at its Sixteenth Session (Resolutions XVI-6 and XVI-14) and the IOC Executive Council at its Twenty-Fifth and Twenty-Seventh Sessions (EC-XXV.2, EC-XXV.7 and EC-XXVII.4).

The Eighth Session of the IOC-UNEP-IMO Committee for GIPME met in Costa Rica, 18-22 April 1994 to adopt a Third GIPME Action Plan, 1994-97, following expressions of satisfaction with the implementation of the Second GIPME Action Plan, 1991-93.

Contained in the Plan are follow-up activities to UNCED including technical backstopping for the framework Convention on Climate Change and the Convention on Biological Diversity, new activities to assist the IMO-led, GEF funded, regional projects on marine pollution prevention and marine environmental protection, and further activities in continued support for the implementation of the UNEP Regional Seas Programme. The GIPME Plan was approved by the Twenty-seventh Session of the IOC Executive Council, Paris, 5-13 July 1994.

At the global level, the activities of the three Groups of Experts provided the main thrust of GIPME actions, while specific regional activities were accomplished in concert with regional subsidiary bodies.

A successful Symposium was convened by the Joint IOC-UNEP Panel (San Jose, Costa Rica, 14-15 April 1994) which focussed on the CEPPOL Programme as a model of a harmonized activity between IOC and UNEP. Results of the CEPPOL programme were presented as well as a number of relevant papers from PAHO, NOAA, USEPA and WMO. The Symposium emphasized the need to structure future joint programmes along the lines of CEPPOL.

GIPME continued in 1994 to take the lead in the development of the strategic plan for the Health of the Ocean (HOTO) module of GOOS. A definitive document was produced following the second meeting of the *ad hoc* Panel on HOTO in Paris, 10-15 February 1994. As a result, a pilot project to demonstrate the practicability and applicability of the HOTO module of GOOS is being planned to take place in the WESTPAC region in early 1995.

1.5.1 IOC-UNEP Group of Experts on Methods, Standards and Intercalibration (GEMSI)

The Group continued its activities in the preparation, revision and review of reference manuals. The JGOFS method protocols manual was finally published in 1994 and a revision of IOC Manuals and Guides No.28 was undertaken. Interactions with the LOICZ Programme as a medium for improving knowledge of river discharges of contaminants and mass-balance construction were strengthened. The Group brought its supervision of the first phase of the International Mussel Watch programme to a successful end in 1994. A similar supervisory role is foreseen for the Asia Pacific Phase which was adopted at a planning meeting in Bali, 22-26 November 1994.

Plans were finalized for publication of the full results of legs 1 and 2 of the Open Ocean Baseline Studies in the Atlantic. Also initiated in 1994 were discussions concerning a Pacific Open Ocean Baseline Survey which could be implemented following the completion of the Atlantic baseline, in 1995 or 1996.

1.5.2 Group of Experts on the Effects of Pollution (GEEP)

Following a change in leadership in 1993, the Group in 1994 consolidated its reorientation aimed at the proper integration of science into management plans at all levels.

Together with a representative of GEMSI, GEEP met with the Co-ordinator of the UNDP Black Sea Programme Co-ordinating Unit in Izmir, Turkey, 20-22 June 1994 to define the details of GIPME input into the programme for the GEF-Supported Environmental Management and Protection Programme of the Black Sea. One representative each from GEEP and GEMSI subsequently attended the meetings of the "Routine" and "Special" working parties of the Programme. GEEP is scheduled to organize a series of Biological Effects Workshops in the region in 1995.

GEEP commissioned a Manual on Experimental Designs in Pollution Studies which was timed to be issued in December 1994 or the first half of 1995.

At the request of the Government of Ecuador, a joint GEEP-GEMSI Mission went to Ecuador to study the "Taura Syndrome" that has produced negative effects on shrimp fishery. A report containing preliminary suggestions as to how to tackle the problem and study it more intensively, has been submitted to the Government of Ecuador.

1.5.3 Group of Experts on Standards and Reference Materials (GESREM)

In 1994, GESREM continued the distribution of two Reference Materials, GESREM 1 (certified for trace metals) and GESREM 2 (certified for organic analytes) particularly to laboratories in developing countries. Action was taken to secure a tissue sample in much larger quantities for GESREM 2 production as such a tissue material for organics remains a high priority.

From the recommendations of their meeting in December 1993, in Miami, the Group followed in 1994, the continued development of genuine reference materials for nutrients-silicate, phosphate, nitrate/nitrite and ammonia. In co-operation and consultation with the HAB Programme, the Group has also identified the need for pigment reference materials, as well as materials for various biotoxins - a need which grows in importance, as more incidents of algal toxin poisoning are reported.

GESREM also continued its representation in meetings of the QUASIMEME Programme which is a Quality Assurance project of European Laboratories in those countries belonging to the European Union.

1.5.4 The Marine Pollution Monitoring System (MARPOLMON)

In the IOCARIBE Region, the Marine Debris Monitoring Programme continued in Barbados, Cayman Islands, Colombia, Cuba, Mexico, Puerto Rico and St Lucia in 1994. A successful beach clean-up campaign was held on the beaches of Cartagena in September 1994. (See Section 5.1 on IOCARIBE).

In the IOCEA region, on-site training exercises on physical oceanographic factors responsible for the transport, distribution and deposition of pollutants in the coastal and marine environment were carried out in Benin, Senegal, Gambia, Guinea (Conakry) and Sierra Leone with the objective of promoting submission of data. Countries that submitted results during 1994 included Ghana, Cote d'Ivoire, Benin and Nigeria. A joint IOC-FAO-UNEP Training Workshop on Quantitative Evaluation of Pollution in the Marine Environment was held in Accra, Ghana, 21-25 June 1994 for French-speaking countries in the region. Two Training Workshops, one on the Measurements of Nutrients in Tropical Marine Waters, Mombasa, Kenya, 5-15 April 1994, and another on Nutrient and Water

Quality Monitoring, Zanzibar, Tanzania, 21-26 November 1994, were organized in the IOCINCWIO region. The Mombasa Workshop took place within the framework of IOC-SAREC capacity Building Initiatives programme for the region while the second was an IOC-UNEP-FAO endeavour within the context of their joint programme on Assessment and Control of Pollution in the Coastal and Marine Environment of Eastern Africa (EAF/6). The emphasis on nutrients derives from the results of an earlier survey in the region of land-based sources of pollution which had pinpointed nutrient loading as the main cause of pollution in the region.

In the Mediterranean region, IOC continued to provide technical backstopping at the national level for the regional monitoring programme MEDPOL. Results from research assisted by IOC grants to Israel, Croatia, Slovenia, Greece and Italy were received during the year and plans are afoot to publish them.

IOC was represented, both at the meeting of experts to review draft programme of MED POL 20-23 June 1994, and the succeeding meeting of the Joint Advisory Committee Meeting on MED POL 24-25 September 1994, all in Izmir, Turkey, as well as the Meeting of Mediterranean Experts, 11-14 October 1994 in Madrid, Spain.

Still in the Mediterranean region, a joint IAEA-IOC-UNEP Workshop on the Determination of Contaminants in Sediments was organized in Mytilini, Lesvos, Greece, 20-24 September 1994.

IOC activities in the ROPME Sea Area were undertaken in the context of the joint IOC-ROPME Integrated Project Plan (IPP), while in the Red Sea region, support was provided to individual laboratories through the agency of the regional organization PERSGA (see section on collaboration with ROPME and PERSGA for full report).

A Training Course on Modelling and Monitoring of Coastal Marine Pollution was organized in India in December 1994. Also in the IOCINDIO region, a Workshop on Integrated Coastal Zone Management was organized in Karachi, Pakistan, in October 1994.

A meeting of GIPME Officers took place at IMO Headquarters, London, UK, 12-14 October 1994, to work out details of GIPME technical assistance, particularly in the area of capacity building, to the IMO-led GEF project in the East Asian Seas. To this end a series of GIPME activities will be implemented in the WESTPAC region starting from January 1995.

In the Black Sea region, IOC financial support continued to be given to the monitoring activities of the co-operative Marine Science Programme for the Black Sea (COMSBLACK) and technical support to monitoring activities under the GEF Project entitled "Environmental Management and Protection of the Black Sea".

1.5.5 International Mussel Watch Project

As a follow-up to the 1994 completion of the first Field Implementation Phase of the International Mussel Watch project in 1994 and the decision of the International Musselwatch Committee, Bermuda, 9-11 September 1993, the Asia Pacific Phase of the project was launched at a planning meeting in Bali in Indonesia, 22-26 November 1994. The Member States of the regions have been invited to participate and principal investigators have been identified at the national level and reference laboratories designated. This phase is expected to take off in 1995.

Within the context of IOC-SAREC Co-operation on Capacity Building in the Eastern African Region, a preliminary meeting was held in Mombasa, Kenya, September 1994, to discuss the possible initiation of the Indian Ocean phase, with emphasis on the IOCINCWO Sector, of the International Mussel Watch. Following a draft proposal from Secretary IOC to SAREC in December 1994, a feasibility study will be implemented in 1995 with the support of IOC-SAREC.

Meanwhile the final report of the First Field Phase was received in the IOC Secretariat in late 1994.

1.5.6 Joint Global Ocean Flux Study (JGOFS)

Preparations continued in 1994 towards the JGOFS Arabian Sea Process Study and the establishment of a JGOFS Time Series Station off the coast of Oman.

To this end, IOC provided funds for the lecturers to the Training Course which was organized in September 1994 in Karachi, Pakistan. Training was also provided to regional scientists during an intercalibration cruise which took place from 18 September to 7 October 1994 on-board the RV THOMAS THOMPSON which travelled from Singapore to Muscat, Oman.

The JGOFS Methods Protocol Manual was finalized and submitted to IOC for publication towards the end of 1994. This will be invaluable for future training commitments on JGOFS.

IOC also followed the progress towards the establishment of a JGOFS Time Series Station by Venezuela with assistance from USA.

1.6 OTHER COMPONENTS OF THE INTEGRATED MARINE SCIENCE PROGRAMME

Introduction

This Annual Report summarizes the 1994 activities of the three ongoing projects: COMAR - Coastal Marine Programme, and related PROMAR - Promotion, and TREDMAR - Training and Education, in the IOC/MRI Office. In 1994, these activities continued to be guided by a small team of specialists at Paris Headquarters together with colleagues in UNESCO Regional Offices in Apia, Cairo, Dakar, Doha, Jakarta, Montevideo, Nairobi and New Delhi and the worldwide networks of interested counterparts in universities, research institutes and governmental services.

The main objectives in 1994 were:

(i) reinforcing the interdisciplinary co-operation with other relevant UNESCO programmes, especially in the Sectors of Natural and Basic Sciences, of Education and of Social Sciences; and (ii) preparing for an integrated approach vis-à-vis the marine, terrestrial and freshwater environments at the land-sea interface, including small islands.

Emphasis continued to be placed on substantive regional and global projects in view of their proven multiplier effect, thus benefiting a maximum number of people, institutions and services around the world, viz. the COMAR regional networks, the 'Floating University' facility, the 'Global Faculty' network, and the 'World Biodiversity Database', a contribution to the 'DIVERSITAS' programme. Project extension through extra-budgetary co-operative arrangements continued to be explored with several new proposals, specified below. New project partnerships are being initiated for submission under the European Commission's Fourth Framework Programme, following the successful co-operation of the UNESCO Coastal Remote Sensing Project in the Commission's DELTA Programme on open and distance learning (cf. 1993 Report, Document MARINF/93).

Nearly 1,000 junior and senior scientists and students were directly involved in the numerous COMAR, PROMAR, TREDMAR activities and projects in 1994. Women made up 20 percent of this figure. Over two thirds of the participants (69%) were nationals of countries developing their marine science capabilities, while the remainder, from countries with advanced marine science infrastructures, in general served as resource people on extrabudgetary and associated funds. To this should be added a core group of over 500 remote-sensing module users worldwide, composed of persons in various mono- and interdisciplinary fields. These knowledge-sharing efforts were further reinforced by the marine science publications distributed around the globe, including those to individuals.

The programme activities, whether implemented from Headquarters or the Regional Offices, have been put on database since January 1990. The activities, summarized in this report, were executed and/or catalyzed with limited UNESCO Regular Programme funds to the amount of US$225,000. The multiplier effect of COMAR, PROMAR and TREDMAR projects, vis-à-vis

extrabudgetary and associated projects (i.e. generated by UNESCO programmes, but funds channeled directly to the projects) was over ten times more or around US$2,300,000.

COMAR

Main objectives

Improving the understanding of the characteristics, functioning and changes in the (eco)systems at the land-sea interface, including socio-economic aspects; and providing the necessary basis for management and related training in view of UNCED follow-up.

(i) Inter-regional co-operation

a) The UNESCO-initiated International Society for Mangrove Ecosystems (ISME) participated in the UN Global Conference on the Sustainable Development of Small Island Developing States (April-May, Barbados). With funds provided by ITTO (US$733.000), ISME, in co-operation with the Coastal Marine project for Africa (COMARAF), proceeded with the preparation of a Manual for Mangrove Conservation and an Atlas of Mangrove Distribution in Africa. With the assistance of COMARAF, ISME published two volumes on "Conservation and Sustainable Utilization of Mangrove Forests in Latin America and Africa Regions". A third volume entitled "Mangrove Ecosystem Studies in Latin America and Africa" is currently being published in the UNESCO Reports in Marine Science series.

b) The UNEP-UNESCO(COMAR) Task Team on Expected Impact of Climate Change on Mangroves completed evaluation visits to pre-selected sites for case studies in Thailand, the Cayman Island, the Saloum Estuary (Senegal) and Tonga; the site of the arid coast of Pakistan still needs to be visited. The final report of the Task Team on the "Scientific Basis for the Monitoring and Study of Expected Climate Change Impact on Mangrove Ecosystems", is being published by UNEP.

(ii) Regional networks

Africa

African coastal marine scientists continued to be supported and trained through UNESCO and other related UN programmes, particularly the network established as part of the COMARAF project (UNESCO-UNDP, 1989-1993). In 1994, an effort was made to attract new extra-budgetary funding, complementary to other sources of assistance, such as ITTO. To this end, a project proposal entitled "Coastal Zone with Dominant Mangrove Formation" was prepared and submitted to funding agencies. This pilot project will be the 'coastal region' component of a series of three projects representing a large-scale effort of the Organization in the domain of "Preservation of the Biodiversity and Sustainable development" in Africa, as a follow-up to UNCED. The two other projects will concern (i) tropical forests and (ii) semi-arid regions.

a) The COMARAF network continued to function, executing research activities and providing various services to the regional and international scientific community. Examples are as follows:

The Ichthyoplancton Pilot Project (started in 1990) held a field workshop, May 1994, Senegal. Ten scientists and trainees from West Africa and the Ukraine undertook joint research and advanced training (in taxonomy and computer data processing) in areas representative of polluted and non-polluted waters (Senegal River delta, offshore Cap Verde peninsula, as well as mangrove and estuarine areas of the Casamance). Significant differences in species in polluted and non-polluted waters were found and the pollution rate was determined accordingly.

Results of the 1990-1993 ichthyoplancton investigations off the West African coast were published as UNESCO Report in Marine Science No. 65. It describes the relationship between the biotopes, the living communities and their biodiversity, as well as the fishing potential and related species diversity in selected mangrove and estuarine areas of Senegal and Guinea.

Over 50 researchers and students from Guinea, Madagascar, Senegal and Tanzania focused their research and training programmes on questions concerning mangroves, seagrass beds, estuaries and the human impact on these ecosystems, which gave them an improved knowledge necessary for an integrated management of coastal zone resources.

b) The Proceedings and Recommendations of the UNESCO/ROSTA Regional Seminar on Human Impact on Coastal Ecosystems, their Responses and Problems, April 1993, Nairobi, Kenya, are being published in the UNESCO Reports in Marine Science series.

c) The lay-out of a Geological-Geophysical Atlas of the Guinean sector of Africa, a COMARAF activity started in 1992, was finalized by Ukrainian and Guinean scientists. The Atlas will be printed in 1995 in co-operation with the IOC.

Arab States

a) Nearly 120 researchers from Egypt, Oman, Qatar, Saudi Arabia, UAE, as well as from Pakistan and the UK gathered at the UNESCO and its IOC-sponsored Regional Symposium on Red Sea Marine Environment, organized by the Faculty of Marine Science, King Abdulaziz University, Jeddah, Saudi Arabia, April 1994. Forty-nine scientific papers and fifteen posters, covering all major disciplines, were presented and discussed. The concluding deliberations revealed that most of the research work was conducted in the coastal waters of Egypt and Saudi Arabia while studies on the Red Sea itself were lacking. This indicates the urgent need for a regional action plan and thus, among the recommendations of the Symposium, the revival and support of PERSGA was emphasized.

b) The "Gulf Symposium on Environmental Biology" was organized in May 1994 by the Faculty of Science, Qatar University in Doha, with UNESCO/ROSTAS support. It gathered nearly 40 specialists from Bahrain, Egypt, Qatar, Saudi Arabia, UAE, as well as from Africa, Europe and North America. Assessment of the effect of human activities on coastal ecosystems, the biodiversity and modeling of biological populations were among the major topics.

c) Several research and study grants were awarded with a view to promoting regional capacity building and inter-regional co-operation.

Asia and the Pacific

a) The National Commissions for UNESCO of Bangladesh and Pakistan were provided assistance in order to organize, respectively, a Workshop on Coastal Aquaculture and Environmental Management to be held at the Institute of Marine Sciences, Chittagong University, in March 1995, and a Workshop on Coastal Aquaculture at the Marine Reference Collection and Resource Center, University of Karachi, April, 1995.

b) The Indonesian NGO "Yayasan Laut Lestari Indonesia-YLLI" ("Eternal Indonesian Seas Organization") was supported with a grant towards the setting up of a coastal clean-up campaign in Ambon and Banda Naira. This activity was operated in the framework of a national "Keep our coastline and beaches clean" campaign.

c) The UNESCO-IOC Coral Reef Assessment and Evaluation Workshop was organized by ROSTSEA in Indonesia (Ambon and Banda Naira, November-December 1994), attended by scientists from 11 countries. A number of major items related to coral reefs were discussed,

including: economy versus ecology; sustainable use; existing community relationships; management components; relationship between geological history and evolution of coral reefs, their past, present and future, etc. Three working groups presented detailed reports on the above and other questions. The meeting concluded with recommendations on sustainable use of reef systems, in particular (i) resource uses by humans, (ii) ecological value, (iii) community "use right" and ownership of management plan and its implementation; and (iv) socio-political and legal aspects.

d) Two consultancies were provided to the Government of Vietnam, June 1994, to advise on identification of hard corals and prepare the basis for a future international training course.

Latin America and the Caribbean

a) The Steering Committee of the CARICOMP (Caribbean Coastal Marine Productivity) network gathered at the Florida Institute of Oceanography, January 1994, St. Petersburg, USA. Site Directors from 24 co-operating institutions in Barbados, Belize, Bermuda, Bonaire, Cayman, Colombia, Cuba, Jamaica, Mexico, Nicaragua, Panama, Puerto Rico, Saba, St. Domingo, St. Lucia, Trinidad and Tobago, the USA and Venezuela met to review the progress of the network's activities. The project document for the second phase was presented and discussed. CARICOMP is benefiting from the continuing support of the MacArthur Foundation, the National Science Foundation and the State Department who contributed US$473.000 (1991-94); and US$455.000 (1995-98). A second meeting of the Steering Committee took place in Caracas, Venezuela, December 1994.

Thanks to the network's monitoring programme and results, CARICOMP is now able to make substantial contributions to research on the status of the coastal ecosystems in the region, for example, concerning the relation between overfishing and degradation of the coral reefs.

b) The Coast and Beach Stability Project for the Lesser Antilles (COSALC-I), in cooperation with the University of Puerto Rico, continued its support to the establishment and supervision of coastal monitoring programmes for several small islands, namely, Anguilla, Antigua, Montserrat, St. Kitts and Nevis. Five technical reports analyzing beach changes during recent years were finalized. A field manual for Dominica on the establishment of a monitoring programme, was issued. A case study report, entitled "Sandy Coast Monitoring: the Dominica Example (1987-1992)" was published as UNESCO Report in Marine Science No. 63.

The above programme has succeeded in establishing the basic infrastructure for the monitoring of coastal changes in the Lesser Antilles. A proposal entitled 'Coastal and Beach Stability in the Smaller Islands of the Caribbean' was prepared and submitted to the Global Environmental Facility (GEF) for funding, in order to reinforce and expand these minimum infrastructures.

c) Field studies, mostly in Brazil and Chile, resulted in reports and scientific publications, as well as 'on-the-job' training for students were carried out, with the UNESCO support, through the Temperate Coastal Systems of Latin America project (COSALC VII).

Europe and North America

a) The "Floating University" facility was expanded through other programmes (COMAR in particular) and through the regions (see also section 8 for the training component). Thus, the 2nd COMARNOR "Baltic Floating University" expedition onboard the Russian research catamaran ORIENTS focussed on near-shore conditions in the Gulf of Finland, July-August 1994. It was co-ordinated with investigations undertaken in deeper waters from the Russian R/V PERSEY. Over forty researchers and students from Angola, Cameroon, Finland, Russia, the Ukraine and Zaire participated in this campaign, during which ecological and pollution-related studies and training in the coastal zone were emphasized. Students were also

introduced to the computer-based learning modules. New coastal lessons, based on the results of the expedition, are being developed.

