Intergovernmental Oceanographic Commission

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TABLE OF CONTENTS

A. IMPLEMENTATION OF RESOLUTIONS AND THEIR STATUS AS OF MARCH 1996

B. PROGRAMME ACTIVITIES

A. IMPLEMENTATION OF RESOLUTIONS AS OF MARCH 1996

1. RESOLUTIONS ADOPTED BY THE EIGHTEENTH SESSION OF THE IOC ASSEMBLY

Resolution XVIII-1: *Ad hoc* Study Group on IOC Development, Operations, Structure and Statutes (DOSS)

Following an invitation letter together with a provisional agenda circulated to Member States as Circular Letters No. 1469 of 5 September 1995 and No. 1483 of 23 February 1996, the First Session of the ad hoc Study Group will be organized at UNESCO, Paris, 20-24 May 1996. A progress report will be presented to the Twenty-ninth Session of the Executive Council.

Resolution XVIII-2: Financial Regulations applicable to the special Account of the IOC

Draft financial rules based on UNESCO financial rules will be presented to the Twenty-ninth Session of the Executive Council for initial consideration, advice and instructions as regards their further specification and presentation to the Nineteenth Session of the Assembly.

Resolution XVIII-3: UN Year of the Ocean 1998

The IOC preparatory task team for "1998 The International Year of the Ocean", which includes the IOC Officers, an ex officio member from Portugal and the chairs of the IOC Regional Subsidiary bodies, has prepared a draft programme proposal which is being circulated to Member States for comments. The draft proposals and a progress report will be presented to the Twenty-ninth Session of the Executive Council.

Resolution XVIII-4: IOC and UNCLOS

The open-ended Working Group has been convened to meet on 13-15 May 1996 at UNESCO, Paris. Views and proposals of the Working Group will be presented to the Twenty-ninth Session of the Executive Council.

Resolution XVIII-5: Intergovernmental WOCE Panel

The need for continuing satellite altimeter observations has been communicated to the space agencies through CEOS. IOC has confirmed its support to forthcoming WOCE activities. The concept of rapid, free, and an open exchange of data, and related data management matters are supported and followed up through the IODE Committee and programme actions.

Resolution XVIII-6: Climate Related Issues

The IOC has fully participated in the development and initial implementation of the climate agenda, including support to the WCRP in particular, as a co-sponsor with WMO and ICSU. Consultations are being held with the Chair of the Subsidiary Body for Science and Technical Advice (SBSTA) on inputs from IOC to the work of SBSTA, actions have been identified, and IOC has been represented at SBSTA meetings. The IOC has participated in relevant IPCC meetings, specific actions to support the work of IPCC have been identified and some implemented, and the co-operation and dialogue with the Climate Change Secretariat is being maintained. Resources to support climate-related activities of the IOC Secretariat have been provided as far as IOC's resources permit.

Resolution XVIII-7: Coastal Regions and Small Islands

At a meeting after the Assembly in June 1995, the Chairman and Executive Secretary IOC conveyed to the Director-General of UNESCO the interest and willingness of IOC to collaborate in the interdisciplinary and inter-sectoral Project, and the suggestions as regards the management structure of the Project.

This has been further followed up by the Executive Secretary after the 28th Session of the General Conference, including the proposal that the Chairs of the five major co-operating programmes-bodies (IHP, IOC, IGCP, MAB, MOST) form the core-group of an external representative group of experts to advise on the definition of the Project, and that the approach for implementation should be based on pilot projects and case studies. This has been adopted. A UNESCO Joint Management Committee has been established under the chairmanship of the ADG/SC with the Executive Secretary IOC as Vice-Chair.

IOC contributions to integrated coastal management are provided from IOC programmes, including OSLR (HAB), OSNLR, GIPME, Ocean Mapping and TEMA, and the regional programmes, in particular in the IOCINCWIO and IOCARIBE regions.

Certain regional guidelines are being prepared using the presentations and elaborations of several workshops and the Coastal Change Conference, Bordeaux 1995. Furthermore, the IOC is supporting the preparation and publication of a major book on coastal area management.

Another book publication is in preparation based on the Workshop on Integrated Coastal Area Management held in Karachi, Pakistan, October 1994.

Resolution XVIII-8: Third Session of the Joint IOC-FAO Intergovernmental Panel on Harmful Algal Blooms

The Recommendations addressed in the Resolution are being gradually implemented. However, the staffing situation in the IOC Secretariat for this programme is now becoming unsatisfactory, with no professional available for the HAB programme as of 1 May 1996.

The Working Groups referred to in Recommendations 3,4 and 5 are holding their meetings and activities.

The development of the Living Marine Resources module of GOOS is being actively supported by the HAB and OSLR programmes.

The next session of the HAB Panel will be convened before the Nineteenth Session of the Assembly.

Resolution XVIII-9: Marine Biodiversity

The results of the IOC-NOAA consultation on marine biodiversity were conveyed to the first session of SBSTA and to the Interim Secretariat for the Convention. Specific requirements for scientific inputs were identified in a general way by the first session. IOC was also represented at the second session and at the Conference of the Parties, and the initial inputs of the IOC to support the implementation of the Convention were pursued. The IOC Secretariat maintains co-operation with the Secretariat of the Convention.

The IOC is represented at relevant meetings of UNCLOS and the preparatory work for the International Sea-Bed Authority. The need to address the effects of possible future exploitation of sea-bed resources on the deep sea water column and sea-bed has been raised by IOC. The implementation is being pursued.

The IOC Secretariat has strengthened the co-operation with the Man and the Biosphere Programme and joint activities are being planned, including with respect to the possible establishment of transboundary biosphere reserves.

Parts of the Resolution are continuously being followed up.

Resolution XVIII-10: Support to the Joint IOC-IHO Ocean Mapping Programme

Within the Ocean Mapping Programme discussions are being pursued on establishment of scientific priorities for bathymetric surveys which also seek the advice of other parts of the ocean research community. Consultations are also initiated with the IHO. Meetings of the editorial boards for the regional ocean mapping projects are being arranged in order of priority and in accordance with availability of funds.

Under present situation the establishment of a UNESCO post for the Ocean Mapping Programme has to be prioritized by the IOC and the Assembly needs to provide instructions in this respect.

Resolution XVIII-11: Second Session of the IOC-WMO-UNEP Committee for the Global Ocean Observing System (I-GOOS).

This Resolution is as a whole being gradually implemented. A UNESCO position for Director of the GOOS Support Office has been announced. The post may be filled during the fall of 1996. The IOC Secretariat and GOOS Support Office are pursuing the priority actions identified by the Assembly, and in particular a review of existing marine meteorological and oceanographic services has been completed; a regional GOOS development workshop is being planned for the fall of 1996; the GOOS priorities meeting is being planned but later than originally considered; the I-GOOS Strategy Sub-Committee has reviewed the implementation of the I-GOOS decisions in March 1996. It is clear that the GOOS development needs more focus and stronger action so as to produce results, directions and show leadership in order to enhance and stimulate more involvement from Member States.

Resolution XVIII-12: International Coral Reef Initiative

The Co-ordination office with a co-ordinator for the Global Coral Reef Monitoring Network has been established with the Australian Institute of Marine Science as host institution. The GCRMN initiative has been represented at relevant coral reef workshops and ICRI meetings, and participation in the 8th International Coral Reef Symposium in June 1996 is being organized. Extrabudgetary finding is being sought, including through efforts of the Co-ordinator.

Resolution XVIII-13: Global Sea-Level Observing System (GLOSS) activities 1996-97

The activities of the IOC Group of Experts on GLOSS are being pursued. Separate allocations for GLOSS have been made. The achievements of these depend upon contributions to the IOC Trust Fund, apart from the UNESCO contribution. The establishment of a dedicated post in the Secretariat to develop GLOSS and related sea-level studies and applications depends upon voluntary contributions from Member States.

Resolution XVIII-14: The Floating University Project

This project is co-sponsored and the IOC is providing financial support to the project commensurate with the support provided from other UNESCO sources.

Resolution XVIII-15: Capacity Building in Marine Sciences, Services and Observations - TEMA

The TEMA Group of Experts for Capacity Building has been established, and the first meeting is planned for early July 1996. This meeting will in particular consider the further development of a strategy for TEMA, and co-ordination with regional subsidiary bodies.

Support to capacity building as part of all IOC programmes is amounting to about 50% of the IOC operational budget.

Consultations as regards joint efforts in capacity building are also being pursued with inter-agency co-operation mechanisms including ICSPRO, and the ACC Sub-Committee on Oceans and Coastal Areas.

Resolution XVIII-16: IOC Sub-Commission for the Caribbean and Adjacent Regions (IOCARIBE)

The IOCARIBE evaluation has been completed and was reviewed by the Fifth Session of IOCARIBE which basically endorsed the results. Continued support is being provided from IOC-UNESCO funds to maintain the IOCARIBE Secretariat, including the provision for a consultant. However, in the light of increasing demands on the severely limited funds of IOC it is necessary that the Member States of IOCARIBE provide much more support to the IOCARIBE Secretariat and programme implementation.

Resolution XVIII-17: IOC Black Sea Regional Programme on Marine Sciences and Services

Collaboration with the Black Sea Environmental Programme funded by GEF is maintained in accordance with an agreement. Support is being provided to initiate pilot studies within the IOC Regional Black Sea Programme and the first meeting of the IOC Black Sea Regional Committee is being planned for September 1996. A meeting of scientific and technical experts is being organized in conjunction with this. Both meetings are hosted by Bulgaria.

Resolution XVIII-18: Programme and Budget 1996-97

The programme as adopted by the Assembly, revised and endorsed by the 28th General Conference is being gradually implemented. However, the funding level is only about half of that anticipated due to lack of voluntary contributions to the IOC Trust Fund/Special Account.

2. RESOLUTIONS ADOPTED BY THE TWENTY-SEVENTH SESSION OF THE EXECUTIVE COUNCIL (JULY 1994) AND THE SEVENTEENTH SESSION OF THE ASSEMBLY (MARCH 1993)

The state of implementation of these Resolutions was reviewed in the Annual Report 1994. In some cases the Resolutions are still operative and further information concerning their state of implementation as of March 1996 is provided herein.

Resolutions EC-XXVII .1, 2, 5, 6, 7 are basically fully implemented.

Resolution EC-XXVII.3 is implemented apart from the staffing problem of the OSLR-HAB programme in the IOC Secretariat.

Resolutions XVII-1, 2, 3, 8, 15, 16, 17, 19 have been implemented.

Resolution XVII-5 is implemented apart from a dedicated post for GLOSS.

Resolution XVII-9 is implemented although more support is required from Member States for ITSU.

Resolution XVII-10 on TEMA is being continuously implemented. However, for a strong capacity building programme of the IOC to be achieved and implemented, for instance through the partnership principle, considerably more support and resources are required. Donor support is being sought and obtained, but support at national levels must be increased.

Resolution XVII-18 The follow-up to UNCED is a continuous programme implementation element.

Resolution XVII-20 is partially implemented and the revival of the *ad hoc* Study Group on IOC Development, Operations, Structure and Statutes by the Eighteenth Session of the Assembly will address further parts of Annex II of the Resolution.

3. GENERAL OVERVIEW

During 1995 significant developments occurred for IOC within UNESCO, following preparatory work of DOSS and subsequently from 1993 (see section 9 in this report). Most significantly a Special Account for IOC within UNESCO was established and the related Financial Regulations adopted by the Executive Board. It is now up to Member States to make proper use of this Special Account so as to provide dependable resources for IOC programme implementation.

Of equal significance was the decision of the 28th General Conference to provide a protected (incompressible) budget for the IOC. This should go a long way towards achieving dependable resources for IOC since the amount of the UNESCO contribution is now well known and incompressible. It is therefore reasonable to expect a commensurable contribution from IOC Member States not Member States of UNESCO. The resources provided from UNESCO can now also be better related to the size of the IOC programme and the requirements for an adequate rate of its implementation.

The relationship between known available resources and adequate programme implementation requirements can be seen from the Action Plan reviewed by the Assembly at its Eighteenth Session. The ratio of available dependable resources and implementation requirements is accordingly about l/3-1/2. Either the programme has to be adjusted or larger dependable resources obtained, or both.

The General Conference adopted the Medium Term Strategy of UNESCO for 1996-2001. This is a profound step, implying a wide range of adjustments of UNESCO and its programmes. For the IOC it opens up and supports the intersectoriality, policy shaping, and issue-oriented approach.

Another very important development within UNESCO is the establishment of the inter-disciplinary project on coastal zones and small islands and the associate management structure. The base funding for the project originates from the other part of the integrated IOC/MRI programme referred to as MRI, before 1991 essentially the Division of Marine Sciences.

The special unit established in the Secretariat responsible for the implementation of the project corresponds to the MRI part of IOC/MRI. This part is now under the direct authority of the ADG/SC. An intersectoral management committee for the project has also been established. The implication is a weakening of the marine programme of UNESCO, but a potential strengthening of interdisciplinarity. This development is related to the Joint Statement of the Chairs of IOC, IGCP, IHP, MAB, adopted in conjunction with the 27th General Conference, and endorsed by Commission III of the General Conference. The meeting of the chairs was repeated in conjunction with the 28th General Conference, now also including the social sciences MOST programme. A Joint Statement was adopted, re-confirming the intention of all five programmes to co-operate in general, and to focus in this respect on the co&al zones and small islands project. This was welcomed by Commission III of the 28th General Conference.

The Joint Statement is also followed up through co-operation in other projects between IOC on the one hand and IHP (Caspian Sea), IGCP (GLOSS and absolute sea-level determinations, natural hazards reductions), MAB (biological diversity with IOC now a partner in Biodiversitas, and potential establishments of biosphere reserves) on the other.

As a follow-up to the Eighteenth Session of the Assembly, the Director-General proposed and the Executive Secretary prepared a document on Intersectoral Aspects of the IOC Programme for the Directorate of UNESCO. This was carried out and presented to the Directorate in the fall of 1995. The reception was very positive and led to the establishment of an intersectoral Task Team, charged with planning for the UNESCO 1998 International Year of the Ocean, and with proposing appropriate initiatives to bring oceans into the school education system of Member States. This is presently being followed up.

It can be concluded that the strategy to strengthen IOC within UNESCO has worked, that IOC has been strengthened within UNESCO and that it is becoming better known. However, there is still need for considerable effort to make IOC better known and understood in the UNESCO National Commissions. Efforts in this direction are underway.

The national base for the IOC must now also be widened and strengthened in most countries. Regional co-operation and regional subsidiary bodies are gradually ????? deepening and strengthening and becoming better known and accepted outside the IOC community. The gradually increasing support for this regional co-operation from several donors is a significant positive trend.

The status of the IOC outside UNESCO is maintained at a reasonable level. However, the great difficulty we have in meeting, in a timely manner, our obligations in accordance with co-operative agreements regarding GOOS, GCOS, WCRP, GIPME, and some others, e.g. the Black Sea - GEF supported programme, are seriously undermining our credibility. A particular case is, of course, GOOS development. IOC must very soon achieve a considerably improved delivery rate as regards GOOS development. If we cannot manage this, GOOS may be dead before it has really had a chance to take off. It is the hope of the Executive Secretary that the announced UNESCO post of Director of the GOOS Support Office and Staff will help considerably. In this respect two points should be noted. First, without strong support and active acknowledgement of Member States of the role of the IOC in relation to GOOS development, we will not succeed only through the Secretariat. ??? Secondly, the post of Director of the GOOS Support Office is the former Deputy Secretary post, This means that the Secretary IOC (presently the Executive Secretary) will not have a Deputy. This will seriously influence the work of the (Executive) Secretary, in the sense that all details as well as other matters will continue to be addressed to the (Executive) Secretary.

The credibility of the IOC to deliver is of course also of paramount importance in relation to our efforts towards the follow-up to UNCED, the related conventions as well as with respect to UNCLOS. Again, it appears to the present Executive Secretary IOC that the most important positive actions which could be obtained are that Member States positively acknowledge IOC as an instrument and an existing body which should be used. The Executive Secretary recently visited Member States which represent the majority of the population of the Earth - and their stand ??? and strong support of IOC was very clearly communicated to him. However, he told them that they should also inform other important Member States of their views.

Interest in the ocean is currently increasing. This is apparent by the entering into force of UNCLOS; the initiation of the GPA for LBA (what does this mean??); the establishment of the Independent World Commission on Oceans; the initiation of the Third GESAMP review of the state of the marine environment, the simultaneous initiation of a SCOPE study of ocean problems and the conditions of the marine environment. The Fourth Session of the Commission for Sustainable Development (CSD) is addressing oceans; as from 1996 the General Assembly will consider oceans under a separate agenda item. The 1998 International Year of the Ocean and EXPO’98 are in planning. In this wave of activities it is imperative for IOC to be able to master the surf and ride on

the wave. This requires an effort from all parts of IOC. You are all invited and requested to contribute, and the least you can do it to acknowledge positively the IOC and its role.

The relation of IOC programmes to issues or problems of society should be continuously considered, as initiated in the formulation of the IOC Medium Term Strategy and Action Plan, reviewed by the Assembly at its Eighteenth Session. A logical continuation of this effort seems to be to prepare a synthesis of results of IOC efforts over some suitable period of time. This could be coupled with an effort to prepare an overview, or synthesis statement from IOC on where we stand as far as scientific understanding of the ocean is concerned. What do we understand sufficiently to be able to make useful forecasting? Where are the gaps? What are the priorities in research, observations, capacity building? How do these efforts help solve society's major problems? It seems that the IOC should make an effort in this direction, and also relate itself to management questions. This is a logical sequence to recent developments within the IOC. It seems appropriate to aim at preparing the First IOC Synthesis for 1998 International Year of the Ocean. One of the agenda items of the Twenty-ninth Session of the IOC Executive Council further elaborates this proposal.

B. PROGRAMME ACTIVITIES

1. OCEAN SCIENCES

1.1 OCEANS AND CLIMATE

World Climate Research Programme (WCRP): General

In 1995 the WMO Congress and the IOC Assembly both expressed satisfaction with progress and approved continuation of the existing co-sponsorship arrangement for the WCRP at their respective sessions.

The sixteenth session of the Joint Scientific Committee (JSC) for the WCRP was held in March 1995. A running theme was to examine ways for spreading the benefits being derived from climate research. A few nations are already taking advantage of improved climate predictions. The post-TOGA emphasis is to enhance the capability of more nations affected by the ENSO to exploit the increasingly skillful El Niño forecasts. The final cumulative results of TOGA were presented in a TOGA International Scientific Conference in Melbourne in April 1995. In the case of WOCE, the focus is to lay the groundwork for the development of longer range climate predictability. In this vein, IOC supported a session on decadal variability at the International Association of Physical Sciences of the Ocean (IAPSO) General Assembly in Honolulu in August 1995. The funds made possible the participation of ocean climate scientists from Ecuador, India, the Philippines, Brazil and China.

The new WCRP initiative (CLIVAR) aims to advance the understanding of natural climate variability as well as the influence on this variability to determine climate predictability on both the interannual and interdecadal timescales. The CLIVAR Science Plan, under development for two years, was completed and published in August 1995. Some 3000 copies were mailed to scientists around the world. The aim of the plan is to inspire and guide the co-ordination of the many investigators that will eventually be needed to implement the programme on a global basis. CLIVAR has three major components: (i) CLIVAR-GOALS: a study of the global ocean-atmosphere-land system; (ii) CLIVAR-Dec-Cen: a study of decadal to centennial climate variability and predictability; and (iii) CLIVAR-ACC: modelling and detection of anthropogenic climate change.

An International CLIVAR Project Office (ICPO) was opened in Hamburg, Germany, with the staffing of the allotted three positions completed in August 1995.

World Ocean Circulation Experiment (WOCE)

The Indian Ocean was the focus of the WOCE Hydrographic Programme in 1995; this was also the year that the Intensive Observation Phase reached its peak. The field effort is scheduled to rapidly wind down in 1996 and be completed in 1997. Emphasis will then switch to the Analysis, Modelling and Synthesis Phase which will dominate the effort until the scheduled completion of WOCE in 2002. Interestingly, some preliminary estimates of heat fluxes based on the high quality WOCE data, differed significantly from estimates obtained from models that are being used to provide forecasts of global climate change.

The Intergovernmental WOCE Panel (IWP) met for the third time in Paris, 8-9 June 1995. A number of recommendations for the IOC Assembly were developed which were fundamental to realizing the full benefit of the enormous resources already invested in WOCE. These urged the continued co-operation of Member States, particularly in expediting data flow, granting access to EEZs to complete the WOCE lines through the all-important coastal boundary currents and in hosting a WOCE scientific conference. The Panel further emphasized the need for support of nations until the scheduled end of WOCE in 2002, and particularly underscored the continued requirement for satellite altimeters, scatterometers, and a gravity mission. The Assembly reconfirmed the IOC's strong commitment to the completion of WOCE and endorsed the results and recommendations of the IWP.

Ocean CO_2 and Climate

The report of the Second International Meeting of Scientific and Technical Experts on Climate Change and the Oceans and CO_2, was published and distributed in May 1995. That meeting focussed on the state of knowledge regarding the ocean's role in, and techniques for measuring the uptake of anthropogenic CO_2. The rate of change of uptake by the ocean of the anthropogenic CO_2 since 1970 is shown in Figure 1. Trends over time in the way the anthropogenic CO_2 is partitioned between the ocean, the atmosphere and terrestrial plants are illustrated in Figure 2. The plots in both cases are based on observation of the $^{13}C/^{12}C$ ratio which acts as a natural tracer for the fate of CO_2 released from the combustion of fossil fuels and biomass.

Interaction with SCOR on ocean CO_2 continued through the Joint IOC-JGOFS Advisory Panel on Ocean CO_2. The Panel's energies in 1995 were concentrated on the First JGOFS International Scientific Symposium, Villefranche, France, May 1995, and planning for the First International Symposium on Ocean CO_2 scheduled for January 1996 in Mayaguez, Puerto Rico. In the past, both ocean and atmospheric CO_2 research results were presented at biennial symposia on CO_2. Because of the lately burgeoning knowledge becoming available from CO_2 research, it is planned to schedule annual symposia but focussing separately on the ocean and the atmosphere in alternate years. Both SCOR and the IOC contributed funding for the organization of this Symposium.

A Panel subgroup, charged with compiling an inventory of CO_2 partial pressure (pCO_2) data. Preparation of a report is underway; the subgroup's report will contain recommendations for the next meeting of the Panel scheduled for January 1996.

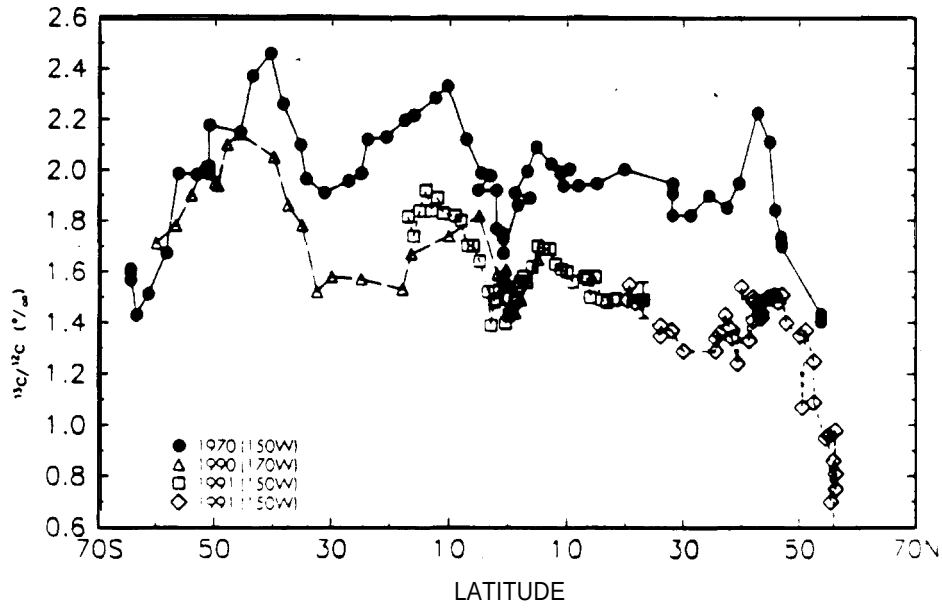


Figure 1. The carbon in the world contains about 1 % in the form of ^{13}C, one part in one trillion in the form of ^{14}C and the rest in the form of '*C. Because plants, during photosynthesis, take up ^{12}C carbon preferentially over ^{13}C, both fossil fuels and plants have a smaller proportion of ^{13}C than atmospheric CO_2. When the plants are burned, the CO_2 emitted into the atmosphere is therefore depleted in ^{13}C, a signal that moves into the ocean as it exchanges CO_2 with the atmosphere. Thus, the change in the ratio of $^{13}C/^{12}C$ in CO_2 is an anthropogenic signal that can be used as a natural means of tracing the fate of CO_2 released from combustion of fossil fuels and biomass. The plots in the diagram show the decrease in the values of $^{13}C/^{12}C$ of dissolved inorganic carbon in the surface waters of the Pacific Ocean between 1970 and 1991 (from Quay 1993).