Two scientific seminars were organized in association with this expedition: 25 specialists discussed the results of the first leg of the expedition, in St. Petersburg, Russia, August 1994; 72 scientists and students from Estonia, Finland, Russia and Ukraine participated in a mid-cruise seminar entitled "Studying the Ecological Conditions of the Eastern Gulf of Finland", Helsinki, Finland, August 1994. The seminar concluded with research and institutional recommendations, including a request asking the Helsinki Commission (HELCOM) to co-sponsor the Baltic Floating University programme. At the 5th Meeting of the Environment Committee (October, Stockholm), HELCOM agreed with the request and its Contracting Parties were encouraged to co-operate. The results of the expedition were reported at the XIXth Conference of Baltic Oceanographers Sopot, Poland, September 1994) and elsewhere.

b) Another COMARNOR activity, the Coastal Expedition in the White Sea, July 1994, called at the White Sea Biological Station (WSBS) of the Moscow State University. The expedition was co-sponsored under the bilateral Russia-Netherlands project "Biodiversity and Adaptation Strategies of Arctic Coastal Marine Benthos". Equipment and chemicals were provided to WSBS to the amount of US$20,000 by the Netherlands. A large-scale international programme on the same subject was approved for support by the European Community through INTAS. The studies planned under this programme are aimed at understanding the influence of both natural and anthropogenic factors on the Arctic benthos, under extreme environmental conditions.

In support of this expedition, a 3-day "training-through-research" workshop was convened, July 1994, with the purpose of introducing research subjects and demonstrating the functioning of the new equipment. This workshop marked a five-year period of activity since the one on "University Field Courses in Marine Sciences: East-West Co-operation Potential", organized by UNESCO and MSU at WSBS. Experience gained during these five years has demonstrated the viability of the "training-through-research" approach.

c) Governments, Foundations and Universities of the European and North American regions co-operated by providing resource personnel and financial contributions to allow the participation of scientists and students from other regions in various coastal study programmes. This involved a large amount of so-called 'associated funds'.

PROMAR

Main objectives

Promoting coastal marine sciences through: (i) co-operation with international, non-governmental scientific bodies and programmes; (ii) support to co-operative undertakings and meetings, in particular between scientists from countries with developing and advanced capabilities in marine sciences; (iii) support to the development and reinforcement of national infrastructures; and (iv) the publication of the IMS Newsletter, reports and technical papers series, monographs and special volumes; information dissemination; and exhibits.

"DIVERSITAS" - World Biodiversity Database

a) Support continued to be provided to the PROMAR-initiated Biodiversity Database of the Expert-Center for Taxonomic Identification (ETI), Amsterdam. The Center is rapidly becoming a world leader in the production and publication of taxonomic multimedia.

The overall UNESCO-ETI objective is to set up worldwide networks of specialists in order to increase communication and knowledge-sharing and to develop and produce educational

materials and computer-based taxonomic information. ETI compiles information on plant and animal species and feeds it into a unique World Biodiversity Database. At the same time, the species descriptions with illustrations, video and sound recordings, as well as identification keys and distribution maps are published on CD-ROM.

Located at the University of Amsterdam, as a non-profit foundation, the Center is funded by the Netherlands Government and the University, with UNESCO providing overall advice as well as catalytic funds for international networking. Individual scientists co-operating with ETI are granted support from national and international (including European Community) sources.

During the first half of 1994, the new Linnaeus II Software for Biodiversity Documentation was tested by the networks. Later, ETI partners were provided with a copy of the software for Macintosh computers and the entry of data started. By the end of 1994, the WINDOWS-PC version of Linnaeus II was finalized.

b) Contributing scientists (working, at present, through eighteen Group Editors) in return receive their own and related species material free-of-charge on floppy or compact disk. Dedicated biodiversity students will also be able to use the ETI data-entry software.

c) The UNESCO-published three-volume "Fishes of the Northeast Atlantic and Mediterranean" (FNAM) became available on CD-ROM following feedback and updated information obtained from a network of 62 ichthyologists. The WINDOWS version will be available in early 1995. Two other CD-ROMs on "North Australian Sea Cucumbers" and "Marine Planarians of the World" were produced as well.

d) Several CD-ROMs with taxonomic, biogeographic and other biodiversity-related information are being finalized on various groups, including Lobsters (with FAO), Sea Mammals, Pelagic Molluscs and Sponges. The "Five Kingdoms" of Lynn Margulis is being updated and will be of interest to students and teachers, as well as the general public.

e) With their vast taxonomic expertise, scientists from Russia and neighbouring countries, besides those from Africa, Asia and Latin America, are encouraged to contribute to the biodiversity database. To that end, ETI, with the financial assistance of UNESCO, made an agreement with the Russian Academy of Sciences for the creation of an ETI-Russian branch to deal with marine groups in particular. An organizational workshop is planned in early 1995. The first Russian-made dataset, on copepodes and amphipods, is also in preparation.

The "Floating University" Facility

Jointly executed by UNESCO and the European Science Foundation (ESF), the "Floating University" Facility expanded in 1994 to new regions. It represents a unique example of combined research and training programmes and functions through a network of university teaching personnel and academic research staff in an increasing number of countries. Support was provided by UNESCO, ESF and several participating countries, in particular Italy, Monaco, the Netherlands, Russia, Spain, Turkey and the United Kingdom. The International Hydrographic Bureau (IHB) assisted the project as well.

In June-July 1994, the Fourth 'Training-through-Research' cruise on-board the R/V GELENDZHIK made various important discoveries in the Mediterranean. The main objective of the cruise was to study the depositional systems of the Tyrrhenian Sea and Balearic Basin, and related processes. Questions raised during previous research campaigns on the Rhone neofan and mud volcanism of the Mediterranean Ridge were also addressed. Field studies of mud volcanism of the Tamanskiy Peninsula (separating the Black and Azov Seas) and the Danube Deep-Sea fan (August-September) served the purpose of comparing terrestrial and marine geological phenomena.

The second post-cruise meeting took place in Amsterdam, January, 1994, the Proceedings of which were published as Document MARINF/94. Several UNESCO-ESF consultations were convened, including a meeting of the Core Group to discuss the future of the programme from 1996 onwards, Villefranche-sur-Mer, France, November 1994. The meeting also initiated the preparation of a large-scale follow-up project to be submitted for funding to the European MAST-III programme.

The scientific results of the programme were presented at various international meetings. Results of the 1993 R/V GELENDZHIK expedition were published as UNESCO Report in Marine Science No.64, and a video-film was produced entitled "The GELENDZHIK Story-3".

Studies of a gigantic field of gas venting through the sea-floor off Paramushir Island, Sea of Okhotsk, is another example of the research activities undertaken under this programme.

Co-operative support

a) A study of the specific Black Sea phenomenon of hydrogen sulfide production, its distribution and dynamics in the near-shore and deep-sea waters was supported as a contribution to the COMSBLACK regional programme on the Black sea. The results are being published in the UNESCO Reports in Marine Science series.

b) Support was provided to nearly 50 scientists - especially students and junior researchers including women - from countries developing their marine science capabilities, to participate in international meetings and workshops devoted to various aspects, such as coastal erosion, conservation and management of aquatic ecosystems, ichthyology, marine science and technology, hazards assessment of marine contaminants, coral reef ecology. As an example, UNESCO/ROSTSEA assisted the local organizing committee of the Third International Scientific Symposium (Bali, Indonesia, November 1994) and provided funding for selected participants from China, Indonesia, Republic of Korea, Malaysia, Philippines, Papua New Guinea, Singapore, Thailand and Vietnam.

c) UNESCO professional staff participated in various meetings, including: Symposium on Science and Technology in Africa (Nairobi, Kenya, February 1994); Working Group of the Inter-Agency Committee on Environment and Development in Asia and the Pacific (Bangkok, Thailand, February 1994); UN Conference on Sustainable Development of Small Island Developing States (Barbados, April/May); XIX Assembly of the European Geophysical Society (April, 1994, Grenoble, France); Regional Symposium on the Red Sea Marine Environment (April 1994, Jeddah, Saudi Arabia); Gulf Symposium on Environmental Biology (Qatar, May 1994); Workshop on Training "Global Change" scientists (Canada, June 1994); Seminar on UNESCO Clubs in Action (Russia, July 1994); Western Pacific Meeting of the American Geophysical Union (Hong-Kong, July 1994); 5th Meeting of Experts on the East-Asian Seas Action Plan (Singapore, July 1994); UNDP Meeting on TSS-2 for THA/92/001 - Human Resource Development in Environmental Toxicology to Promote Sustainable Development (Bangkok, Thailand, August 1994); Suomenlinna Marine Science Seminar (Helsinki, Finland, August 1994); DELTA Concertation Meeting (Brussels, Belgium, September 1994); EURISY Workshop on Distance Learning and Environmental Awareness: the Role of Satellites (Frascati, Italy, September 1994); 3rd International Conference on Gas in Marine Sediments (Texel, The Netherlands, September 1994); EARSEL Workshop on Remote Sensing and GIS for Coastal Zone Management (Delft, The Netherlands, October 1994); "Down to Earth: Practical Applications of Ecological Economics" Conference (San Jose, Costa Rica, October 1994); DELTA Conference (Dusseldorf, Germany, November 1994); UNESCO-ESF meeting on the Future of the Floating University Programme (Villefranche-sur-Mer, France, November 1994).

Information dissemination

In 1994, three volumes in the UNESCO Reports in Marine Science Series (Nos.63-65) were published and distributed to institutional libraries and documentation centers worldwide. These

documents are given systematic worldwide distribution to nearly 1650 libraries and documentation centers. In addition, three documents in the MARINF Series, Nos.94-96 were issued. This series is mostly for special, targeted distribution.

The four issues (Nos.69-72) were published as follows: English (original), French and Spanish at Headquarters, Paris; Arabic by the UNESCO Regional Office in Doha, Qatar; and Chinese and Russian through co-publication under a UNESCO contract by established partners in China and Russia. For the first time, these issues were produced with colour illustrations and better quality paper, thanks to additional funding made available from various governmental and private sources to the total of US$30,000.

Assistance was provided in the production of the following IOC information materials: two issues (Nos. 8 and 9) of Harmful Algae News, and one issue (No.2) of WESTPAC News.

The Information Center (MIC) answered some 400 individual requests and distributed worldwide over 1400 copies of documents. Requests are received from students, university teachers and professors, as well as from those carrying out research in a specific field.

Exhibits were mounted at various international fora, including Oceanology International 94 (Brighton); the UN Conference on Sustainable Development of Small Island Developing States, Barbados; the UN Conference on Natural Disaster Reduction, Yokohama, Japan; and the Second International Conference on Oceanography, Lisbon.

Assistance was provided to the World Underwater Federation (CMAS) in the organization of the campaign to award the 1994 CMAS International Marine Environment Award, and to the World Federation of UNESCO Clubs and Associations (WFUCA) by participating in roundtables in Belgium and Russia, in particular, on environmental awareness efforts.

TREDMAR

Main objectives

Enhancing interdisciplinary learning and teaching worldwide to better equip scientists, teachers and planners, and through them the public at large, for the decision-making process concerned with questions related to the sustainable development of coastal areas.

"Global Faculty" Network

a) The computer-based, Remote Sensing Module project has reached the level of a genuine 'Global Faculty' Network. Since the beginning of the year, over 500 universities, government services, secondary schools and companies in 77 countries were provided with sets of the fourth module.

The Spanish original of the fifth module on coastal marine applications was finalized and published as MARINF/96. It contains lessons that were initiated at an interregional workshop at Lepe, Spain, at the end of 1992. The authors are scientists from Argentina, Chile, Mexico, Peru, Spain and Venezuela. The English version will be available early in 1995.

A significant initiative was UNESCO's involvement through the Module Project in a project funded by the European Commission's DELTA programme (Telematic Systems for Flexible and Distance Learning). The formal agreement was signed between the Commission and various partners, including Dornier Aerospace, Germany as coordinator; Lancaster University, UK; Tecnopolis, Italy; Knowledge Technologies, Belgium; and UNESCO.

The Russian State Hydrometeorological Institution, RSHI (St. Petersburg, Russia) organized and convened a contest for students from Africa, Latin America and Russia, studying the

TREDMAR remote sensing modules. The Institution also initiated their translation into Russian in order to facilitate the use in Russian-speaking countries. Corresponding training was incorporated in the "Baltic Floating University" activities and pertinent material will result from the 1993 and 1994 Gulf of Finland coastal expeditions.

The management team of the project has already received sufficient draft lessons for publication of the sixth module planned for the end of 1995. Moreover, expressions of interest to contribute material could produce several other high-quality modules. Additional (extra-budgetary) funds and staff are required, however, to satisfy this rapidly growing interest in the material and service underlying the network.

Finally, preparations for the project's 1995-1998 extension phase have already started with a planning meeting, which took place at UNESCO Headquarters and involved members of the Management Team and representatives of various Divisions of UNESCO, December 1994. This concerns in particular: (i) the complete rewriting of the BILKO image-processing software into Windows, and (ii) the creation of application lessons using this new software, with special emphasis on coastal and small island subjects.

b) Distribution of a new series of learning materials, entitled "SeisStart: Seismic Learning Tasks" commenced, after its testing in 1993. Interested partners were invited to comment on the material and co-operate in producing further lessons.

UNESCO Chairs and "Training-through-Research" facilities

a) A UNESCO Chair in Marine Geosciences was established at Moscow State University, with an executing and co-ordinating function within the 'Floating university' project. In co-operation with UNESCO, ESF and the University of Naples, the above Chair organized, *inter alia*, a training workshop on Mediterranean geology (Naples, Italy, June 1994) focussed on the relationship between terrestrial and marine geological processes. It was attended by over 40 participants from Europe, the Arab States Region and Latin America. In the fall of 1994, three courses in marine geology, geophysics and tectonics were given by international professors to MSU students. Around 180 scientists and students from Europe, Africa, the Arab States and Latin America participated in the "Training-through-Research" activities, supported by the above Chair, in the Baltic, Barents and Mediterranean regions, with over 70 students involved in training activities.

b) A UNESCO Chair in Coastal and Marine Sciences was established at the University of Concepcion, Chile, with the assistance of the Temperate Coastal Systems of Latin America project (COMAR-COSALC VII). Four courses were given by international professors to some 40 students. It is envisaged to invite universities of other countries of Latin America to join and form a UNITWIN network.

c) UNESCO Chairs in Marine and Coastal Sciences are being established at two universities in Morocco, viz. the Universities of Chouiab Doukkali (El Jadida) and Ibn Tofail (Kenitra).

Advanced training and environmental education in regions

a) TREDMAR (mostly through the UNESCO Regional Offices) co-operated with other programmes in providing study and travel grants to students and scientists in the various regions in order of building regional capacity and reinforcing inter-regional co-operation.

b) A field training workshop on the "Rational Use of Coastal Resources in the Arctic" was held in the coastal waters of the Barents Sea (June-July), in co-operation with the Russian State Hydrometeorological Institute RSHI, St. Petersburg, and the Polar Institute for Oceanography and Fishery (PINRO, Murmansk). Thirteen trainees from Latvia, Russia and the Ukraine participated. The stocks of living resources of the coastal zone were estimated, and hydrological and hydrochemical characteristics of the environment studied.

(c) The need for marine environmental teaching and related materials for primary school children is being addressed for Latin America by a UNESCO-sponsored project carried out by the Chilean Ministry of Education and the "Pontificia" Catholic University, Santiago de Chile. Visits to Ecuador and Peru were made by a project member in order to discuss the possible initiation of similar projects in both countries.

d) As a contribution to intersectorial co-operation, a manual in Spanish for secondary schools entitled "Introduction to the Marine Environment: Practical Applications for Temperate Zones of Latin America" was published as Document MARINF/95. The Manual gives practical lessons on coastal monitoring.

e) ROSTAS offered technical services, in addition to extra-budgetary financial support, to the University of Qatar in organizing a training course on "Environment and Environmental Information" Doha, Qatar, May 1994. Twenty specialists from Qatar were trained on environmental issues and on ways to disseminate environmental awareness through the mass media.

f) ROSTSEA organized a regional training workshop entitled "Environmental Education for Sustainable Human Development: UNESCO Marine Workshop for Teacher Trainers" Seribu Islands, Indonesia, November 1994. The workshop aimed at exposing the participants to coastal field studies, as well as related environmental issues such as the effect of human activities on coral reefs and other near-shore systems. The participants from China, Thailand, Cambodia, Malaysia, Korea, and Indonesia are expected to incorporate this knowledge into the existing curriculum and teaching materials.

2. OCEAN SERVICES

2.1 INTERNATIONAL OCEANOGRAPHIC DATA AND INFORMATION EXCHANGE (IODE)

In compliance with the decisions of the Seventeenth Session of the IOC Assembly, Paris, 25 February-11 March 1993, the main emphasis of the IOC Member States participating in the IODE programme have been focussed on the implementation of the IODE programme and Workplan for the 1993 to 1995 intersessional period as presented in Resolution XVII.8 on the Support to the IOC Programme on the International Oceanographic Data and Information Exchange.

The call to Member States to support the IODE programme has been heard and several contributions have been received. These include contributions from the United States of America for the implementation of GODAR and OceanPC; Canada for GTSPP; Russia, Argentina, Netherlands and Malta for IODE-TEMA-related activities; China for MIM, Greece for the preparation of IODE-XV. IOC co-operation in the field of ocean data management with some international organizations such as WMO, ICES, CEC and ICSU has been strengthened and broadened. It is to be hoped that this trend will continue in the coming years.

Unfortunately, there was only very limited progress in strengthening oceanographic data and information management capabilities, although progress is being made by some of the IOC Regional Subsidiary Bodies such as IOCINCWIO, IOCEA, IOCARIBE and IOCINDIO.

In 1994, IODE also continued its efforts in meeting the objectives of IOC programmes related to climate and global change, environmental protection and sustainable development.

The Sixth Session of the IODE Group of Experts on Technical Aspects of Data Exchange (TADE) was held in Geneva, Switzerland, 22-29 June 1994. This was the first time that the Session used its first two days by meeting jointly with the IGOSS Group of Experts on Operations and Technical Applications (OTA) to discuss issues of mutual interest and to better co-ordinate OTA and TADE activities. The Session reviewed the progress made by IODE in the development of technical mechanisms of data exchange, such as modern formats used in the exchange of oceanographic data,

oceanographic code tables, flexible character code forms and formulated recommendations for further actions.

The implementation of the GODAR project continued to be successful and was helped by a few important achievements. GODAR deals with the process of seeking out, retrieving, resorting, evaluating, correcting and interpreting historical datasets in an effort to save data at risk of being lost to the community. Regional workshops for the WESTPAC area and the Indian Ocean were held in 1994 in Tianjin, China, and Goa, India respectively. Almost 20 countries took part in these events. More than 2 million profiles of temperature, salinity and other parameters have been identified that are still in manuscript form and it is clear that the international community will benefit from a much more complete database than was ever thought possible. The results of the GODAR project were published by NOAA in January 1994. The data restored under GODAR laid the basis for the publication of the four volumes of the World Ocean Atlas and a new World Ocean Atlas CD-ROM series has been started by the US NODC, in co-operation with IOC, containing all the profile data used in preparing the Atlas, including objectively analyzed fields and statistics of the data. CD-ROM technology represents the least expensive and simplest way to exchange oceanographic data internationally particularly to nations without an electronic network system. Information on this development of the World Ocean Atlas, 1994, has also been shared with all the ICSPRO Agencies at a recent consultation (January 1995).

CD-ROMs were published in March 1994 by the British Oceanographic Data Centre of the GEBCO Digital Atlas and of the data collected during the Biogeochemical Ocean Flux Study in the North Atlantic. This CD-ROM represents the first seamless, high quality, digital bathymetric contour chart of the world's oceans, and is based on the Fifth Edition of the General Bathymetric Chart of the Oceans (GEBCO). The second contains 98% of the data collected during the deep ocean cruises of RRS Discovery and RRS CHARLES DARWIN from May 1989 to July 1991. The dataset covers a wide range of physical, chemical, biological and bio-geochemical data and represents an important contribution to JGOFS.

As a joint effort between MEDS of Canada, US NODC and the IODE Group of Experts on Marine Information Management, the first GTSPP CD-ROM was published. The CD-ROM contains four software tools to provide interaction with the information and data which are included. The software tools are the UNESCO CDS/ISIS package for bibliographic searches; a commercial document viewer to navigate and browse the documents and information; the PC ATLAST product for viewing and working with the temperature and salinity data; and some extraction scripts to enable users to download subsets of the data to the PC disk for processing by local applications software. The CD-ROMs were demonstrated at the Lisbon Conference (November 1994) and raised a high interest among participants and visitors. It is a pleasure to thank Dr. R. Wilson, the Chairman of the IODE Committee for arranging the demonstrations of the CD-ROMs in Lisbon. It is important to stress that in accordance with the ICSU-IOC International Oceanographic Data Exchange principles, the data will be distributed internationally without restriction.