Quay, P. D., 1993. Tracing the fate of anthropogenic CO, with carbon isotopes. In: U.S. JGOFS News. VI. Sep. 1,7.

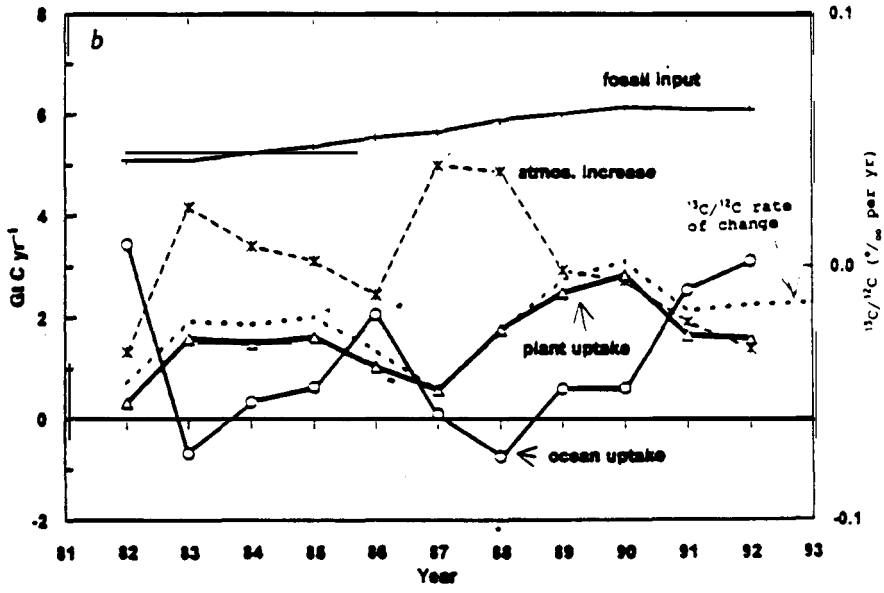


Figure 2. Trends in atmospheric CO_2 and the relative uptake of CO_2 by the ocean and terrestrial plants (from Fancey *et al* 1995). The large decrease in the growth of atmospheric CO, starting in 1988 is reflected by increases in both terrestrial and ocean uptake, the latter persisting through 1992. The $^{13}C/^{12}C$ ratio shows a gradual decrease from 1982 to 1993 but with a pronounced flattening from 1988 to 1990 that appears to involve the terrestrial carbon cycle.

Fancey, R. J., P.P. Tans, C.E, Allison, I.G. Enting, J.W.C. White, and M. Trolier, 1995, Changes in oceanic and terrestrial carbon uptake since 1982. Nature, 373.326-330.

UNFCC and IPCC

During 1995 IOC continued its efforts to support the implementation of actions for the follow-up to UNCED in this field.

An in-depth report on climate-related issues with respect to IOC, in relation to the FCCC, the IPCC and the World Climate Programme (WCP), was presented to the Eighteenth Session of the IOC Assembly (Document IOC-XVIII/2 Annex 5). It is recalled that in Chapter 17 of Agenda 21 of UNCED, IOC, together with other relevant competent United Nations bodies and with the support of countries having the resources and expertise, is requested to carry out analyses, assessments and systematic observations of the role of oceans as a carbon dioxide sink. The Assembly decided that IOC should maintain its links and co-operation with mechanisms and bodies related to the UN-FCCC.

Accordingly, the presence of an IOC expert-consultant has been maintained at the Climate Change Secretariat in Geneva. He has been stationed at the UNESCO liaison office in Geneva. This mechanism has led to close links with the Climate Change Secretariat and the IPCC Secretariat. Furthermore, there has been a continuous representation of IOC at the related, relevant meetings:

At INC-XI, New York February 1995, arrangements were made for a briefing of INC participants, and in particular, members of the Association of Small Islands and Low Lying Coastal States. Progress of sea-level observations in the framework of IOC-GLOSS was reported on.

IOC's expert-consultant participated in the First Conference of the UNFCCC Parties, Berlin, March 1995, where the Executive Secretary IOC made a statement on behalf of IOC reporting the main findings and conclusions from the Second International Meeting of Scientific and Technical Experts on Climate Change and the Ocean (Ocean-CO_2 interaction), October 1994, Malta.

IOC, represented by its expert-consultant, participated in WMO-XII Congress, Geneva. June 1995. A report on climate-related issues was presented at a plenary session of the Eighteenth Session of the IOC Assembly, and the related resolution was adopted. The Geneva-based expert-consultant of IOC chaired the *ad hoc* Group on the Law of the Sea and the Technical Committee on Draft Resolutions.

Preparations for IOC's participation in the UNFCCC SBSTA-1 Session, Geneva, August 1995, were made. Draft proposals for the IOC Action Plan to implement climate-related decisions taken at the Eighteenth Session of the Assembly were drawn up. The Geneva-based expert-consultant attended this session and made a statement on behalf of IOC. He also participated in the WMO ACCAD-V Session which took place in Geneva; he also drafted comments on IOC documents concerning financial issues. The expert-consultant prepared a list of IOC experts on Climate and Ocean for IPCC and participated in the UNFCCC AGBM-2 Session, November 1995, Geneva.

At the IPCC-XI Plenary Session, December 1995, Rome, the expert-consultant, besides attending meetings of plenary sessions, participated in the *ad hoc* planning working group, where a short paper on IOC'S intentions with respect to some climate-related issues was presented. A proposal to arrange a special workshop on carbon accumulation by coral reefs was taken into consideration.

The reports, together with a number of proposals on each related event listed above, were communicated to the IOC Secretariat. It is concluded that IOC remains a major intergovernmental body which co-ordinates a majority of efforts to more deeply understand the effects of the ocean on global warming. There is no doubt that IOC is a recognized participant of the UNFCCC process due to its active co-operation. At the same time, should IOC wish to respond adequately on the climate change challenge it would be preferable to have an integrated and well co-ordinated programme of actions on ocean-climate interaction in a more consolidated form, than as different and separate parts among several projects.

1.2 OCEAN SCIENCE IN RELATION TO LIVING RESOURCES (OSLR)

The OSLR Programme has been without a Technical Secretary since the end of 1993. A new Associate Expert was seconded by Denmark for the OSLR Programme from May 1995.

Harmful Algal Bloom Programme

The Harmful Algal Bloom (HAB) Programme Office was established at the IOC Secretariat, UNESCO Headquarters in Paris in 1993. The HAB Programme Office was staffed with two Associate Experts seconded by Denmark, until March 1995 and presently by one Associate Expert seconded by Denmark.

The IOC Science and Communication Centre on Harmful Algae, University of Copenhagen, established on the basis of Resolution XVII-2, was inaugurated on 5 May 1995. The Centre is staffed with a Associate Professor, a Project Co-ordinator and a Documentalist. All staff take an active part in both the training, research and service activities of the Centre. The Centre is hosted by, and located at, the Botanical Institute, Department of Mycology and Phycology at the University. Activities are centered around training in taxonomy of harmful species and associated services, including a species identification confirmation service. The Centre is sponsored by DANIDA (through the IOC Trust Fund), the University of Copenhagen, the Danish Ministry of the Environment, the Danish Ministry of Fisheries, and IOC for a five-year period. A separate report is presented as Document IOC-SCC Annual Report 1995.

The HAB Programme Office and the IOC Science and Communication Centre on Harmful Algae have distributed information on the Programme, reference books and proceedings from conferences in relation to HAB, kindly donated by the publishers and the organizers, to more than 200 libraries or scientists, especially in developing countries.

The Third Session of the Joint IOC-FAO Intergovernmental Panel on Harmful Algal Blooms was held in Paris 6-9 June 1995. FAO then announced that it is withdrawing its co-sponsorship of the Panel due to budgetary constraints and a need to focus the activities of FAO.

The major achievements reported on were:

(i) the continuity of programme development and co-ordination at the HABP Office in Paris;

(ii) the establishment of HAB Science and Communication Centres in Copenhagen and Vigo;

(iii) publishing and distribution of nine issues of the IOC newsletter on toxic algae and algal blooms *Harmful Algal News* to around 2000 subscribers;

(iv) the production of the IOC Directory of Experts on HAB;

(v) provision of literature to developing countries from the IOC Science and Communication Centres;

(vi) implementation of the IOC-U NEP-WHO-FAO Training Course on Qualitative and Quantitative Determination of Algal Toxins, Germany, for scientists mainly from developing countries held in 1994;

(vii) implementation of a IOC Regional Science Planning Workshop on Harmful Algal Blooms, Uruguay, held in 1994;

(viii) the intersessional work of the four task teams a) Algal Taxonomy; b) Aquatic Biotoxins; c) Design and Implementation of HAB Monitoring Programme; and d) HAB Project Development, respectively;

(ix) the development of interaction with other IOC programmes and governmental as well as non-governmental organizations.

During this session, the Panel focussed on its intersessional action plan with respect to: (i) the staff situation at the HAB Office in Paris; (ii) the presentation of the HAB Programme in form of a brochure; (iii) the development of networks; (iv) the implementation of the HAB Training and Capacity Building Programme; (v) the establishment of Working Groups on transfer of phytoplankton by ballast of ships; (vi) Aquatic Biotoxins related to harmful algae, and harmful algal blooms in South America; (vii) a stronger link between the HAB Programme and GOOS; (viii) availability of marine biotoxin standards and reference materials to developing countries. The Panel adopted an intersessional workplan including financial implication.

The IOC Manual on Harmful Marine Microalgae was finalized after three years of preparation. 40 scientists have contributed to the 550 pages Manual and its 26 Chapters covering field methods, taxonomy, toxin analysis and assays, and monitoring and management issues. The Manual is published as IOC Manual & Guides No. 33.

Several activities within the HAB Training and Capacity Building Programme, the TEMA component of the Harmful Algal Bloom Programme, have been implemented:

(i) The IOC/WESTPAC-Japan Training Workshop on Monitoring of PSP Plankton and Shellfish Toxicity, Japan, 17-21 July 1995.

(ii) The IOC/WESTPAC-ASEAN-Canada Training Course on Harmful Algae, Ambon, Indonesia, 1995, organized with the support of Japan.

(iii) The IOC-DANIDA Training Course on the Biology and Taxonomy of Harmful Marine Microplankton, IOC Science and Communication Centre on Harmful Algae, Copenhagen, University of Copenhagen, Denmark, 4-16 August 1995.

(iv) The IOC-UNEP-WHO-FAO-Italy Training Course on Toxin Chemistry and Toxicology related to Harmful Algal Blooms, University of Trieste, Italy, 3-12 September 1995.

(v) The Second IOC Regional Science Planning Workshop on Harmful Algal Blooms in South America, Mar del Plata, Argentina, 30 October-1 November 1995.

(vi) The MAST-IOC Advanced Phytoplankton Course on Taxonomy and Systematic, Marine Botany Laboratory, Stazione Zoologica, Naples, Italy, 24 September-14 October 1995.

(vii) The IOC-SAREC-DANIDA Training Course on the Taxonomy and Biology of Harmful Marine Microalgae, University of Mauritius, Mauritius, 5-14 February 1996.

The ICES-IOC Working Group on the Dynamics of Harmful Algal Blooms met in Vigo, Spain, 7-13 May, 1994, and in Helsinki, Finland, 17-19 May 1995. The activities of this Group is a part of the development of the “Ecology and Oceanography” scientific element of the Harmful Algal Bloom Programme Plan, by ICES and IOC.

The ICES-IOC Workshop on Intercomparison on in *situ* Growth Rate Measurements (Dinoflagellates), Aviero, Portugal, 25-29 July 1994, is an activity of the ICES-IOC Working Group.

The Reports of: (i) The Working Group on Modelling the Population Dynamics of Harmful Algal Blooms, Vigo, Spain, 4-7 May 1994; (ii) The Joint Meeting of the Working Group on Harmful Algal Bloom Dynamics (WG-HABD) and the ICES Working Group on Shelf Seas Oceanography (WG-SSO), Vigo, Spain, 9-10 May 1994; (iii) The ICES-IOC Working Group on Harmful Algal Bloom Dynamics, Vigo, Spain, 11-12 May 1994; and (iv) The ICES-IOC Workshop on

Intercomparison on *In Situ* Growth Rate Measurements (Dinoflagellates), Aviero, Portugal, 25-29 July 1994, are all available at the IOC Harmful Algal Bloom Programme Office, Paris.

The SCOR-IOC Working Group 97 on the Physiological Ecology of Harmful Algal Blooms met for the first time in La Rochelle, France, 25-26 October 1993. The Scientific Committee on Oceanic Research established the Working Group at its Executive Council meeting, November 1991, to examine available data on the physiological ecology of harmful blooms. The second meeting was held at the University of Tokyo, Japan, 10-11 July 1995. The main item on the Agenda was the continued planning of the "Advanced Study Institute on the Physiological Ecology of Harmful Algal Blooms" for which a proposal has been submitted to NATO, SCOR, and IOC and accepted for funding. The Study Institute will be held in May 1996 at the Bermuda Biological Station.

The Second IOC Regional Science Planning Workshop on Harmful Algal Blooms in South America was held in Mar del Plata, Argentina, 30 October -1 November 1995. The objectives of the Workshop were: (i) to present the state-of-the-art with respect to implementation and research on Harmful Algal Blooms (HAB); (ii) to establish the immediate needs for training and retraining; (iii) to identify priorities for research to be developed in the medium term; and (iv) to promote contacts and exchange of information on research and control of HAB among the regional experts. It was proposed institutionalizing these meetings through the establishment of an IOC Working Group on Harmful Algal Blooms in South America (IOC-FANSA), and this was adopted at the IOC Assembly in June 1995.

Marine Biodiversity and the Convention on Biological Diversity

An IOC *ad hoc* Consultation on Marine Biodiversity, co-sponsored by the US National Oceanic and Atmospheric Administration (NOAA), was held in Paris, 3-5 May 1995. The Consultation was formed of regional and international experts in scientific issues concerning the field of marine biodiversity, with possible different views on the topic, as follows: Dr. Michael P. Crosby, National Research Co-ordinator, NOS/NOAA (USA); Dr. Mohamed Isahakia, Centre for Biodiversity of the National Museums of Kenya (Kenya); Prof. Ulf Lie, Centre for Studies of Environment & Resources, University of Bergen (Norway); Dr. Daniel Lluch-Belda, Centre for Biological Research, La Paz (Mexico); Dr. Mohd. Kasim Moosa, Research and Development Center for Oceanology of the Indonesian Institute of Sciences, Jakarta Utara (Indonesia); Dr. Jacob van der Land, National Museum of Natural History of Leiden (the Netherlands); Prof. Mingyuan Zhu (China). The experts were selected in consultation with the national IOC Action Addressees.

The main objective of the Consultation was to develop an IOC strategy in the field of marine biodiversity, eventually relying on existing IOC programmes and activities of relevance to the development of an IOC programme on marine biodiversity. Another important issue from which the need for a consultation on marine biodiversity arose was the association of IOC with the Convention on Biological Diversity. This should also be considered in the light of IOC's association with other international legal instruments, in particular the Framework Convention on Climate Change (FCCC) and the United Nations Convention on the Law of the Sea (UNCLOS).

The strategy and recommendations developed by the Consultation were endorsed by the Eighteenth Session of the IOC Assembly (Paris, 13-27 June 1995), including the IOC Work Plan on Marine Biodiversity for the period 1995-97, which focuses mainly on training and capacity building. The Assembly adopted a resolution on marine biodiversity (Resolution XVIII-9), where the following points were *inter alia* agreed upon: (i) that the report from the IOC-NOAA *ad hoc* Consultation on Marine Biodiversity be submitted to the First Meeting of the Subsidiary Body on Scientific, Technical and Technological Advice to the Convention on Biological Diversity (Paris, 4-8 September 1995) and that specific needs and requirements of SBSTTA for scientific input which can be provided by IOC be identified; (ii) that the Executive Secretary IOC interact with the International Sea-Bed Authority on matters concerning the effects of possible future exploitation of sea-bed resources and dumping on marine biodiversity, as well as discussing the possibility for IOC to provide scientific, input to the International Sea Bed Authority in this respect; (iii) that links with the UNESCO Man and Biosphere

Programme be strengthened in order to develop joint activities in the field of sustainable use and conservation of marine biodiversity; (iv) that Member States undertake efforts at the national and regional levels to compile inventories of their marine flora and fauna. In this latter respect the UNESCO-IOC Register of Marine Organisms, the first version of which will be published in the first half 1996, represents an important (computerized) tool, which IOC will make available free of charge to developing countries for their compilation of inventories of marine species. The Register will be available on Internet during 1996.

The decisions of the Eighteenth Session of the Assembly were conveyed to SBSTTA-1, UNESCO, Paris, September 1995, and IOC also participated in the Second Conference of the Parties to the Convention on Biological Diversity (COP2) (Jakarta, Indonesia, 6-17 November 1995). COP2 adopted a resolution on marine and coastal biodiversity, where UNESCO and its Intergovernmental Oceanographic Commission are referred to as organizations, among others, whose activities will have to be taken into account by the Conference of the Parties to the Convention to ensure its successful implementation.

IOC is therefore gradually establishing co-operative relationships with the Convention Secretariat, and the role of IOC in assisting the implementation process of marine and coastal biodiversity issues within the Convention is being progressively recognized by Parties to the Convention.

Large Marine Ecosystems (LME)

IOC was represented at the First Meeting of the Working Group and the First Meeting of the Steering Committee of the Global Environmental Facility (GEF) -supported Large Marine Ecosystem Project for the Gulf of Guinea (GOG). The meeting took place at the UNIDO Regional Office, Abidjan, Côte d'Ivoire, 14-19 August 1995.

The GEF LME GOG Project deals mainly with the prevention of pollution and the conservation of biodiversity of the Gulf of Guinea. Five countries are presently participating in the project (Benin, Cameroon, Côte d'Ivoire, Ghana and Nigeria) and Togo has formally requested to become a partner. The Project is physically located at the GEF GOG Project Regional Co-ordination Center in Abidjan, Côte d'Ivoire, with UNIDO as the implementing agency.

IOC will participate in the implementation of the GOG Project, also in the light of the activities IOC is carrying out in the context of its Regional Committee for the Central Eastern Atlantic (IOCEA).

Global Ocean Ecosystems Dynamics (GLOBEC)

The GLOBEC-SPACC (Small Pelagic Fish and Climate Change) Implementation Plan Meeting was organized in Swakopmund, Namibia, 4-8 December 1995.36 scientist from 16 countries (Angola, Denmark, France, Germany, Ghana, Italy, Morocco, Namibia, Norway, Romania, Russia, South Africa, Spain, USA, Sweden, Turkey), including representatives from IOC, FAO and EU participated in the meeting. The objective of the meeting was to recommend on how to proceed regarding the implementation of SPACC activities in the West Africa Region. The meeting was co-sponsored by IOC. A draft Implementation Plan was drawn up to be considered and then finalized at the second Implementation Plan meeting of SPACC in Mexico in June 1996.

Benguela Current Region

The Namibia Seminar and Workshop on the Benguela Current Region was organized by the Ministry of Fisheries & Marine Resources at the National Marine Information and Research Centre (NATMIRC) in Swakopmund, Namibia (30 May-3 June 1995). This was the first co-operative meeting on Oceanographic Research, Marine Science and Technology in the South West African Region. The

objective of the meeting was to produce a science and training plan for the Benguela Current Region covering regional and international co-operation, and to improve the understanding of dynamics of fish stocks and thereby contributing to a rational and effective management of the Benguela Current Ecosystem. The outline of a regional co-operative programme in the Benguela Current Ecosystem referred to as BENEFIT was drafted at the meeting. The BENEFIT programme will run from 1996 to 2000. The meeting was co-sponsored by IOC, GTZ (Germany) and NORAD (Norway).

Marine Critical Habitats

Seagrass beds

IOC has finalized the first edition of the IOC International Directory of Seagrass Bed Institutions, which will be published in early 1996 (on diskette) and made available on Internet. The directory provides information on activities related to research and training on and management of seagrass beds worldwide, including names and addresses of contact persons/institutions, availability of research grants, exchange of scientists. The Directory was presented to the International Seagrass Biology Workshop (Rottnest Island, Western Australia, 25-29 January 1996). The activity is part of an exercise which will lead to the establishment of a global network of seagrass bed institutions for research on and monitoring of these ecosystems worldwide.

IOC has developed an activity aimed at mapping seagrass beds off East Africa from satellite (LANDSAT-TM) images, in co-operation with the UNEP Ocean and Coastal Area Programme Activity center (UNEP-OCA/PAC). Ground-truthing activities will be coupled to the computerized processing of satellite images, and a strong training component will be included. The activity will be implemented during 1996 and will involve scientists from all of Eastern Africa.

Coral reefs

IOC is a partner in the International Coral Reef Initiative (ICRI). Presently, IOC's major contribution to ICRI is through development of a global coral reef monitoring network. The number of research institutions which have already joined this network up to end 1995 is such that the network will achieve global coverage.

This network is being developed within the joint IOC-WMO-UNEP Global Ocean Observing System Programme, the global coral reef monitoring network being developed within the Coastal Zone Module for GOOS. The IUCN is also a partner in this specific activity.

The IOC initiatives on seagrass beds presented above also contributes to ICRI.

Marine Mammals

IOC has been represented on the Planning and Co-ordinating Committee (PCC) for the Marine Mammal Action Plan (MMAP) since its inception. The activities of IOC related to marine mammals have to be considered within the PCC co-ordination framework and are mainly aimed at the implementation of MMAP.

IOC's contribution to PCC activities focuses mainly on the provision of scientific advice through IOC's network of experts, programmes and services, in strong co-ordination with the MMAP Scientific Advisory Committee. In particular, IOC actively operates within two of the five concentration areas of MMAP, namely the thematic areas "Improvement of scientific knowledge"; and "Enhancement of public awareness", with IOC contributing to the development of the latter through public awareness and environmental education activities. Scientific advice is also necessary to address the first concentration area of the Plan "Policy formulation".

In 1995 IOC assisted Eastern African countries to design and implement a research project on dugong *(Dugong dugon)* distribution in relation to the seagrass bed distribution in the area. This project has been accepted for inclusion in the list of projects carried out within MMAP, and will be strictly linked to the above-mentioned research project on seagrass mapping from satellite imagery, which IOC is presently carrying out in co-operation with UNEP-OCA/PAC.

IOC participated in the First Workshop on the Indian Ocean Conservation Programme (27 November-1 December 1995) organized by the Indian Ocean Marine Affairs Co-operation Organization (IOMAC) in co-operation with the New England Aquarium, Boston, USA. The Workshop was an occasion to finally move a first important step towards the co-ordination of conservation-oriented efforts in the Indian Ocean, *inter alia* in the field of marine mammals. The Region sees many actors involved in conservation-related issues, and the IOC participation in the workshop allowed co-ordination of the activities carried out within the IOC Regional Committee for the Co-operative Investigation in the North and Central Western Indian Ocean (IOCINCWIO) with those of other organizations.

Marine mammals represent a priority in the region, both because of the lack of information on them as well as the important ecological role they play. IOC will co-ordinate its actions in the field of marine mammals in East Africa with those of other partners. The dugong distribution activity will, in particular, be carried out in co-operation with UNEP-OCA/PAC, the Port Elizabeth Museum in South Africa and the Kenya Wildlife Service (KWS).

Outlook

The OSLR Programme deals with scientific aspects concerning marine living resources. It is composed of the Harmful Algal Blooms Programme (HAB) as well as a series of activities divided into categories, namely those reported here (GLOBEC, LME, etc.). Some of the OSLR activities represent specific contributions to the follow-up to the United Nations Conference on Environment and Development (UNCED) (e.g., the activities dealing on seagrass beds) as well as to international legal instruments such us the Convention on Biological Diversity.

The news of the withdrawal of FAO as co-sponsor of the IOC-FAO Intergovernmental Panel on Harmful Algal Blooms, and the HAB Programme, was received with regret. The co-sponsorship of FAO to the HAB Programme could have strengthened the monitoring and aquacultural part of the Programme, but future activities in this respect will still be carried out through interaction with FAO and other relevant organizations in this field.

Many activities within the different elements of the HAB Programme have been or are being developed. The importance of the Programme was confirmed at the last IOC Assembly in 1995, and many Member States have been able to develop national and regional programme activities, initiated and catalyzed by the International IOC HAB Programme. The opening of the IOC Science and Communication Centre on Harmful Algae in Copenhagen has given the developing countries a possibility to develop research activities with help and guidance from the IOC HAB Programme Office. The development of the HAB Training and Capacity Building Programme was one of the main activities in 1995.

1.3 OCEAN SCIENCE IN RELATION TO NON-LIVING RESOURCES (OSNLR)

Coastal Change Conference

The most important OSNLR event was the Coastal Change Conference, Bordeaux, France, 6-10 February 1995, jointly organized by IOC and the Aquitaine Region (France) with additional support from SCOR and the EC. Following Resolution XVII-3 of the Assembly and as a follow-up to UNCED, the major aim was to examine the nature, origin and impacts - including socio-economic ones - of physical coastal changes (natural or man-made). Over three hundred scientists and managers

from fifty countries and NGOs participated. Special support for travel and subsistence was offered to participants from developing countries and Eastern European Member States (IOC Workshop Report Series No.105). During ninety oral presentations, sixty posters and two days of field trips, the following questions were addressed: (i) what are the phenomena responsible for physical coastal changes? (ii) what are the socio economic implications of change? (iii) how can science be used to support integrated coastal zone management?

Proceedings of the Conference will become available during 1996. One of the most significant outputs is the decision adopted by the Assembly at its Eighteenth Session to use selected case studies presented at the Conference to produce a set of manuals that will facilitate the assessment of coastal changes, and will contribute to practical coastal zone management. The first document relative to the French Coasts will be available in the near future. Further developments are relative to the East African coast for which a plan of action has been adopted and a group of specialists designated at a preparatory meeting organized at the IOC Secretariat on 24 November 1995, and at a regional workshop, Mombasa, Kenya, 27 November 1995. Regarding East Africa, the preparation of a manual is jointly organized with the UNESCO CSI project (Pilot Project 2) and with East Africa IOC-SAREC activities,

Ad hoc Consultation on OSNLR

An ad *hoc* consultation on OSNLR was organized in Bordeaux, France, 8 February 1995, on the occasion of the Coastal Change Conference (Document IOC/INF-991). The objective was to obtain advice on the future possible development of OSNLR, particularly in the context of the IOC follow-up to UNCED and UNCLOS. The *ad hoc* consultation considered that OSNLR has a major role to play in coastal zone management. To this end, a presentation at the Coastal Change Conference was considered as informative as to various actions to be developed. Proposals from the consultation were adopted by the Assembly at its Eighteenth Session.

IOC-OSNLR *ad hoc* Expert Consultation on UNCLOS

As part of IOC's responsibilities in relating to UNCLOS as well as to the request of UN-DOALOS, an IOC-OSNLR *ad hoc* Expert Consultation on UNCLOS was convened in Paris, 20-21 March 1995. The major aim of the consultation was to provide scientific and technical information in relation to the determination of the limits of the continental shelf.

UNESCO National Commission of the Democratic Peoples Republic of Korea

At the invitation of the UNESCO National Commission of the Democratic Peoples Republic of Korea, an IOC consultant, Dr. C. Latouche, visited the National Oceanographic Commission in Pyongyang to present lectures, to organize seminars, to visit laboratories and natural sites, and to give advice concerning environmental studies, monitoring and sampling (Document Mission Report No. 30, 1995, UNESCO Science Sector).

Following the severe storm which deeply affected the DPRK in August 1995, a request for exceptional UNESCO aid (Emergency Programme) was recently presented by the DPRK UNESCO National Commission, and supported by IOC in the framework of its OSNLR Programme.

1.4 OCEAN MAPPING

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 Ocean Research. The first activity was the compilation of the 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 USSR.

A map showing global coverage and the state of development appears on the following page. (Figure 3).

At present, IOC contributions to Ocean Mapping activities fall within three categories: GEBCO, GAPA and regional ocean mapping projects.

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. The "GEBCO Digital Atlas GDA" is now available on Compact Disc (CD-ROM). This provides the results of the interpretative contouring in a computer compatible form so that they can be widely used and flexibly manipulated. To date 555 copies have been sold or distributed as complimentary copies in 55 countries. However, it has been recognized that this initial success can only be maintained if the GDA is updated regularly - a two year interval has been proposed between updates and a second edition is now scheduled for release in mid-1996. It is expected that by the end of 1995 sufficient new data will have been acquired to justify the printing of the 6th Edition of GEBCO. In 1995, IOC received from the Head Department of Navigation and Oceanography of Russia a proposal to publish a new atlas "World Ocean" and transform its volume "Bathymetry" into the 6th Edition of GEBCO. An Assembly Diagram for GEBCO Sheets follows as Figure 4.

Work has continued on the "GEBCO Guidelines". The final part (of the initial planned contents) "Digital Bathymetric Data (Multibeam Echo-Sounders)" is in draft stage and is scheduled for approval at the 1996 GEBCO) meetings, and subsequent publication. It has however become apparent that there is a need for an additional set of guidelines to cover the digitization of bathymetric contours, and a draft document will be prepared in the intersessional period.

The demand for an authoritative and global description of the bathymetry of the world's oceans from physical and chemical oceanographers, who are involved in modelling the ocean environment and predicting changes in global circulation, is steadily becoming more urgent, in addition to the increasingly fine scale resolution requirements of marine geologists and geophysicists. Repeated routine ocean observations, as anticipated in the IOC's Global Ocean Observing System (GOOS), will be required to monitor oceanic change, and this will also require global bathymetry data of known quality. For this purpose a gridded dataset is needed, so a Task Team of Experts has been setup to conduct a study of the requirement and how it might be achieved.

The 15th Session of the GEBCO Guiding Committee was held at the International Hydrographic Bureau, Monaco, 15-17 May 1995. The session reviewed the matters arising from the 9th Meeting of GEBCO Officers and current problems of GEBCO activities were successfully considered (Document IOC-IHO/GEBCO-XV/3).

The Permanent Secretary of GEBCO Guiding Committee, Mr. Desmond P.D. Scott, announced his retirement from this post. Mr. Brian Harper was elected to take up this responsibility as of 1 January 1996.

International Bathymetric Chart of the Mediterranean and its Geological and Geophysical Series (IBCM)

An informal consultation of the IOC Editorial Board for the International Bathymetric Chart of the Mediterranean and its Geological and Geophysical Series was held in Valletta, Malta (28-30 March 1995).

A second edition of the IBCM is planned for publication after completion of the five Geological and Geophysical Series. At present, a full cover of 1:250 000 plotting sheets for the region is being maintained by a network of Hydrographic Offices. Progress has been achieved in the

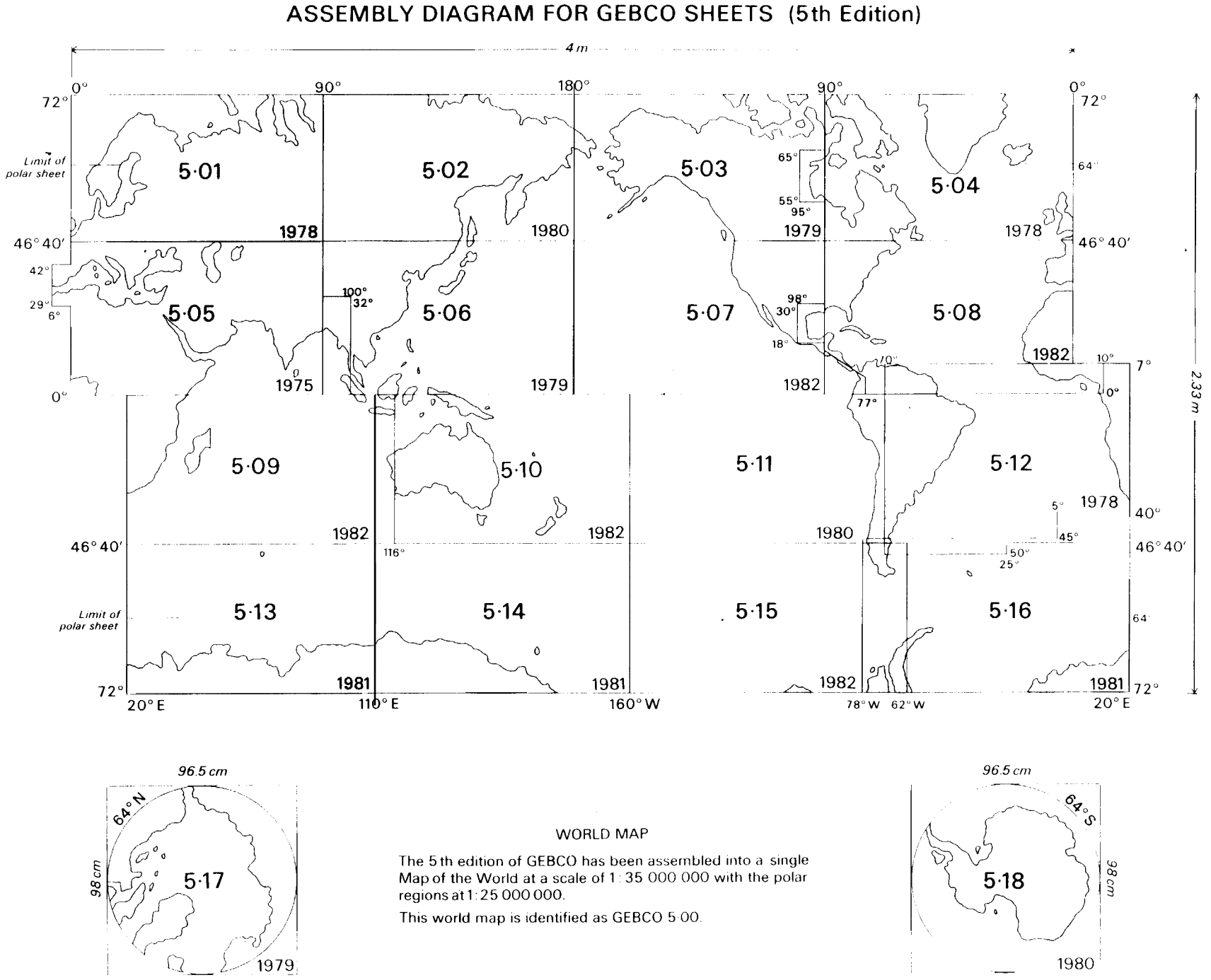
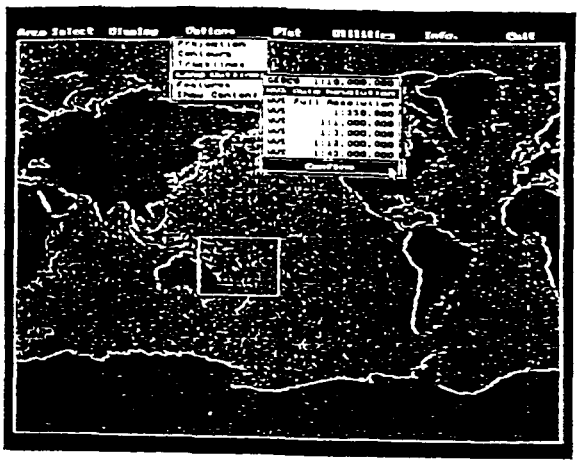
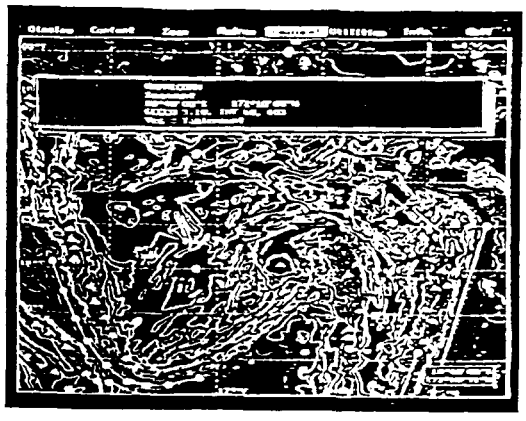


Figure 3. Assembly Diagram for GEBCO Sheets (5th Edition)

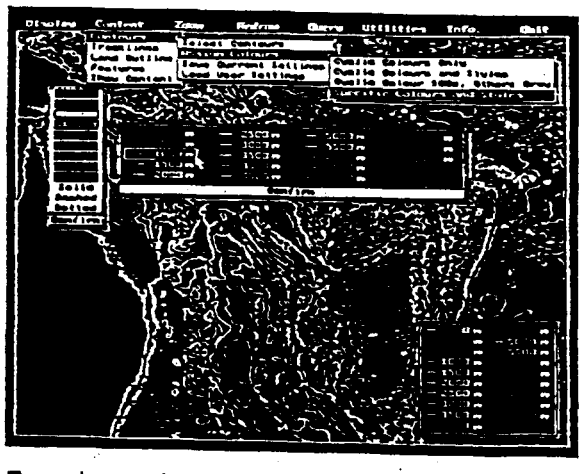
The GEBCO Digital Atlas



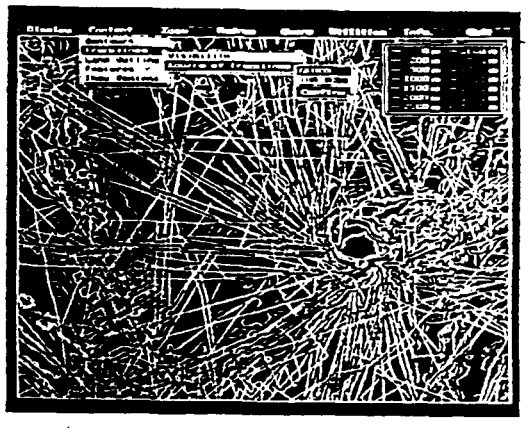
The Atlas system is user-friendly, with a low learning overhead. It is controlled by pull-down menus and context sensitive help is available at all times. The user's geographic area of interest may be selected using an on-screen zoom box.



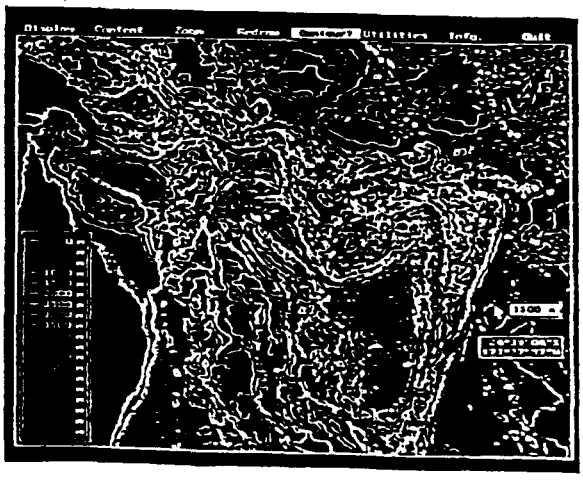
The user may zoom into and pan across the selected area at will. A geographic grid provides reference, and symbols indicate the location of named features. A symbol query reveals the feature's name.



The user has control over the contours to be displayed and on their colour and line style



Tracklines and survey boxes may be overlaid to show the distribution of data used in the compilation of the contours.



The geographic coordinates of the cursor are constantly displayed and the depth of any contour may be queried

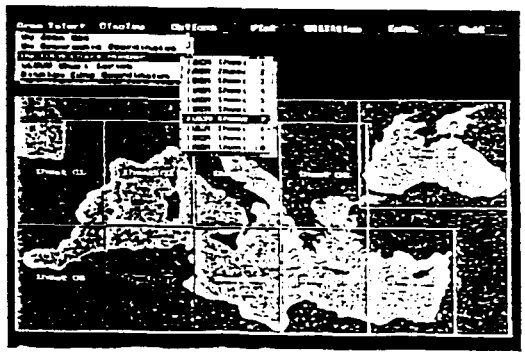


Figure 4. The GEBCO Digital Atlas

Geological and Geophysical Series within which the Unconsolidated Sea-bed Surface Sediment Chart was printed in 1995.

GAPA

The International Geological-Geophysical Atlases of the Atlantic and Pacific Oceans (GAPA) is another IOC project in Ocean Mapping. The Atlantic Ocean Atlas was published in 1991 and has now been widely distributed to contributors and to IOC Depository Centres. The companion atlas for the Pacific Ocean is now in the process of being published. Under contract from the Houston Advanced Research Centre (HARC), the Russian Mapping Production Association "Kartografia" started last October 1995 to print this atlas and it is expected to be ready for distribution mid-1996. The 14th Meeting of the Editorial Board for GAPA took place in Tokyo, Japan, September 1995.

International Bathymetric Chart of the Central Eastern Atlantic (IBCEA)

The First Meeting of the Editorial Board for IBCEA was held in Lagos, Nigeria, in February 1990. Due to the shortage of funds in 1992, the second session was postponed to a later date; it is now planned for September 1996 in Paris.

In spite of a lot of difficulties, some progress was achieved within this project. The final version of sheet 8 is being printed and color proofs of sheets 6 and 9 were printed in 1995 by the French Hydrographic and Oceanographic Service. The final version of sheets 6 and 9 is expected to be available in 1996. The Institute of Hydrography of Portugal has just completed the compilation of sheets 1 and 4.

International Bathymetric Chart of the Western Indian Ocean (IBCWIO)

The Third Meeting of IBCWIO was held in October 1994, Zanzibar, Tanzania. Data have been collected from various sources and strong national support was received The project has strongly advanced through this meeting. The Russian Federation, through HDNO, has joined the Editorial Board. The Republic of South Africa has shown an interest in collaborating with IBCWIO but has not yet joined the Editorial Board. France recently expressed its willingness to participate in this project. There has been a significant change in the ability of most Member States to handle digital source material. In 1995, the Chief Editor was working with the sheet co-ordinators to identify their capabilities as well as the hardware and software now available in their institutions with a view to furnishing them with any additional programmes needed to handle IBCWIO data. The Sheet Assembly Diagram for IBCWIO has been modified and now consists of 21 sheets. Following a successful Training Course on Bathymetric Charting held in Nosy Bé, Madagascar on board RV METEOR in June/July 1987, the German Government has again offered, as a contribution to IOC's Training, Education and Mutual Assistance in the Marine Sciences (TEMA) programme, to organize an Advanced Training Course on Bathymetric Charting in the Western Indian Ocean. This was implemented on board the RV METEOR, 16-30 December 1995.

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

The Fifth Meeting of the Editorial Board for IBCCA was held in San Jose, Costa Rica, November 1994, and considerable progress was achieved in 1995. Thus bathymetry for IBCCA project is complete for sheets 1-01, 1-05, 1-07, 1-08 and nearly complete for sheets 1-02, 1-03 and 1-11. Sheets 1-15 and half of 1-14 are undergoing major revisions after having been extensively reviewed. Considerable work has been done on sheets 1-13 and 1-17. Progress has been made on sheets 1-12, 1-10 and 1-16. INEGI (Mexico) has sent all digital bathymetric data and software to the Costa Rican participants. Cuba and Mexico will help Costa Rican representatives to get the bathymetric compilation started in 1996. Sheets 1-09 and 1-04 are being processed to switch from paper format into digital form by using the automated systems of INEGI. They will be sent in digital

form to the GEBCO Sub-Committee on Digital Bathymetry in March 1996. A tentative printing programme for 1996 includes sheets 1-05, 1-06, 1-07, 1-08 and possibly sheets 1-01 and 1-02.

International Bathymetric Chart for the Western Pacific (IBCWP)

Due to lack of funds, the Second Session of the EB-IBCWP and the IBCWP Workshop on Data Sources and Map Compilation proposed by the First Officers Meeting, Bali, November 1994, could not take place as planned.

Other activities proposed by the Officers Meeting include: (i) investigation of the current practices in terms of data checking using an agreed international computer programme in other IOC regional ocean mapping projects as reference to IBCWP (6.2); (iv) to send a formal invitation to New Zealand and SOPAC in an attempt to encourage and maximize their involvement; this has been done; (v) to send an invitation to IFREMER to participate on the Editorial Board with copies to the French Navy, ORSTOM in New Caledonia, and SOPAC; this has been done; and (vi) the formulation of a draft implementation plan for IBCWP.

The IOC Assembly, at its Eighteenth Session, adopted Resolution XVIII- 10, which, *inter alia*, decided that resources be ensured to hold the second session of EB-IBCWP in 1996.

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

General

The activities in 1995 were mainly directed at fulfilling the objectives and targets of the Third GIPME Action Plan, 1994-1996, approved by the Eighteenth Session of the IOC Assembly (Paris, 13-26 June 1995) as well as the Resolutions passed by the Twenty-seventh Session of the Executive Council (Resolution EC-XXVII.4)

Since the Eight Session of the IOC-UNEP-IMO Committee for GIPME met in Costa Rica, 18-22 April 1994, where the Third GIPME Action Plan was adopted, a large part of the activities has been implemented. However some are still pending as a result funding restraints.

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 review of the Marine Environmental Studies Laboratory (MESL) of the Marine Environmental Laboratory (MEL) of the International Atomic Energy Agency (IAEA) in Monaco was conducted during April 1995. IOC was invited to become a full partner in the Umbrella Project supporting the MESL, currently supported by UNEP and IAEA.

Developments of the next phase of the Open Ocean baseline study have been prepared during the year and this phase is presently being carried out. Joint Global Ocean Flux Study (JGOFS) protocols have been published. A GIPME brochure has been printed in English and will be distributed at all technical meetings. GIPME has contributed to some of the regional ACOPS Conferences on Land Based Sources of Marine Pollution.

GIPME was represented at the Second Steering Committee Meeting GEF-UNDP-IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas (MPP-EAS), 11-13 December 1995, Phuket, Thailand. IOC/WESTPAC co-operated in planning for the exercise in pollution assessment and prediction: workshops are to be convened in 1996.

The joint Secretariat of GESAMP met at IMO Headquarters, London, 28-29 September 1995, where the following issues were discussed and reported on: Draft Guidelines for Procedures of GESAMP; GESAMP's role as the advisory body to the Executive Secretary of the Convention on Biological Diversity: the outcome of the ACC Sub-Committee on Oceans and Coastal Areas; Preparation of the state of marine environment report; further development of GESAMP involvement in GEF activities.

The GIPME HOTO Panel of the joint Scientific and Technical Committee for GOOS (J-GOOS) meeting was organized in Bangkok, 15-21 November 1995, where the HOTO strategic plan was modified and finalized. The meeting also discussed ways and means to carry out activities relevant to HOTO implementation and it was proposed that a specific pilot project in the WESTPAC region should be developed in a wider context. Also the collaboration with NEAR-GOOS as well as the International Musselwatch Project was discussed.

During the GIPME Officers' meeting, Paris, 28-30 June 1995, it was agreed to develop a mechanism for the Committee for GIPME so as to be co-sponsored by UNEP and IMO and approved by the requisite UN Agency Governing Bodies.

The Senior Assistant Secretary for MPRM left IOC in April 1995 in order to take up a position as Project Co-ordinator for the UNIDO-GEF-Large Marine Ecosystems project in the Gulf of Guinea.

Group of Experts on the Effects of Pollutants

Following the meeting with the Co-ordinator of the UNDP Black-Sea Programme Co-ordination Unit in Izmir, Turkey, 20-22 June 1994, GIPME, through GEEP has participated Environmental Management and Protection Programme of the Black Sea. In this regard GEEP organized a training course in Plymouth, UK, 14-18 August 1995, on Biological Effect of Pollutants in the Black Sea, where 12 regional scientists developed their scientific skills.

GIPME Officers undertook a mission to Istanbul in order to review laboratory facilities, identify potential sampling sites and design a sampling and analysis plan for musselwatch survey to commence in 1996. The mission included visits to Odessa and to Sachi to prepare for training activities in respect of Black Sea-IOC co-operation and to initiate the development of a monitoring system.

GEEP-GEMSI experts undertook a mission to ROPME in December 1995 in order to advise on appropriate parameters to initiate a monitoring network

Group of Experts on Methods, Standards and Intercalibration (GEMSI)

The Group continued its activities in the preparation, revision and review of reference manuals. Collection of mussels for the GEMSI programme is being carried out in the South Western Atlantic Region and sent to MESL for use in the preparation of reference material.

A mission to the Black Sea region was undertaken to identify sampling sites and to develop a monitoring system for Musselwatch.

Indian Ocean Musselwatch programme is being planned and may be initiated during 1996-1997.

Group of Experts on Standards and Reference Materials (GESREM)

Since the GESREM meeting in 1993, the Group has continued its work towards accomplishing genuine reference materials. After completing the reference material on nutrients-silicate, phosphate,

nitrate/nitrite and ammonia they have during 1995 initiated preparation for Algal Pigment Reference Material as well as preparation of Tissue Organic Reference Material.