TEMA continued to be one of the pillars of the IODE system. All IODE-TEMA activities were aimed at improving the international ocean data and information exchange system by providing support to developing countries. These regional training courses have been carried out in Russia, Japan and Argentina for the Black Sea countries, WESTPAC and South America respectively, on the basis of national oceanographic data centres with the participation of experts from 13 countries. These training courses helped experts from the region to improve their knowledge in the oceanographic data processing and management, to get acquainted with new methods for data handling and to establish close bonds of friendship and co-operation between data centres within the region. The third successive year the VCP has been successfully implemented in the framework of the IODE programme. In 1994, computer equipment donated by the Netherlands (KNMI) was delivered to Kuwait and a printer to Mozambique. This equipment will be used at the national oceanographic institutions for data management. Distribution of computer equipment continues to be an excellent means of providing assistance.

With the assistance of a consultant, a first draft of the training modules on marine data and information management has been completed and is now being reviewed in order to prepare a final version for the consideration of the Fifteenth Session of the Committee on IODE, planned for January 1996 in Athens, Greece.

In spite of all these achievements, there is still much work to be done in order to respond effectively to many critical environmental problems facing humankind. Out of more than 50 IOC Member States which expressed interest in joining the IODE community, only about 10-15 countries really contribute to different components of the system. There are still big gaps in the IODE data centre networks in Africa, Central America and among the Arab-speaking countries. The Member States should ensure that the funding and human resources are available to national ocean data management infrastructures. In order to cope effectively with the requirements and needs for non-standard types of oceanographic data, and with the technological boom in the fields of computer and communication techniques, the IODE Committee should critically review existing methods and procedures for ocean data collection and management and come to IODE-XV with concrete proposals and recommendations for improving and modernizing all components of the existing system.

2.2 MARINE INFORMATION MANAGEMENT (MIM)

During the intersessional period after the Fourth Session of the IODE Group of Experts on Marine Information Management (Wormley, 6-9 October 1993) a substantial number of actions of the Action Plan have been implemented.

In order to better focus on the marine information management-user community the Group decided to publish the 'MIM Publication Series'. In 1994 three publications were issued on topics related to the development of information networks and services; standard structure for directories of organization, individuals and their research interests. For 1995 another seven publications are forecast in this series, of which four have already been released. Reactions received from the Member States to the Series have been very positive and encouraging.

With regard to the development of standards the Group also developed a standard directory structure for an International Directory of Marine Science Libraries and Information Centres, and a standard structure for Serial Holding Lists.

Several studies, recommended by the Group are being carried out: the study of electronic communication systems, study of information analysis products, monitoring of development in document delivery over the Internet, and development of a worldwide list of marine information related newsletters.

At the IOC Secretariat the development of an IOC Catalogue of Publications and full-text infobase of IOC publications was initiated. The installation of a UNESCO Internet server enables users to access the catalogue and documents on-line. IOC documents are being scanned and converted into machine-readable format retroactively as from 1994. For users who do not have access to the Internet a CD-ROM version of the infobase needs to be developed.

The MEDI catalogue is being revitalized and converted into an on-line referral database which will also be available through the UNESCO Internet server.

In close co-operation with the ASFA Advisory Board and funded by the ASFA Trust fund, a user-friendly input interface was developed for preparing ASFA input. This interface will benefit not only the ASFA input centres but any information centre or library that wishes to create a library holdings database. The so-called ASFISIS interface also provides a user-friendly output interface which can be used as an on-line public access catalogue user interface.

In order to facilitate human resources capacity building a directory of training opportunities in marine information management has been developed.

The RECOSCIX-WIO project, operational in the IOCINCWIO region, has continued its activities thanks to the support provided by Belgium and SAREC. Furthermore, the scope of services has expanded to include both information and data.

In the IOCEA region the development of RECOSCIX-CEA was initiated with the identification of the Centre de Recherches Océanologiques, Abidjan, Côte d'Ivoire; as the Regional Dispatch Centre. Some funds were provided for the setting up of the centre and the development of a regional directory of institutions and scientists. However, due to shortage of funds the network is only developing slowly.

During the Twenty-seventh Session of the Executive Council, July 1994, the Director-General of UNESCO announced the establishment of a professional post for Marine Information Management. The post has meanwhile been created and is being recruited.

Despite the strong efforts made by the Members of the Group to implement the Action Plan, insufficient funds are available for Marine Information Management. Despite the strong verbal support given to IODE and its Marine Information Management programme during IOC-XVII and EC-XXVII, very limited funds were available during 1994-95.

2.3 INTERNATIONAL TSUNAMI WARNING SYSTEM IN THE PACIFIC (ITSU)

IOC is engaged, since its establishment, in the assessment and mitigation of risks arising from natural hazards, such as tsunamis, storm surges, sea-level changes, harmful algal blooms and others. The purpose of IOC in these fields is to set up reliable early warning systems, to protect peoples lives and property, to enhance preparedness and public awareness through education and training, communication and information and to foster post-disaster investigation, recovery and rehabilitation. These activities are also clearly contributions to the IDNDR.

A World Conference on Natural Disaster Reduction (WCNDR), convened by the United Nations and hosted by the Government of Japan, was held in Yokohama, 23-27 May 1994. The World Conference constituted a milestone in the IDNDR and gave IOC an opportunity to bring to the attention of a world audience its achievements in the field of natural hazards mitigation and to assert its role in the study of the mechanisms of natural hazards (tsunamis, storm surges, sea-level change, harmful algal blooms) and of the scientific and technical mitigation of risks arising therefrom.

IOC was co-operating closely with UNESCO in the preparation for the Conference and in different Conference activities, particularly in the preparation and demonstration of promotion materials -exhibitions, video tapes, publications, in participating in the Conference Technical Committee on Warning Systems and in poster sessions.

The results of the Conference were reported to the Twenty-seventh session of the IOC Executive Council. The Executive Council expressed its support to the outcome of the Yokohama Conference presented in the Yokohama Strategy and Yokohama Message, reaffirmed its commitments to the implementation of the Decade and commented on the importance of the development of the IOC programmes to meet the IDNDR objectives.

The Executive Council has also adopted Resolution EC-XXVII.7, calling for increased support to tsunami programme activities.

In response to this Resolution and as a contribution to IDNDR the following activities have been implemented:

(i) The Tsunami Public Education and Awareness Programme has progressed well with the publication of eight volumes of textbooks and instructions for teachers in earthquake and tsunamis in Spanish. Italy, Russia and Japan have expressed their interest in publishing a modified version of this educational material in their respective languages. The Visiting

Experts Programme was resumed in October after two years' break. Training was provided for two experts from the region.

(ii) Implementation of the TIME project has come into a new phase after the contribution made by the US. A contract has been signed with the Tohoku University of Japan for the development of an accurate tsunami inundation model and for training experts from the region in tsunami modelling.

(iv) The development of the Expert Tsunami Database for the Pacific has commenced in Russia with the support from IOC.

(v) Activities from the International Tsunami Information Centre have been revitalized with the resumption of the training programme, publication of the ITIC Newsletter (two issues in 1994) and implementation of a wide scope of responsibilities assigned to the Centre by ICG/ITSU. It is especially worth noting that after numerous calls to IOC Member States to consider financial support for the post of an Associate ITIC Director, the problem was resolved and an expert from Mexico will join ITIC from March 1995 for the period of one year with partial support from IOC.

(vi) Preparations for the Fifteenth Session of the International Co-ordination Group for the Tsunami Warning System in the Pacific are coming to a final stage. The meeting will be held in Papeete, French Polynesia, in mid-1995.

In spite of all these achievements it would not be right to say that the implementation of the programme is going smoothly without any problems. No progress so far has been made in the search for financial support for the project proposal "Tsunami Warning System in the Southwest Pacific" which has been with the UNDP since 1989. Though the team of experts prepared to survey affected areas within a few days of any major tsunami was set up, lack of funds prevented IOC from sending a survey mission to the affected area in Russia after 4 October 1994 South Kuril Earthquake and Tsunami.

During the last two years, tsunamis in Indonesia, Japan, Nicaragua and Russia have brought the total death toll to more than 2,000 people. New tsunamis are forecast for the coming years. It is only through the consolidated efforts of all Member States in the Pacific, supported by international funding agencies that these funding problems may be overcome. For many years the tsunami hazard was a forgotten issue among other natural hazards impacting more frequently. Now we are reminded of the tsunami danger. No one will accept the excuse of the lack of funding if the Tsunami Warning System we are responsible for is not efficient in saving lives and property when a disastrous new Pacific-wide tsunami occur and gigantic waves sweep and roar over the land. It is time to contribute now. Each cent allocated now will be remembered when the disaster occurs.

2.4 REMOTE SENSING AND RELATIONSHIP WITH CEOS

During 1994, IOC continued to participate actively in the activities of the Committee on Earth Observing Satellites (CEOS). IOC contributed to the updating of the sensor requirements in co-operation with the other affiliates and these were published in volume 3 of the CEOS Dossier. IOC actively contributed to the on-going activities of the Working Group Data and the Data Purge procedures, and also participates in the Working Group Calibration/Validation and Working Group Networks.

A significant effort in CEOS was the definition of its activities with relation to developing countries. IOC represented the ocean community at the CEOS Workshop on Developing Country Activities, San José dos Campos, Brazil, 9-13 May 1994, and was successful in increasing the level of awareness of the satellite community on the needs of developing countries for satellite data. The workshop noted that "*CEOS members are committed to assist Developing Countries*', that "*a number of CEOS members, observers and affiliates currently have activities underway that support Developing Countries*', and that the "*successful plan of action must identify the needs of the Developing Country*

to create user demand rather than technology push". The goal is to *"contribute to achieve sustainable economic development and environmental management through expanded research, application, and operational use of earth observation data in Developing Countries"*. As a result, IOC has approached some of the space agencies as well as the EU for assistance in the development of remote sensing capabilities in developing countries.

IOC, in co-operation with WMO, initiated the CMM-IGOSS-IODE Sub-Group on Oceanic Satellites and Remote Sensing at its first session (ESA, Paris, 19-23 September 1994). This group adopted its terms of reference and established its workplan which included the production of an annual report on the status of ocean remote sensing and the development of an inventory of instructors for training in remote sensing. The group will play a key role in reviewing ocean remote sensing requirements for satellite as well as other electromagnetic systems and in support of various training activities.

Significant progress has been made in establishing remote sensing as a core programme of the IOC. It is an important element of GOOS as well as other IOC programmes, and shows potential for increased internal as well as external growth. Internal funding limitations however prevent IOC from taking full advantage of external opportunities. IOC member states with space faring capability are encouraged to contact their CEOS representatives and explore the possibility of co-operative support for the IOC in the development of remote sensing capabilities nationally, regionally and globally.

3. GLOBAL OCEAN OBSERVING SYSTEM (GOOS)

3.1 GOOS DESIGN AND PLANNING: IOC-WMO-UNEP COMMITTEE FOR GOOS AND RELATED ISSUES

The First Planning Session of the IOC-WMO-UNEP Committee on GOOS was held in Melbourne, Australia, 18-21 April 1994, and was attended by the representatives of 15 Member States in addition to international organizations/bodies.

The Planning Session reviewed the activities since the First Session of I-GOOS, Paris, February 1993.

The Planning Session noted with interest regional activities related to GOOS - for EUROPE - EUROGOOS and European SEAWATCH, and for the North Pacific, and agreed that such co-ordinated regional efforts were potentially a very effective way of proceeding with GOOS implementation. The Planning Session agreed that existing regional bodies would have an important role in assisting and contributing to GOOS implementation.

Particular consideration was given to the international structure of GOOS, and I-GOOS - J-GOOS interaction: J-GOOS is responsible for scientific design; I-GOOS is responsible for implementation.

The Planning Session recommended the establishment of:

(i) **A Strategy Sub-Committee** to advise I-GOOS and its chairman on requirements, policy, marketing and resources-related issues.

(ii) **I-GOOS Panel on Technical Implementation** - to advise I-GOOS on the implementation of an integrated ocean observation network capable of meeting GOOS scientific and operational requirements.

(iii) **I-GOOS Panel on Products and Distribution** - to advise I-GOOS on products to meet user needs.

The planning Session made proposals on the development of a data management policy for GOOS; revision and more precise definition of the coastal module of GOOS; review and up-dating "The Approach to GOOS" and preparation of a strategic plan.

Recommendation on the establishment of an I-GOOS Panel on Capacity Building was prepared which will be presented for adoption at the Second Session of I-GOOS, Paris, June 1995.

The Planning Session proposed the following Priority Actions for 1994-1995:

(i) Formulation of a GOOS Strategy

(ii) Development of GOOS Coastal Zone Strategy

(iii) Scientific design of GOOS and its modules

(iv) Support of the development of the operational implementation of the post-TOGA Observing System

(v) Support of GOOS-related aspects of existing operational ocean observing and data management systems

(vi) Establishment of the other I-GOOS Panels.

The Twenty-seventh Session of the IOC Executive Council, July 1994, reviewed the Executive Summary of the First Planning Session of I-GOOS and by its Resolution EC-XXVII.6 approved the recommendations of the Planning Session.

The Executive Council agreed that within the IOC, GOOS should be given top priority and serve as one of IOC's major responses to UNCED, and that it be one of IOC's "flagships". Management issues identified centered on the following relationship and their balance: (i) priorities and implementation strategy; (ii) I-GOOS and J-GOOS; (iii) operation and research; (iv) existing and new system; (v) physical-climate community and the biological-health-coastal zone communities; and (vi) GCOS and GOOS. The need to concretely define GOOS objectives was stressed.

Particular consideration was given to the required resources for the implementation of GOOS (as reflected in the Annex VI to the Summary Report of the Twenty-seventh Session of the IOC-EC). The Council urged Member States to contribute to the earmarked GOOS/TEMA part of the IOC Trust Fund, and to consider seconding specialists to the GOOS Support Office. The Council noted the critical importance of establishing a permanent UNESCO post for the Director of the GOOS Support Office.

Issues discussed by the Council will be brought to the attention of the First Session of the GOOS Strategy Sub-Committee in March 1995.

GOOS Resources in 1994

(i) Major support for GOOS activities was provided through the regular IOC budget as well as contributions by Member States and other organizations to the IOC Trust Fund.

(ii) There were no contributions to the earmarked GOOS/TEMA part of the IOC Trust Fund in 1994.

(iii) WMO and ICSU provided support for the activities of I-GOOS and J-GOOS.

(iv) UNEP provided some support for the sea-level pilot monitoring activity in the Indian Ocean.

(v) The IOC Secretariat, in co-operation with the Oceans and Coastal Areas Programme Activity Centre (OCA/PAC) of UNEP, prepared a proposal on the project to be funded by GEF on "Assisting Developing Countries to participate fully in the next 3-year period". The GEF Council will consider this proposal together with other project proposals in 1995 within the International Waters focal area.

GOOS Support Office

Dr. W. Scherer, Director of the Office, seconded by USA, completed his term of secondment at the end of 1994.

Mr. T. Murakami has been seconded by Japan to the GOOS Support Office since June 1994.

France and Brazil have offered to second their specialists to the Office. Dr. J-P. Rebert has been seconded by France and serves as the Director a.i., of the Office, following agreement of all the GOOS co-sponsors.

The rest of the GOOS support staff does not only serve GOOS directly, but also serves existing operational programmes/activities (GLOSS, IGOSS, DBCP, OOSDP, etc.).

Two issues of GOOS NEWS were produced and widely circulated in 1994.

During the Oceanology International '94 Exhibition and Conference (Brighton, UK, 8-11 March 1994), special GOOS sessions were held with a number of technical papers presented on GOOS. A GOOS exhibit was organized with the support of Seawatch Europe and Oceanor. Close contacts were maintained with CGOS and new linkages were established with GTOS activities.

Scientific design of GOOS and its modules

The First Session of the IOC-WMO-ICSU Joint Scientific and Technical Committee for the Global Ocean Observing System (J-GOOS) was held at IFREMER in Nantes, France, from 25 to 27 May 1994.

Climate-related issues (GOOS Climate Module) and their priorities as presented in the recommendations of the OOSDP Report were noted. This common GOOS/GCOS module will be closely co-ordinated with JSTC-GCOS.

Since the Living Marine Resources *ad hoc* Panel had only one meeting, its terms of reference and membership were discussed and the design requirements of this module will be reviewed.

The Coastal Zone Module was discussed quite extensively, noting the need for common methodology, the wide range of the client/user base, and the need to make use of remotely-sensed data. The overlap with HOTO and LMR was also noted.

The brief discussion of the marine services module concluded that no pressing scientific issues had yet been identified and therefore referred the establishment of this module to I-GOOS, since implementation is the critical issue.

GOOS Pilot Activities

(i) UNEP-IOC-WMO-IUCN Pilot Activity on Coral Reefs Ecosystems Monitoring

30 countries have expressed their interest in participating in the Pilot Activity and nominated their participating institutions and specialists (40 institutions) as national contacts for the Pilot Activity.

The first Training Course on Coral Reef Monitoring and Assessment, jointly sponsored by SPREP, IOC and UNEP was held in Rarotonga, Cook Islands, 22 February-13 March 1994, with the trainees from Cook Islands, Fiji, Papua New Guinea and Solomon Islands and instructors from the Australian Institute of Marine Science and the National University of Singapore. The report of the training course was published in the IOC Training Course Reports Series No. 27.

The report of the UNEP-IOC-ASPEI-IUCN Global Task Team on Coral Reefs entitled "Global Climate Change and Coral Reefs: Implications for People and Reefs" was published in 1994 by IUCN on behalf of the sponsoring agencies.

Recommendations of the Second Meeting of the UNEP-IOC-ASPEI-IUCN Coral Reef Global Task Team (1993) regarding the implementation of Coral Reef Monitoring, were considered at the IOC-IUCN-LOICZ Expert Meeting on Coral Reef Monitoring, Research and Management, held in Bermuda, 23-27 October 1994.

The expert meeting in Bermuda recommended that the following objectives must be met for the monitoring network to become fully operational:

a) the implementation of a Global Coral Reef Monitoring Network within GOOS to assess global change;

b) the organization of a support or co-ordination Office for the Global Coral Reef Monitoring Network where data collected in a standardized manner world-wide are compiled, analyzed and distributed;

c) involve and assist developing countries' participation in the planning and implementation of activities carried out as part of the monitoring system.

The Australian Institute of Marine Science expressed its willingness to provide assistance in database management, data analysis, technology transfer and provision of training courses and seminars.

The US Department of State has offered to provide financial support for Coral Reef International Co-ordination through the US Coral Reef Initiative. The Secretary of IOC had consultations with other sponsoring agencies (UNEP, WMO, IUCN) and the U.S. Department of State on the establishment of international Coral Reef Co-ordination.

To implement the Global Coral Reef Monitoring Network, substantial financial support will be required from the sponsoring agencies and interested Member States. This matter will be brought to the attention of the Second Session of I-GOOS in June 1995, and the Eighteenth Session of the IOC Assembly.

(ii) IOC-UNEP-WMO Pilot Activity on Sea-Level Changes and Associated Coastal Impacts in the Indian Ocean

The following countries have agreed to participate in the Pilot Activity and designated their institutions/laboratories to act as Cells for Monitoring and Analysis of Sea-Level (CMAS): Bangladesh, India, Kenya, Madagascar, Malaysia, Maldives, Mauritius and Mozambique.

The first review of the activities of designated CMAS was made in January 1994 at the IOC-UNEP-WMO-SAREC Planning Workshop on an Integrated Approach to Coastal Erosion, Sea-Level Changes and their Impacts (Zanzibar, United Republic of Tanzania, 17-21 January 1994).

The report of the Workshop and two supplements (containing the submitted papers) were published in 1994 as IOC Workshop Report No.96.

The Workshop encouraged other countries of the region to participate in the Pilot Activity and recommended that Dr. S. Shetye (NIO, India) be the Co-ordinator of the Pilot Activity.

It was stated that most of the CMAS do not have the capacity to analyze sea-level data and prepare products for various categories of users. The Workshop therefore recommended that during the first period 1994/1995, priority should be given to short-term training on analysis of sea-level data and maintenance of tide-gauges. IOC, due to severe budget limitations, could not provide support for such training in 1994.

The Workshop recommended specific actions for all designated CMAS regarding the sea-level data analysis and studies. Following a recommendation of the Workshop, information on the Sea-Level Pilot Activity was prepared by Dr. Kamazima Lwiza (State University of New York) and included in the "WINDOW" (Western Indian Ocean Waters) Newsletter.

(iii) North-East Asian Regional GOOS (NEAR GOOS) - An operational demonstration of certain aspects of GOOS activities

In accordance with Draft Resolution 57 passed by the 27th UNESCO General Conference, IOC organized an expert consultation in Beijing, China, 16-18 August 1994, in order to develop a draft proposal concerning GOOS-related activities in the North-East Asian region. It was attended by experts from China, Japan, Russian Federation, Republic of Korea, Thailand and SEAWATCH. The purpose of the proposal was to establish linkages between global and regional/sub-regional GOOS activities and to show the operational capabilities of the WESTPAC region in the establishment of an operational demonstration project.

The experts felt that the existing observing system was sufficient to start a NEAR GOOS and expand the present capabilities as the system develops by improving spatial and temporal resolution, by increasing data exchange and products distribution capabilities, and by developing near-real time communication capabilities through technology transfer.

The aims of the North-East Asian regional GOOS (NEAR GOOS) is to satisfy a number of pecific applications for ocean services, disaster prevention, fisheries, pollution monitoring, mariculture, recreation, modelling and assimilation workshop. The project proposal was presented to the Third International Scientific Symposium on Sustainability of the Marine Environment (WESTPAC) (Bali, Indonesia, 22-26 November 1994), and particularly to the Pre-WESTPAC Symposium Workshop on NEAR GOOS.