Marine Pollution Monitoring System

In the IOCARIBE Region Marine Debris/Waste Management activities have continued. The Fourth IOC-UNEP/CEPPOL Marine Debris/Waste Management Workshop was convened in La Romana, Dominican Republic, 19-23 August, 1995 with an emphasis on education. The regional action plan on Marine Debris Waste Management has continued its implementation as regards Outreach and Awareness Campaigns. Fingerprinting of Oil Crudes as well as the Circulation Modelling for the Gulf of Praria have been finalized by the Institute of Marine Affairs, IMA, Trinidad. In addition, pesticide and eutrophication pilot studies have continued in this Region.

In the IOCEA region a workshop on Integrated Coastal Area Management with emphasis on marine pollution was convened in Conakry, Guinea, December, 1995. In addition, the Marine Debris Waste Management programme for the Gulf of Guinea initiated in December, 1994 convened a workshop in order to assess the result from the monitoring exercise in Abidjan, Cote d'Ivoire, 5-7 December 1995. The recommendation from the first workshop, Lagos, Nigeria, December 1994 is being implemented accordingly.

Results from the 1990 Open Ocean Baseline Study on the RV METEOR

The following description is extracted from a paper in EOS on the IOC baseline study[1].

The baseline cruise aboard the METEOR began at Cape Town, South Africa, on 13 March 1990 and ended in Funchal, Madeira on 15 April 1990. The survey occupied four sites for vertical profiles, Station 9 (30CS, 8°E) in the Cape Basin, Station 7 (15° S, O-W) in the Angola Basin, Station 5 (24° N, 23°W) over the Cape Verde Abyssal Plain and Station 4 (34° N, 13°W) over the Seine Abyssal Plain. These four stations enabled sampling of most of the deep and intermediate water masses of the eastern Atlantic. Up to 36 depths were sampled using a CTD/rosette and trace metal samplers at each station. In addition, detailed surface sampling was undertaken on the long south-north transects between stations.

There are few previous trace metal data for the pelagic South Atlantic Ocean and, for some metals (e.g., Ag, Hg, Sb), the 1990 baseline survey provided the first deep ocean profiles for this region. The baseline cruise data for other metals (e. g., Al, Cd, Cu, Ni) have significantly augmented the previous data.

Figure 5 shows profiles of hydrographic variables (salinity, phosphate, silicate), Cd, Ag and Al at Station 7. The hydrographic profiles show the presence of South Atlantic Central Water in the upper 750 m, Antarctic Intermediate Water (AAIW) just below this, and Circumpolar Intermediate Water (CPIW) centred at 1000 m depth. The upper and lower components of North Atlantic Deep Water (NADW) are found between 1500 and 4200 m, and there is some indication of Antarctic Bottom Water in the deepest samples.

Among the trace metals, the strongest correspondence with the hydrographic features was seen for aluminium with the southern intermediate waters (AAIW and CPIW) having low Al concentrations and surface waters, and those from the north (NADW), having much higher values due to atmospheric input. The Ag and Cd profiles are much more nutrient-like, with Ag correlating with silicate and Cd with phosphate. Significantly, this is the first South Atlantic profile for Ag, an element that has exhibited distinct anthropogenic inputs in the coastal North Pacific. The co-variance between Cd and

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1 G.A. Cutter, W.M. Landing, C.I. Measures and P. A. Yeats. The IOC baseline survey for trace contaminants in the Atlantic Ocean. EOS, 77 (in press).

phosphate in all ocean basins has found considerable application in paleo-oceanography. The results presented here help to define the Cd:P signature of the waters that originate in the southern ocean, a subject of considerable debate.

Figure 6 depicts surface transects for Al and Fe obtained on the 1990 baseline cruise. The drop in salinity between 7°S and 4° N is primarily due to rainfall associated with the Intertropical Convergence Zone (ITCZ), with the increase in both salinity and phosphate just south of the equator being due to upwelling. Coastal upwelling inputs of phosphate are also evident between 9°N and 15° N where the transect is closer to the western coast of North Africa. Since a primary source of A 1 to the surface ocean is atmospheric deposition of terrestrial aerosols, the horizontal transect clearly shows the input of Al, presumably of Saharan origin, to the ITCZ. Moreover, as the vertical profile of Al in Figure 6 indicates, upwelling at the Equator and near the North African coast dilutes the surface water Al concentrations. Iron, a trace metal that is receiving considerable attention as a micro-nutrient, also shows large atmospheric inputs as that are simulated by Al. Upwelling of deeper waters at the Equator and along the North African coast, however, provides an additional input of Fe. These and many other IOC baseline data were presented at the 1992 AGU Ocean Sciences Meeting and are featured in a recently published special volume of Marine Chemistry (Volume 49). Some overall findings from the 1990 baseline survey include the importance of atmospheric deposition on the biogeochemical cycling of several trace metals (e.g., Al, Fe, Hg, Sb) and the evident influence of physical forcing (deep water circulation, upwelling) on the concentrations and distributions of trace metals .

2. OCEAN SERVICES

2.1 INTERNATIONAL OCEANOGRAPHIC DATA EXCHANGE (IODE)

In 1995, the efforts of the IODE have been targeted at the expansion of the IODE data centres' expertise, skills and efficiency. It has been marked by a very significant change in the fields of networking and electronic publications of data and information.

One activity that was of significant importance to IODE was convening the IODE "Think Tank" meeting in Paris in March 1995. It was attended by a broad range of IODE experts and representatives of client programmes. The Meeting reviewed the IODE programme critically and suggested the way forward in delivering products and services that meet the needs of clients over the next decade. While certain shortcomings were identified, it was pointed out that IODE, working with the World Data Centres, remains the only international programme that has a formal responsibility for the long-term care and distribution of oceanographic data.

In the field of GODAR, IOC was able, with financial support from the USA and EU/MAST, to develop in-depth studies of historical data holdings in Southern Europe and Northern Africa by arranging the Fourth Regional Workshop, 24-28 April 1995, Valletta, Malta. As a result of the first three years of GODAR activities, the size of the global temperature profile database has been increased by approximately 1.4 million temperature and 300,000 salinity profiles. In 1995, a wide distribution of the set of 10 CD-ROMs and products based on this data has been implemented, known as the World Ocean Atlas 1994.

Plans for the further development of the first phase of GODAR include two more regional workshops in September/October 1996 in Colombia for Central and South America and in March/May 1997 in Nigeria for Eastern and Western Africa. After this, the first phase will culminate with the publication of the second issue of GODAR CD-ROMs and the International GODAR Conference which will review the progress achieved during the first phase and outline a plan for the future.

OceanPC has made steady progress in 1995. Over 100 requests for copies have been received from 35 countries. A regular column in the IMS Newsletter has been developed to highlight software

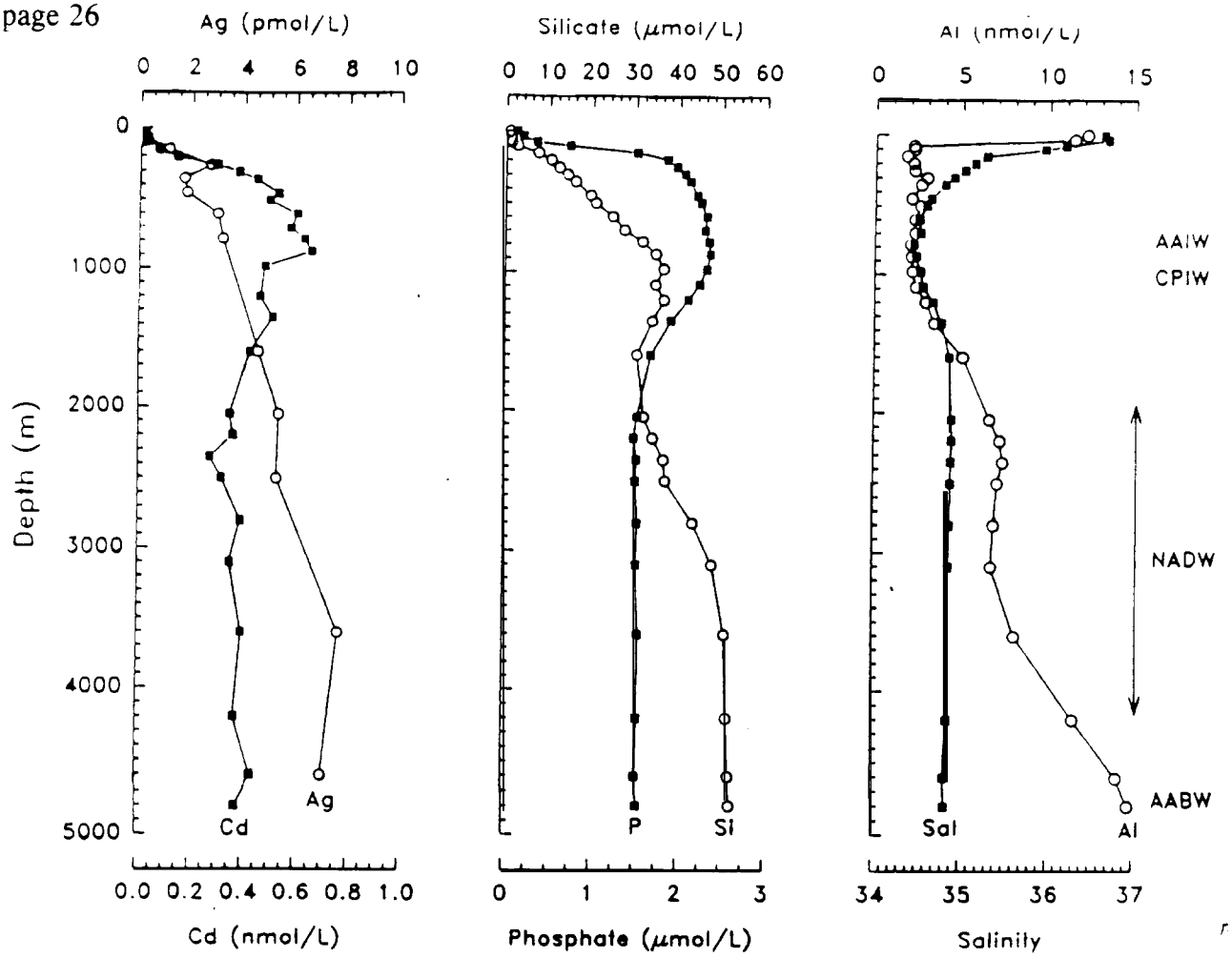

Figure 5 - Vertical profiles obtained from the baseline survey

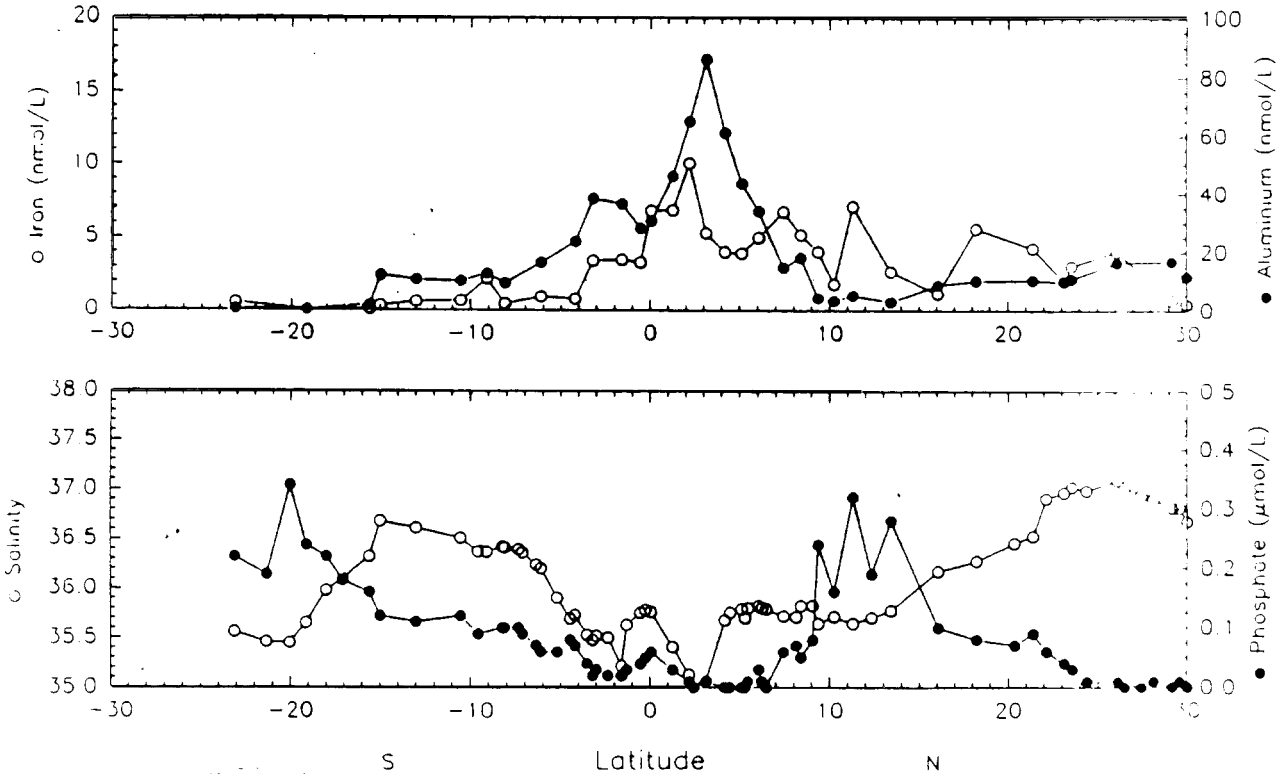

Figure 6 - Latitudinal profiles obtained from the baseline survey

of interest to the oceanographic community. A detailed programme review was accomplished in 1995 by an OceanPC advisory board meeting which was held at Oceanor, Trondheim, Norway, 20-24 March 1995, to review and update the basic OceanPC package and explore the possible co-operation with Oceanor in project development. As a result, there was a revision of the OceanPC programme. A nicely presented OceanPC Manual entitled “Software for Management and International Exchange of Oceanographic Data” has been published and distributed. The manual contains information of the basic concepts of the system, overviews its components and describes the use of Version 952 of OceanPC. The textual part of the manual is accompanied by two disks containing a set of executable programmes, source codes and a menu programme.

The fundamental question of the IODE implementation was to facilitate regional co-operation and capacity building. What can IODE do so that scientists and others in developing countries can become important users of and contributors to the IODE system?

The IODE programme in the regions has been oriented mainly towards establishing regional data and information networks, national oceanographic data centres and providing necessary training.

At the Third Session of IOCINCWIO, Mauritius, December 1994, it was noted that regional capabilities to interpret and use the results from large-scale experiments like TOGA and WOCE were very limited. There was a need to enhance this capability and train human resources to both use the data and interpret the results so as to provide advice on actions to the governments. RECOSCIX-WIO was identified as a centre through which such data could be delivered. In January 1995, a mission was arranged to draft a design document for a regional network of data centres.

A project proposal for the establishment of an Ocean Data and Information Network in Eastern Africa (ODINEA) was developed.

The OceanPC training course was successfully held in Mombasa, Kenya, 18-22 April 1995, at the Kenya Marine Fisheries Research Institute with 15 participants. The interest of the students was very high as evidenced by their willingness to work outside regular class hours including three night sessions. All registered students successfully completed the course, as did several sit-in students from KMFRI.

Another mission was organized to the Islamic Republic of Iran with a view to helping the country to establish the national oceanographic data management infrastructure including an NODC. In compliance with the mission recommendations, a training course on oceanographic data management was implemented in Tehran, 15-26 May 1995, for national experts with invitations from lecturers from Europe. Hardware and software was made available to the country.

Training courses have also been arranged: for the Black and Caspian Sea countries on marine geological and geophysical data management in Gelendzik, Russia, under the auspices of WDC-B, MGG (13-29 September 1995); on the general aspects of oceanographic data and information management for the countries of Western Africa and Southern Europe in Valletta, Malta, 10-21 April 1995 and for WESTPAC countries in Tokyo, Japan, at the Japan Oceanographic Data Centre, 16-27 October 1995. The latter course is worth special mention as it is being implemented on an annual basis since 1982 and to a large degree helped to establish an active regional system of data management, provided an important contribution to the WESTPAC scientific programmes and to the IODE regional and activities in general.

In total more than 50 individual travel/study grants were provided to experts from developing countries enabling them to participate in international conferences, training courses and related capacity building activities.

In 1995, IODE started a new type of training course for instructors. The first training course of this type was conducted on OceanPC at ICES, Copenhagen, 27-31 March 1995. This type of

training will provide an opportunity to extend training capabilities without being involved in big financial obligations.

In conformity with the decisions of the IOC Assembly, the IODE Committee has been working in close co-operation with the IOC Secretariat with a view to finding an adequate solution to the shortage of available resources - staff and programme funds.

A permanent post has been staffed for Marine Information Management at the P-3 level. Mr. P. Pissierssens took this position and will be able to continue the excellent work he has been doing on information matters for IODE for the past several years, as a consultant. There is now a solid core of expertise in the Secretariat contributing to the IODE programme.

In 1995, the IODE programme has undertaken numerous activities in order to widen the impact of current projects and to involve other sponsoring agencies such as WMO, ICES, ICSU, EU/MAST, SAREC of SIDA, etc. For example, WMO is involved in the joint implementation of OceanPC and the GTSPP projects; ICSU operates and supports the activities of WDCs, Oceanography and MGG, which in turn, constitutes an important component of the IODE data centres system; ICES co-operates closely in the format development activities, establishment of common quality control procedures, etc; EU/MAST co-sponsors a few projects and meetings. IOC is closely associated with EU/MAST in launching a “joint approach” to the oceanographic data management.

More and more countries have started to recognize that data management is for the common good and that it will not be successful unless there is a shared commitment to making it work.

Several Member States contributed to the IODE programme through earmarked Trust Fund or in-kind contributions. The Government of the United States supported GODAR and OceanPC, the Government of Canada - GTSPP, the Government of Russia - TEMA and GODAR, the Government of Sweden and Belgium - RECOSCIX-WIO, the Government of France - data management activities in the Mediterranean and GODAR, etc.

In spite of many success stories, IODE needs to establish a proactive programme to make data centres more responsive to the users’ needs and to build the skills of the data centres of the system.

The data centres will have to recognize that the science programmes do not exist to conveniently supply them with data and that the data centres are there to provide a service back to the community. The first steps in this direction have been made and further action is needed.

2.2 MARINE INFORMATION MANAGEMENT (MIM)

The intercessional period after the Fourth Session of the IODE Group of Experts on Marine information management, Washington DC, 6-9 October 1993, continued the implementation of the adopted action plan. The MIM programme shifted its focus slightly towards new technologies, a direction already suggested during the GEMIM-IV.

Acknowledging the exponential growth of the Internet, but also the lack of tools which can clearly guide users interested in marine sciences, the IOC Secretariat developed its World Wide Web server. A first version was put on-line in September 1995. Since then the server has been updated and expanded regularly. The server not only provides information on IOC programmes and activities, it also provides on-line access to IOC publications. The server is intended to be a central information point for users interested in IOC activities and includes jumps to Member States Home Pages, thereby emphasizing the partnership of IOC programmes. In order **to** serve users in Member States where Internet access is not available a CD-ROM is planned for 1996.

The WWW server will also be used to host databases such as MEDI, the Global Directory of Marine Institutions and Scientists.

Within the framework of the Global Directory of Marine Institutions and Scientists, the IOCINCWIO's regional directory will be published by IOC in 1996. A PC database version will be distributed by the RECOSCIX-WIO regional dispatch centre. Publication of the IOCEA regional directory is also planned for 1996.

The active role of IOC within ASFA has continued. The user-friendly ASFA input interface ASFISIS was accepted during the 1995 ASFA Board and the software package, after revision by the ASFA Secretariat, is being distributed to the ASFA input centres in January 1996. The software package may also be used for the preparation of library holding databases of small marine science libraries. The publication "ASFA - the First Twenty Years" prepared for the ASFA Board was published by IOC (Document IOC/INF-994). Within the ASFIS Reference Series the ASFIS-2 guide on "Subject Categories and Scope descriptors" will be published by IOC in 1996.

Support to the RECOSCIX-WIO project, operational in the IOCINCWIO region, ended in December 1995. However, the Government of Belgium decided to support a follow-up to RECOSCIX-WIO which will start in 1996. The regional newsletter 'WINDOW' is now being printed and distributed by IOC.

In June 1995 a professional post (P-3) for Marine Information Management was recruited at the IOC Secretariat.

Despite strong efforts by Members of the Group of Experts on MIM to implement the action plan, insufficient funds are available for Marine Information Management. Special efforts are required for capacity building in developing countries. Although some achievements were made in 1994 to start up RECOSCIX-CEA, no funds were available for this project in 1995. Although information can be disseminated more cost-effectively and faster with new technologies such as the Internet, it must be emphasized that few developing countries have access to this technology. Concerted actions need to be taken in this respect.

2.3 INTERNATIONAL CO-ORDINATION GROUP FOR THE TSUNAMI WARNING SYSTEM IN THE PACIFIC (ITSU) AND IDNDR-RELATED ACTIVITIES

1995 marked the increasing interest of Member States in the tsunami programme, not only in the Pacific, but in the IOCARIBE and Mediterranean regions as well. The Tsunami Warning System in the Pacific continues to be a unique operational warning system which comprises hazard assessment, warning and educated response.

The Meeting of the ICG/ITSU Officers in Honolulu, Hawaii, USA, 24-27 January 1995, with the purpose of reviewing what has been achieved, what obstacles have been faced and what should be done for the preparation of ITSU-XV.

The Fifteenth Session of the International Co-ordination Group for the Tsunami Warning System in the Pacific took place in Papetee, Tahiti, 24-28 July 1995. The Session focussed on further development of the network of seismic and sea-level measurement stations; improvement of communication links for real-time exchange of telemetry, seismic and tsunami data and dissemination of tsunami notices and warnings; implementation of the Tsunami Inundation Modelling Exchange (TIME) project; development of the Expert Tsunami Data Base (ETDB) for the Pacific; on training and education activities, and on actions targeted to increase the awareness of the population on earthquake and tsunami dangers. The participants discussed ways and means of improving the quality of the system components and expanding the knowledge and experience in tsunami mitigation gained in the Pacific to other geographical areas such as IOCARIBE and the Mediterranean. The Summary Report of ITSU-XV has been published, and has been widely distributed among IOC Member States.

In 1995, two comprehensive projects which were embarked upon two years before bore their first fruit: under the TIME project, due to generous contributions from Japan and the USA, a Manual

of Numerical Simulation of Tsunamis was finalized and is now being published by IOC. A few numerical models have been transferred free of charge to leading institutions involved in the tsunami mitigation and research, and the description of the characteristics of a work station and peripherals necessary for the tsunami simulation and computer graphics animation have been drafted and distributed; under the ETDB project the first set of floppy disks containing software and the full dataset of the tsunami-related data for the Kuril-Kamchatka region have been issued, the work is proceeding so as to have Pacific-wide coverage.

The International Tsunami Information Centre (ITIC) continued its activities successfully in providing training, services and increasing awareness to the Pacific population of tsunami danger. Special acknowledgement is given to Mexico for providing the services of Mr. S. Ferreras from April 1995 for a one-year posting to the position of the ITIC Assistant Director. This position was supported financially by IOC. Mr. D. Sigrist (USA) left the position of Acting Director ITIC in August 1995, which he had occupied since July 1993 and Dr. C. McCreer (USA), has been selected for the post of Director ITIC. I would like to take this opportunity to thank Mr. Sigrist for his accomplishments as Acting Director.

Co-operation among Member States and other international agencies in seeking support for the development and maintenance of the system is the keynote of the ICG/ITSU operation.

Due to the efforts and contributions from France and the USA, wide utilization of modern reliable TREMOR and NGWLM systems has been started: seven TREMORS have been installed in 1995 and four more are planned for 1996. Australia has developed a project for improving and upgrading the national tsunami warning system which will also be able to provide regional warning services.

Jointly with the IUGG Tsunami Commission, the Tsunami Measurements Workshop took place in Estes Park, Colorado, USA, 28-30 June 1995; a new joint workshop is planned in Petropavlovsk-Kamchatskiv, Russia, 19-23 August 1996.

At the awareness building level, the ICG/ITSU launched initiatives in two directions: the first, facilitating the publication of new materials related to the tsunami danger and placing information on the IOC tsunami programme and ICG/ITSU activities on Internet; and second, through implementing training.