The pre-symposium workshop was attended by representatives from Indonesia, Korea, Japan, Thailand, China, and the Secretariats of IOC as well as WESTPAC. The draft plan, developed out of the Beijing expert meeting, was reviewed and modified to include a section on an action plan. Keen interest was expressed by Indonesia in developing a similar regional approach for the South-East Asian Regional GOOS (SEAR GOOS) plan. It was considered that the next logical step in the implementation of NEAR GOOS, after the review of the revised plan, is the official ratification and commitment by the regional Member States of the plan, including the identification of the appropriate national contact and responsible agency.

The participation in the WESTPAC Symposium included the presentation of a paper entitled "The Importance of the Regions in the Concept of GOOS" and the participation on a discussion panel which discussed integrated coastal zone management. The paper included a formal presentation of the above workshop results regarding NEAR GOOS.

3.2 EXISTING ELEMENTS OF GOOS

Global Sea-level Observing System (GLOSS)

According to the latest status report (October 1994) submitted by PSMSL, the number of GLOSS stations considered "operational" increased from 210 in 1993 to 218 in 1994 (with the latest data entered into the data bank, 1980-1989 (35), and 1990 or later (183).

The GLOSS network continued to serve as a major source of sea-level data collected by specialized sea-level centers established within TOGA and WOCE programmes and IGOSS.

PSMSL, acting as the GLOSS Global Center, prepared a revised GLOSS Handbook (version 2) describing the current status of each tide-gauge in the GLOSS network. The PSMSL is producing a CD-ROM containing the PC-based GLOSS Handbook software, maps of GLOSS tide-gauge sites and the complete PSMSL data set.

At the request of the Secretary IOC, PSMSL prepared the report "Sea-Level Monitoring in Small Island Developing States". It was submitted to the First Global Conference on the Sustainable Development of Small Island Developing States, Barbados, April 1994 (Document IOC/INF-954). In addition, GLOSS activities were included in the UNESCO Publication "An Overview of UNESCO's work on island environments, territories and societies", presented to the Conference.

The second volume of the IOC Manual on Sea-Level Measurements and Interpretation - Emerging Technologies, was published in the IOC series Manuals and Guides No. 14, and widely circulated. The first volume of the Manual - Basic procedures - was out of stock and had been reprinted.

The first issue of "Afro-America GLOSS News" was prepared by the Instituto Oceanográfico da Universidade de Sao Paulo of Brazil and widely circulated.

GLOSS regional co-ordinators, established within IOCARIBE (Dr. G. Maul), IOCEA (Dr. L. Awosika), IOCINCWIO (Mr. M. Odido), played an important role in promoting GLOSS in their respective regions. The Chairman of the IOC Group of Experts on GLOSS, Dr. D. Pugh, Director of PSMSL; Dr. P. Woodworth; Prof. K. Wyrtki; and Dr. G. Mitchum (Co-director of TOGA, WOCE and IGOSS Sea-Level Centers), continued their valuable contribution to GLOSS development.

Consultations were continued with GLOSS experts on the role and activities of GLOSS in the preparation of global and regional sea-level products, needed for global assessment of climate change as well as for regional and national practical applications. Close contacts were maintained with the IAPSO Sea-Level Commission, particularly regarding geocentric fixing of some GLOSS tide-gauge bench marks. Those matters as well as GLOSS strategy for the next decade, will be discussed at the Fourth Session of the IOC Group of Experts on GLOSS, in January/February 1995.

The Chairman of the Group of Experts for GLOSS carried out a briefing session on GLOSS at the Tenth Session of the INC-FCCC, Geneva, August 1994.

Integrated Global Ocean Services System (IGOSS)

The IGOSS Bureau, formally established by IGOSS-VI, Geneva, November 1991, held its First Session in Sydney, Australia, 17-21 January 1994, to review the state of implementation of the IGOSS work programme by the middle of the intersessional period. The Bureau dealt with several technical matters (data gathering and management, the Ship-of-Opportunity Programme, the new XBT fall rate equation and changes to BATHY code form, sea level projects, code questions, the IGOSS-IODE Global Temperature Salinity Pilot Project, the Ocean-PC project and ocean remote sensing), as well as scientific ones, such as the work of the IGOSS Scientific Advisory Group and the IGOSS Products Bulletin. It then defined ways and means to prepare a draft IGOSS Plan and Implementation Programme 1996-2003 for submission to IGOSS-VII (Paris, November 1995) and reviewed the Joint

Committee's activities in the field of Training, Education and Mutual Assistance (including cost/benefit studies). It finally discussed its relationships with other bodies/programmes (with the main emphasis on GOOS and GCOS) and drafted the agenda and planning schedule for IGOSS-VII.

The IGOSS Operations Co-ordinator attended the TOGA-WOCE/XBT-XCTD Performance Planning Committee and WOCE/DAC Meetings in Miami during April 1994. GTS code changes and other technical modifications were in progress and the new codes for the BATHY messages would be ready for implementation in November 1995. The paper prepared by the members of the IGOSS Task Team for Quality Control of Automated Systems, which describes the new fall-rate equations, was about to be published by Deep Sea Research. Concern was expressed about continuation of the upper ocean thermal programmes (i.e. XBT, salinity and current observations) after the end of the scientific programmes. It was noted that WOCE, CLIVAR, GOOS and GCOS should reconsider the structure of their committees and avoid duplication of effort. Emphasis should be placed on a comprehensive sampling strategy to maximize the allocation and quality of the data.

The IGOSS Operations Co-ordinator was still developing the database for Ships-of-Opportunity along with information on equipment supported by the ships and the national programmes responsible. This information is necessary to inform operators of problems concerning the quality of data transmitted from their platforms. The Operations Co-ordinator is working closely with the GTSPP in monthly monitoring of the quality of XBT data and notifying problems.

The six monthly reports of worldwide XBT sampling requested at the IGOSS SOOP Meeting in 1993 were being generated. There was some delay in obtaining the information from the operators but the last two reports had been completed and were being used by the WOCE/IPO and national programmmes to assess the allocation and management of XBT resources to global programmes.

The Third Session of the IGOSS Group of Experts on Operations and Technical Applications (GE/OTA) was held in Geneva, 20-24 June 1994, partly in conjunction with the Sixth Session of the IODE Group of Experts on Technical Aspects of Data exchange (GE/TADE), 22-28 June 1994. The Group reviewed several observation techniques, mainly in the form of the outcomes of several "demonstration projects" it had set up at its Second Session, Paris, November 1990. It further decided to prepare a project proposal to take in charge the end-to-end management of the ship-of-opportunity lines after TOGA and WOCE have come to an end. Questions regarding data management were discussed together with GE/TADE. They dealt with character-based and binary code forms, data quality control, the Global Temperature Salinity Pilot Project, a review of relevant ocean data management systems, data monitoring and the OceanPC project. The Group then discussed existing and possible future communication systems and procedures, as well as IGOSS products and their distribution, and concluded its work by reviewing the status of various IGOSS publications.

A new IGOSS Operations Co-ordinator took over the position on 1 July 1994. He attended the afore-mentioned session of the GE/OTA as an opportunity become acquainted with the terminology and procedures necessary to execute the duties of the position, as well as to meet individuals active in IGOSS.

The IGOSS Operations Coordinator attended the OCEANS'94 Conference in Brest, France, 11-16 September 1994. The conference included several technical papers dealing with data management, modelling and status of XBT/CTD instrumentation. At the Conference Exhibition, the Operations Co-ordinator met with representatives of a principal manufacturer of underway expendable probes used by the IGOSS Ship of Opportunity Programme. Information was exchanged about their calibration techniques, tank test procedures and "salinity steps" test sites used to derive probe fall rate equations. Other topics included costs of probes, probe deployment problems and errors, and demonstrations of their XBT and XCTD equipment.

The IGOSS Operations Co-ordinator visited the WOCE International Project Office in Wormley, England, on 19 September 1994. The role of the IGOSS Operations Co-ordinator, in general and with respect to TOGA/WOCE in particular, was discussed in detail. The need for the Operations Coordinator to make the transition from OMNET to Internet for increased file transfer and communication capability and to reduce long term communications costs were emphasized.

IOC was represented at the Eighth Session of the Advisory Working Group of the Commission for Marine Meteorology (CMM) of WMO, Mauritius, 12-16 December 1994. The Advisory Working Group plays the role of a "Bureau" for CMM and meets normally once between two CMM sessions. After having carefully reviewed the status of implementation of the tasks identified by CMM-XI, Lisbon, April 1993, the Working Group adopted a final draft version of the Marine Meteorology and Associated Oceanographic Activities Programme section to be included in the fourth WMO Long-Term Plan (1996-2005) to be submitted to the forthcoming Twelfth World Meteorological Congress, Geneva, June 1995. It then reviewed the terms of reference and internal structure of CMM, as well as its relationships to related systems such as IGOSS, GOOS and GCOS. It concluded its work in defining a work programme until CMM-XII, including preparation for CMM-XII.

Data Buoy Co-operation Panel (DBCP)

The European Group on Ocean Stations (EGOS) Technical Sub-group and Management Committee met twice, first in Copenhagen, Denmark, 14-15 June 1994, and second in Geneva, 6-7 December 1994. The Technical Sub-group was mainly concerned with the development of joint buoy programmes in the North-eastern Atlantic, the timeliness of data reception and data quality in EGOS, as well as with the definition of minimum technical requirements for EGOS buoys. The Management Committee reviewed the work of its technical secretariat, its relationship with IOC, WMO and DBCP, its financial situation and its future action plan. EGOS documents are maintained at the Christian Michelsen Research, Fantoft, Bergen, Norway.

The Groups for the International Programme for Antarctic Buoys (IPAB) and the International Arctic Buoy Programme (IAPB) met in Helsinki, Finland, 20-22 and 22-24 June 1994 respectively. Both meetings reviewed the status of buoy deployment in their respective areas, data transmission, quality control and archival problems, as well as specific technical items. The former decided to officially apply to become an Action Group of the DBCP.

The Group for the International South Atlantic Buoy Programme (ISABP) formally established itself by adopting its Operating Principles and "Letter of Intent to Participate" during its half-day Second Preparatory Meeting, Buenos Aires, Argentina, 3 October 1994. It then held the first meeting of its Programme Committee, Buenos Aires, 3-5 October 1994. The Committee decided to appoint a Programme Co-ordinator and accepted with appreciation the offer by the South African Weather Bureau (SAWB) to provide for the position. It reviewed the status of contributions to the programme for 1995: 72 buoys are planned to be deployed in the South Atlantic in 1995, with sufficient logistic support to effect these deployments; as to future years, most participants indicated that a similar level of contributions would be available in subsequent years. It further initiated several studies relating to data transmission in the region and agreed on procedures for buoy data archiving, as well as for the preparation and delivery of special South Atlantic data sets. To oversee the programme and direct the work of the Programme Co-ordinator during the next intersessional period, the Programme Committee established a Steering Committee made up of its Chairman, Vice-chairman and two additional members.

The Tenth Session of the DBCP was held in La Jolla, CA, USA, 1-4 November 1994. DBCP-X agreed to request the continuation of the arrangements with IOC-UNESCO and CLS/Service Argos for the employment and logistic support of the Technical Co-ordinator of the Panel. During a joint half-day session with the World Ocean Circulation Experiment (WOCE) Surface Velocity Programme (SVP) Steering Group, the Panel agreed to liaise closely with the Global Drifter Center (GDC) in the future, and in particular to: (i) establish a joint sub-group on technical developments, to initially complete the work undertaken on the low-cost SVP barometer drifter; (ii) incorporate scientific and/or technical presentations at future Panel sessions; and (iii) develop mechanisms for collaboration in planning buoy deployment strategies. Regarding buoy data quality control, the Panel decided to move from the use of OMNET to that of Internet as soon as possible. Two new Action Groups were adopted by the Panel: the International Programme for Antarctic Buoys (IPAB) and the International South Atlantic Buoy Programme (ISABP). Work should be pursued to establish an Indian

Ocean Buoy Programme. The Panel took this opportunity to more precisely define an "Action Group" of the DBCP.

The Fourteenth Meeting on Argos Joint Tariff Agreement (JTA) was held in La Jolla, CA, USA, from 7-9 November 1994. JTA-XIV decided to further study the possibility of introducing within the Argos Tariff structure an "incentive" to encourage the development of combined oceanographic and meteorological drifter programmes. It further proposed several formula to be simulated during the next intersessional period, aiming at defining a "minimum use charge" for Argos services. It then reviewed the funding agreement for CLS/Service Argos operations and reimbursement of accumulated debt, and agreed on the Terms and Conditions of the 1995 Global Agreement.

The DBCP and the Meeting on JTA were both invited to meet next year in Pretoria, Republic of South Africa, which has recently recovered its rights as a Member of WMO.

4. TRAINING, EDUCATION, MUTUAL ASSISTANCE (TEMA) AND CAPACITY BUILDING

The TEMA programme has targeted its objectives to fill in gaps in marine scientific knowledge and operational techniques among Member States. The Action Plan endorsed at the Seventeenth Session of the Assembly was implemented with extra-budgetary assistance received from Canada, France, Germany, Japan, Sweden, and USA.

A selected ship-board training programme related to WESTPAC projects was implemented, with contributions from Japan through the UNESCO Funds-in-Trust scheme.

Three trainees participated in the Training Course on Oceanographic Data Management organized at JODC, Tokyo, 26 September-7 October 1994. The course has been organized each year for almost a decade and about fifty scientists from the region have been trained. Through their efforts the network of NODCs in the region has been strengthened. JODC expects to organize an advanced training course on an *ad hoc* basis, to further develop the network. Four scientists participated in various Japanese oceanographic research cruises.

Fourteen participants from countries in the Indian Ocean, as well as four international and two regional instructors participated in the IOC-IOMAC-German Training Course on Marine Geology and Geophysics off the Pakistan Coast, which was supported financially and technically by the German authorities, at the National Institute of Oceanography, Karachi, Pakistan, from 12-26 November 1994. During the course, the Hydrographic Department of Pakistan arranged three one-day cruises on board RV BEHR PAIMA for demonstrations on geological sampling and oceanographic surveys. The course aimed to provide modern knowledge and technology in marine geology and geophysics related to the continental shelf, as well as sampling and survey techniques. In conjunction with the training course, a public lecture was given by the chief instructor on marine mineral resources to an audience of about a hundred.

The IOC-UNEP-SPREP Training Course on Coral Reef Monitoring and Assessment was organized in Rarotonga, Cook Islands, 23 February-13 March 1994, to disseminate standard techniques to monitor coral reefs. The course was part of the Pilot Phase Activities of the coastal zone module of the Global Ocean Observing System (GOOS) and received fifteen participants from four South Pacific countries together with three instructors.

IOC is a partner in the UNDP-UN(DOALOS)-run TRAIN-SEA-COAST programme, and was represented at its Panel of Experts Meeting, UN Headquarters, New York, July 1994. This Panel discussed the Training Development Guidelines and the Course Developers' Materials. The TRAIN-SEA-COAST Programme is one of the components of the Action Plan for Human Resources Development and Capacity Building for the Planning and Management of Coastal and Marine Areas. The main objective of the programme is to introduce a common course development strategy to the

field of marine affairs. The strategy is based on the establishment of a network of centres for course development and presentations. IOC is actively participating in the development and is responsible for some of the proposed courses. IOC was also represented at the TRAIN-SEA-COAST Course Development Workshop, Stony Brook, NY, USA, January 1995.

Following discussions with representatives of Nigeria which took place during the UNESCO General Conference, and the subsequent visit of the Secretary IOC to Nigeria in May 1994, during which he met with the Minister of Education, authorities of the University of Lagos and the Director of the Nigerian Institute for Oceanography and Marine Research, a Course in Physical Oceanography was held in Lagos, 17-27 October 1994 as a pilot experiment. The course aimed at providing advanced students with a basic knowledge of physical oceanography of coastal zones, focussing on the West Africa region. It is intended that this course shall become a recurrent one and be open to regional participation to be supported by IOC. The activity constitutes one contribution of IOC to coastal zone studies and human resources development for coastal area management as a follow-up to UNCED.

Another coastal zone training course was developed in India. Following discussions held in Delhi, Goa and Bangalore with oceanographic institutions during the visit of the Secretary IOC to India, December 1993, a training programme in modelling and monitoring of coastal marine pollution was developed. The concept of conducting such a training programme was originally conceived during an expert mission under the UNDP TOKTEN Programme to the Indian Institute of Technology, Centre for Atmospheric Sciences, Delhi, May 1993. The aim of the training programme was to provide oceanographic knowledge and tools to professionals involved in day-to-day coastal area management and development activities. The training programme was developed during 1994, following confirmation that support would be provided from IOC-UNESCO to a training course. The Course took place from 21 November-16 December 1994 in IIT, Delhi, and NIO, Goa.

The experience of this Training Course was very positive. The aim is to develop scientifically trained manpower for coastal zone management purposes. Hence it is intended to proceed with this activity on a regional or sub-regional scale in 1995/1996.

IOC offered assistance to many individual scientists from developing countries through study/travel grants, enabling them to participate in international meetings, as well as in training programmes. At the same time, IOC supported, through contracts, several organizers of international seminars and workshops to assist over forty scientists from developing countries.

Within the framework of UNESCO-UNU Co-operative Studies Programme, the UNU-IOC Workshop on the Asia Pacific Component of the International Mussel Watch was organized in Bali, 18-21 November 1994, preceding the Third IOC-WESTPAC Symposium to develop a project on mussel watch in the Asia-Pacific region, in particular the western Pacific region. Twenty scientists from the region attended the Workshop and at the conclusion a project outline was finalized.

Throughout UNESCO's biennium budgetary period of 1994-1995, seventeen marine scientific proposals/projects were submitted by UNESCO National Commissions to the UNESCO Participation Programme and fourteen were favourably evaluated and implemented by IOC.

Many other TEMA-related activities are presented under the individual subject area programmes, and references are made to those for details. It must, however, be stated here that a major amount of all IOC funding is directed towards capacity building, i.e., TEMA, which constitutes the main element of all the IOC programmes.

5. REGIONAL ACTIVITIES

5.1 IOC SUB-COMMISSION FOR THE CARIBBEAN AND ADJACENT REGIONS (IOCARIBE)

There are two intergovernmental bodies working on marine environmental protection and science-related issues in the Caribbean: IOC through IOCARIBE, and UNEP through the CAR/RCU Caribbean Environmental Programme. IMO has also increased its activities in the region and is becoming an active participant, especially in the area of marine debris and waste management, where IOC/IOCARIBE is the lead agency.

IOC started the CARIPOL programme in the late seventies, mainly focussing on oil pollution monitoring, and later, marine debris surveys. Several scientists have been trained in both subject areas. After the creation of the IOCARIBE Secretariat and UNEP CAR/RCU, the two bodies joined forces and established the Caribbean Marine Pollution Assessment and Control Programme (CEPPOL) in 1990. Experts from the region identified eight marine pollution problems of primary concern: Pesticide Contamination and Formulation of Control Measures; Monitoring and Control of the Sanitary Quality of Bathing and Shellfish Growing Waters; Monitoring and Control of Pollution by Marine Debris and Oil; Site Specific Studies in Damaged Ecosystems and the Development of Proposals for Remedial Action; Development of Environmental Quality Criteria and Effluent Guidelines; Significance of Organotin Compounds as Pollutants in the Wider Caribbean Region; Research on the Significance of Increased Turbidity and Eutrophication; and to start in 1995 - Atmospheric Input of Pollutants to the Marine Environment. IOC, through IOCARIBE, is the implementing organization of this latter programme component. Apart from this, IOCARIBE has, in the context of the CEPPOL Programme, directed its main efforts towards the Oil Pollution, Marine Debris, Eutrophication and Pesticides components.

Despite limited funding, IOCARIBE has been actively developing the Ocean Processes and Climate programme as well as the programme on Ocean Science in Relation to Non-Living Resources, in accordance with Recommendations from SC-IOCARIBE-IV and the related Resolution XVII-11 of the Assembly. Action on the Programme on Ocean Science in Relation to Living Resources has been lacking due to funding constraints. The TEMA component has been managed within the different subject areas.

With regard to the state of marine science in the region, it is necessary to point out the differences in capacity between developed countries and countries which are in the developing process. It is also necessary to point out that within developing countries in the region some institutions have seen an important increase in their capacities while others have not. Institutions that can be mentioned as actively participating in the IOCARIBE programmes, apart from US-based institutions are: the Institute of Marine Affairs, Trinidad and Tobago; University of Puerto Rico; CINVESTAV and UNAM, Mexico; University of West Indies, Barbados; CIOH, Colombia; Instituto de Oceanologia, Cuba; University of West Indies, Jamaica; NRI, Cayman Island; CEHI, (Caricom Member States) and CONICIT, Venezuela. These institutions have actively participated in various groups as well as individual training activities. The participation of Guyana, the French and Netherlands Antilles as well as the Central America countries has remained rather limited.

In the IOCARIBE region there now exists a large number of well-trained scientists and considerable local expertise. However, there is a need for specific training in connection with the different programmes, with the objective of moving ahead with the IOCARIBE Medium-term Plan, as recommended during SC-IOCARIBE-IV, as well as with IOC-UNEP CEPPOL Programme activities, which will serve marine environmental management priorities in the Caribbean Region, adjusted so as to meet UNCED follow-up priorities.