An updated version of the ITIC Brochure was published in English, French and Spanish as well as “Tsunami - *the Great Waves”*, a colour booklet describing tsunami and tsunami safety guidelines. The text of the booklet is also available in digital format. Efforts have been made to implement the publication of a set of textbooks and teachers’ guides on earthquakes and tsunamis, in English, Japanese and Russian. They are now available in Spanish.

The electronic Tsunami Bulletin Board system was developed by the USA NOAA/PMEL as an experimental e-mail notification system for the international tsunami community. A World Wide Web Home Page with access to a broad range of tsunami information was developed at the University of Washington (USA) and at the IOC.

The International Tsunami Information Centre (ITIC), sponsored by IOC, implemented the visiting experts programme in October-November 1995 - a regular annual training exercise for 2-3 experts from the Pacific. Training was also arranged in the framework of the TIME project by Japan and a Training Workshop and Seminar are planned by Chile and Colombia for 1996.

Finally, a few shortcomings of the programme are to be noted. In spite of all the efforts, there was no progress in the development of a regional tsunami warning system in the Southwestern Pacific. More effort should be made to improve disaster prevention and preparedness which is of primary importance in reducing the need for disaster relief. Due to the lack of funds, nothing has been done

for the implementation of the decisions of the Assembly to support Russia in reconstructing the tsunami and seismic warning systems on the Kuril Islands. Lack of funds has not permitted the implementation of all the decisions of the Assembly concerning the ICG/ITSU meetings. More Member States of the Pacific should be involved and contribute actively to further the programme.

Lack of funding was also the reason for the postponement of the launching of the storm surge project.

In June 1995, the WMO Congress and the IOC Assembly reiterated their interest to join in efforts to launch a storm surge project, particularly for the Bay of Bengal and the northern part of the Indian Ocean, with the joint co-operation of WMO, IOC, UNESCO (IHP) and UNEP. However, no actions have yet been taken.

2.4 REMOTE SENSING

Remote Sensing and Relationship with CEOS

Ocean Color was the key topic for IOC in 1995. IOC was asked by the CEOS WGD meeting, Baltimore, 23-26 May 1995, to serve as project leader for a pilot project in ocean color data and information system development. In co-operation with other interested affiliates, IOC organized an international ocean color workshop to set in place the international user requirements for ocean color data. This workshop would take advantage of lessons learned from the CZCS instrument and be singular as an international activity to anticipate the distribution and use of a renewed remotely sensed data stream.

IOC, in co-operation with CEOS, organized the Workshop to lay out the data and information requirements for Ocean Color. The Workshop was attended by 21 participants from 9 countries and chaired by Dr. Trevor Platt a well known ocean color scientist involved in IGBP and IOC programmes and hosted by the Canadian Institute of Oceanographic Sciences at Victoria B.C. Canada, 21-22 September 1995.

The Workshop reviewed the status of the ocean color sensors as well as the ground segments associated with them. From the CZCS experience it identified areas where data and information management of ocean color data could be improved. It emphasized the need for international co-operation to promote the best distribution and utilization of the data. Near term emphasis was place on calibration and validation activities and the need for integrated *in-situ* and remotely sensed data streams to support them.

IOC carried the results of the Victoria Workshop to the ninth session of the Committee on Earth Observation Satellites, Montreal, 11-13 October 1995. At the meeting IOC promoted the formation of an expert group to carry out the international co-ordination activities referred to in the report of the workshop. The Committee agreed that an international ocean color co-ordination effort was necessary and supported the formation by IOC of the International Ocean Color Co-ordination Group by endorsing the following resolution:

"The Committee on Earth Observation Satellites,

noting the executive summary of the IOC Workshop on Ocean Color Data Requirements and Utilization Sidney, B.C. 21-22 September 1995;

recognizing the value of ocean color data in the understanding of the marine ecosystems and their contribution to the global ecosystem;

also recognizing the need for increased co-ordination among space-based data providers, in-situ data providers, and the global user community to improve data utilization and reduce costs;

supports the establishment by IOC of the International Ocean Color Co-ordination Group (IOCCG);

encourages all CEOS members, observers, and affiliates with relevant scientific, technical, or other interests to filly participate in the IOCCG;

requests WGISS, WGCV and IOCCG to co-ordinate relevant activities in order to foster the best collective use of the various ocean color sensors to be launched by different nations over the next decades".

CNES informed the Meeting that it would be hosting an international workshop on ocean colour calibration and validation in April 1996 and agreed to co-ordinate closely with IOC and the IOCCG in the preparations for the workshop. Subsequent discussions lead to the decision to hold the first meeting of the IOCCG in conjunction with the workshop.

In April 1995, IOC co-sponsored an Intensive Course on Applications of Remotely-Sensed Data on Ocean Colour taught in India. The course was attended by 50 participants from the region and provided a general introduction to the applications of remotely-sensed data on ocean colour, with particular reference to the estimation of primary production. Other applications to ocean biogeochemistry and mixed-layer modelling were also discussed. Short presentations were made by participants which illustrated and amplified the material presented in the course. Another course is envisioned in 1996 subject to availability of funds.

IOC continued to participate in the other activities of CEOS regarding user requirements for ocean remotely sensed data. Interest continues to be expressed for the development of coastal remote sensing products but insufficient funds are available to bring these activities to fruition.

3. GLOBAL OCEAN OBSERVING SYSTEM (GOOS)

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

The progress in GOOS design and planning was reviewed by the IOC-WMO-UNEP Committee for GOOS at its Second Session, Paris, 6-9 June 1995. 21 nations attended the I-GOOS H Session and provided reports on their national activities in support of GOOS.

The Executive Summary and Recommendations of I-GOOS-II were considered by the Eighteenth Session of the IOC Assembly, June 1995, and the conclusions of the Assembly were reflected in Resolution XVIII-11.

The Assembly emphasized the following points:

(i) the need for regional socio-economic studies in Member States to explain the benefits of GOOS to their governments and to society, based upon techniques and expertise evaluating these benefits, also including capacities needed for GLOSS involvement;

(ii) the need to set priorities in GOOS implementation in the light of global economic pressures;

(iii) that a regional approach to GOOS implementation and *to* capacity building is likely to be the most appropriate means for many Member States, especially for aspects of GOOS concerning the ocean adjacent to their shores.

Following the recommendations of I-GOOS-II as well as recommendations of the First Session of the I-GOOS Strategy Sub-Committee, Geneva, 27-30 March 1995, and the relevant decisions of the IOC Assembly the following actions have been taken:

(i) the document "Towards Operational Oceanography: the Global Ocean Observing System (GOOS)" (a revision of the document "The Approach to GOOS" (1993)) was prepared;

(ii) an outline of a Strategic Plan for GOOS was prepared and actions have been identified to prepare the plan by members of the I-GOOS SSC;

(iii) the outline of the GOOS Handbook as a comprehensive manual containing all information necessary to countries for understanding and participating in GOOS, was prepared;

(iv) a Draft IGOSS/IODE Data Management Strategy document was prepared as a possible model and basis for a GOOS data management plan;

(v) I-GOOS-II agreed that a series of regional GOOS Development Workshops should be organized to focus on furthering the involvement of developing countries in GOOS and established an *ad hoc* Steering Group to assist in organizing such workshops.

The IOC Assembly agreed that in order to increase the interest of governments and facilitate funding of GOOS, some early and concrete results must be ensured and made rapidly available. The principle of organizing an "Initial Priority Agreement" meeting was welcomed and an I-GOOS Working Group drafted a document "Initial Priorities for GOOS" based on the findings of the OOSDP final report and Health of the Ocean strategic plan. This document after its review by GOOS bodies, will serve as a basis to seek agreement and commitments from Member States on the initial observing system of GOOS.

Among the initial elements, given the concern expressed by Member States about coastal zone problems and degradation of world coral reefs in particular, the Assembly decided to support the establishment of a Global Coral Reef Monitoring Network and appointment of a GCRMN co-ordinator. Following consultation with an *ad hoc* group of experts, Dr. Clive Wilkinson was identified as a GCRMN co-ordinator, and the offer of Australia to locate the GCRMN co-ordinator's office at the Australian Institute of Marine Science in Townsville was gratefully accepted. The Co-ordinator was requested to define the potential contribution of this network to the GOOS Coastal Module and prepared an action plan.

GOOS Support Office

Dr. Jean-Paul Rebert was seconded by France as an interim Director of the Office. As requested by the IOC Assembly, the Executive" Secretary has used the established position as Deputy Secretary IOC, vacant in January 1995, to achieve a position as Director of the GOOS support office, expected to be filled in 1996.

GOOS information server

The GOOS Support Office created a special section on the UNESCO on-line WWW server which provides general information on GOOS. The address is:

http://www.unesco.org/ioc/goos/IOCGOOS.HTML

This server provides information on GOOS organization and reference material (GOOS handbook), GOOS implementation development, GOOS national activities, status of existing systems, list of meetings and reports and is linked to other servers relevant to GOOS.

Joint Scientific and Technical Committee for GOOS (J-GOOS)

The Joint IOC-WMO-ICSU Scientific and Technical Committee for GOOS (J-GOOS) held its Second session in Paris, 24-26 April 1995, and considered J-GOOS structure and support; relationship with other activities; J-GOOS strategy; status of GOOS Panels.

J-GOOS II adopted the GOOS Scientific Strategy Statement as follows:

(i) the translation of the identifiable needs of humanity in the use and protection of the oceans and the evaluation of its role within the global environment, into a set of ocean observations, methodologies and associated scientific products that are appropriate for implementation on an operational basis;

(ii) the identification and continual reassessment of the best scientific practice for operational ocean observations including technology, standards, sampling design, data management and numerical modelling, suitable for implementation in the present and foreseeable future by regional and national ocean service organizations;

(iii) the definition of the scientific framework within which national services can be developed to contribute to a co-ordinated and fully integrated global ocean observing system;

(iv) the promotion of the development and application of those scientific products of a global ocean observing system which will maximize social, environmental and economic benefits for the nations of the world.

It is intended that this strategy statement will serve as the long-term compass to guide its future course of action.

The Committee moved to accelerate the module planning process with a series of decisions. It welcomed the existing IOC Health of the Ocean (HOTO) Panel as a sub-panel working under J-GOOS and modified its terms of reference accordingly. Collaboratively with the JSTC for GCOS and the JSC for the WCRP, it established a new Ocean Observations Panel for Climate (OOPC) to follow-on the work of the Ocean Observing System Development Panel (OOSDP), It drafted guidelines for workshops to better define the scientific and technical components of the Coastal and Living Resources Modules, the latter in co-operation with GLOBEC. The results will serve to guide the work of Panels to be established in the future for these modules. Finally, it developed terms of reference for an *ad hoc* group for the GOOS Services Module.

The state of development of the modules is summarized as follows:

Climate Monitoring, Assessment and Prediction (common GOOS-GCOS module)

J-GOOS-II officially accepted the OOSDP Final Report “Scientific Design for the Common Module of the Global Ocean Observing System and the Global Climate Observing System: An Ocean Observing System for Climate”.

J-GOOS-II decided to establish a Joint J-GOOS-WCRP-JSTC Panel to follow on the OOSDP The Ocean Observations Panel for Climate (OOPC) was set up.

Assessment and Prediction of the Health of the Ocean

A report dealing with observation requirements and methodology was prepared by the J-GOOS ad hoc Panel for the Health of the Ocean Module of GOOS (HOTO).

Monitoring and Assessment of Marine Living Resources

J-GOOS II recommended convening a Workshop in collaboration with GLOBEC in 1996 to further examine direction for an LMR GOOS module.

Monitoring of the Coastal Zone Environment and Its Changes

J-GOOS II emphasised that the coastal module should now have a high, if not the highest priority and is likely to share many of the scientific objectives of the IGBP LOICZ programme. J-GOOS decided to establish an ad hoc Panel for GOOS Coastal Module and to organize a Workshop in early 1997 to examine issues to be considered in developing the coastal aspects of GOOS.

Marine Meteorological and Oceanographic Operational Services

J-GOOS-II decided to establish an *ad hoc* panel to assist it in identifying problems ranging from data acquisition to product delivery that are common to all the GOOS modules.

I-GOOS, on the other hand, appointed a Rapporteur on Marine Meteorological and Oceanographic Services to review and summarize existing marine meteorological and oceanographic services and to identify requirements, deficiencies and trends. The J-GOOS *ad hoc* Panel will liaise closely with the I-GOOS Rapporteur in its work. The report of the Rapporteur will be examined at the Second session of the I-GOOS Strategy Sub-Committee.

GOOS regional activities

The development of the North-East Asian Regional GOOS (NEAR GOOS) has continued - a demonstration case on a regional approach for GOOS in the WESTPAC region. The draft Implementation plan for the project was prepared by an *ad hoc* Working Group in 1995 and endorsed by the Expanded *ad hoc* Working Meeting for the NEAR-GOOS Implementation Plan, held in Bangkok, Thailand, 8-10 January 1996. The draft plan was submitted to the Third Session of the IOC Sub-Commission for WESTPAC (Tokyo, Japan, 26 February -1 March 1996).

EuroGOOS is made up of a consortium of European Agencies. A EuroGOOS Strategic Plan is being prepared and will be published in 1996. Several “test cases” were’ planned in five oceanic regions (Baltic Sea, Arctic Sea, North-East Atlantic Shelf Area, the Mediterranean Sea and the Atlantic Ocean, including the Caribbean.). IOC and EuroGOOS have reciprocal Observer Status at each other’s meetings. GOOS is taking advantage of the surveys conducted by EuroGOOS for identification of the priorities of data requirements and information services for the users of maritime data and forecasts as well as of socio-economic studies conducted by EuroGOOS.

Direct contacts were established with South-Pacific regional organizations, particularly SOPAC and SPREP, which expressed interest in strengthening co-operation with the IOC with respect to GOOS-related activities. Key observing elements in their area were identified where such organizations could play a leading role. A map indicating regions of the world who have reported on their GOOS-related activities is shown as Figure 7.

Nations participating in GOOS or in its regional programmes

This map is based on information provided by countries *(shaded)* who reported on their **activities related to** GOOS since 1994.

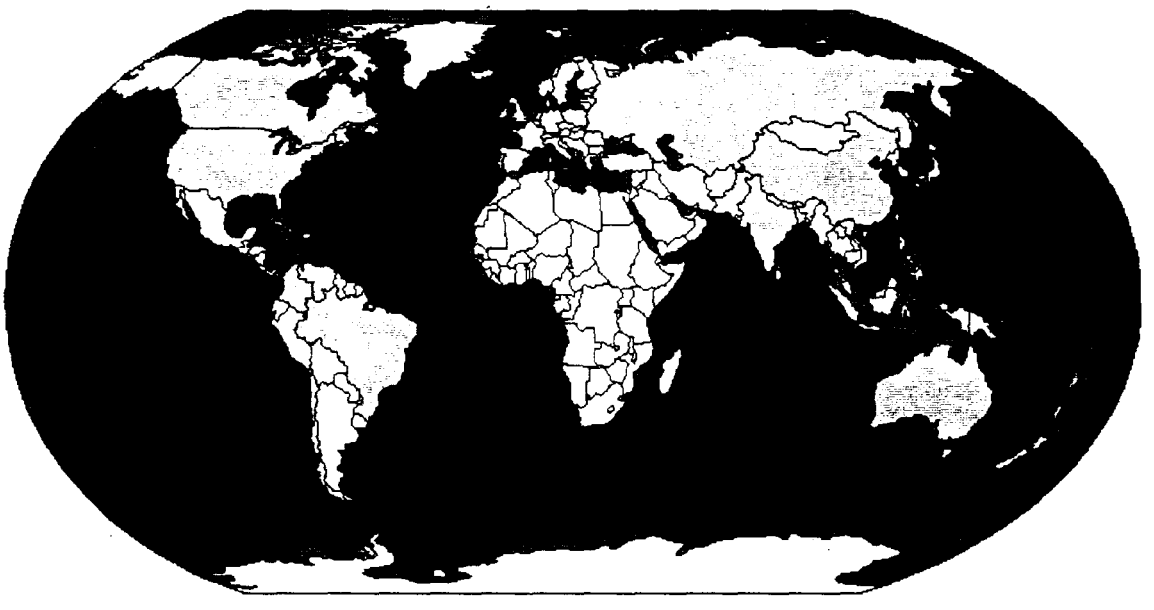

Figure 7. Nations participating in GOOS or in its regional programmes

3.2 EXISTING ELEMENTS OF GOOS

Global Sea Level Observing System (GLOSS)

The Group of Experts on GLOSS held its Fourth Session in Bordeaux, 1-3 February 1995. It was chaired by Dr. David Pugh. The meeting was preceded by an IOC/GLOSS-IAPSO Workshop on Sea Level Variability and Southern Ocean Dynamics and was chaired by Dr. Christian Le Provost.

Several GLOSS experts participated in the IOC-BORDOMER Coastal Change 95 Conference which included a special session on the impacts of sea-level variability, and was chaired by Dr. D. Pugh.

The GLOSS Group of Experts reviewed the progress in GLOSS implementation since its Third Session, October 1992, and formulated the GLOSS Strategy and Plan of Action for 1995-1997. The proposed GLOSS strategy was supported by I-GOOS-II. The report of the Group including the GLOSS Strategy and Plan of Action were endorsed by the Eighteenth Session of the IOC Assembly (Resolution XVIII-13).

In accordance with the GLOSS strategy and Plan of Action the major GLOSS activities in 1995 were focused on the following:

(i) Continued development of the GLOSS network and encouragement of Member States to install new tide-gauges at the GLOSS sites and to maintain and up-grade the operational GLOSS stations

The table below shows the progress in the development of the GLOSS network from the viewpoint of mean sea level data received by PSMSL from 1989 till October 1995. For each GLOSS station the year of the last data entered into the data bank has been used to place the station into one of four categories:

Category 1 "operational" stations for which the latest data is 1991 or later;
Category 2 "Probably operational" stations for which the latest data is within the period 1981-1990;
Category 3 "Historical" stations for which the latest data is earlier than 1981;
Category 4 for which no PSMSL data exist

Category	June 89	Oct 90	Aug 91	Oct 92	Oct 93	Oct 94	Oct 95
1	105	133	136	158	177	183	168
2	51	50	57	46	33	35	59
3	47	42	36	29	26	26	22
4	103	81	77	73	72	64	59
TOTAL	306	306	306	308	308	308	308

Table 1

A map showing the geographical distribution of different categories of GLOSS stations for October 1995 appears below as Figure 8.

The GLOSS Technical Secretary has approached a number of countries with the request to respond to the proposals of the GLOSS Group of Experts on the amendments and deletions of some non-operational GLOSS stations.

The GLOSS Group of Experts and the IGOSS Committee (at its seventh session in November 1995) as well as the WOCE community expressed great concern regarding possible reduction of funding by the USA for maintaining GLOSS stations in the Pacific and in support of the SOC for ISLP-Pac and invited the USA and other countries to consider ways and means to maintain this very successful operational sea-level activity needed for operational climate predictions as well as continued research.

Substantial efforts are still required by Member States to establish operational GLOSS stations in the Arctic and Antarctic regions and to assist countries of Africa, South Asia and Small Island States in the installation and maintenance of GLOSS stations.

(ii) Integration of satellite altimetry and tide-gauge data

The success of the TOPEX/POSEIDON and the ERS-1 satellite altimetry missions proved that those altimetry measurements can provide blended data products which allow the monitoring of global and regional sea-level variability. The GLOSS Group of Experts emphasized that coastal gauges will be necessary to provide long-term stability across several satellite missions, and to evaluate the risk statistics for coastal flooding.

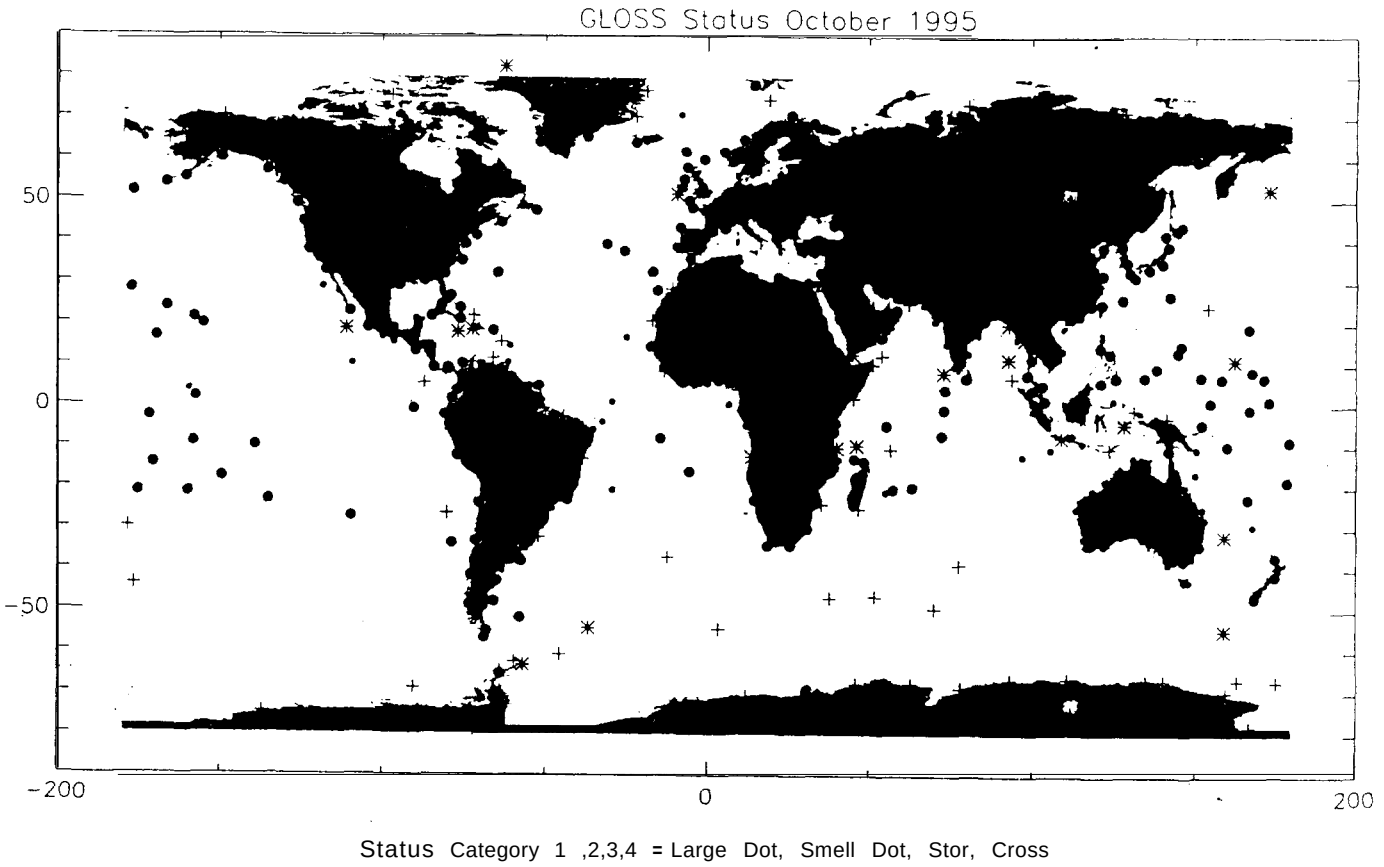

Figure 8. Geographical distribution of different categories of GLOSS stations for October 1995.

(iii) Connection of selected GLOSS tide-gauge bench marks to a global geodetic reference system

The Group of Experts has been working with the International GPS Service in evaluating and selecting some key GLOSS stations whose tide-gauge bench marks are to be connected to a global geodetic frame using the GPS techniques as one method to enable the monitoring of absolute sea level.

(iv) Sea-level products and data/information services

Presently available sea-level products and data/information services include: monthly sea-level anomaly maps and other sea-level data analysis products in the Pacific; altimetric topography maps; access through Internet; a CD-ROM containing datasets of the PSMSL and TOGA Sea Level Center; GLOSS Handbook (Version 2.1) giving details of all GLOSS stations; GLOSS bulletin (Version 2.1) giving details of all GLOSS stations; GLOSS bulletin via the WWW started by PSMSL in 1995 (two issues in 1995); Afro-America GLOSS News (2 issues) produced by Brazil. Figure 9 shows plots of recent changes in annual mean sea-level.