During 1994, IOCARIBE has been reviewing its status in the region and has produced a Strategy Plan for service to its Member States including increased communication so as to meet with the increasing concern for the marine environment, changes in technology and requirements of the implementation of UNCED decisions. IOCARIBE is aiming to provide better services by

the integration of information of marine science data and assessments; enhancing capacities of Member States for data access and utilization; improving national and regional monitoring systems and, above all, providing user-defined sectoral information products. It is becoming increasingly important for IOCARIBE and other bodies working in the Caribbean to clarify to the users the different services and products, and how they aim to achieve a solid environment by joining forces in order to reach out to both the decision makers as well as to scientists. As an example IOCARIBE and UNEP have invited UNITAR to participate in the CEPPOL Programme and thus strengthen the technical input to specific projects. The sub-regional Gulf of Mexico Programme is also a new partner. The final new focus of IOCARIBE will follow the evaluation of IOCARIBE Programmes which is under way and the result will be brought to the attention of the IOC Assembly.

In accordance with the CEPPOL Programme, IOCARIBE organized the Third Caribbean Marine Debris Workshop, Bahamas, 10-14 January 1994. 160 participants from 26 countries attended this Workshop which focussed primarily on land-based sources of pollution by debris, and reviewed and finalized the Marine Debris/Waste Management Action Plan for the Caribbean (Document IOC Technical Series No.41). The Action Plan consists of 15 Action Items of which several have been or are being implemented.

During 1994, IOCARIBE, together with the Center for Marine Conservation, developed a strategy for conducting a marine debris outreach campaign in the wider Caribbean, and the establishment of a region-wide public education campaign. Both are being implemented. After negotiation with the Sub-regional Gulf of Mexico Programme, IOCARIBE is now a part of the Coastal Information Exchange Bulletin Board System, which will primarily serve the Marine Debris component. Later on other IOCARIBE programmes will benefit from this system as a mean of facilitating communication and information. The wider Caribbean Beach Clean-up Campaign is continuing and IOCARIBE assisted in organizing part of it. IOCARIBE is a partner in the GEF Project on the Wider Caribbean Initiative for Ship Generated Waste. Marine Debris Monitoring, phase II, has been finalized and data is being gathered at the IOCARIBE Database.

Within the Regional Component of Marine Pollution Research and Monitoring, pilot case studies on the impact of the use of pesticides in the Wider Caribbean Region were initiated in 1992. The development of the projects are at different stages due to delays in the purchase and delivery of special equipment and reagents. However the final reports have been received from three countries: Colombia: "Evaluacion del impacto sobre ecosistemas marinos costeros generados por el uso de plaguicidas en zonas agricolas adyacentes al municipio de Cartagena"; Mexico: "Organochlorine pesticides in Laguna de Terminos, Campeche"; Jamaica: "Baseline study on pesticidal contamination of the Jamaican coastal environment and formulation of control measures".

A second phase is being initiated which will aim at assessing the fate and effects of second generation pesticides including organophosphorus compounds and carbamates.

In order to achieve a detailed budget of nitrogen and related transformation processes and of nitrogen metabolism in a lagoon by characterization of rates of nitrification, denitrification and nitrogen fixation at representative stations, a pilot project is being finalized by CINVESTAV in Mexico, in accordance with the CEPPOL Programme.

IOCARIBE is providing support for research on coastal current patterns and modelling transport of surface-borne oil pollutants being carried out by the Institute of Marine Affairs, Trinidad and Tobago. The initial phase of setting up a digitized grid and digitization of the depths has been completed and the model production is under way. High resolution nested models of specific areas of interest, together with density stratification and oil spill modelling, will complete this pilot project. Based on the results, additional projects will be carried out in sensitive areas.

A fingerprinting databank has been created at the Institute of Marine Affairs in Trinidad with data from several areas in the region with a total of 61 crudes characterized by analytical techniques. IOCARIBE is supporting an extension of this bank and training of scientists is currently being carried out.

Within the Regional Component of Ocean Processes and Climate and in agreement with UNEP-CAR/RCU on Global Climatic Change, the regional network of tide-gauges has been strengthened through installation of gauges in Guyana and Jamaica. This will be followed by installations of tide-gauges in Cuba and Haiti.

IOC, through IOCARIBE, organized the CEPPOL Symposium, and the Second CEPPOL Group of Experts Meeting, San Jose, Costa Rica, April 1994. The new CEPPOL Project Document has been approved by UNEP and IOC.

Within the regional component of the IOC-UN(DOALOS) Programme on Ocean Science in Relation to Non-Living Resources, IOCARIBE organized the OSNLR *ad hoc* Experts Meeting on Technical and Cartographic Methodology for Caribbean Critical Areas at Isla Margarita, Venezuela, 17-20 May, 1994.

Within the OSNLR component, IOCARIBE is producing a Manual for Monitoring of Beach Dynamics. Mapping of a few critical areas in the Caribbean has been accomplished by CIOH, Colombia. Also a Manual of Guidelines on Mapping of Critical Areas in the Caribbean Related to the Impacts of Sea Level Rise is being produced.

With regard to the OSLR component, planning of the Symposium on Sea Turtles to be convened in Miami, 21-25 February 1995, as well as the Workshop on Fisheries Oceanography of Highly Migratory Fishes and Straddling Species, 2-4 March, Miami, USA, are well under way.

In accordance with Recommendation SC-IOCARIBE-IV.4 two workshops on Integrated Coastal Area Management are being planned for 1995 in co-operation with the World Bank.

IOCARIBE News has been produced in a new format with the assistance of the South-East Marine Fisheries Center. It is being produced on a quarterly basis again. Dr Fernando Robles returned to Headquarters after serving for seven years as IOC Senior Assistant Secretary for the Caribbean and Adjacent Regions. It has not yet been possible to staff the IOCARIBE office sufficiently. However, thanks to support from the USA, Dr. Fred Berry has been appointed Acting Secretary for IOCARIBE for one year (February 1994-February 1995).

5.2 IOC SUB-COMMISSION FOR THE WESTERN PACIFIC (WESTPAC)

The implementation of WESTPAC activities in 1994 focused on the Third WESTPAC Symposium, Bali, Indonesia, 22-26 November 1994, as well as the pre-Symposium meetings on various subjects, including the Joint Seminar on HAB/RI/SC, Planning Meeting of the Atmospheric Inputs, WESTPAC Workshop on Palaeogeographic Map, Workshop on NEAR-GOOS, and the Meeting of the Officers for EB-IBCWP.

Thanks to the joint efforts of the Scientific Organizing Committee and the Local Organizing Committee as well as the generous support of the Government of the Indonesia, the Third WESTPAC Symposium succeeded in attracting more than 200 scientists from inside and outside the WESTPAC region, with some 124 papers presented on the following general topics: (i) Biogeochemical Processes and their Impacts on Regional Biodiversity; (ii) Dynamics and Modelling and Prediction of Transport Phenomena; and (iii) Climate Variability, Predictability and Impacts. IOC supported some 60 participants to the Symposium and pre-Symposium meetings, and special funds were set aside to support young scientists. The integrated management of coastal areas was given special attention, with a one-day special plenary session devoted to this topic. This Session aimed at interaction between marine scientists and coastal managers and economists, so as to enable the identification of general and specific needs for marine science contribution to the integrated coastal zone management.

During the Symposium, the WESTPAC programme and projects were reviewed, and recommendations on further implementation of WESTPAC activities made. Much emphasis was laid on those projects which are more directly related to coastal zone management, such as HAB, River Inputs and Mussel Watch, as well as climate-related projects.

The Officers of WESTPAC also held a meeting during the Symposium and reviewed the implementation of the WESTPAC programmes and projects, as well as the operational and administrative needs of the newly established IOC Regional Secretariat for WESTPAC.

The Joint Seminar on HAB/RI/SC, 20-21 November 1994, evaluated the on-going activities and discussed the future direction of WESTPAC Projects on Harmful Algal Blooms in the WESTPAC Region, River Inputs, and Shelf Circulation, with emphasis on future co-operation and co-ordination among the three groups.

The result of the WESTPAC Workshop on Palaeogeographic Mapping, 20-21 November 1994, showed that the Paleogeographic Mapping Project had completed its first stage. Seven of the WESTPAC countries, i.e. Russia, Japan, China, Indonesia, Malaysia, Thailand and Australia, have provided their own paleogeographic map of the Last Glacial Maximum (LGM, 15000-20000 years ago) together with a data-base map, list of sites and list of references. The first version of compiled maps for the entire WESTPAC region will be completed by the end of March 1996, and the final version will be ready by the end of June 1996. The next map to be compiled by the group will be the Holocene Optimum Map (some 6500-500 years ago), which is needed for the prediction of consequences of the future sea-level rise.

The Planning Workshop on Atmospheric Inputs, Bali, 21 November 1994, revised and adopted the Action Plan, including the establishment of a network, organization of intercalibration exercise and training courses, and co-ordination of research work.

The Workshop on NEAR-GOOS, Bali, 19-21 November 1994, was attended by representatives from Indonesia, Korea, Japan, Thailand, China and the IOC Secretariat. The Meeting considered the draft plan developed out of the Beijing Expert Meeting, October 1994, with some revision. Keen interest was expressed by Indonesia to develop a similar regional approach for the Southeast Asian Regional GOOS (SEAR-GOOS) Plan. The next step in the implementation of NEAR GOOS is the official ratification and commitment by the Member States, including the identification of the appropriate national contact and responsible agency.

The Officers Meeting of EB-IBCWP, 20-21 November 1994, succeeded in inviting the representatives of New Zealand and SOPAC, the proposed responsible country and organization for sub-regions 5 and 6, who were unable to attend the First Session of EB-IBCWP, Tianjin, China, October 1994. Both New Zealand and SOPAC expressed their willingness to participate in the IBCWP project and contribute data within their scope of responsibility. With Thailand and the Philippines becoming new members of the Editorial Board, the total number of Board members has increased to ten. Vietnam has recently indicated its willingness to be a producing country in Sub-region 3, and Russia has already begun to submit plotting sheets and the accompanied data of sub-region 1 to the Chief Editor.

In addition, the IOC-FAO PREP Workshop was organized in Penang, Malaysia, 31 October-4 November 1994. Participants from Australia, China, Indonesia, PNG, Philippines, Thailand and Malaysia attended the workshop.

The IOC/WESTPAC Nutrient Intercalibration Exercise was completed in the first quarter of 1994, with participation from some twelve laboratories from 10 countries of the region. Due to the poor intercalibration results, it was suggested that further training should be organized to elevate the level of nutrient analysis with subsequent intercalibration in the participating countries.

With regard to co-operation with other organizations in the region, IOC co-sponsored or was represented at a number of meetings, workshops and seminars, including:

(i) UN Interagency Meeting on GEF-UNDP-IMO Programmes for the Prevention and Control of Marine Pollution in East Asian Seas, Philippines, 7 June 1994;

(ii) PACON 94, Townsville, Australia, 4-8 July 1994;

(iii) ACOPS Training Course/Seminar on the Management of Coastal Towns and Cities, Semarang, Central Java, 8-12 August 1994. IOC contributed funds to the training course and lectures of WESTPAC Officers on coastal marine science were presented;

(iv) UNEP Preparatory Meeting of Experts and National Focal Points for the Northwest Pacific Action Plan (NOWPAP), Seoul, 12-13 September 1994;

(v) International Symposium on Assessment, Yield and Long-Term Sustainability of Large Marine Ecosystem of the Pacific Ocean, Qingdao, China, 10-14 October 1994;

(vi) GIPME Expert Meeting on GEF-UNDP-IMO Programmes for the Prevention and Control of Marine Pollution in East Asian Seas, London, 12-14 October 1994;

(vii) 31st Session of CCOP Annual Meeting, Kuala Lumpur, Malaysia, 18-22 October 1994;

(viii) Eleventh Meeting of the Coordinating Body on the Seas of East Asia, Bangkok, Thailand, 28-29 October 1994;

(ix) SEAPOL Tri-Regional Conference on Current Issues in Ocean Law, Policy and Management: Southeast Asia, Northwest Pacific and Southwest Pacific, Bangkok, Thailand, 13-16 December 1994.

The Office of the IOC Regional Secretariat for WESTPAC was officially inaugurated on 29 November 1994, in the National Research Council of Thailand. Dr. Apiral Arunin, Secretary-General of NRCT, Prof. Su Jilan, Chairman WESTPAC, and Dr. Gunnar Kullenberg, Secretary IOC, attended the opening ceremony and cut the ribbons. Mr. Yihang Jiang (China), has been appointed the Assistant Secretary for WESTPAC and has taken up his post in Bangkok.

5.3 IOC REGIONAL COMMITTEE FOR CO-OPERATIVE INVESTIGATION IN THE NORTH AND CENTRAL WESTERN INDIAN OCEAN (IOCINCWIO)

Thanks to continued funding from and co-operation with the Swedish Agency for Research Co-operation with Developing Countries (SAREC), and several Member States, using the mechanism provided through IOC regional co-operation and networking, activities related to marine and coastal research and training in the region, continued to be developed within the framework of the IOCINCWIO-III Action Plan.

The following activities were carried out in the intersessional period of the Assembly (1993/1994):

IOC Training Course on Ocean Flux Monitoring in the Indian Ocean (Mombasa, Kenya, 15-27 November 1993)

This training course was designed to introduce scientists of the region to the project on the Joint Global Ocean Flux Study (JGOFS), to test whether the JGOFS Core Measurement Protocols were adaptable for developing countries in the region, and acquaint scientists with current technical knowledge in marine sciences. The course was financially assisted by the German Government through a Trust Fund contribution.

The course included such topics as physical oceanography, ecosystem modelling, methods and practical training on PCs.

The course was attended by 12 participants from Egypt, India, Kenya, Madagascar, Maldives, Nigeria, Sri Lanka, and Tanzania; and 13 lecturers from France, Germany, Kenya, Pakistan, Sultanate of Oman, The Netherlands, Ukraine, United Kingdom, and the United States.

The report of this course is available as IOC Training Course Reports No. 26.

The regional component of the bathymetric chart has progressed gradually (see section on Ocean Mapping).

IOC-UNEP-WMO-SAREC Planning Workshop on an Integrated Approach to Coastal Erosion, Sea Level changes and their Impacts, Zanzibar, Tanzania, 17-21 January 1994

The overall objective of the Workshop was to review the present knowledge and activities regarding coastal erosion problems in the region. Sea-level changes and associated coastal impacts were included with a view to formulating an action plan for the implementation of a regionally co-ordinated programme on coastal erosion, sea-level changes and associated coastal impacts in the Indian Ocean.

The Workshop formulated several recommendations for follow-up actions within the subject areas of Coastal Erosion and Sea-level Change.

The Workshop was attended by 43 participants from Australia, Canada, Ghana, India, Kenya, Madagascar, Malaysia, Maldives, Mauritius, Mozambique, Senegal, Seychelles, Sweden, Tanzania, United Kingdom, United States, UNESCO-ROSTA and IOC. The report of this workshop is available as IOC Workshop Report No.96 (with two separate supplements).

IOC-SAREC Field Study Exercise on Nutrients in Tropical Marine waters, Mombasa, Kenya, 5-15 April 1994

The goal of the nutrient training series is to build capacity in the form of a core of East African nutrient chemists and to foster inter-regional co-operation and co-ordination through the standardization of sampling and analytical methods.

The natural progression in this series led to the objectives of the Fourth Workshop being identified as the application of known techniques to a field situation, so that different groups working within the region could be sure that they were using the same laboratory and field techniques. The present exercise was therefore entitled "Nutrients in Tropical Marine Waters: Field Study Exercise". A secondary objective that was introduced at the request of IOC on behalf of IOCINCWIO was to give consideration to the establishment of guidelines for the introduction of a number of baseline stations for water quality to be established within the region as part of the IOCINCWIO-III Implementation plan for 94/95.

During its Third Session, the IOC Regional Committee for Co-operative Investigation in the North and Central Western Indian Ocean (IOCINCWIO) recommended the establishment of Baseline Stations for Coastal Water Quality under the GIPME/MARPOLMON programme. In view of the complementarity of the Nutrient Monitoring programme and the Baseline Stations project, the IOC Secretariat requested the participants in the IOC-SAREC Field Study Exercise on Nutrients in Tropical Marine Waters to discuss the combination of the monitoring of water quality and nutrients into a single plan which will be initiated in 1995 with a limited quantity of funds available to support the initiative.

In line with perceptions of acute pollution problems in their home countries, the participants proposed baseline monitoring stations oriented to examining concentrations of pollutants in "local" waters; i.e. harbours and recipients/estuaries.

The Field Study exercise was attended by 12 participants from Kenya, Madagascar, Mauritius, Seychelles and Tanzania, and the report of this activity is available as IOC Workshop Report No. 99.

First Session of the IOC-FAO Group of Experts on Ocean Science in Relation to Living Resources for the IOCINCWIO region (Mombasa, Kenya, 13-17 September 1994)

After discussions on an impressive agenda including follow-up to UNCED, inventory of critical marine habitats in the IOCINCWIO region, recruitment and stock assessment, large marine

ecosystems, harmful algae marine mammals, and the question of introduction of species, the Group identified priorities in relation to OSLR. It approved a Work Plan for 1995-1997 covering topics on: marine science country profiles, data collection and distribution on seagrass distribution, new approaches to catch assessment surveys, a training course on catch landing statistics for off-shore tuna fisheries, an LME Planning meeting, a training course on taxonomy and biology of Harmful Marine Phytoplankton, documentation on sighting of whales, a pilot project on status of dugongs, and compilation and publication of a check list on species diversity in several habitats.

The meeting was attended by 18 participants from France, Kenya, Mauritius, Mozambique, Senegal, Seychelles, Tanzania, FAO, IUCN, UNEP, UNESCO-ROSTA, and the IOC Secretariat. The report is available as Document IOCINCWIO/GE-OSLR-I/3.

During the intersessional period seven individual training grants were provided through the IOC Secretariat. For their participation in the Second International Conference on Oceanography, Lisbon, Portugal, 14-19 November 1994, support was provided to six participants from the IOCINCWIO region.

In response to the Recommendations of IOCINCWIO-III, several co-ordination activities were organized. These include:

IOCINCWIO Officers meeting (Mombasa, Kenya, 12-16 July 1993)

During this meeting, the state of implementation of the IOCINCWIO Action Plan, co-operation between RECOSCIX and WIOMSA, and co-operation between WIOMSA and IOCINCWIO were discussed. The report of this meeting is available as Document IOC/INF-944.

SAREC-IOC Workshop on Donor Collaboration in the development of Marine Scientific Research Capabilities in the Western Indian Ocean Region, Brussels, Belgium, 23-25 November 1993

This was the third session in a series of meetings of donors related to the IOCINCWIO region: the first was held on 21 October 1991 (Brussels), the second 12-13 October 1992 (Brussels). The main objective of these meetings is to improve communication and co-ordination between the various active donor parties. Information on each other's programmes and activities was exchanged and possibilities of co-operation were explored in order to enhance the impact of our marine scientific activities in the Western Indian Ocean region, and to identify the appropriate alliances.

The meeting was attended by 23 participants from Belgium, Ghana, Kenya, Mozambique, Senegal, The Netherlands, SAREC and IOC. The report of this meeting is available as IOC Workshop Report No. 95.

RECOSCIX-WIO Project Planning and Evaluation meeting (Mombasa, Kenya, 7-18 February 1994)

The objective of this meeting was to evaluate the achievement of the RECOSCIX-WIO project (1991-1994) in the light of the planned submission of a new RECOSCIX-WIO project (1996-1999).

The occasion was also used to discuss the development of public awareness activities in the region. In this regard, reference was made to the video production project carried out in Zanzibar (IMS-University of Newfoundland). A draft scenario for a regional IOCINCWIO marine environment video was prepared.

WIOMSA First Session of the Board of Trustees (Zanzibar, Tanzania, 30 September 1994)

During this meeting the Board of Trustees approved the Constitution of WIOMSA and registered applications for WIOMSA Marine Research Grants.

Further WIOMSA support was provided for the establishment and support of the WIOMSA Secretariat, based in Zanzibar, Tanzania.

As a follow-up to the IOCINCWIO-III Action Plan and with financial support from the United States, support is being provided for e-mail communication to six institutions in Mauritius, Mozambique, Seychelles and Tanzania. Kenya is receiving communication support with support from Belgium through the RECOSCIX-WIO project.

5.4 IOC REGIONAL COMMITTEE FOR THE CENTRAL EASTERN ATLANTIC (IOCEA)

As indicated in the Workplan for 1993-1996, IOC has pursued the development of activities related to living resources considered as a high priority. Following the recommendation of the meeting held in Casablanca, June 1993, a second meeting was convened at the University of Las Palmas, Canary Islands, 31 January-2 February 1994. The purpose of the meeting was the preparation of a sub-regional integrated programme of study of the Canary Current System (CCS) and associated upwellings, including living and non-living resources (COMEMIR), following the approach adopted at IOCEA-III. The oceanic area under the influence of the CCS (Eastern boundary current) has been considered as a Large Marine Ecosystem. The different proposals and projects elaborated as agreed at the previous meetings were reviewed, up-dated and modified according to existing means, scientific criteria and more recent information. Three projects related to living resources were considered: (i) study of vertical distribution of larvae of coastal pelagic fish (contribution to the study of the relation circulation/larvae advection/recruitment); (ii) evaluation of coastal demersal and pelagic resources through experimental cruises; and (iii) study of cephalopodes fisheries and their development.

Regarding implementation, it was stressed that, for a certain number of activities, important external financial support was needed. However, other activities could be conducted with the existing means in the sub-region, with the assistance and co-ordination of IOC. Facilities for implementation through existing bilateral agreements should be explored. Activities proposed for implementation before IOCEA-IV (May 1995) were the following:

(i) Training workshop on acoustic methods for evaluation of marine biomass;

(ii) Workshop on methodologies of evaluation of marine living resources; and

(iii) Analysis of satellite data.

IOC supported the participation of four experts from the sub-region who act as co-ordinators for the different project proposals.

The first Training Workshop on Acoustic Methods was organized in Tenerife (Canary Islands) in co-operation with the Centro Oceanografico de Canarias (Instituto Español d'Oceanografía - IEO), 28 November-2 December 1994. The IEO provided two instructors and placed the research vessel from the Instituto Canario de Ciencias Marinas at our disposal for practical exercises at sea. The training course (in French) was attended by 16 participants 10 of whom were supported by IOC (including one from Madagascar).

The Workshop on Methodology of Evaluation is scheduled to take place in Las Palmas during the week preceding IOCEA-IV.

Activities related to remote sensing were initiated and their development was discussed at a meeting at the Centre Royal de Télédétection Spatiale (CRTS), Rabat, Morocco, 8 June 1994. The organization of an International Workshop on Space Oceanography - Climate and Marine Resources in the Northwest of Africa, was considered and agreed upon. It will take place at the CRTS, 10-14 October 1995, and is sponsored jointly by IOC, WMO, FAO and the Joint Research Center (EU). A short meeting to discuss its preparation, also attended by representatives of FAO and the JRC apart

from IOC and some experts from the sub-region, took place in Lisbon during the 2nd International Conference on Oceanography, 14-19 November 1994.

Regarding the follow-up of the regional project on "Sediment budget along the West African Coast" (and related to coastal erosion), an International Symposium on the Results of the First IOCEA Cruise in the Gulf of Guinea was held in Lagos, Nigeria, 17-20 May 1994, hosted by the Nigerian Institute for Oceanography and Marine Research in collaboration with and supported by IOC. The Secretary IOC attended the Symposium. Over 40 specialists from ten countries, including France, Netherlands and the United States, participated in the Symposium which focused on the following general areas: (i) geomorphology, (ii) physico-chemical characteristics, (iii) mineralogy, and (iv) sedimentology. The main recommendations adopted were the following: (i) an editorial board to be set up to review the 27 papers presented for possible publication; (ii) a call for financial resources to carry out the sediment dynamic studies requested of the projects; (iii) the establishment of a regional centre for coastal engineering and management; and (iv) the launching of a regional integrated coastal and marine management project.

A Pilot Training Course in Physical Oceanography was held in Lagos, Nigeria, 17-27 October 1994, in co-operation with the Nigerian Institute for Oceanography and Marine Research (NIOMR) and the University of Lagos, attended by ten participants (including participants from Cameroon, Côte d'Ivoire and Ghana). This initiative was planned with a view to creating a degree course in physical oceanography at the University of Lagos.

Within the framework of WACAF/, second phase, a series of activities related to physical oceanography were organized in different countries (Benin, Gambia, Guinea-Conakry, Senegal and Sierra Leone) during the last quarter of 1994 and a joint IOC-FAO-UNEP Training Workshop on Quantitative Evaluation of Pollution in the Marine Environment was held in Accra, Ghana, 21-25 June 1994.

As a follow-up to the IOC-UNESCO mission to Namibia in 1993, UNESCO-IOC organized a mission (Mission-94) to study the progress achieved in building up a national marine science programme in Namibia, and to give advice on further actions. Mission-94 took place in September 1994 and was composed of Professor Gotthilf Hempel (Zentrum für Marine Tropenokologie, Bremen, Germany) and Professor Ulf Lie (University of Bergen, Bergen, Norway). One important result of outcome has been agreement on the organization of a scientific workshop to discuss the development of a programme of comprehensive studies in the Benguela Current Ecosystem, scheduled for end May 1995.

Regarding the ocean mapping project on an International Bathymetric Chart of the Central Eastern Atlantic (IBCEA), the activities have been pursued.

IOC was represented at the International Symposium on Middle-sized Pelagic Fish, Las Palmas, Canary Islands, 24-28 January 1994.

IOC provided support to an expert from Côte d'Ivoire to participate in the Twelfth African Colloquium in Micropaleontology and the Second Colloquium on Stratigraphy and Paleogeography of the Southern Atlantic, Angers, France, 16-20 July 1994.

Following the generous offer of Spain, the Fourth Session of the Regional Committee will be hosted by the University of Las Palmas de Gran Canaria in Las Palmas, Canary Islands, in May 1995. Consultations on its organization took place with the University of Las Palmas and local authorities at the end of November 1994.

An IOC-UNEP Marine Debris Waste Management meeting, devoted to the development of a Regional Marine Debris Action Plan, took place at NIOMR, Lagos, 13-14 December 1994.

Thanks to the Nigerian Institute for Oceanography and Marine Science, IOC organized the First Workshop on Marine Debris/Waste Management for the Gulf of Guinea, NIOMR, Lagos, 21-23

December 1994. Experts from Benin, Cameroon, Cote D'Ivoire, Ghana and Nigeria produced country reports on the state of pollution by marine debris and jointly produced nine action items related to combat the problem with marine debris. These recommendations are a first step toward the creation of an action plan in the sub-region.

5.5 IOC REGIONAL COMMITTEE FOR THE CENTRAL INDIAN OCEAN (IOCINDIO)

Several activities have been carried out in the region at national and regional level. At regional level, the activities concentrated in the ROPME and Red Sea regions. Training courses and workshops were held (see Sections 1.5 and 4) covering aspects related to marine pollution, marine geology and coastal zone management. India hosted GODAR-III which took place in Goa, December 1994.

Following consultations between the Delegation of Pakistan and the Secretary IOC during the UNESCO 27th General Conference (November 1993), a programme was developed with an IOC Consultant for a Workshop on Integrated Coastal Area Management to be held in Pakistan, with the participation of other countries in the IOCINDIO region. The Workshop was held in Karachi, Pakistan, 10-14 October 1994, with about 100 participants, including foreign experts supported by IOC and UNDP. The Secretary IOC attended the Workshop.

In the IOCINDIO region, the Training Course on Modelling and Monitoring of Coastal Marine Pollution was also implemented, Delhi and Goa, India, 21 November-16 December 1994 (see also Section 4).

Co-operation with IOMAC is continuing and IOC was represented at the IOMAC *ad hoc* Consultation Meeting of the Technical Co-operation Group, Meeting of the Association of Shipping and Ports Authorities and Tenth Meeting of the IOMAC Standing Committee, 30 November-6 December 1994, Colombo, Sri Lanka.

In addition, as a follow-up to Draft Resolution 153 submitted by the Islamic Republic of Iran and approved by UNESCO General Conference in November 1993, a feasibility study mission for the establishment of a National Oceanographic Data Centre (NODC) was arranged from 25 August to 1 September 1994, funded from the IOC regular budget. Consultations have been pursued concerning the Second Session of IOCINDIO.

5.6 IOC SOUTHERN OCEAN COMMITTEE (IOCSOC)

In accordance with the decisions of the Seventeenth Session of the IOC Assembly, IOC Member States had been invited to designate their official national contact for SOC.

By 1 December 1994 the following IOC Member States had designated national SOC contacts: Argentina, Australia, Ecuador, France, Germany, Russian Federation, and the United Kingdom.

IOC activities in the Southern Ocean continued to be implemented within the framework of other IOC research and ocean services programmes, in collaboration with various international organizations (WCRP, WOCE, GIPME, JGOFS, GLOBEC, IGOSS, GLOSS, DBCP and IODE).

Germany proposed to organize the First Southern Ocean Forum in Bremerhaven at the end of 1995, to review the on-going research and observational programmes in the Southern Ocean and formulate proposals to the IOC governing bodies on IOC's future role and activities in the Southern Ocean, taking into account the ratification of the Conventions: UNCLOS, UN-FCCC, the Convention on Biological Diversity, the Protocol on Environment Protection to the Antarctic Treaty, Agenda 21 of UNCED, development of GOOS and GCOS, and activities of other international organizations: ATCM, SCAR, SCOR, CCAMLR, IWC, WMO, IMO, UNEP.

IOC issued a Circular Letter in December 1994, seeking the views of Member States on their participation in the proposed First Southern Ocean Forum.

IOC was represented at the 23rd Meeting of SCAR, Rome, 29 August-9 September 1994, by Dr. G. Giermann (AWI, Germany); meetings of CCAMLR held in Hobart, Australia, October-November 1994, by scientists of CSIRO, Australia; at the Inter-American Workshop on High Latitude Processes, Buenos Aires, Argentina, 15-17 December 1993, by Mr. Eduardo A. Rodriguez, Argentina. Unfortunately, IOC was unable to send a representative to the Eighteenth Antarctic Treaty Consultative Meeting, Kyoto, Japan, 11-22 April 1994.

IOC provided information on IOC Southern Ocean-related activities to UNEP for the preparation of the Secretary-General's report on the state of the environment in the Antarctic.

5.7 SOUTH EAST PACIFIC

Co-operation with CPPS is continuing on matters related to: marine pollution, with UNEP; the El Niño phenomenon with WMO; the implementation of coastal zone observations, e.g., sea-level.

However, during 1994, interactions and activities have been limited. IOC was represented by the Chairman IOC at the regional seminar on UNCLOS, convened by CPPS in Lima, Peru, September 1994. The Chairman presented a review of IOC activities and responsibilities relevant to UNCLOS.

5.8 SOUTH WEST ATLANTIC

Following the declaration at the Seventeenth Session of the IOC Assembly by Argentina, Brazil and Uruguay to establish among them a Sub-regional Programme of Co-ordination of National Experts from the three countries for the Upper Southwest Atlantic to co-ordinate oceanographic research activities and to implement joint scientific initiatives, a meeting was held on 28 October 1994 to establish the ASOS (a sub-regional programme for the Upper South-West Atlantic). In relation to ASOS, work on Cartographic Synthesis, Morphology and Sedimentologies has been finalized by experts from the three countries during 1994 as a part of the OSNLR Programme.

In light of the newly established co-operation IOC and UNEP organized a Training Workshop on Integrated Coastal Area Management, with the assistance of the PAP/RAC Center, for participants from the three countries, Montevideo, 13 October-4 November 1994. This was a first step towards co-operation in this area and the country experts made statements on the various legal, scientific and technical projects that are being undertaken in each country. The recommendations that arose from this meeting will be followed jointly by IOC and UNEP. An agreement on further joint programmes was reached.

5.9 MEDITERRANEAN

Development has continued of the two major activities in the region co-sponsored by the Commission and ICSEM: (i) PRIMO (the International Research Programme in the Western Mediterranean); (ii) POEM (Programme on Physical Oceanography of the Eastern Mediterranean). Field work has been pursued and workshops organized.

The publication of the special issue of "OCEANOLOGICA ACTA", devoted mainly to the results of PRIMO-ϕ experiment, is well advanced and is expected to appear during 1995. PRIMO phase 2 has started and it is worth mentioning that a Tunisian team is participating in the field work.

Preparations for the POEM Levantine Intermediate Water (LIW) Experiment have been made. The winter multiship survey started in December 1994 and is scheduled to end by April 1995.

Regarding OSLR and in particular the Harmful Algal Blooms programme, the development of regional components of the programme is being encouraged.

Activities are being planned within the framework of the OSNLR in close co-operation with ICSEM; some progress has been made on the insular coastal systems programme.

Co-operation with UNEP and the Mediterranean Action Plan is continuing in marine pollution-related studies.

Consultations have been held with the ICSEM Executive Director on the possibility of increasing co-operation. A step in this direction will be IOC's participation at the XXXIVth Congress and Plenary Assembly, Valletta, Malta, 27-31 March 1995. Round Tables and meetings will take place to discuss results and further development of these activities.

5.10 THE BLACK SEA

In accordance with Resolution XVII-15 entitled "Regional Black Sea Co-operation Programme" and the related Resolution 190 of the 27th General Conference of UNESCO, the Secretary IOC has explored ways of obtaining assistance, in addition to available UNESCO Regular Programme funds, to support development of a workplan by a Regional Association for the Black Sea, with a view to establishing a Regional Committee for the Black Sea as an IOC regional subsidiary body. Support has been provided to a consultant who, in co-operation with the Bulgarian Academy of Science, prepared a draft programme which was circulated to all Black Sea states in June 1994. Preliminary discussions were held during the Twenty-seventh Session of the IOC Executive Council, indicating various requirements for the revision of the draft. Support has also been obtained for BLACK SEA '94, an international conference with a Workshop on the Regional Co-operation Project for Integrated Research and Monitoring of the Black Sea, Varna, Bulgaria, 12-17 September 1994. The Workshop, with participants from most Black Sea states, as well as UNEP, GEF together with the Secretary IOC, reviewed the draft programme, and prepared a revised version entitled "Draft Proposal for an IOC Black Sea Regional Programme in Marine Sciences and Services". This was sent to all Black Sea states in early October 1994 from the Secretary IOC, and comments have been received from several. It is planned to convene a formal expert meeting to agree on the draft proposal, and present this to the Assembly.

Throughout 1994, IOC has supported the regional research programme COMSBLACK. This has resulted, *inter alia*, in the preparation of a Black Sea bibliography, and a publication on the present state of knowledge regarding Black Sea hydrogen sulfide. Support to COMSBLACK is also being provided in 1995.

IOC is also an associate partner in the GEF-supported Black Sea Environmental Programme. This has involved expert participation in several meetings of working parties and co-ordinating bodies. The substantive part of IOC's involvement concerns the GIPME programme (see Section 1.5). The main contributions came from the GIPME Groups of Experts on Biological Effects of Pollutants (GEEP) and on Methods, Standards and Intercalibrations (GEMSI). Several training workshops are planned for 1995.

The Secretary IOC visited Bulgaria, 7-17 September 1994, to discuss the increased participation of Bulgaria in IOC activities, the Black Sea programme, and to attend BLACK SEA '94, including the conference and workshop.

5.11 PERSIAN GULF, RED SEA AND THE GULF OF ADEN

In the ROPME Region, IOC continued to provide technical backstopping through its GIPME Groups of Experts for the implementation of the joint IOC-ROPME Integrated Project Plan (IPP) for the Protection of the Coastal and Marine Environment of the ROPME Region.

One aspect of the IPP that was pursued during 1994 is the issue of a summer cruise. The International Workshop on the Results of the MOUNT MITCHELL Cruise, Kuwait, 24-28 January 1993 had strongly recommended a summer cruise in order to bridge the gaps in knowledge of the oceanography and ecological characteristics of the ROPME Sea Area.

To that end, a joint IOC-ROPME-AS Meeting was held in Kuwait in January, 1994 to consider a cruise proposal received from the Ukrainian Academy of Sciences (UAS), in 1994 through

the IOC. The meeting was attended by regional experts and agreement on the timing as well as the scientific and logistic details of the cruise were decided. The cruise, originally scheduled for the summer 1994 was later postponed to summer 1995 to permit greater consultations and planning between the ROPME Secretariat and Member States of ROPME.

Technical details of the cruise were further discussed during the visits of Professor Peter Sphak and Mr Dimitry Greku, the Institute of Geological Sciences of the Ukrainian Academy of Sciences, to the IOC Secretariat, Paris, in July and November 1994 respectively.

Following a request made by the Executive Secretary of ROPME during the Eighth Session of the Committee of GIPME, San José, Costa Rica, 18-22 April 1994, a GIPME Review Group was constituted to evaluate all data and information available in ROPME's archive with a view to making a definitive statement on the state of health of the ROPME Sea Area. This Group, which started its work by correspondence, was to meet in Kuwait, 12-16 December 1994 to finalize the first phase of its work. A logical outcome of this review meeting is expected to be a comprehensive plan for continued monitoring of the ROPME Sea Area at both national and regional levels.

In the PERSGA Region, Expert Missions were sent to laboratories selected in close consultation with PERSGA in order to identify their needs in technical support necessary to strengthen their capabilities for marine pollution monitoring and research.

The GIPME Group of Experts provided advice to PERSGA towards establishing a Regional Co-ordination Unit for two GEF projects in the Red Sea, as well as towards the establishment of the Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden.

IOC also assisted in the organization of the Conference on the Red Sea Environment in Jeddah, Saudi Arabia, 18-21 April 1994.

IOC has been working closely with PERSGA during 1994 in planning the proposed Sea to Sea Conference to be organized during the first quarter of 1995 by UNEP, ROPME, PERSGA, ACOPS in collaboration with IOC and others.

A one-day pre-conference Workshop on Integrated Coastal Zone Management in the Red Sea to be organized jointly by PERSGA, IOC, UNEP and ACOPS and supported financially by IOC and UNEP is planned in conjunction with the Conference. The overall objective is to prepare an integrated project for the monitoring of the Red Sea which will, in particular, address matters related to oceanography. The project proposal will be presented to the Conference.

5.12 THE CASPIAN SEA

The 27th Session of the UNESCO General Conference requested the IOC to organize a study and workshop on the causes of sea-level rise in the Caspian Sea, in co-operation with IHP.

The present environmental situation of the Caspian Sea, caused by unprecedented sea-level rise (2.5m.) in the last 15 years, in combination with increasing human activities around the Caspian Sea, created serious economic and social problems in all the countries of the region. Despite many years of study, there is no clear understanding of the causes of such a sea-level rise.

The IOC representative (Dr. S.S. Lapo, Russia), attended the meeting of the UNEP Regional Task Team on the Implications of Climate Change in the Caspian Sea region, Moscow, Russia, 20-31 May 1994.

Upon the invitation of the IAEA, the representative of IOC, Dr. A. Tolkachev, took part in the joint IAEA-IOC-UNESCO mission, August-September 1994, to the riparian countries of the Caspian Sea: Russian Federation, Republic of Kazakhstan, Turkmenistan, Republic of Azerbaijan, Islamic Republic of Iran. The objective of the mission was to discuss the interest of the countries and to assess their willingness and capacity to participate in the project on Multidisciplinary Studies of

Environmental Processes in the Caspian Sea Region proposed by the IAEA, to be implemented in co-operation with IOC-UNESCO and other international organizations. All riparian countries have expressed their interest and willingness to participate in the project.

In October 1994, the IAEA organized a meeting on possible co-operation of UN Organizations in a Caspian Sea Project. The meeting was attended by representatives of IAEA, UNEP, WMO, WHO and IOC.

The participants agreed that, because of the complexity of the Caspian Sea problem and its multidisciplinary nature, interagency co-operation was needed, and UNEP was requested to take a leading role in developing such a co-ordinated activity.

Following the proposal of IAEA, it was agreed that in 1995, IOC jointly with IAEA and IHP-UNESCO, would organize a meeting of national representatives to be designated, for the proposed regional project as a pilot phase for future programmes, and to focus on specific issues related to the implementation of the project.

C. CO-OPERATION AND DEVELOPMENT

6. CO-OPERATION WITH OTHER ORGANIZATIONS OF THE UNITED NATIONS SYSTEM AND OTHER BODIES

Co-operation with other organizations and programmes is extensive and increasing. It is frequently referred to under the relevant programme activities in this report. Here, only a summary of the main features and actions is presented as an overview. Co-operation is obviously also a major aspect in the follow-up to UNCED.

6.1 ICSPRO AND RELATED MATTERS

An ICSPRO Consultation was organized at FAO, Rome, Italy, 22 April 1994, which strongly confirmed the need to maintain ICSPRO. Subsequently, the Director-General of UNESCO informed the Executive Heads of the ICSPRO Members, now including IAEA and UNEP, of the results, and made several proposals for the role of ICSPRO.

The Consultation reviewed the situation and concluded that ICSPRO has a supplementary and complementary role to that of the ACC Sub-Committee on Oceans and Coastal Areas in that it is not bound to the IACSD, nor to Agenda 21. The Sub-Committee will be fully occupied with its primary task of preparing a report to the IACSD for early 1996. However, there are other matters which also need to be addressed. The ICSPRO membership covers those with a common ocean mission, and with substantive roles to play in relation to the condition of the marine environment. It has a much wider scope in the field of oceanography. ICSPRO can address specific issues, for instance, those related to the United Nations Convention on the Law of the Sea; early warning systems; biodiversity and climate change; critical habitats. It can also take a broad-brush, brain-storming approach when exchanging views on emerging problems, and be forward-looking in that context. ICSPRO can also, through its composition and representation, provide a harmonized message to high-level decision makers, thereby creating an improved recognition of the need to understand the role of the ocean in the life-supporting system on earth, its linkages to sustainable development, and its societal implications. ICSPRO can, in the same vein, serve as a generator of increased public awareness and could constitute the basis for any inter-agency task force, if required, for the preparation of the International Year of the Ocean 1998.

A second ICSPRO consultation was organized at WMO, Geneva, 26 February 1995.

Intersecretariat consultations are held at intervals with one or several ICSPRO Agencies, occasionally also involving other UN bodies, to discuss co-operation within specific programmes or regions. These consultations are referred to in the section dealing with the programme in question.

The IOC is also normally represented at meetings of other partners in the UN system, in particular those of WMO, UNEP and IMO. This helps increase dialogue and co-ordination.