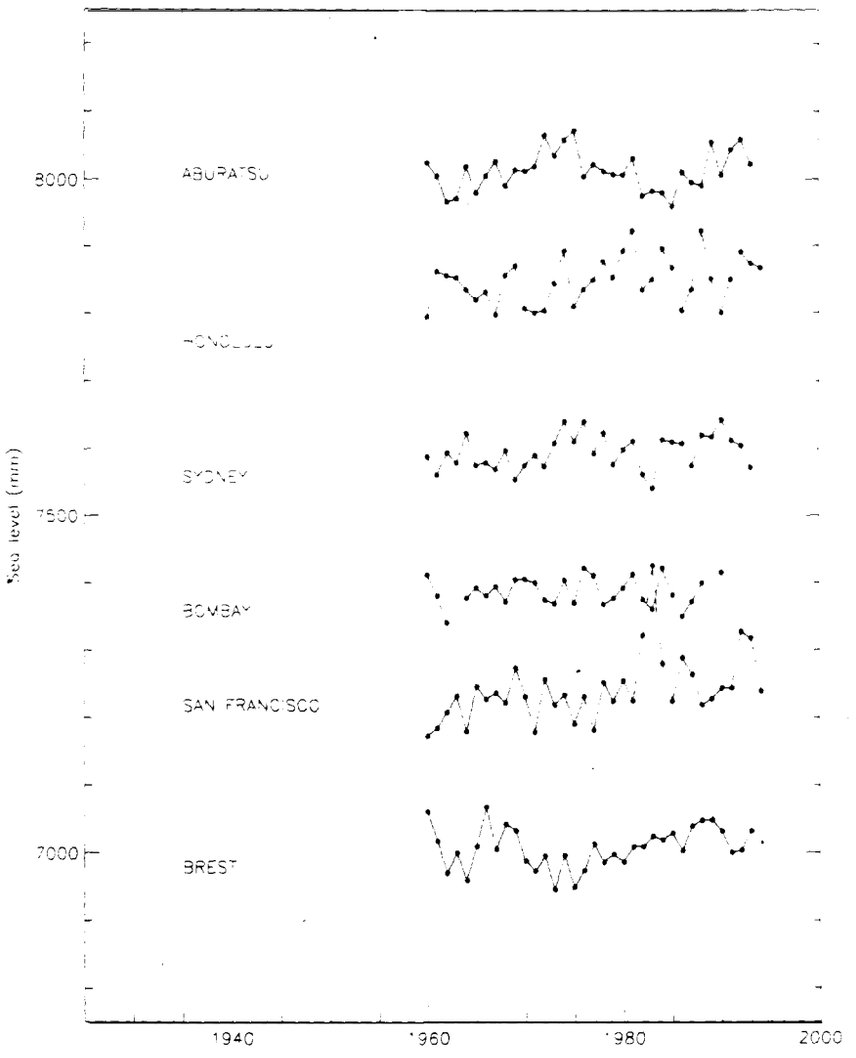

Figure 9. Plots of recent changes in annual mean sea-level from six selected GLOSS tide gauge stations around the world (Aburatsu, Japan; Honolulu, USA; Sydney, Australia; Bombay, India; San Francisco, USA; Brest, France). Note that each MSL record has been given an arbitrary vertical offset for presentation purposes.

(v) Regional complementary GLOSS activities

These programmes include: IGOSS Sea-Level Programme in the Pacific (operational, co-ordinated by the University of Hawaii with the support of NOAA, USA); GLOSS-GOOS Pilot Activity on Sea-Level Changes and Associated Coastal Impacts in the Indian Ocean (co-ordinated by NIO, India); EuroGLOSS (Dr. P. Woodworth is a EuroGLOSS liaison with GLOSS); Sea-Level Pilot Project in the Southern Ocean (planning by NTF, Australia); Sea-Level Pilot Project in the North and Tropical Atlantic (planning by MEDS, Canada); IOCARIBE Sea-Level Programme; South-Pacific Sea-Level and Climate Monitoring Project (by Australia and the South-Pacific Forum).

(vi) TEMA Capacity-building-related activities

Many countries, particularly in the IOCEA and IOCINCWIO regions, have expressed their needs for assistance in the provision of instruments, their installation and up-grading, as well as training of specialists in sea-level measurements, interpretation and analysis. Due to limited funds, IOC was only able to meet a few of the expressed requirements for assistance. The GLOSS Group of Experts emphasized the need to investigate the possibility of receiving support for GLOSS TEMA elements from other international (e. g., GEF) or national funds. The regional bodies, particularly IOCEA, IOCINCWIO and IOCINDIO are expected to play a more active role in formulating regional GLOSS/TEMA programmes and seeking extra-budgetary funding for such activities.

Training Seminar on Sea-Level Data Analysis was held at Dehra Dun, India, 21 November-1 December 1995. It was hosted by the Geodetic and Research Branch of Survey of India (Director Brigadier B.S. Rajal and former Director Brigadier B.C. Roy) and organized in collaboration with and support from the Department of Ocean Development (Director, Mr. B.N. Krishnamurthy) and the National Institute of Oceanography (Dr. S. Shetye). It was attended by specialists from the CMAS (Cells for Monitoring and Analysis of Sea Level) participating in the Pilot Activity on Sea-Level Changes and Associated Coastal Impacts in the Indian Ocean from Bangladesh, India, Kenya, Madagascar, Malaysia, Mauritius, Maldives and Tanzania and three invited lecturers: Dr. P. Woodworth, Dr. P. Caldwell and Dr. T. Murty.

IOC continued financial support of PSMSL activities at the GLOSS data center.

Integrated Global Ocean Services System (IGOSS)

For IGOSS 1995 was chiefly the year of the quadri-annual session of its Joint IOC-WMO Committee, which took place in Paris, 20-28 November 1995. Among the decisions and/or recommendations of the Joint Committee, a few items are worth highlighting:

(i) a new IGOSS Plan and Implementation Programme for 1996-2003 (see Recommendation 6 (JC-IGOSS-VII)) was adopted. It is of course one of the key bench-marks of IGOSS development for the next decade, in line with previous such plans;

(ii) a mechanism was proposed to follow-up the international co-ordination of ship-of- opportunity activities after the termination of research programmes such as the Tropical Ocean and Global Atmosphere (TOGA) experiment (see Recommendation and Resolution 1 (JC-IGOSS-VII));

(iii) the increasingly closer collaboration between IGOSS and IODE (see Recommendations 3 and 5 (JC-IGOSS-VII)), especially as far as data management is concerned, marks an important trend in the development of operational oceanography and in support to GOOS;

(iv) likewise, the IGOSS efforts to disseminate near-real-time oceanographic products to a wide range of users (see Recommendation 4 (JC-IGOSS-VII)) can be considered as a significant step towards the actual establishment of GOOS, as well as of the Global Climate Observing System (GCOS).

In summary, it can be said that IGOSS is very keen to play its role as a building block of GOOS. All participants in the old system understand the necessity of actually constructing the operational oceanography of the year 2000 and beyond, and intend to assist in this building process by contributing their know-how - in this case, by running a global ship-of-opportunity programme (if national funding follows) and, in collaboration with IODE, in providing for the bases of an integrated data management system.

Data Buoy Co-operation Panel

The eleventh session of the DBCP attracted more attendance than usual, most likely because it was one of the first UN meetings to be held in Pretoria, South Africa (17-20 October 1995), since a long time. Another welcome innovation was to devote a full-day session to scientific and technical presentations on topics related to buoy technology and the processing, distribution and applications of buoy data.

The session had been preceded by a one-day session of the Steering Committee for the International South Atlantic Buoy Programme (ISABP), the latest established action group of the panel. The Programme had began with the deployment of some 41 SVP (Surface Velocity Programme of TOGA and WOCE) drillers. Further on, buoys to be deployed were always in supply, but deployment opportunities were lacking most of the time. The Panel nevertheless expressed satisfaction to ISABP achievements so far, in such a short period of time (roughly one year). The other action groups, namely the European Group on Ocean Stations (EGOS), the International Arctic Buoy Programme (IABP) and the International Programme for Antarctic Buoys (IPAB) also reported on their actions.

In addition, the decision was taken to prepare for the possible establishment of an Indian Ocean Buoy Programme as a new action group.

As usual, various technical issues were dealt with during the session, among which the following might be worth noting:

(i) the guidelines adopted by the Panel and implemented since 1 January 1992 proved efficient in improving the quality of at least air pressure data, whose number had increased five-fold since 1988 whereas the RMS difference between observations and the first-guess model prepared by the European Centre for Medium-Range Weather Forecast (ECMRF) had decrease from 4 to about 1.8 hPa per month;

(ii) work was continuing with regard to evaluating the SVP-B (a SVP equipped with a barometer), developed and evaluated through co-operation between the Panel and the Scripps Institution of Oceanography (SIO). A successful DBCP-SIO workshop had been held in New Orleans in May 1995 on this topic and another one was planned to be held in conjunction with DBCP-XII (UK, October 1996);

(iii) the Panel learned with interest the planned enhancements to the Argos system, which were to take place in three stages: new Argos-2 equipment on-board NOAA-K, -L, -M and -N, beginning in 1996; addition of an Argos payload to the Japanese satellite ADEOS-II, planned for 1999; and the development of a greatly enhanced system, Argos-3, expected to fly from 2001 onwards. The Panel was invited to participate in producing detailed specifications for the latter.

Along with the usual practice, the fifteenth Meeting on Argos Joint Tariff Agreement (JTA) was held after the DBCP session, from 23 to 25 October, in Pretoria again. The core discussion dealt with details concerning the structure of the JTA (which concerns exclusively those users represented by a government signing a Memorandum of Understanding with Collect - Localisation - Satellites (CLS) / Service Argos and are government funded or considered as non-profit) and with the Terms and Conditions of the 1996 Global Agreement. One of the key issues during the discussions laid with the problem of the Argos IDs, viz. the identification numbers attached to any platforms and provided by CLS to the authorized users upon request, and which are, for the time being, limited to a maximum of 32,000. The Meeting decided on a procedure to encourage, or even force, authorized users to recycle unused user IDs, through invoicing a user ID charge for each ID which had remained unused throughout 12 consecutive months. The final tariff under the Global Agreement for 1996 was eventually fixed (under certain conditions) to FF 25,750 per platform terminal transmitter (PTT) x year, which represents a large saving as compared to the “normal” Argos tariff.

Global Coral Reef Monitoring Network (GCRMN)

The Second Session of I-GOOS (June 1995) considered the progress in the implementation of the Pilot Activity on Monitoring Coral Reef Ecosystems (started in 1991). The Committee also considered the proposal of the IOC-LOICZ-IUCN Expert Meeting on Coral Reef Monitoring, Research and Management held in Bermuda, October 1994, on the development of a Global Coral Reef Monitoring Network (GCRMN) as part of the GOOS Coastal Module.

The Committee agreed that the proposed activity might be a potential contribution to the GOOS Coastal Module as well as to the HOTO and LMR modules, and invited J-GOOS to advise I-GOOS on this matter. The Committee agreed that it would be important for the Co-ordinator of GCRMN to be fully involved in GOOS activities and panels.

The Eighteenth Session of the IOC Assembly decided to support the establishment of a Global Coral Reef Monitoring Network (Resolution XVIII-12) and instructed the Executive Secretary of IOC that the GCRMN Co-ordinator establish close contact with I-GOOS and J-GOOS. The Assembly invited UNEP, IUCN, UNESCO, WMO and ICSU (IGBP/LOICZ) to join IOC in the participation and co-sponsorship of proposed GCRMN, subject to available resources and urged Member States to make direct and in-kind contributions to IOC to support this endeavour.

Dr. Clive Wilkinson has been selected as an a GCRMN Co-ordinator by the IOC Executive Secretary in consultation with an *ad hoc* expert group, IOC experts and with the co-sponsoring organizations. The location of the GCRMN Co-ordinator is being negotiated by the Executive Secretary with Australia and the Philippines which *inter alia* have offered to host the GCRMN office.

IOC provided support for the participation of several experts at the Workshop on Monitoring the Physical and Chemical Environment of Coral Reefs: the new technologies at the 1995 European meeting of the International Society for Coral Reefs, hosted by the Centre for Tropical Coastal Management Studies at Newcastle University, United Kingdom, 5-9 September 1995.

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

In the framework of the programmes (e.g. Ocean Dynamics and Climate; Marine Pollution Research and Monitoring; Ocean Science and Living Resources; Marine Geology and Geophysics and Ocean Mapping) and services (e.g., Global Ocean Observing System, Marine Information Management, and International Oceanographic Data Exchange), the main results showed a total of 32 training activities (workshops and courses) carried out during 1994-1995, with the participation of 1,075 trainees from 107 Member States.

Classification of these activities (A: activities involving workshops and training courses; P: participants; C: countries) through main global training actions and those directed to main ocean areas, is presented in the table following this section.

Following a resolution of the Twenty Seventh Session of the IOC Executive Council (1994), a TEMA Strategy *ad hoc* Meeting was held in Paris, 21-24 March 1995, to evaluate and redefine the Capacity Building and TEMA activities of the Commission after Chapter 17 of UNCED and the entry into force of the United Nations Convention on the Law of the Sea (UNCLOS) in November 1994. The new strategy emphasizes activities at the regional level, thematic and co-ordination networking, north-south institutional partnernship, south-south co-operation , and political and public coastal and ocean awareness. The strategy was adopted by the IOC Assembly at its Eighteenth Session by Resolution XVIII-15.

A pilot project for Latin America and the Caribbean, following this new strategy, has been negotiated with the European Union (DG1) and international and bilateral agencies (for 1996-1997), in the framework of the EU(FER)/UNESCO (IOC) Agreement. This project aims to establish five coastal and ocean issue-oriented networks for: the Eastern Pacific (in co-operation with CPPS; the Western Atlantic (in co-ordination with ASOS); and the Wider Caribbean (co-ordinated through IOCARIBE). The projected has been accepted for funding.

The main conclusions which emerge after examining the results often years of TEMA activity (1984-1994), indicate the need to implement the new strategy mentioned above. In particular, the results expected from the Pilot Project for Latin America and the Caribbean, would, in the near future, be applied to other regions such as Western Africa (IOCEA) and the Mediterranean.

Some specific examples of training are presented for the ocean services sections of IOC's programme.

International Oceanographic Data and Information Exchange (IODE)

(i) Main results

1994-1995 marked a further development of the IODE system by assisting Member States to establish and improve national and regional data and information management facilities. Data centres in Iran, Malaysia, South African and the Ukraine joined the system which now includes more than 60 Member States. The Fifteenth Session of the IODE Committee, Athens, Greece, January 1996,

PARTICIPATION IN IOC TRAINING ACTIVITIES

Global oceans

A	P	C	Countries and trainees by country
4	290	65	Argentina (3), Australia (3), Bangladesh (2), Barbados (1), Begium (4), Benin (3), Brazil (6), Cambodia (1), Canada (26), Chile (4), China (6), Cook Is (1), Costa Rica (1), Côte d'Ivoire (1), Croatia (2), Cuba (5), Denmark (1), Egypt (6), France (56), Gambia (1), Georgia (1), (1), Germany (6), Ghana (2), Guinee (1), Guyana (1), India (9), Indonesia (1), Israel (1), Italy (3), Jamaica (4), Japan (7), Kenya (8), Kuwait (2), Malaysia (4), Malta (1), Mauritania (3), Mexico (2), Monaco (1), Morocco (1), N Ireland (1), New Zealand (2), Nicaragua (1), Nigeria (5), Philippines (4), Portugal (2), Romania (2), RPChina (4), Russian F (15), Saudi Arabia (2), Senegal (1), Singapore (1), South Africa (1), Spain (5), Sri Lanka (4), Trinidad & Tobago (1), Thailand (6), The Netherlands (5), Togo (1), Tunisie (1), Turkey (22), UK (2), Ukraina (10), Uruguay (1), USA (7), Vietnam (1)

The Atlantic, including the wider Caribbean

Wider Caribbean (IOCARIBE); South Western Atlantic (ASOS) and Eastern Atlantic (IOCEA)

A	P	C	Countries and trainees by country
6	183	38	Anguilla (1), Argentina (5), Barbados (5), Benin (1), Brazil (4), Cameroon (1), Canada (4), Chile (3), Colombia (3), Cook Is (1), Costa Rica (11), Côte d'Ivoire (1), Cuba (3), Dominica (1), Ecuador (1), Fiji (1), Germany (1), Ghana (1), Guadeloupe (1), Jamaica (2), Japan (1), Kenya (1), Mexico (13), Monaco (1), Nigeria (9), Peru (3), Puerto Rico (28), Russia (1), Saint Lucia (2), Spain (1), St Thomas (1), The Netherlands(2), Tonga (1), Trinidad &Tobago (5), Uruguay (11), US Virgin Is (3), USA (48), Venezuela (1)

The Pacific

Western and South Pacific (WESTPAC); Eastern Pacific (PACO)

A	P	C	Countries and trainees by country
12	319	34	Australia (2), Belgium (3), Brunei Drussalam (1), Canada (12), Chile (14), China (4), Colombia (14), Cook Islands (4), Denmark (2), Ecuador (14), Fiji (3), France (2), Hongkong (1), India (40), Indonesia (35), Japan (5), Korea (4), Korea RD (10), Malaysia (4), New Zealand (1), Norway (1), Papua NG (37), Peru (14), Philippines (4), Russia (4), Singapore (11), Solomon Is (11), Thailand (3), The Netherlands (2),Tonga (5), UK (16), USA (1), Vietnam (18), Western Samoa (17),

Indian Ocean

Western Indian Ocean (IOCINCWIO); Northern and Eastern Indian Ocean (IOCINDIO)

A	P	C	Countries and trainees by country
6	211	30	Australia (2), Balgladesh (1), Canada (2), Comores (1), Denmark (1), France (3), Ghana (1), India (23), Indonesia (1), Iran (2), Kenya (13), Kuwait (1), Madagascar (2), Malaysia (2), Maldives (2), Mauritius (6), Mozambique (7), Nigeria (2), Oman (1), Pakistan (111), Saudi Arabia (2), Senegal (1), Seychelles (10), Sri Lanka (1), Sweden (1), Tahiland (2), Tanzania (2), The Netherlands (2), UK (2), USA (4)

Mediterranean and Caspian Seas

A	P	C	Countries and trainees by country
3	48	20	Azerbajian (1), Belgium (1), Croatia (2), Cyprus (1), Egypt (2), France (4), Greece (1), Iran (2), Israel (1), Italy (12), Kazakstan (3), Malta (2), Morocco (2), Portugal (2), Russia (5), Spain (2), Turkey (1), Turkmenistan (2), Ukraina (1), USA (1)

Southern Ocean (SOC)

A	P	C	Countries and trainees by country
1	24	12	Argentina (1), Australia (2), Canada (1), France (3), India (1), Italia (1), Monaco (1), Nigeria (1), Norway (1), Russian Fed (1), UK (6), USA (5)

brought together almost 100 participants representing 38 Member States and 16 organizations and programmes.

Support for the scientific programmes was achieved through the implementation of the Global Temperature and Salinity Project (GTSPP) and the Global Oceanographic Data Archaeology and Rescue Project (GODAR). The past two years culminated in the publication and wide distribution of ten CD-ROMs which contain the global, objectively analyzed, gridded datasets of major ocean parameters and include almost two million profiles. New centres are being created in Africa and the Caribbean.

The IOC World Wide Web server was developed and is being expanded with the IODE Homepage as a tool to provide information on programme activities including services and products. In order to promote data and information management in developing countries for sustainable development, several training courses were arranged and almost 50 specialists were trained. The second edition of the OceanPC Manual with software has been issued and distributed. OceanPC is an IOC-WMO project to assemble and link available IBM compatible software for processing oceanographic data.

(ii) Internal evaluation

The IODE implementation is a success story which could not have been achieved without close co-operation with other international organizations to obtain common goals. Productive bonds of co-operation have been established with other programmes and bodies. IODE is a service programme and to effectively meet changing user demands, the principle of free exchange and open access to oceanographic data and information should be maintained along with the goodwill and interest of Member States.

(iii) Lessons learned

Changes in the client community of IODE are envisaged, including many large, multi-disciplinary, global-scale projects. At present, the main client for IODE data and information services may continue to be the scientific community. However, the operational and services industries will also become important clients in the next few years. The main focus of the programme will become the upgrading of the skills of its data and information centres.

International Co-ordination Group for the Tsunami Warning System in the Pacific (ICG/ITSU) and International Decade for Natural Disaster Reduction (IDNDR)-related activities

(i) Main results

Eighteen countries are members of the Tsunami Warning System in the Pacific. The Fifteenth Session of the International Co-ordination Group took place in Papeete, Tahiti, July 1995. The Session focussed on the further development of the network of modern seismic and sea-level measurement stations by the wide utilization of new systems and on the improvement of communication links for real-time exchange. Five specialists were trained in Japan and a colour booklet describing tsunami and tsunami safety guidelines entitled “Tsunami - the Great Waves” was published. The ITSU Homepage is on the IOC WWW server. A set of textbooks and instructions for teachers (eight volumes) on earthquakes and tsunamis was published in Spanish and widely distributed.

(ii) Internal evaluation

The Tsunami Warning System in the Pacific continues to be a unique operational warning system which comprises hazard assessment, and warning and education response. Efforts will continue to establish sub-regional warning systems in the South-western Pacific and Central America.

(iii) Lessons learned

Unfortunately, “tsunami” is not correctly considered as a priority natural disaster due to a relatively small death toll and damage in comparison with droughts, floods or earthquakes. This focus may have changed. The last few years show increased earthquake activity in the Pacific with an increase in tsunami events. Change in attitude should also bring a change in the level of funding in order to permit development of a wider system.

5. REGIONAL ACTIVITIES

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

During 1995, the activities of IOCARIBE have, as far as possible, continued to focus on the implementation of programmes as specified in the Medium Term Plan and Recommendations of SC-IOCARIBE-IV.

The Marine Pollution, Research, Monitoring and Abatement Programme has been the most active programme. Despite limited funding, IOCARIBE has been developing the Ocean Processes and Climate Programme, as well as the Programme on Ocean Science in Relation to Non-living Resources, in accordance with the recommendations of SC-IOCARIBE-IV.

Action on the programme according to recommendations from SC-IOCARIBE-IV on Ocean Science in Relation to Living Resources has been lacking due to funding constraints, However, workshops and actions within the mandate of this programme such as the Workshop on Fisheries Oceanography of Highly Migratory and, Straddling Species of the Wider Caribbean, Miami, 2-4 March 1995, have been carried out,

The TEMA component has been managed within the different subject areas. Efforts are being made to increase the numbers of active Member States as well as pertaining institutions. There are several institutions within the developing countries that have seen an important increase in their capacities, while others have not.

During 1994-1995, 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 the requirements of the implementation of UNCED decisions IOCARIBE has initiated work to provide better services by integration of information of marine science data and assessment; enhancement off 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 has become increasingly important for IOCARIBE and other bodies working in the Caribbean to clarify the different services and products to users, and how they aim to achieve a solid environment by joining forces in order to reach out both to decision-makers and to scientists.

During 1994-1995 IOCARIBE has carried out an evaluation with the aim of providing an opportunity to make choices, learn from experience and provide explanations in the light of achievements made since the establishment of IOCARIBE in 1982, taking into account the expectations of Member States and participating organizations. The efficiency of programme implementation by the IOC and IOCARIBE Secretariats has also been considered in order to introduce managerial improvements, as well as to advise on any changes in programme design and implementation that may lead to the enhancement of response to Member States’ needs. This evaluation will be presented during SC-IOCARIBE-V.

Within the IOCARIBE Programme on Ocean Processes and Climate, the project on Global Climate Change - Establishment of a Regional Monitoring Network is being continued after

submission of the proposal to UNEP/CEP and is included in the IPID component of the Study of Global Climatic Changes - Establishment of a Regional Monitoring Network. The project is to be finalized in 1996. Geomorphological maps are being developed within the projects of Cartagena, Colombia and a possible extension to Surinam. A manual on beach dynamics and coastal mapping is being developed and a workshop to review the manual will be convened in 1996. The regional network of tide gauges was enhanced with the addition of two new tide gauges which have been installed off Guyana and Jamaica. Two more are being installed off Cuba and Haiti. This contributes considerably to the IOCARIBE component of the Global Sea-Level Observing System (GLOSS). Data flow from the GLOSS network is important and participating institutions should be encouraged to submit their data on a regular basis to the data centre in Bidston (UK) and to MEDS (Canada) for the near real-time maps of the North Atlantic (ISLPP/NTA) sea-level.

Several components of the IOCARIBE Programme on Ocean Processes and Climate are actively collecting data published in the literature. The multinational effort to study the cross equatorial flow in both the surface water and the deep western boundary current has been continued. Periodic cruises between Tobago, Barbados and Martinique have been carried out by the US Coast Guard and the Barbados Coast Guard to calculate the surface cross-equatorial waters flowing into the Caribbean. Mexico and Cuba are continuing their periodic cruises to measure the water flowing through the Yucatan Channel and the Windward Passage. NOAA has continued the monitoring of the Gulf Stream System.

A second meeting took place of an IOCARIBE Group of Experts on Ocean Processes and Climate in conjunction with the Chapman Conference on the Circulation of the Intra-American Sea, Puerto Rico, February 1995.

An agreement exists on co-operation between IOC and ARPEL within CEPPOL activity IV (Pollution by Oil and Marine Debris) for the protection of the marine environment. Within the proposed activities for this co-operation, development of a circulation model for the Gulf of Paria has been finalized this year through the Institute of Marine Affairs, Trinidad and Tobago.

The implementation of the IOC-UNEP Marine Pollution Assessment and Control Programme (CEPPOL) has continued during the intersessional period, considerably contributing to the activities proposed in Agenda 21, Chapter 17 of UNCED. IOCARIBE has been supporting the Oil and Marine Debris component as well as the Pesticide and Eutrophication part of the CEPPOL Programme. The results obtained through the CEPPOL Programme, as well as through the International Musselwatch programme, have been of interest to problems associated with land-based activities in integrated coastal management, and the associated follow-up to the Washington DC Conference (October 1995).

Funding contributions from SIDA-SAREC, US-NOAA, US-EPA and UN International Sea Grant have facilitated the development of the marine debris, oil pollution, pesticide and eutrophication components.

In accordance with the CEPPOL Programme, IOCARIBE organized the Fourth Marine Debris/Waste Management Workshop, La Romana, Dominican Republic, 21-24 August, 1995. The Marine Debris/Waste Management Action Plan for the Caribbean and Adjacent Regions has been streamlined and during the workshop certain amendments were made which are included in the workshop report.

During 1994 IOCARIBE, together with the Centre for Marine Conservation, developed a strategy for for conducting a marine debris outreach campaign in the Wider Caribbean and the establishment of a region-wide public awareness campaign is being carried out. The strategy was presented at a “Teach the Teacher” workshop in the US Virgin Islands, May 1995. The Wider Caribbean Beach Clean-up Campaign is continuing and IOCARIBE is taking an active part in the organization of part of it. IOCARIBE is a partner in the GEF project on the Wider Caribbean initiative for Ship-generated Waste.

IOCARIBE has been providing support for research on coastal current patterns and modelling the transport of surface-borne oil pollutants carried out by IMA, Trinidad and Tobago. Based on the relevant results, additional projects will be carried out.

A fingerprinting data bank has been created at the Institute of Marine Affairs, Trinidad and Tobago with data from several areas in the region, and a total of 61 crudes have been characterized by analytical techniques. IOCARIBE is supporting an extension of this bank and more scientists will be trained.

IOCARIBE is producing a manual for the monitoring of beach dynamics within the OSLR component and Colombia has mapped several critical areas in the Caribbean. A manual of Guidelines on the Mapping of Critical Areas in the Caribbean Related to the Impacts of Sea-Level Rise is also being produced.

A workshop on Fisheries Oceanography of Highly Migratory Species of the Wider Caribbean was organized by IOCARIBE within the OSLR programme on Ocean Science in Relation to Living Resources, Miami, 2-4 March 1995, and the planning of a Symposium on Sea Turtles is well under way.

A necessarily limited investigation was carried out during 1994-1995 to estimate specific research projects which will best serve Member States needs. The projects selected are: Highly Migratory Species, Coral Reef Research, Marine Biodiversity, TRODERP, Algae and Eutrophication, and Sea Turtle Research.

Efforts have been made to revitalize the Harmful Algal Blooms Programme in the Caribbean since the workshop in Cumana, Venezuela, August 1992.

The development of the International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico (IBCCA) has proceeded successfully. The Fifth Session of the IBCCA Editorial Committee was convened in San Jose, Costa Rica, 21-22 November 1995.

The regional component of GLOSS has been actively supported by the Sub-Commission taking into account the vital importance of sea-level to all IOCARIBE Member States.

SC-IOCARIBE-V was convened in Barbados, 11-15 December 1995. A seminar on Small Island Developing States was held prior to the Session, with the object of linking up with IOCARIBE activities in this area, The seminar resulted in a Framework Document showing how IOCARIBE will assist in the development of Coastal Zones on Small Islands, bearing in mind mandates and a role for IOCARIBE.

Certain changes took place within the IOCARIBE Secretariat. Mr. Fred Berry was appointed Acting Secretary from February 1994 to March 1995. On his departure Mr. Rafael Steer Ruiz replaced him as Acting Secretary. Certain members of the General Staff were hired as local UNESCO staff. Stefan Andersson has been responsible for IOCARIBE activities from the IOC Secretariat in Paris.

IOCARIBE NEWS has been produced in a new format with the assistance of the South-east Marine Fisheries Centre and is again appearing on a quarterly basis. This will assist the IOCARIBE Secretariat to improve communication with Focal Points, institutions and experts of IOCARIBE Member States.

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

WESTPAC programme activities during 1995 concentrated on the follow-up to the recommendations of the Third IOC/WESTPAC Scientific Symposium, 22-26 November 1994, where

the WESTPAC programmes and projects were reviewed, and the action plan from WESTPAC II was up-dated.

Under OSLR, activities carried out focused on HAB. The Training Workshop on Monitoring of PSP Plankton and Shellfish Toxicity was held in Iwata, Japan, 17-21 July 1995, with the support from the Government of Japan. Twenty-four scientists from 13 countries attended the four-day lecture and laboratory practice and one day field training. Topics in the training included; taxonomy, physiology and life history of PSP and shellfish toxins. In-country training and seminars have also been carried out actively in China, Indonesia, Philippines and Korea. These training activities and scientific seminars have helped identify effective ways for these countries in conducting their national projects.

In the field of OSNLR, subsequent to the WESTPAC Workshop on Paleogeographic Map, Bali, Indonesia, November 1994, the first maps on Last Glacial Maximum (LGM 20,000-15,000 years ago) for the entire WESTPAC region are being prepared based upon the data submitted by the participating countries. They are expected to be published in 1996.

Several activities have been carried out in terms of Marine Pollution Research and Monitoring-GIPME. As a follow-up to the Joint Seminar on River Input-Harmful Algal Blooms-Coastal Studies, November 1994, a new intercalibration exercise on low level nutrients was organized in 1995 with the co-ordination of Dr. Manuwadi Hungspreugs, the WESTPAC project leader on river inputs assessment, and Dr. Dan Wruck from the Queensland Health Scientific Services, Australia. Seventeen laboratories participated in the exercise. Results show much improvement compared with the previous exercise in 1994, and provide a platform from which meaningful analytical problems can be addressed,

In response to the planning workshop on atmospheric inputs to the regional seas, November 1994, a joint project to study the atmospheric depositions in 1994-1995 between Ocean University of Qingdao (China) and Korean Ocean Research and Development Institute (KORDI) was launched. The study includes extensive sample collection of both dry and wet depositions from the Yellow Sea and the East China and from the surrounding land-based stations. The samples will be analyzed by both laboratories form major trace elements and stable and radioactive isotopes.

A study on atmospheric deposition in southern oceans was initially launched by scientists from the University of Southern Pacific (Fiji), with the aim of identifying the atmospheric fluxes to ocean surface by wet deposition sample collection and analysis. Sampling and data exchange have also begun among the participating laboratories in the western Pacific region, with the view to facilitating better use of modern techniques and to establishing a database and network, in order to understand, at a regional level, the impact of atmospheric inputs upon biochemical processes in the western Pacific Ocean.

Some of the research results have been published in both national and international publications. These studies addressed a number of questions relevant to scientific and socio-economic issues: (i) trace metal input via atmosphere to the western Pacific coastal oceans can be as important as their pathways via rivers; (ii) atmospheric input of nutrients may have significant impacts on the biological productions in upper oceans, and in some areas of the western Pacific region, harmful biological blooms can be triggered by epidemic atmospheric inputs of nutrients; (iii) composition of atmospheric materials (e.g. aerosol and rain) are highly variable, depending upon the origins and pathways of airmass, hence a detailed information on airmass trajectories is quite necessary in establishing the atmospheric deposition fluxes.

With respect to Ocean Dynamics and Climate, no specific activity was planned in 1995. However, in recognizing the importance of NEAR-GOOS and its linkage with the project on continental shelf circulation, it was proposed that close co-operation be ensured between the project leader of the shelf circulation project, has been involved in the activities relating to NEAR-GOOS.

Regional GOOS initiatives in WESTPAC resulted in two important developments in 1995. The first is that the proposal on the establishment of NEAR-GOOS as a result of the two expert meetings in 1994, was submitted to the I-GOOS Strategy Sub-Committee during 27-30 March 1995 for consideration. A back-to-back informal consultation on NEAR-GOOS was held during that meeting. The consultation suggested that an ad hoc drafting group consisting of four experts from Russia, China, Korea and Japan be nominated by the WESTPAC Chairman in order to prepare an implementation plan for NEAR-GOOS, and Dr. Taira was invited to be the leader of the group. A document entitled “IOC-WESTPAC North East Asia Regional GOOS Draft Implementation Plan” has been prepared by the drafting group and was discussed during the IOC/WESTPAC Workshop on NEAR-GOOS, Bangkok, Thailand, January 1996. The draft implementation plan, as revised, was presented to the Third WESTPAC session (Tokyo, Japan, February 1996) for consideration and approval.

The draft resolution on the continued support to NEAR-GOOS co-sponsored by China, Korea, Japan and Russia was approved by the twenty-eight session of the UNESCO General Conference, November 1995, which ensured US$ 30,000 from UNESCO DR reserve for the implementation of the NEAR-GOOS project for the biennium 1996-1997.

The GOOS Health of the Ocean Panel (HOTO) initiated its first regional pilot activity in the WESTPAC through a meeting in the IOC-WESTPAC Regional Secretariat in Bangkok, 16-21 November 1995. A pilot project to demonstrate the predictability and applicability of HOTO module of GOOS in WESTPAC region was prepared. This pilot project would also provide supplementary support to the NEAR-GOOS initiative.

Activities of the WESTPAC Regional Secretariat

Since 1995 was the first year after the IOC/WESTPAC Regional Secretariat become operational (November 1994), much of the efforts of the Secretariat were concentrated on establishing the working environment, generating co-operative relations with other organizations and increasing visibility of WESTPAC.

The administrative procedure has been set up through the UNESCO Office in Bangkok. Through decentralized funding, the Secretariat has been able to function in programme implementation since March 1995. With the generous support of the Thai Government, two secretaries were seconded to the Regional Secretariat. After the completion of their term in September 1995, they were replaced by two new seconded secretaries.

The IOC Assistant Secretary for WESTPAC paid visits to the regional offices of the international organizations and the regional organizations, including UNEP Regional Co-ordinating Unit, CCOP, ESCAP and ADB. IOC/WESTPAC was also represented at a number of meetings, workshops and seminars. These include:

(i) 31 Sessions of CCOP Annual Meeting, Kuala Lumpur, Malaysia, 18-22 October 1994;

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

(iii) 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;

(iv) ESCAP High-Level Meeting on Environmentally Sound and Sustainable Development in Asia and the Pacific, Manila, Philippines, 7-10 February 1995;

(v) ESCAP-ADB-UNEP Workshop on Coastal and Marine Environmental Management, Bangkok, Thailand; 27-29 March 1995;

(vi) Meeting of Plenipotentiaries on the Action Plan for the Protection and Management of the Marine and Coastal Environment of the South Asian Seas Region, 23-24 March 1995, New Delhi, India;

(vii) LOICZ Second Open Science Meeting, Manila, Philippines, 24-27 April 1995;

(viii) Eighth Workshop of Japan and East China Sea Study (JECSS), Ehime, Japan, 25-27 September 1995;

(ix) 32nd Session of CCOP Annual Meeting, Tsukuba, Japan, 27-30 September 1995;

(x) APEC Marine Resources Conservation Working Group Meeting, Hawaii, USA, 23-27 October 1995; and

(xi) EcoNet in South China Sea Workshop, Hong Kong, 12-14 December 1995.

A larger effort of the Regional Secretariat has been the preparation for the Third Session of the Western Pacific Sub-Commission. This included all documentation and reporting, invitations and co-ordination with local organizing committee, and arrangements for the related scientific seminar.

Based on this experience it can be confirmed that the Regional Secretariat is now fully operational and well established, also as regards co-operation with other organizations. The announcement in early 1996 of a second UNESCO post (P4) for the Regional Secretariat was another very good news.

Co-operation with CCOP has been developed very well and on Memorandum of Convention signed. Co-operation with UNEP at the regional level is likewise going well. Interaction with the UNDP-GEF-IMO project is on-going.

The interest of the Member States in IOC activities is further demonstrated by the secondment of a senior professional team KORDI to the IOC Secretariat in Paris.

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

‘Thanks to continued funding from the Swedish ‘Agency for Research Co-operation with Developing Countries (SAREC of SIDA), as well as several Member States, and using the intergovernmental mechanisms provided through IOC/IOCINCWIO 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. Furthermore, thanks to regular interaction with the IOCINCWIO Officers (IOCINCWIO Officers Meetings) as well as with WIOMSA, activities could be adjusted to emerging needs and changing conditions.

The following activities were carried out in 1995:

Mission to draft design a document for a regional network of data centres
December 1994-January 1995.

At the Third Session of IOCINCWIO, Mauritius, December 1994, it was noted that regional capabilities to interpret and use the results from large scale experiments such as TOGA and WOCE were very limited. There is a need to enhance this capability and train human resources to both use the data and interpret the results so as to provide advice on actions to governments. RECOSCIX-WIO was identified as a centre through which such data could be delivered.

A project proposal for the establishment of an Ocean Data and Information Network in Easter Africa (ODINEA) was developed.

Training Course on Biogeochemical Processes in Coastal Systems
6-17 February 1995, Seychelles

This was the follow-up course to the Training Course on Biogeochemical Processes in Coastal Systems organized in 1992 in Zanzibar. The course was attended by participants from Mauritius, Madagascar, Kenya, Tanzania, Mozambique and Seychelles. Activities for the training course consisted of lectures, public investigations, fieldwork, computer modelling and laboratory exercises. The seminar covered relevant biogeochemichal processes and computer modelling with emphasis on their coupling to fieldwork investigations. Three groups were formed to carry out field and laboratory work, as part of their investigations on environmental pollution problems generally accepted to be of major significance. The pollution sources of interest were: (i) waste water discharge from a paint factory; (ii) a brewery; (iii) a hotel; and (d) Victoria domestic sewage treatment plant. Three reports were prepared by the participants. The participants from each group developed computer models from the data generated from their investigations of pollution from the identified sources and carried out risk assessments for these sources. All the pollution problems and the related practical applications were discussed during a special seminar at the end of the course.

Regional Nutrient and Water Quality Monitoring Project

This project is a follow-up to the series of Nutrient Fluxes and Dynamics training courses organized in 1991, 1992 and 1994. Following this extensive training programme, the objective is now to initiate an operational activity. In order to ensure that all participating institutions have the required equipment, a spectrophotometer was procured for the Seychelles. The programme itself will commence in 1996.

Training Workshop on the use of OceanPC software
18-22 April 1995, Mombasa, Kenya

The OceanPC Training Course was held at the Kenya Marine Fisheries Research Institute with 15 participants. “OceanPC” is a project to assemble and link available IBM compatible software for processing of oceanographic data, The software will support: (i) entry of various types of ocean observations, (ii) merging of entered data with historical data from other ships and nations, (iii) analysis and display of the merged data; and (iv) international data exchange.

The interest of students was very high as evidenced by their willingness to work outside regular class hours, including three night sessions. All registered students successfully completed the course, as well as several sit in students from KMFRI.

WIOMSA Development and Marine Research Grants

In 1995, support to the WIOMSA Secretariat in Zanzibar was continued. The support covered expenses for local staff, office equipment and maintenance, and costs related to the organization of the second WIOMSA Board meeting.

Individual travel/study grants

A total of 14 travel/study grants were provided to IOCINCWIO scientists in 1995 enabling them to participate in international conferences, training courses and related capacity building activities.

RESCOSCIX-WIO

Thanks to the support of the Government of Belgium, the RECOSCIX-WIO project continued to provide its information services to institutions in the region. RECOSCIX-WIO now **provides services** to 61 institutions in the region. The 1995 version of the Western Indian Ocean Directory of Marine Institutions and Scientists (WIODIR) will be published by IOC in 1996.

Communication

Thanks to support from the United States and Belgium, E-mail access was provided to institutions in Kenya, Mauritius, Mozambique, Seychelles and Tanzania.

Review

A review and evaluation of the regional programme supported by SAREC and IOC was carried out by an external team, December 1995-January 1996. A comprehensive report on programme activities was presented as a basis for the review.

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

The Fourth Session of the IOC Regional Committee for the Central Eastern Atlantic (IOCEA) was held at the University of Las Palmas de Gran Canaria, Canary Islands, 8-11 May 1995. It reviewed the programme implementation and formulated a framework programme for 1996-1997. It noted that a high activity level had resulted from the Third Session of the Committee (Dakar, Senegal, 1993). This has continued also after the Fourth Session. The Joint EU-MAST-IOC Training Course on the Canary Current System and related upwelling was organized in August 1995 at the University of Las Palmas, Gran Canaria. About 20 African students were supported by IOC.

A coastal management workshop was organized in Conakry, Guinea, in December 1995, with basic support from IOC. The report is being published in the Workshop report series. The IOC co-operates with the GEF-supported LME-Gulf of Guinea project, participated in the workshop on marine debris and is co-sponsoring that part of the project.

The second coastal zone workshop was convened in Ghana, in March 1996 with partial support from the IOC. The Sub-regional workshop on living resources from Guinea to Angola is being convened in Benin in May 1996. This series of workshops will constitute a regional information basis which can be used for a synthesis on regional conditions in the coastal zone. The second regional co-operative cruise as part of the sedimentary budget project was planned for the spring of 1996, but has been postponed.

Support is being provided to Conakry, Guinea, for the establishment of a data centre. Support is also being provided towards the publication of scientific studies carried out at the same centre.

The regional communications and information exchange network REOSCIX-CEA is gradually being developed, co-ordinated from Cote d'Ivoire.

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

Plans have been developed for the Second Session of the Regional Committee for the Central Indian Ocean, to be convened in India in 1996. It will be preceded by a regional GOOS workshop.

A Training Course on Modelling and Monitoring of Coastal Marine Pollution was organized for the second year in Delhi, India, in November 1995.

The Integrated Coastal Area Management Workshop held in Karachi, Pakistan (October 1994) is being followed-up by preparations for further specific national workshops and preparation of a national project proposal to obtain donor funding. An open literature book publication including presentations is being prepared.

5.6 IOC SOUTHERN OCEAN COMMITTEE (IOCSOC)

In response to the request of the Seventeenth Session of the IOC Assembly, Paris, March 1993, the following countries have designated their official national contacts for SOC: Argentina, Australia, Brazil, Chile, China, Ecuador, France, Germany, Peru, Russia and the United Kingdom.

During 1995 the activities of IOC in the Southern Ocean were carried out mainly within the framework of other research and ocean services programmes, and in particular:

(i) WOCE Core Project 2 “The Southern Ocean”
(ii) International GLOBEC Southern Ocean Programme (SO GLOBEC)
(iii) The JGOFS Southern Ocean Study
(iv) IGOSS Specialized Oceanographic Centers for the Southern Ocean area of Argentina and Australia
(v) IODE Responsible National Oceanographic Center (RNODC) for the Southern Ocean (RNODC-SOC) operated by NODC of Argentina;
(vi) WCRP/DBCP International Programme for Antarctic Buoys
(vii) GLOSS Sea Level Pilot Project for the Southern Ocean

IOC was represented at the CCAMLR meeting, 23 October-3 November 1995, Hobart, Australia, by Professor Pat Quilty of the Antarctic Division of the Australian Department of the Environment, Sport and Territories.

IOC was represented as an observer at the XIXth ATCM (Seoul, Republic of Korea) by Dr. Won-Oh Song, President of the Korea Ocean Research & Development Institute.

The Eighteenth Session of the IOC Assembly considered and supported the initiative of Germany to organize the First Southern Ocean Forum, to review on-going and planned ocean research and observational programmes in the Southern Ocean and to prepare proposals on future IOC activities in the region taking into account programmes and activities of other international organizations. The Forum will be held at Bremerhaven, Germany, 9-11 September 1996 to be followed by the Sixth Session of the IOC Regional Committee for SOC, 12-13 September 1996.

5.7 SOUTH EAST PACIFIC (CPPS)

Co-operation with the CPPS is being maintained through the Joint projects regarding El Nine, marine pollution studies, networking of scientific institutions and related training activities. The IOC is normally represented at relevant CPPS meetings.

5.8 SOUTH WEST ATLANTIC

Several regional projects are on-going within OSNLR, Ocean Mapping and OSLR. The co-operation between Argentina, Brazil and Uruguay through ASOS is pursued, and support is provided to the extent possible: An ASOS meeting was held in November 1995.

5.9 MEDITERRANEAN

The IOC continues to support POEM and PRIMO, including organizational and planning activities as well as field activities. Cruises have been carried out within POEM in the Eastern Mediterranean, yielding very important results and new discoveries.

Consultations have been held with CIESM and co-operation is on-going in developing networks.

Co-operation is maintained with UNEP and the Mediterranean Action Plan. A part-time IOC consultant is posted in Athens for this purpose.

Co-operation has also been maintained with the Foundation for International Studies, University of Malta, as regards coastal zone management actions, training, and in relation to the harmful algal blooms programme. These actions particularly involve the Mediterranean Centre on Insular Coastal Dynamics at the Foundation for International Studies.

Co-operation has been initiated with the International Centre for Coastal and Ocean Policy Studies (ICCOPS), based in Genoa, Italy. This co-operation potentially includes training and information dissemination activities.

Within the framework of the POEM action plans are being developed for a Workshop on the Science of the Mediterranean Sea and its Applications.

5.10 THE BLACK SEA

The IOC is co-operating with the GEF-sponsored Black Sea Environmental Programme, mainly through GIPME. Actions are being pursued in accordance with the established agreement, involving GIPME-GEEP, GIPME-GEMSI and mussel watch. These actions are mainly of a capacity building nature.

Support is also provided to further implementation of COMSBLACK, through resources to a joint, cruise, to the Steering Committee, and to publication of results.

The IOC Intergovernmental Black Sea regional meeting was organized at UNESCO, Paris, 7-9 June 1995. This meeting agreed upon an IOC Black Sea Regional Programme in Marine Sciences and Services and proposed the establishment of an IOC Black Sea Regional Committee as the management body for the Programme. This was subsequently endorsed by the Assembly (Resolution XVIII-17).

5.11 PERSIAN GULF, RED SEA AND THE GULF OF ADEN

The IOC co-sponsored the Sea-to-Sea Conference (October 1995, Saudi Arabia) and in particular organized a one-day workshop on an oceanographic monitoring programme for the Red Sea and Gulf of Aden preceding the Conference. The proposed programme was presented to the Conference and endorsed. Co-operating with the regional body PERSGA is maintained. Co-operation has also been on-going with ROPME. The IOC co-sponsored the Symposium organized by ROPME and the Japan Sea Fisheries Institute in Japan, December 1995. An expert mission of GIPME scientific and technical experts was sent to the ROPME Secretariat, Kuwait, in co-operation with UNEP and. ROPME itself in March 1996, to evaluate the state of the marine environment of the region.

5.12 THE CASPIAN SEA

The rapid rise of the Caspian Sea level since 1978 (by about 2.25 meters) has **caused** great concern for all of the riparian countries of the Caspian Sea.

At the request of the 27th session of the UNESCO General Conference (1993) the Workshop on Sea Level Rise and the Multidisciplinary Studies of Environmental Processes in the Caspian Sea Region was organized by IOC, jointly with IAEA and IHP of UNESCO in Paris from 9 to 12 May 1995.

The Workshop was attended by specialists of all the riparian countries of the Caspian Sea: Republic of Azerbaijan, Republic of Kazakhstan, Turkmenistan, Russian Federation, the Islamic Republic of Iran, as well as of France and representatives of UNESCO (IOC, IHP), IAEA and WMO and was chaired by Dr. S. Partovian (Iran). Dr. V. Ferronsky (Russia) acted as rapporteur.

The Workshop reviewed the present knowledge of the causes of the rapid sea level rise of the Caspian Sea and its impact on the coastal zone; formulated a plan of action to initiate the Caspian Sea

Regional Project in 1995-1996, proposed and supported by IAEA, which includes the use of isotope techniques for the study of marine environmental processes: and made proposals for further regional co-operation.