IOC has also participated in interagency consultations related to GEF programmes, at a global level, organized by UNEP, Nairobi, Kenya, October-November 1994, and at regional level for the Black Sea, organized by the Black Sea Environmental Programme Co-ordinating Unit, and for the East Asian and South-east Asian Seas, organized by IMO.

Close contacts are maintained with the Secretariat of IPCC and the Interim Climate Change Secretariat in Geneva, *inter alia*, through an IOC consultant stationed in Geneva. IOC is endeavouring to provide inputs to relevant activities and reports, to the extent that resources permit.

6.2 CO-OPERATION WITH THE INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS (ICSU) AND THE SCIENTIFIC COMMITTEE ON OCEANIC RESEARCH (SCOR)

Co-operation between ICSU and IOC occurs mainly through SCOR, IGBP, WCRP, GCOS and GOOS-development, but also within some of the Associations, e.g., IAPSO, CODATA and SCAR.

Co-operation in relation to GOOS, GCOS, WCRP and IGBP is reported under the subject sections. It should be emphasized here that this co-operation is highly beneficial in increasing IOC's association with many parts of the scientific community. Major issues concern co-ordination of activities, information exchange between the various programmes and a sustained availability of necessary resources, both human and financial.

Co-operation with SCOR is likewise presented within subject sections and includes GLOBEC (OSLR), JGOFS, COASTS and TEMA. IOC is providing contractual support to SCOR, e.g., for Working Groups of specific interest to IOC. The Assembly, at its Seventeenth Session, emphasized that independent scientific advice is important, and this can be obtained through the SCOR Working Groups.

The Secretary IOC, at intervals, has consultations with the ICSU and SCOR Secretariats in order to help ensure co-ordination and co-operation. Consultations have also been held in 1994 with Officers of SCOR, the President and the Secretary.

IOC was represented at the SCOR General Meeting, Vancouver, Canada, October 1994, and provided a report on co-operation and interactions. Increased interaction between IOC and SCOR was considered, including interaction in relation to TEMA.

Contractual support was provided to SCOR for specific activities, including support to GLOBEC and to several SCOR Working Groups, some of which work jointly with IOC.

IOC was represented at the 23rd Session of SCAR, Rome, 5-9 September 1994. SCAR's future strategy is to set scientific priorities for Antarctic research.

IOC is co-operating with the IGBP through association with JGOFS, LOICZ, GLOBEC and the START Programmes. This co-operation is related to specific IOC substantive programmes or projects.

IOC has signed a Memorandum of Understanding on co-operation with LOICZ in the context of coastal zone activities, GIPME and GOOS coastal module development.

6.3 OTHER BODIES AND PROGRAMMES

IOC is co-operating with the EU-CEC within specific programmes such as HAB, GIPME and IODE. This works satisfactorily and is expanding.

IOC is also co-operating with ACOPS and IOMAC. This is mainly in the organization of meetings. IOC was represented at the ACOPS regional meeting for local authorities of East Asia in Thailand, August 1994, and presented the WESTPAC programme and the role of marine research in the context of coastal zone protection and development. A joint training course was organized with IOMAC on coastal geology in Pakistan, with support from Germany. IOC was represented at IOMAC Committee meetings, Sri Lanka, November-December 1994.

Co-operation is extensive and increasing with ICES, mainly within the GIPME, IODE and OSLR programmes. Several working groups of ICES are co-sponsored by IOC.

IOC is likewise co-operating with PICES, mainly in the WESTPAC region, but also in the global- GLOBEC programme.

7. FOLLOW-UP TO UNCED

7.1 GENERAL

IOC has been actively participating in the implementation of UNCED decisions and related follow-up actions, including: Agenda 21; Framework Convention on Climate Change; Convention on Biological Diversity; Conference on Small Island Developing States with related preparatory work; and the on-going Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks. The Twenty-seventh Session of the Executive Council, Paris, July 1994, was informed of progress so far through several documents: IOC/EC-XXVII/Inf.5, Progress Report on Implementation of IOC-XVII Resolutions related to UNCED; IOC/INF-959, Report of the First Session of the ACC Sub-Committee on Oceans and Coastal Areas, FAO Headquarters, 19-21 April 1994; IOC/EC-XXVII/8 Annex 3 and Addendum, IOC Involvement in Climate-related Activities and Associated Issues; and Statement on the Climate Agenda, IOC/EC-XXVII/Inf.3, IOC and the Convention on Biological Diversity; IOC/EC-XXVII/8 Annex 4, Draft TEMA Strategy to respond to UNCED Agenda 21, Chapter 17, Part E; the Annual Report 1993 (IOC/EC-XXVII/6); and the Action Paper, Section 6 (IOC/EC-XXVII/8).

The Secretariat thus endeavours to implement Resolution XVII-18 "Implementation of UNCED Decisions Relevant to the IOC" through the mechanisms which have been put in place within the UN system for the follow-up to UNCED.

The ACC Sub-Committee on Oceans and Coastal Areas, at its First Session, FAO, Rome, 19-21 April 1994, agreed on a division of work among the participating bodies relating to the implementation of and reporting on Chapter 17 of Agenda 21, and a time schedule for the preparation of the report to the CSD to be ready in early 1996. The Second Session of the Sub-Committee is scheduled at WMO, Geneva, 23-27 January 1995. It is recalled that UNESCO, through IOC, is providing the Secretary (Mrs. N. Philippon-Tulloch) and related services to the Sub-Committee. The IOC Secretariat has provided input to the draft report, and the Secretary IOC represents UNESCO and IOC on the Sub-Committee.

IOC is participating in the preparations for the global conference on land-based sources of marine pollution (United States, 1995) including preparatory meetings in Ottawa, Canada, 1994, and in Reykjavik, Iceland, 1995. IOC is preparing an input in the form of guidelines and methods for monitoring of conditions in coastal waters, drawing on GIPME-MARPOLMON experiences.

IOC organized the Second Meeting of Scientific and Technical Experts on Oceans and Climate, hosted by the Government of Malta, at the Foundation for International Studies, University of Malta, 6-8 October 1994. This meeting focussed on the role of the oceans in the carbon and CO_2 budgets, in direct response to Agenda 21, Chapter 17.

The proposal for 1998 as the International Year of the Ocean was endorsed by the UN General Assembly in December 1994 (UN General Assembly Resolution No. A/RES/49/131). Preliminary ideas for IOC activities in this context are presented to the Assembly.

IOC is participating in the work related to the UN Framework Convention on Climate Change in the INC and with the interim Climate Change Secretariat in Geneva. IOC was represented at the INC meetings in New York and Geneva in 1994. A special briefing on sea-level observations and GLOSS was organized at INC-X, Geneva, August 1994. An IOC consultant stationed at the Climate Change Secretariat in Geneva assures close liaison, and also maintains close contact with the IPCC Secretariat at WMO.

7.2 SMALL ISLAND DEVELOPING STATES (SIDS)

The conditions facing the environment and development of small island states have attracted considerable attention in the last few decades as a result, for instance, of new emphasis on marine resources management.

Significant importance was given to the particular situation and needs of SIDS at the UN Conference on Environment and Development (UNCED, Rio de Janeiro, June 1992). Notably, the Conference included a sub-chapter on sustainable development of small islands in Agenda 21, and provided the ground work for the decision of the UN General Assembly at its 47th Session to convene a special conference in Barbados, May 1994.

In preparation for the Barbados conference, IOC provided technical support and participated in two regional preparatory meetings: Port Vila (Vanuatu), for Asia, Pacific and the Indian Ocean regions, and Port of Spain, Trinidad and Tobago, for the Caribbean and Atlantic islands developing states.

IOC participated in the Conference on Small Island Developing States, Barbados, May 1994, and organized a special exhibition with information on IOC programmes of particular relevance such as GLOSS, in co-operation with NGOs.

The Conference adopted an Action Programme addressing the following topics: climate change and sea-level rise; natural and environmental disasters; waste management; coastal marine, land, freshwater, energy and tourism resources; biodiversity; national institutions and administrative capacity; regional institutions and technical co-operation; transport and communications; science and technology; and human resource development. Provisions were included on implementation, monitoring and review.

A number of IOC programmes are helping to elucidate the oceanic conditions facing islands and to find answers to some of the development problems involved, and IOC, which was represented at the official Conference, gave full support to the Conference. As a contribution to the UNCED follow-up for tropical island states, and as a contribution to the SIDS Conference, IOC organized a Workshop on Small Island Oceanography in Relation to Sustainable Economic Development and related Coastal Area management, in the French Antilles in November 1993 (IOC Workshop Report No. 97).

Another example of special activities carried out as direct contributions to SIDS was the International Workshop on Geographic Information Systems (GIS) of Small Island Developing States, sponsored by IOC and the Canadian government, held in Barbados just prior to the UN Conference on SIDS (IOC Workshop Report No.103).

IOC has indicated its willingness to implement those aspects of the abovementioned Action Programme, in co-operation with island states and other UN and non-UN bodies, which relate to the Organization's mandate. For instance, IOC is planning a Second Workshop on Small Island Oceanography for the Indian Ocean, in the Comores Islands, to be held in 1995.

7.3 IOC AND THE CONVENTION ON BIOLOGICAL DIVERSITY

The Convention on Biological Diversity has called on the UN Specialized Agencies to review their policy with respect to activities related to the conservation and rational use of biodiversity. IOC is now in the process of further developing the biodiversity component of its on-going programmes.

As a competent intergovernmental organization, the role of IOC is to assist Contracting Parties to the Convention to develop their national strategies with respect to marine biodiversity.

In accordance with decisions of the Seventeenth Session of the Assembly and the Twenty-seventh Session of the Executive Council, consultations on the specific and priority roles of IOC have been held with experts. An *ad hoc* consultation of experts is being planned for Spring 1995 which can also respond to the First Conference of the Parties to the Convention, Nassau, Bahamas, 28 November-9 December 1994. IOC was represented at the Conference, and provided information on its relevant activities. The IOC Secretariat has also initiated co-operation with the interim Secretariat of the Convention.

The following activities are presently being carried out, related to marine biological diversity, and further activities specifically related to the implementation of the Convention on Biological Diversity are being considered:

(i) An IOC Register of Marine Organisms is being prepared jointly with the Natural History Museum of Leiden, Netherlands, and the Expert Centre for Taxonomical Identification (ETI), Amsterdam, Netherlands. This register is intended to provide taxonomists, decision-makers and other users (students; museums; etc.) with an instrument for the preparation of national inventories of marine organisms as called for in the Convention. The Register also represents a basis for an agreed taxonomic terminology of marine organisms. The first draft (which is to be considered at a more general level than the species-related one, that is at the level of families) is being reviewed by specialists. The second phase of the project will expand the register at the genus and species levels. The register will run on computer diskettes; therefore it is also aimed at promoting computer assisted taxonomy. All the scientists from the Small Island Developing States are now invited to co-operate with IOC in developing the second phase of the project by requesting a copy of the ETI LINNAEUS II Software for Biodiversity Documentation. They should provide IOC with their list of marine species (the software is available, free of charge, from ETI, University of Amsterdam, Mauritskade 61, NL 1092 AD Amsterdam, The Netherlands).

(ii) Within the context of the Coastal Pilot Monitoring System of the IOC-WMO Global Ocean Observing System (GOOS), an IOC-UNEP-WMO-IUCN pilot activity on monitoring coral reef ecosystems is being developed. This activity will, *inter alia*, provide many data on the state of coral reefs, which can be used by decision-makers in taking actions aimed at rational use, as well as the protection of such important marine ecosystems. Within GOOS, and as an IOC-FAO Programme on Ocean Science in Relation to Living Resources input to GOOS, a Directory of Seagrass-bed Research Institutions is also being developed. This Directory will provide decision-makers with information on on-going research, management and training activities on seagrass beds worldwide. Seagrass beds are one of the most important coastal ecosystems, together with coral reefs and mangroves, from the ecological and biodiversity viewpoints. Several studies have been conducted to date on this marine ecosystem, and many scientific data are already available for developing sustainable management strategies.

(iii) Activities related to the mangrove ecosystem are carried out within the UNESCO-IOC Inter-regional Project on Research and Training on Integrated Management of Coastal Ecosystems (COMAR). COMAR's objectives are to improve the knowledge and understanding of the characteristics, functioning and change in the systems and ecosystems of coastal zones and to provide the scientific basis for their integrated management. One of the main activities to be mentioned is the on-going major research, conservation and training project on mangrove ecosystems in Asia and the Pacific.

(iv) The IOC-UNEP International Mussel Watch Programme is providing information on potential threats to marine biodiversity in the coastal zone, through monitoring the concentration of selected pollutants in bivalves (molluscs) on a global scale. The Programme is under way in Central and South America, and its Asia-Pacific component is being developed. This programme can be considered as a response to Article 12 of the Convention "Research and Training", calling for the promotion of research which contributes to the conservation and sustainable use of biodiversity.

(v) As training is an essential component for the implementation of the Convention on Biological Diversity, a special effort is being made to improve the on-going taxonomy-oriented activities within the context of the IOC Programme on Training, Education and Mutual Assistance in the Marine Sciences (TEMA). The improvement of local capabilities in taxonomic identification, through the organization of training courses on specific themes, will help develop the necessary basic tools for the conservation of marine biodiversity.

8. IOC IN RELATION TO UNCLOS

In view of the imminent coming into force of the United Nations Convention on the Law of the Sea, the IOC Executive Council, at its Twenty-seventh Session, Paris, 5-12 July 1994, considered the IOC in Relation to UNCLOS under a separate agenda item. The discussion was based on a working document entitled "IOC and UNCLOS: Responsibilities and Actions" (Document IOC/EC-XXVII/15) prepared by Professor Alexander Yankov, in consultation with the IOC Secretariat.

The document pinpointed responsibilities of IOC explicitly singled out by UNCLOS to assist in the work of the Commission on the Limits of the Continental Shelf and of the Special Arbitral Tribunal; the leading or major role as a designated "competent international organization" in marine scientific research, ocean services and capacity building; and the contributory or advisory role in the work of other international organizations. The priority areas for the adjustment of policy, operation and statutes of IOC under UNCLOS was suggested, and it was emphasized that this adjustment should be made in the framework of the follow-up to DOSS.

The Executive Council realized the urgency of the tasks entrusted to IOC by UNCLOS and gave its full support to the Secretary IOC to take immediate action to fulfil its short-term responsibilities. It also decided to establish an *ad hoc* Intersessional Working Group on IOC Responsibilities and Actions in Relation to UNCLOS, together with their Terms of Reference, to further study the evolving roles and responsibilities of IOC as a result of UNCLOS. Accordingly, a letter was sent to all members of the Executive Council, inviting their contribution and proposition with regard to the Terms of Reference, based upon which a consolidated report will be prepared.

As a follow-up to Executive Council decisions, Circular Letter No.1424 on the List of Experts for Use in Special Arbitration was sent to all IOC Member States, inviting their nomination of experts in marine scientific research. Altogether 22 replies have been received with 37 nominations. These nominated experts have been compiled in a list which has been submitted to the Secretary-General of the United Nations.

IOC was represented at the 12th Summer Session of the Preparatory Commission for the International Sea-bed Authority and for the International Tribunal for the Law of the Sea. A proposal of the IOC with respect to co-operation with the International Sea-bed Authority in training qualified personnel in various fields in relation to the international sea-bed activities was welcomed by the Preparatory Commission.

On 16 November 1994, the First Vice-Chairman, Dr. Geoffrey Holland, attended the celebration ceremony in Kingston, Jamaica, on the entry into force of UNCLOS, as well as the First Session of the International Sea-bed Authority.

Upon the request of the Secretary-General, IOC made its contribution to the Report of the SG to the 48th Session of the UN General Assembly, December 1994.

An *ad hoc* expert meeting on scientific questions related to Article 76 of UNCLOS, to be composed by marine geologists, geophysicists and hydrographers, is being planned with a view to assisting in the work of the Commission on the Limits of the Continental Shelf.

9. ENHANCING THE ROLE OF THE IOC

Actions taken to continue the implementation of Resolution XVII-20 have been continued, and the resulting documentation as regards the level of appropriation from UNESCO and the tasks of the IOC Officers are presented to the Assembly (Document IOC-XVIII/2 Annex 1). Revised Rules of Procedure are also brought to the attention of the Assembly (Document IOC-XVIII/2 Annex 2).

New arrangements for IOC are being implemented through decisions of the Director-General in accordance with Resolution XVII-20 and the endorsement thereof by the 27th General Conference

of UNESCO. These new arrangements will enter into force in the biennium 1996-1997, implying that support from UNESCO to IOC will be granted in the form of a "financial allocation" to a special account.

A document (146 EX/20) on these matters will be presented by the Director General to the 146th Session of the UNESCO Executive Board (May 1995), similar to the version presented to the Twenty-seventh Session of the IOC Executive Council.

The Second International Conference on Oceanography, Lisbon'94 - Towards Sustainable Use of Oceans and Coastal Zones, 14-19 November 1994 included an analysis of the evolving role of IOC since its establishment in 1960, and the perspectives for the future in the light of the entering into force of UNCLOS, and the follow-up to UNCED.

The Conference was divided into two parts:

Part I: Experts Meeting, 14-17 November 1994

The purpose of Part I of the Conference was to identify the scientific needs and capabilities, as well as the institutional requirements for research, development and protection of the marine environment and its resources, as a stage-setting process for Part II of the Conference on institutional aspects.

To this end, Part I was conceived as comprising four main elements. These were in sequence:

1. Definition of the global challenges to society presented by the concepts of sustainable development and bio-diversity protection in the context of global societal trends and aspirations such as population growth, demographic trends and improved standards of living.

2. Present the challenges to marine science and its institutional arrangements and structures in the global development context, taking account of the pressures on marine resources, amenities and other uses, and potential opportunities provided by the oceans, including coastal areas, for sustainable development.

3. Identify the scientific and technical elements for these challenges, including the limits to the carrying and productive capacity of the ocean, the capacity to provide scientific information and understanding as required to satisfy the need for sustainable development of marine resource and amenities.

4. Appraising the scientific needs and capabilities for providing the required insights and understanding and specifying the requirements of international institutional arrangements to ensure the effective delivery and application of scientific knowledge and information for rational management.

Part II: Governmental Experts Meeting, 17-19 November 1994

Over 150 participants attended the Conference and about 60 countries were represented, covering all geographical regions. It was a truly global Conference, with about 40 developing countries represented.

The scientific part of the Conference produced a "Shared Vision" and the Governmental Expert part of the Conference adopted a Declaration. These are both provided in Annex I to this report.

The adoption of the 1998 International Year of the Ocean must also be seen as a possibility to enhance the role of IOC.

10. PUBLICATIONS

A complete list of available titles is found in Document IOC/INF-700 rev.9. The following titles issued in 1994 were:

IOC Technical Series

41 Marine Debris: Solid Waste Management Action Plan in the Caribbean. 1994. 22 pp. (English)

42 Calcuiation of New Depth Equations for Expendable Bathythermographs Using a Temperature-Error-Free Method (Application to Sippican/TSK T-7, T-6 and T-4 XBTs). 1994. 45 pp. (English)

IOC Manuals and Guides

14 Manual on Sea-Level Measurements and Interpretation. Vol.II: Emerging Technologies. 1994. 72 pp. (English)

28 Nutrient Analysis in Tropical Marine Waters. 1993. (Published in 1994). 24 pp. (English)

29 Protocols for the Joint Global Ocean Flux Study (JGOFS) Core Measurements. 1994. 178 pp. (English)

30 MIM Publication Series

Vol. 1: Report on Diagnostic Procedures and a Definition of Minimum Requirements for Providing Information Services on a National and/or Regional Level. 1994. 6 pp. (English)

Vol. 2: Information Networking: The Development of National or Regional Scientific Information Exchange. 1994. 22 pp. (English)

Vol. 3: Standard Directory Record Structure for Organizations, Individuals and their Research Interests. 1994. 33 pp. (English)

IOC Workshop Reports

94 BMTC-IOC-POLARMAR International Workshop on Training Requirements in the Field of Eutrophication in Semi-Enclosed Seas and Harmful Algal Blooms. Bremerhaven, Germany. 1992. (Published in 1994). 60 pp. (English).

95 SAREC-IOC Workshop on Donor Collaboration in the Development of Marine Scientific Research Capabilities in the Western Indian Ocean Region. Brussels, Belgium. 1993. (Published in 1994). 33 pp. (English).

96 IOC-UNEP-WMO-SAREC Planning Workshop on an Integrated Approach to Coastal Erosion, Sea-Level Changes and their Impacts. Zanzibar, United Republic of Tanzania. 1994. 23 pp. (English).

96 Suppl.1 IOC-UNEP-WMO-SAREC Planning Workshop on an Integrated Approach to Coastal Erosion, Sea-Level Changes and their Impacts. Zanzibar, United Republic of Tanzania. Submitted Papers: 1. Coastal Erosion. 1994. 178 pp. (English)

96 Suppl.2 IOC-UNEP-WMO-SAREC Planning Workshop on an Integrated Approach to Coastal Erosion, Sea-Level Changes and their Impacts. Zanzibar, United Republic of Tanzania. Submitted Papers: 2. Sea Level. 1994. 107 pp. (English)

97 IOC Workshop on Small Island Oceanography in Relation to Sustainable Economic Development and Coastal Area Management of Small Island Developing States. Fort-de-France, Martinique. 1993. (Published in 1994). 28 pp. (English)

98 CoMSBlack '92A Physical and Chemical Intercalibration Workshop. Erdemli, Turkey. 1993. (Published in 1994). 108 pp. (English)

99 IOC-SAREC Field Study Exercise on Nutrients in Tropical Marine Waters. Mombasa, Kenya. 1994. 19 pp. (English)

100 IOC-SOA-NOAA Regional Workshop for Member States of the Western Pacific (GODAR-II). Tienjin, China. 1994. 74 pp. (English)

101 IOC Regional Science Planning Workshop on Harmful Algal Blooms. Montevideo, Uruguay. 1994. 75 pp. (English, Spanish)

102 First IOC Workshop on Coastal Advanced Science and Technology Study (COASTS). Liège, 5-9 May 1994. 27 pp. (English)

103 IOC Workshop on Geographic Information Systems Applications in the Coastal Zone Management of Small Island Developing States. Barbados. 1994. 132 pp. (English)

104 Workshop on Integrated Management. Dartmouth, Canada. 1994. (English). (In preparation)

IOC Training Course Reports

22 First IOC/IOCARIBE-UNEP Training Course on Monitoring and Control of Shoreline Changes in the Caribbean Region. Port-of-Spain, Trinidad and Tobago. 1993. (Published in 1994). 14 pp. (English, Spanish)

23 IOC/WESTPAC Training Course on Numerical Modelling of the Coastal Ocean Circulation. Matsuyama, Japan. 1993. (Published in 1994). 9 pp. (English)

24 IOC-JODC Training Course on Oceanographic Data Management. Tokyo, Japan. 1992. (Published in 1994). 16 pp. (English)

25 IOC-JODC Training Course on Oceanographic Data Management. Tokyo, Japan. 1993. (Published in 1994). 37 pp. (English)

26 IOC Training Course on Ocean Flux Monitoring in the Indian Ocean. Mombasa, Kenya. 1993. (Published in 1994). 22 pp. (English)

27 IOC-UNEP-SPREP Training Course on Coral Reef Monitoring and Assessment. Rarotonga. Cook Islands. 1994. 18 pp. (English)

28 IOC-JODC Training Course on Oceanographic Data Management. Tokyo, Japan. 1994. 42 pp. (English)

29 IOC-WHO-FAO Training Course on Qualitative and Quantitative Determination of Algal Toxins. Jena, Germany. 37 pp. 1994. (English)

Ocean Forum Series

Coastal Zone Space: Prelude to Conflict? By Edward G. Goldberg. 1994. 138 pp. ISBN: 92-3-102953-3. (English). **On sale at UNESCO Publishing. Price: 85 FF**

Non-serial Titles

Sea-level Monitoring in the Small Island Developing States. Document IOC/INF-954. 1994. 24 pp. (English)

IOC Titles and Acronyms, 1994. Document IOC/INF-960. 1994. 181 pp. (Composite English/French/Spanish).

ANNEX I

SECOND INTERNATIONAL CONFERENCE ON OCEANOGRAPHY LISBON'94 TOWARDS SUSTAINABLE USE OF OCEANS AND COASTAL ZONES

A. DECLARATION

Participants at the Second International Conference on Oceanography Lisbon'94 Towards Sustainable Use of Oceans and Coastal Zones, Lisbon, 14-19 November 1994, wish to present their conclusions by making this Declaration. We:

1. **Reaffirm** the following principles and concepts for international, regional, sub-regional, and national action with a view to engendering a common commitment by the governmental and scientific communities so that all aspects of the ocean and its coastal and atmospheric interfaces can be better understood, utilized and protected for the sustainable environmentally sound and peaceful uses by humankind.

(i) *'the oceans, covering some seventy percent of the Earth's surface, exert a profound influence on mankind and indeed upon all forms of life of the Earth .. In order properly to interpret the full value of the oceans to mankind, they must be studied from many points of view. While pioneering research and new ideas usually come from individuals and small groups, many aspects of oceanic invesigations present far too formidable a task to be undertaken by any one nation or even a few nations'.* (First International Conference on Oceanography, Copenhagen, July 1960)

(ii) *'marine research on coastal systems is an inseparable component of oceanographic research that interfaces with open-ocean research, as well as providing input to coastal area management'* (Twelfth Session of the IOC Assembly, Resolution XII-10, November 1982)

(iii) *'... the problems of ocean space are closely inter-related and need to be considered as a whole'*(UNCLOS: Preamble 1982)

(iv) *'... the Convention of the Law of the Sea is intended to establish a new regime for the seas and ocean, which requires the fulfillment of obligations and the exercising of rights in good faith (Article 300 of the Convention) ... [but] unless urgent measures are taken, the marine scientific and technological gap between the developed and developing countries will widen further and thus endanger the very foundations of the new regime* (Annex VI of the final act of the third UN Conference on the Law of the Sea).

(v) 'The marine environment - including the oceans and all seas and adjacent coastal areas - forms an integrated whole that is an essential component of the global life-support system and a positive asset that present opportunities for sustainable development. This requires new approaches to marine and coastal area management and development, at the national, subregional, regional and global levels, approaches that are integrated in content and are precautionary and anticipatory in ambit. (UNCED: Agenda 21, para. 17.1 of Chapter 17, June 1992).

2. **Recall** that the decision to create the Intergovernmental Oceanographic Commission in 1960 was based upon recognition that an institutional mechanism for joint action between nations is a basic prerequisite for achieving common goals.

3. **Recognize** that the progress made during the last three decades in developing an ocean partnership has been reinforced through the relevant provisions of the UN Convention on the Law of the Sea, now entering into force, and the strategy provided in Agenda 21 of UNCED, as well as the Framework Convention on Climate Change and the Convention on Biological Diversity, which are equally relevant for the global knowledge of the Ocean.

4. **Express concern** that society is facing many critical environmental problems, particularly in the coastal zone where the majority of the global population lives and **note** at the same time that there is now a greater opportunity for translating the results of the last decades of ocean research into operational, practically applications which can help address some of the pressing problems, such as pollution, loss of habitats and reduction in biodiversity, decline in fisheries, human health problems, coastal hazards and the vulnerability of coasts to the impacts of climate change.

5. **Recognize** that an increased and effective application of science to the solution of concrete problems calls for a closer interaction and dialogue between scientists and managers as well as other users of marine and coastal resources.

6. **Consider** however, that a more concerted approach by governments through appropriate coordination mechanisms and institutions at the national and regional levels would accelerate the acquisition of knowledge and its application for a better management of the ocean and coastal areas and their resources.

7. **Encourage** all efforts by nations and the international community that would lead to adequate and concrete commitments to the principles referred to herein, which have already received endorsement at high governmental levels.

8. **Emphasize** that a concerted approach to capacity building through a reinforced ocean partnership is the essential building-block for integrated management of the ocean and coastal areas, and all types of seas that would help ensure sustainability of the global ecosystem.

9. **Call upon** Member States of and institutions within the UN System to take urgent action to ensure that:

   (i) national institutions dedicated to ocean and coastal research, systematic observations and services are strengthened or established,

   (ii) commitment to capacity building is reflected in greater effectiveness of bilateral and international assistance so that the resources are commensurate with the political and socio-economic challenges associated with the use and wise management of ocean and coastal areas, and, in particular, new arrangements for North-South support, South-South collaboration and increased use of the capacity created in the South,

   (iii) a cohesive and co-operative approach to ocean science, ocean services and related capacity building is applied within the UN System using the IOC as an appropriate institution for facilitating this.

10. **Call also** upon Member States of IOC and of its parent body UNESCO, to join together to ensure that the funding and human resources available to the IOC are commensurate with its responsibilities and tasks.

11. **Request** the Government of Portugal to inform the Secretary-General of the United Nations about the deliberations and outcome of the Conference, bearing in mind the report required under the UN General Assembly Resolution of the Law of the Sea as well as the fact that the Commission on Sustainable Development will consider in 1996 the Secretary-General's Report on Chapter 17 of Agenda 21.

12. **Invite** the Director-General of UNESCO, as Executive Head of IOC's parent body, to consider appropriate measures to further reinforce the IOC and its regional subsidiary bodies so as to enable it to respond fully to its mandate and role in ocean and coastal affairs within the UN System.

13. **Request** the Chairman of the IOC, in reporting on the Conference to the Eighteenth Session of the IOC Assembly, to emphasize the need for Member States to commit themselves to the strengthening and further development of the IOC so as to ensure that a concerted intergovernmental approach regarding ocean and coastal research, services, systematic observations and related capacity building can be arrived at and the goal of sustainable development of the oceans and coastal zones be realized.

B. THE OCEANS - A SHARED VISION

Scientific experts met to exchange information and ideas at the Second International Conference on Oceanography held in Lisbon in November 1994. Together they developed a view of the future, a shared vision, of a world in which the oceans are used in a sustainable manner.

The shared vision is of caring and sensible management of the oceans and of their resources, through the accumulation and application of knowledge, together with strengthened dialogue between scientists, decision-makers, managers and the public, in order to ensure that the oceans are a continuing source of wealth and delight to humankind.

The world's oceans, including the coastal zones and the marginal and semi-enclosed seas, are of great environmental, cultural, intellectual, nutritional and socio-economic value. Knowledge of them has increased enormously in recent decades but there is still much to discover and understand.

The pursuit of knowledge regarding the oceans has now been given added impetus and a new focus on sustainability through the Earth Summit in 1992 (Agenda 21), the Convention on Biodiversity and the Framework Convention on Climate Change in 1992, and the entry into force of UNCLOS in 1994.

The vision is of ensuring the future health of the world oceans through continuing national and international co-operation at global, regional and local levels. Development activities, especially in coastal areas have caused problems such as pollution, loss of habitat, ecosystem degradation and decline in fisheries. Therefore scientific activities will be increasingly pursued on an holistic and continuing basis that recognizes the close inter-relationships between the oceans, atmosphere and land, and between the oceans, weather and climate.

The vision is of common objectives being pursued through strategic, tactical and operational programmes of marine surveying, monitoring and modelling, underpinned by research, undertaken and/or facilitated by intergovernmental bodies such as IOC, governmental and non-governmental organizations, universities and research institutes.

Capacity building, particularly in developing countries, will be a requirement to ensure national needs can be met. Institutions will increase their ability to adjust to new and complex linkages and produce the human resources required to help implement the UNCED and UNCLOS agreements.

New interfaces will be established between the marine sciences and the social sciences to influence research and enhance communication. Communications will also be strengthen between the marine scientists, policy-makers, managers and the public in order to facilitate the effective and integrated management of the oceans, sea and coastal zones for the benefit of humankind.

ATTAINING THE VISION

The Conference re-affirmed the dedication, enthusiasm and long-term commitment of the international marine scientific community to help the vision become a reality. this will require that a number of objectives be met, including:

- Integrated management of marine and coastal environments including maintenance of biodiversity;
- Sustainable harvesting and farming of marine living resources;
- Exploitation of marine non-living resources in a cost-effective and environmentally acceptable manner;
- Assessment and prediction of marine hazards in order to minimize their impact on human life and the infrastructure;
- Integration of scientific activities and their results into continuing and integrated marine management systems;
- Building and strengthening the scientific capacity of less developed countries using the partnership approach and local knowledge to ensure their national needs can be met and that they can fully participate in international oceanographic programmes of relevance to their national priorities and aspirations;
- More effective communication of the scientific outcomes to decision-makers and managers to inform their actions;
- Better links between the marine sciences and society to enhance community involvement and awareness;

Scientific and operational activities required in the oceans, coasts and seas will need to include:

- Systematic base-line mapping, monitoring and analysis against which to measure future changes in the water column, the sea floor, and marine and coastal ecosystems;
- Assessment of the potential economic and intrinsic value of marine resources and long-term and continuous monitoring before, during and after any resource exploitation;
- Evaluation of the capacity of the oceans to absorb change;
- Development and application of new technologies in measuring, monitoring and modelling, underpinned by continuing and relevant research;
- Documentation of economic and other benefits resulting from improved knowledge, forecasting conditions and sustainable development of the oceans and coasts;
- Monitoring and modelling of oceans and ecosystem variations which may indicate global climate change.

We now know a great deal about the world's oceans, but there is still much to learn. The knowledge, skill and enthusiasm of the oceanographic community will be needed if the oceans, coasts and seas are to be responsibly and sustainably used in the future.

ANNEX II

LIST OF IOC CIRCULAR LETTERS AND INFORMATION DOCUMENTS ISSUED IN 1994

1. LIST OF CIRCULAR LETTERS AND JOINT CIRCULAR LETTERS

1.1 LIST OF CIRCULAR LETTERS (1401-1438)

1994

1401	07.01.94	Twenty-seventh Session of the Executive Council, Paris, 5-13 July 1994, (To EC Member States)	E F S R
1402	07.01.94	Twenty-seventh Session of the Executive Council, Paris, 5-13 July 1994, (To Member States not Members of the Executive Council)	E F S R
1402a	03.01.94	First Planning Session of the IOC-WMO-UNEP Committee for the Global Ocean Observing System (I-GOOS), Melbourne, Australia, 18-21 April 1994	E F S R
1403	07.01.93	Twenty-seventh Session of the Executive Council, Paris, 5-13 July 1994, (To organizations)	E F S R
1403a	08.01.94	IOC in Relation to the UN Convention on the Law of the Sea	E only
1404	14.03.94	IOC/WESTPAC Third International Scientific Symposium, Bali, Indonesia, 22-26 November 1994	E only
1405	03.03.94	Recent Developments at the IOCARIBE Secretariat Cartagena de Indios, Colombia	E S
1406	14.03.94	IOC/WESTPAC Third International Scientific Symposium Bali, Indonesia, 22-26 November 1994	E only
1407	25.05.94	Second International Conference on Oceanography Lisbon '94 - Towards Sustainable Use of Oceans and Coastal Zones, Lisbon, Portugal, 14-19 November 1994	E only
1408	24.03.94	Establishment of an NODC System in Ireland	E only
1409	25.03.94	Establishment of a Designated National Agency (DNA) of the IODE System in Ukraine	E only
1410	11.04.94	Participation in Japanese Oceanographic Cruise	
1411	03.05.94	Invitation to GLOBEC International Strategic Planning Conference, Paris, 18-22 July 1994	E only
1412	05.05.94	Training Course in Oceanographic Data Management for the Black Sea Countries	E only
1413	18.05.94	Training Course on Oceanographic Data Management in Support of WESTPAC Activities, Tokyo, Japan, 26 September-7 October 1994	E only
1414	25.05.94	Establishment of a Designated National Agency (DNA) of the IODE System in Malaysia	E only

1415	30.05.94	IOC-WHO-FAO Training Course on Qualitative- and Quantitative Determination of Algal Toxins as part of the IOC-FAO Harmful Algal Bloom Programme	E only
1416	01.06.94	IOC Regional Black Sea Programme	E only
1417	14.06.94	Curso de Capacitación sobre Gestión e Información de Datos Oceanográficos, Buenos Aires, 17-28 October 1994	S only
1418		CANCELLED	
1419	21.06.94	IOC Executive Council Session 1994	E only
1420	28.07.94	First Session of the joint CMM-IGOSS-IODE Sub-group on Ocean Satellites and Remote Sensing, Paris, 19-22 September 1994	E only
1421	05.08.94	South Western Atlantic Co-operation in the Field of the Marine Environment	E S
1422	05.08.94	Strengthening of GIPME-MARPOLMON and updating of expert rosters for GIPME Groups of Experts (GEMSI, GEEP and GESREM)	E F S
1423	30.09.94	Third Regional Workshop for the IOC Member States bordering the Indian Ocean, Goa, India, 6-9 December 1994	E only
1424	17.08.94	Preparation of a "List of Experts" for Use in Special Arbitration	E F S R
1425	14.09.94	Participation in Japanese Oceanographic Cruise SV TAKUYO in support of WESTPAC Activities	E only
1426	18.10.94	Second International Conference on Oceanography Lisbon '94 - Towards Sustainable Use of Oceans and Coastal Zones, Lisbon, Portugal, 14-19 November 1994	E F S R
1427	10.10.94	Surplus Equipment under the IOC Voluntary Co-operation Programme - Donation from KNMI, Netherlands	E only
1428	10.10.94	Questionnaire on Seagrass Bed Activities	E only
1429	27.10.94	Questionnaire on Requirements from the GIPME Programme	E only
1430	28.11.94	Eighteenth Session of the Assembly (to Member States) Paris, 13-27 June 1995	E F S R
1431	28.11.94	Eighteenth Session of the Assembly, Paris, 13-27 June 1995 (to Organizations)	E only
1432	28.11.94	Twenty-eighth Session of the Executive Council, Paris, 12 June 1995 (to Member States of the IOC Executive Council)	E F S R
1433	28.11.94	Twenty-eighth Session of the Executive Council, Paris, 12 June 1995 (to Member States not Members of the IOC Executive Council)	E F S R

1434	28.11.94	Twenty-eighth Session of the Executive Council, Paris 12 June 1995 (to Organizations)	E only
1435	22.11.94	UNESCO-IOC Register of Marine Organisms	E only
1436	09.12.94	Ad hoc Intersessional Working Group on IOC Responsibilities and Actions in Relation to UNCLOS	E only
1437	05.01.95	Third Session of the IOC-FAO *ad hoc* Intergovernmental Panel on Harmful Algal Blooms (IPHAB-III), Paris, 6-9 June, 1995	E only
1438	07.12.94	First Southern Ocean Forum	E only

Joint IOC-WMO Circular Letters IGOSS (140-142)

140	09.09.94	Oceanographic products issued by national centres - IGOSS Information Service Bulletin	E F S R
141	03.10.94	Seventeenth Issue of the Regular Information Service Bulletin on Non-drifting Ocean Data Acquisition Systems (ODAS)	E F S R
142	04.01.95	WMO-IOC Workshop on Operational Ocean Monitoring using Surface-based Radars, Geneva, 6-8 March 1995	E F S R

Joint IOC-WMO Circular Letters IGOSS Sp. (92-93)

92	15.04.94	Exchange of IGOSS Operational Data Reports over the GTS in 1993	E only
93	15.08.94	Final Report of the Third Session of the IGOSS Group of Experts on Operations and Technical Applications, Geneva, 20-24 June 1994	E only

Joint IOC-WMO Circular Letters JTA (20-22)

20	15.06.94	Fourteenth Meeting on Argos Joint Tariff Agreement, La Jolla, California, USA, 7-9 November 1994	E F S R
21	28.11.94	Global Agreement for the Utilization of the Argos System in 1995	E F S R
22	30.12.94	Final Report of the Fourteenth Meeting on the Argos on the Argos Joint Tariff Agreement	E F S R

Joint IOC-WMO Circular Letters DBCP (34-36)

34	15.06.94	Tenth Session of the Data Buoy Co-operation Panel, La Jolla, California, USA, 1-4 November 1994	E F S R
35	21.06.94	Lists of National Focal Points for the Data Buoy Co-operation Panel and for the Logistic Support for Buoy Deployments	E F S R
36	30.12.94	Final Report of the Tenth Session of the Data Buoy Co-operation Panel	E F S R

2. LIST OF IOC INFORMATION DOCUMENTS (962-983)

IOC/INF-962	--	CANCELLED	
IOC/INF-963	--	CANCELLED	
IOC/INF-964	01.06.94	WMO-ICSU-IOC World Climate Research Programme	E only
IOC/INF-965	07.06.94	Executive Summary of the Revelle Memorial Lecture presented at EC-XXVII by Dr. S. Qasim	E only
IOC/INF-966	07.06.94	National Oceanographic Programmes of the Republic of Korea for 1994	E only
IOC/INF-967	07.06.94	National Oceanographic Programmes of Canada for 1994	E only
IOC/INF-968		CANCELLED	
IOC/INF-969	09.06.94	Oceanographic Programme of Brazil planned for 1994	E only
IOC/INF-970	09.06.94	Programme océanographique de la France, provisoire, pour 1994	F only
IOC/INF-971	09.06.94	Oceanic Research Ship Schedule as of 15 November 1993	E only
IOC/INF-972	18.06.94	National Oceanographic Programme of Japan for 1994	E only
IOC/INF-973	22.12.94	IODE Handbook, Revised Edition 1994	E only
IOC/INF-974	20.06.94	Oceanic Research Ship Schedule as of 20 May 1994	E only
IOC/INF-975	20.06.94	National Oceanographic Programme of Finland, 1994	E only
IOC/INF-976	05.07.94	Report from the Scientific Committee on Oceanic Research (SCOR) to the Intergovernmental Oceanographic Commission, at the Twenty-seventh Session of the Executive Council	E only
IOC/INF-977	26.07.94	Information to the 12th Session of the Preparatory Commission for the International Sea-bed Authority and for the International Tribunal for the Law of the Sea, New York, USA, 1-2 August 1994	E only
IOC/INF-978	01.09.94	Report of the 1993 IOC/WESTPAC Nutrient Intercalibration Exercise	E only
IOC/INF-979	20.09.94	Summary Report of the Third Session of the IOC-WMO Steering Group on the GTSPP, Ottawa, Canada, 5-19 November 1993	E only
IOC/INF-980	19.10.94	National Oceanographic Programme of Sweden for 1994	E only
IOC/INF-981	19.10.94	National Oceanographic Programme of Turkey for 1994	E only
IOC/INF-982	19.10.94	National Oceanographic Programme of Argentina for 1993 and 1994 (planned)	E only
IOC/INF-983	19.10.94	Cruise Report No.4/94 of the Baltic Sea Research Institute, Rostock, Germany	E only