In view of the multidisciplinary and the multisectorial nature of the environmental problem in the Caspian Sea, the Workshop urged international organizations, such as IMO, UNDP, UNEP, UNESCO-IOC, WHO, WMO and the World Bank, to work together in tackling the Caspian Sea problem.

The report of the Workshop was published as IOC Workshop Report No. 108, together with its Supplement containing the submitted papers.

As the follow-up of the Workshop and within the framework of the IAEA Regional Project the research/training cruise was carried out from 11 to 28 September 1995 with participation of specialists of all the riparian countries,

The Eighteenth Session of the IOC Assembly was informed of these activities in the Caspian Sea. The Assembly noted those activities undertaken in response to the decisions of the 27th General Conference of UNESCO and stressed the need to continue these efforts within the mandate of the IOC and available resources. The Assembly recognized that a solution for the problem in the Caspian Sea would require a multidisciplinary approach and the involvement of many of the international organizations.

At the 28th UNESCO General Conference Azerbaijan, Kazakhstan and Iran submitted draft resolutions on the involvement of UNESCO in solving the Caspian Sea Problem.

The UNESCO General Conference took note of the submitted draft resolutions and in view of the multidisciplinary nature of the problem requested the IOC, IHP, IGCP and MAB in association with the UNESCO Project on Environment and development in coastal regions and in small islands, to formulate co-ordinated actions aimed at better understanding the causes of the sea-level changes (as a basis for their eventual prediction) and associated environmental and socio-economic impacts. The Division of Water Sciences of UNESCO will take responsibility for co-ordination of those activities.

6. CO-OPERATION WITH OTHER ORGANIZATIONS OF THE UNITED NATIONS SYSTEM AND OTHER BODIES: ICSPRO, GESAMP, ICSU-SCOR, OTHER BODIES AND PROGRAMMES

Co-operation with other organizations and programmes is occurring in most of the IOC activities. This is a reflection of the IOC role as a joint specialized mechanism, and that sciences and services are necessary inputs to many other maritime activities. It also reflects the need for the IOC to maintain strong links with the scientific communities represented by ICSU and SCOR. The particular programme and regional co-operations are referred to under these accounts and here only some main aspects are presented. Co-operation is also an essential element in the follow up to UNCED and UNCLOS (see section 7).

The interaction and co-operation of the IOC with the intergovernmental programmes of UNESCO, namely MAB, IHP, IGCP and MOST, is also increasing. The Joint Statement of the Chairpersons adopted at the 28th General Conference forms the basis for this increasing co-operation, which also reflects the wish of Member States to obtain more real interdisciplinarity and intersectoriality in UNESCO programmes. Co-operation is, in particular, centred on the coastal zones and small islands project, but also involves specific bilateral actions, e.g. the Caspian Sea programme and development of transboundary biosphere resources including parts of marine environments.

6.1 ICSPRO AND RELATED MATTERS

The ICSPRO consultations organized back-to-back with the sessions of the ACC Sub-Committee on Oceans and Coastal Areas have continued, at WMO, Geneva, 26 February 1995 and UNESCO, Paris, 30 August 1995. These have re-confirmed the use of ICSPRO as an inter-agency co-ordination and co-operation mechanism for broad issues, e.g. those related to the United Nations Convention on the Law of the Sea; 1998 International Year of the Ocean; global change; consideration of emerging problems; and overall, general programme co-ordination.

The ICSPRO consultation in August 1995 specifically reviewed the planning so far made for 1998 International Year of the Ocean, and for the participation in EXPO'98.

Agencies and Programmes participating in ICSPRO are making plans for major activities dedicated to the Ocean Year 1998. Participation in the UN co-ordinated contribution to EXPO'98 is also being considered.

Besides ICSPRO, the IOC also normally is represented at the governing body meetings of other partners in particular WMO, IMO and UNEP. In 1995 the IOC attended the UNEP Governing Council and the WMO Congress.

The IOC has also in 1995 become a co-sponsor of GESAMP together with UNESCO, UNESCO-IOC. This implies no additional burden on the IOC resources, but acknowledges the fact that the IOC is providing the UNESCO technical secretary for GESAMP, and is providing for the support to UNESCO-IOC nominated experts, members of GESAMP. The IOC also co-sponsors several Working Groups of GESAMP, including the UNEP-led one on the review of the state of the marine environment.

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 through several specialized bodies and programmes, in particular SCOR, IGBP, WCRP, GCOS, GOOS, IAPSO, CODATA, SCAR, IUGG and IGU. SCOR is a major advisory body of the IOC and serves as the 'scientific brain' for the IOC. The IOC is associated with several SCOR Working Groups, and we are also endeavoring to develop further co-operation in relation to scientific capacity building. Contractual support is provided to SCOR for specific activities on an annual basis. The ICSU Secretariat is also providing support to J-GOOS, and part of the IOC resources for J-GOOS is provided to ICSU through a contract.

The IOC is co-operating with IGBP is specific programmes, especially LOICZ, JGOFS and GLOBEC.

The IOC has also endeavored to establish co-operation with START, in particular since START is also a partner in the WCRP. This partnership has been sought at a regional level, initially in Africa. This co-operation also involves national donors, in particular from the Netherlands.

6.3 OTHER BODIES AND PROGRAMMES

The IOC co-operation with EU is expanding, and is now associated with OSLR-HAB, IODE, GIPME and TEMA. The latter in particular concerns the development of co-operative networks for partnership, as well as specific training courses at a regional level. Inter-secretariat consultations are held at suitable occasions, e.g. during the IODE Committee meeting in Athens, Greece (January 1996), as well as in Paris and Brussels.

Co-operation with ICES is maintained at an extensive level, including joint publications emerging from the OSLR-HAB programme. The IOC is represented at the ICES Annual Science

Meetings, and participates in several ICES Working Groups, some of them jointly sponsored, e.g. the ICES-IOC-IMO Working Group on Ballast Waters.

Co-operation with ACOPS and IOMAC is also continuing, as well as with PICES with respect to WESTPAC. In the WESTPAC region co-operation is now also increasing with CCOP and SOPAC. Endeavors are being made to interact more closely with SPREP, in particular as regards oceans and climate.

The association with IUCN is being strengthened through dialogue and co-operation with respect to marine biodiversity, regional activities, focusing on Africa and with IUCN as a partner in the Global Coral Reef Monitoring Network development.

The IOC has been invited to co-operate with the Independent World Commission on the Oceans (IWCO) by its Chairman Dr M. Soares, former President of Portugal, Co-operation has been initiated in specific actions, in particular through the preparation of thematic papers and provision of high-level scientific contacts. The IOC Executive Secretary has also invited IWCO, SCOPE of ICSU, GESAMP and IOC itself to consider co-ordination in respect to similar efforts as regards the state of the marine environment, and has offered IOC as a facilitating mechanism in the co-ordination of these efforts.

7. FOLLOW-UP TO UNCED AND UNCLOS

7.1 FOLLOW-UP TO UNCED

The follow-up to UNCED is continuing to be a major framework for the IOC programme development and implementation. This is also properly emphasized in the IOC Medium-Term Strategy, endorsed by the Eighteenth Session of the Assembly.

The IOC is accordingly maintaining strong links with the Secretariats for the Framework Convention on Climate Change, Biological Diversity and other Secretariat-related mechanisms established for specific purposes, including Small Island Developing States (SIDS) (Barbados Conference 1994), Natural Disaster Reduction (Yokohama Conference 1995), and the Secretariat being established in UNEP for the implementation of the Global Programme of Action for Protection of the Marine Environment against Land-Based Activities, adopted at the Washington DC Intergovernmental Conference, November 1995. The IOC was represented at the Conference and participated actively in all the preparatory activities.

The IOC is represented at the Interagency Committee for Sustainable Development (IACSD) through UNESCO. The IOC Secretariat is maintaining close dialogue with the United Nations DPCSD Secretariat, *inter alia* through the IOC providing the secretariat services for the ACC Sub-Committee for Oceans and Coastal Areas.

The ACC Sub-Committee, in addition to ICSPRO, is the major co-ordination and co-operation mechanism in the United Nations system for the implementation of, and activities in relation to, the Chapter 17 of Agenda 21. The Sub-Committee met twice in 1995, at WMO, Geneva, February 1995, and at UNESCO, Paris, August 1995. A substantive report was prepared on the state of implementation of Chapter 17, with a summary and an extended part. These were delivered to the DPCSD Secretariat. Through the related mechanisms the report on Chapter 17 from the Secretary-General to the Fourth Session of the CSD (UN, New York, April-May 1996) was prepared. The IOC attended the preparatory meeting of the CSD inter-sessional Working Group, UN, New York, February-March 1996. The IOC was also represented at the Fourth CSD session, and co-convened an ocean round-table panel at that occasion, in co-operation with other bodies and programmes.

The follow-up to the Conference on Small Island Developing States is pursued at regional levels, mainly through IOCARIBE, but also in the IOCINCWIO region. The Workshop on Small

Island Oceanography planned to take place in Comores Islands in 1995, is now being organized there in July 1996. Another workshop on related matters is being organized in Madagascar, also in 1996, in co-operation with the World Bank and SIDA-SAREC.

The IOC association with the implementation of the Conventions is presented under the respective subject-area headings. It should only be emphasized that we are actively pursuing this co-operation, and endeavoring to provide ocean science and services inputs and advice, to the extent available resources permit.

7.2 FOLLOW-UP TO UNCLOS

During the Eighteenth Session of the IOC Assembly, June 1995, IOC and UNCLOS was again addressed as a matter of importance. Delegations expressed their general support for IOC as a competent international organization in the field of marine scientific research to take positive and effective action to respond to UNCLOS. The Assembly decided to continue the Intercessional *ad hoc* Working Group on IOC's Possible Role in Relation to UNCLOS (IOC-LOSI), with terms of reference to review all provisions of UNCLOS that may have explicit or implicit relevance to the role of IOC.

IOC was represented at the second and third sessions of the First Session of the Assembly of the International Sea-Bed Authority, Kingston, Jamaica, respectively 27 March-17 April 1995 and 7-18 August 1995. The meeting adopted the Role of Procedure for the Authority, but did not succeed in electing the 36 members of the Council nor the Secretary-General of the Authority. In this context, the meeting decided to hold informal intersessional consultations in New York, 6-8 December 1995, in an attempt to resolve the question of membership of the Council and other related issues.

IOC was also represented at the second and third sessions of the Meeting of the States Parties to the UN Convention on the Law of the Sea, New York, respectively 15-19 May 1995 and 27 November-1 December 1995. The main topic under discussion was the preparation for the establishment of the International Tribunal for the Law of the Sea. Given the fact that many countries, including some important industrialized countries have not yet ratified the Convention and some are in the process of so doing, the meeting also decided that the election of the members of the Commission on the Limits of the Continental Shelf be postponed until March 1997.

At the invitation of UN-DOALOS, Dr. Peter Cook, Chairman of the Expert Group on IOC-UN-DOALOS/OSNLR and a staff member from the IOC Secretariat, participated in the Meeting of the Group of Experts on Preparations for the Establishment of the Commission on the Limits of the Continental Shelf (CLCS), New York, 11-14 October 1995. The role of IOC in assisting the CLCS as a designated competent international organization in the field of marine scientific research under UNCLOS was well acknowledged. As a result of the meeting, a Conceptual Modus Operandi for the CLCS and an IOC-IHO publication on science and technology associated with continental shelf definition under the UNCLOS were recommended. UN-DOALOS expressed its willingness to co-operate with IOC and IHO in the preparation of this publication.

As a follow-up to the recommendation of the Expert Meeting on CLCS, upon the invitation of IHO, IOC was represented at the IHO Meeting of the Advisory Board on the Law of the Sea (ABLOS), Monaco, October 1995, so as to exchange views with IHB on how to proceed with the preparation of the publication, both technically and financially. The meeting invited IOC to become an ex-officio member of IHO/ABLOS, and supported the establishment of a joint IOC-IHO Editorial Board to prepare the manual. Three representatives from the IHO/ABLOS were nominated as members of the joint Editorial Board. On the IOC side, Drs. Peter Cook, R.T. Haworth and P.A. Symonds were nominated as members of the Editorial Board, with Dr. Cook designated as co-Chief Editor from the IOC side.

With regard to the preparation of a list of experts for use by the Special Arbitral Tribunal in accordance with Article 2 of Amex VIII of UNCLOS, the number of experts nominated have increased to 52 from 25 countries. A new Circular Letter No. 1477 dated 28 December 1995 was sent

out, urging IOC Member States who have ratified the Convention and have not yet nominated their experts for the Special Arbitration to do so.

In response to the invitation of the United Nations, IOC made its contribution to the annual report of the UN Secretary-General on the law of the sea to the Fiftieth Session o the UN General Assembly. IOC was previously invited to make similar contributions to the Forty-ninth Session of the UN General Assembly in 1994. In its contribution, IOC reported on the immediate actions taken in response to UNCLOS and introduced various IOC programmes which could potentially contribute to the implementation of the UNCLOS provisions, including Ocean Mapping, OSNLR, GIPME/MARPOLMON, GOOS development, and Training, Education and Mutual Assistance (TEMA).

The main UNCLOS-related activities planned in 1996 include: (i) the first session of the Joint IOC-IHO Editorial Board, with a view to preparing a detailed outline of the publication on science and technology associated with the delimitation of the outer edge of the continental shelf, identifying authors for each chapter, deciding on the division of work and the timetable for publication. It is expected that the publication will be ready during the latter half of 1997; (ii) the meeting of the IOC *ad hoc* Intercessional Working Group on UNCLOS (IOC-LOSI), as a follow-up to Resolution XVIII-4, and possibly (iii) the preparatory meeting open to all Member States of IOC for the purpose of reviewing the results of IOC-LOSI.

8. 1998 INTERNATIONAL YEAR OF THE OCEAN

This is reported separately here although this action may also be seen as a contribution to follow-up to UNCED as well as UNCLOS.

The Eighteenth Session of the Assembly through its Resolution XVIII-3 requested the Executive Secretary, in consultation with the Chairman, to organize the work of a Task Team to prepare IOC for its participation in 1998 International Year of the Ocean.

The Executive Secretary and Chairman decided to take advantage of the meeting of the IOC Officers in Lisbon, 15-17 January, 1996, and have this group of elected IOC officials to initiate the work of the Task Team. In addition the Past-Chairman, Dr Murillo and the Past-Secretary, Dr Ruivo, assisted in the deliberations.

For convenience the discussion was separated into the two related areas of the IOC contribution to EXPO'98 in Lisbon and more general activities for consideration for the International Year of the Ocean. The proposals outlined below will be distributed to Chairs of Regional Bodies as well as Member States for comment and suggestions. A plan with specific activities and budget will then be presented for consideration at IOC/EC-XXIX.

It was recognized that participation in activities relating to both the Exposition and for the International Year of the Ocean would entail costs. The intent of the Assembly resolution was that such costs should impose only very limited demands to the IOC budget. Avenues for contributions to, or sources for, the costs of the actions listed below have therefore to be sought.

IOC participation in Ocean EXPO'98

The participants accepted an invitation from the Ocean EXPO officials to visit the offices for a detailed presentation of the state of plans for the exhibition. Progress on both the site and in the plans was impressive. We were informed that 51 countries had already announced their active participation. The participation of a UN Pavilion had already been agreed.

It was agreed that the EXPO'98 and the IOC have mutual objectives for increasing the visibility of ocean issues and improving political and public awareness in the ocean. Therefore the IOC and its Member States should be supportive of co-operation with the EXPO'98.

Several opportunities exist for the IOC to contribute to the exhibition.

Publicity

During the period leading up to the exhibition, the IOC can use its networks and regional bodies to assist in the distribution and promotion of material and information on EXPO'98.

In addition to including promotional brochures in its mailing lists and accepting announcements and articles, as appropriate in its publications, the IOC can make use of its "Home Page" on Internet and its other regional electronic networks to distribute information.

The IOC should seek co-operation with existing marine technology programs, such, as the European Union MAST and EUREKA programs, in relation to a possible information package for the Exposition which could lead to closer interest and involvement by industry.

The UN Pavilion

As an important ocean component of UNESCO, the IOC will contribute to the UN pavilion. In this regard, the IOC may call upon its regional bodies to co-ordinate individual and collective inputs to the exhibition.

The IOC will also be ready to organize scientific and technical advice on the preparation and planning for the pavilion.

Scientific Advice

The IOC can also offer assistance and advice, on request, directly to the EXPO'98. In particular, the theme pavilion "Pavilion of the Future" could make use of the advanced knowledge from the technical programmes of the IOC in automated ocean observations, remote sensing and modem computer analyses, possibly displaying real-time or near real-time ocean conditions. The possibilities for an IOC exhibition in the Pavilion of the Future should be explored. Pilot projects involving the development of the GOOS in regional contexts should be explored. The IOC Vice-Chairmen should be tasked to explore these possibilities.

Scientific Conference

The IOC could consider the organization of a scientific conference to be held in Lisbon during the time of the exposition. A possible multidisciplinary theme for such a conference could be focussed on the evolution of life from the oceans.

The Executive Council, scheduled to take place in 1998, will possibly be held in Lisbon.

In the past the Executive Councils of the IOC were hosted by governments of Member States in appropriate locations around the world. Although the practice allowed *the* IOC to be seen in various regional contexts, it was decided that the administrative burden of holding the meeting outside of Paris was too severe.

For the Year of the Oceans in 1998 however, an exception could be made to hold the Council meeting in Portugal. Such a decision could allow delegates to participate more fully in the activities planned for EXPO'98. The provision of facilities by the Portuguese government would assist in offsetting additional costs. This proposal would need to considered by the next EC and a recommendation made to the, Nineteenth Session of the Assembly.

Activities Parallel with the International Year of the Ocean

Many other IOC activities, proposed for consideration under the Year of the Oceans could have a component or be supportive of the actions undertaken directly with EXPO'98.

1998- International "Year of the Ocean"

The contributions associated with EXPO'98 are all considered contributions of the IOC towards the celebration of the Year of the Oceans. The activities below are of a global nature or more directly related to the interests and responsibilities of the IOC, however they also may have components or parallels in the exhibition.

Inter-Agency activities

Several activities have been discussed under the umbrella of ICSPRO for co-operative activities . with other UN organizations. These other agencies will be undertaking individual and collective actions to celebrate the Year of the Oceans from the point of view of their own responsibilities. The IOC should co-operate and collaborate as appropriate.

A Global Capacity-Building Cruise

It is proposed to investigate the feasibility of a sequence or series of training cruises, sponsored by developmental agencies, that will circumnavigate the globe during 1998 and possibly finishing with the arrival at Lisbon. The successful model of the Floating University could be used.

The schedule could commence in the Black Sea followed by the Mediterranean, Red Sea, IOCINCWIO, IOCINDIO, WESTPAC, CPPS, SOC, IOCARIBE and IOCEA to Lisbon. Each portion of the cruise would involve regional scientists, conduct regional seminars and have a specific regional program. The continuity could be achieved by having a video record of the highlights of each portion of the voyage that would be combined into a final record for display in Lisbon and thereafter, During the period of EXPO'98, arrangements could be made to record the progress of the training program, or even interact with the vessel in a real-time link-up.

A commemorative UNESCO-IOC flag could also be passed from vessel to vessel and presented to the IOC for display at future governing body meetings.

The WOCE Scientific Conference

The IOC has already arranged for a global conference on the scientific results of the WOCE to be held in Halifax, Canada, during 1998. The IOC should strongly encourage ocean scientists from all Member States to attend this important meeting. It may be possible for video highlights from keynote presentations at the Conference, to be taken and displayed at appropriate locations.

Ocean Benefits Study

The IOC has undertaken discussions with ICSU with regard to the preparation of an independent study on the status of ocean knowledge. The study is expected to be carried out by the Scientific Committee on the Protection of the Environment (SCOPE), with assistance from the IOC and SCOR. The results should be available in 1998. It is recognized that an IOC study of the potential applications for, and benefits to society from ocean science programmes, could be a valuable adjunct to the SCOPE report. Such a study may also prove a useful contribution to the Independent World Commission on the Oceans, which is carrying out a broader study of ocean matters with the same time frame in mind.

The Ocean Charter

The concept of an Ocean Charter, open for signature during 1998, has already been accepted by t-be Assembly. It may be possible to use such a Charter in two ways. Firstly, to have Heads of Government sign the Charter officially on behalf of their respective governments. It is noted that the Charter is a statement of principle and not a legally binding document. Governmental signing should take place at appropriate national regional or global events with appropriate publicity.

Secondly, an individual version of the ocean charter could be adapted for the public. Electronic networks, schools, organizations, non-governmental bodies, public fora, etc., could all be used to gather signatures from individuals accepting that the oceans are a vital part of life on the planet and should be protected.

The combination of political and public commitments would be very powerful in promoting ocean awareness. The cost would minimal. Perhaps the IOC could supply the basic design, complete with the UNESCO and IOC logos, for both levels of the Charter. Copies would be supplied on request. In fact the copyright could perhaps generate revenue by sale to entrepreneurs for t-shirt and other commercial uses. Organizations undertaking to collect signatures could be allowed to add their own logo to promote the campaign.

The Formal Acceptance of an Annual Oceans Day

Several calendar dates have been proposed as the annual Oceans Day. One suggestion is June 8, because of the original Oceans Day at the Rio Conference, another is November 16, the date the UN Law of the Sea came into force, and other dates linked to national preferences. The IOC could use its Assembly to decide on a globally accepted date and announce such a decision at an appropriate occasion during 1998.

Ocean Awards

It would be very appropriate to seek finding for the presentation of Ocean Awards during 1998, Such awards could be for any appropriate category (science, environmental, public service, etc.), with the object of rewarding individuals who have made important contributions to the conservation and management of the global ocean. If possible a capital contribution for a continuing awards would be most appropriate, perhaps given annually or bi-annually on Oceans Day.

The presentation of grants or scholarships would be an equally rewarding action, either for 1998 only or for the commencement of an annual series.

Activities with UNESCO programmes

It was agreed that opportunities existed to promote activities in co-operation with UNESCO programmes. Examples cited were the announcement of a regional or deep sea biosphere reserve, in co-operation with the MAB programme, the preparation of articles or books on such themes as a history of oceanography, peoples and the sea, and 1998 as the entry into the Ocean Age. A project of the CITIES program could be developed to concentrate on the problems of coastal development.

Television and Media Attention

Arrangements should be sought with world press and television agencies to have general interest articles and video clips on ocean issues and activities available throughout 1998.

9. DEVELOPMENT OF IOC WITHIN UNESCO

A summary of the developments is presented to serve as a reference.

The Twenty-fourth Session of the General Conference adopted Amendments to the Statutes of the Intergovernmental Oceanographic Commission, through its Resolution 10.4. These amended Statutes specify *inter alia.*[2]

"Article 1 paragraph 1:

(a) the Intergovernmental Oceanographic Commission, hereafter called the Commission, is established as a body with functional autonomy within the United Nations Educational, Scientific and Cultural Organization.

(b) It guides the conception and follows the implementation of its programme as approved by the . General Conference in the framework of the latter's adopted budget.

Article 1, paragraph 2:

The purpose of the Commission is to promote marine scientific investigations and related ocean services, with a view to learning more about the nature and resources of the oceans through the concerted actions of its members

In the period 1988-1993, IOC carried out a series of studies providing a gradual evolution of the IOC within UNESCO in terms of functional autonomy.

This was interpreted through the combined implications of (a) and (b) in paragraph 1 of Article 1 of the Statutes, effectively concluding that, once the General Conference has approved the programme based on submission of the IOC Assembly, IOC would have functional autonomy in implementation within the decided budgetary provisions, through functions carried out in accordance with the rules and regulations of UNESCO. Thus, the studies undertaken within IOC have attempted to define the responsibilities and roles of Member States, the Governing Bodies of IOC (Assembly and Executive Council), the elected officers of the IOC and the IOC Secretariat. Major concerns have been, and still are, dependable resources for the IOC; flexibility with regard to administration and operations; recognition of the IOC in and outside of UNESCO; organization and structure of the IOC. These studies, fully debated by the Assembly, have considered the IOC as an organization or body within the Organization, consisting of the elements mentioned above.

Results of the debates are reflected in the reports and resolutions of the XV, XVI, XVII and XVIII Assemblies (1989, 1991, '1993 and 1995, respectively). In response, the Director-General has pursued actions to gradually implement flexible operational, administrative and financial arrangements for the IOC. The next step in this regard will be undertaken within the general policy of devolution of authority to bring adequate decision-making to the level of implementation.

Following up the initial overall policy decision of 1990, the Director-General delegated a number of functions to the Secretary IOC in early 1991. The aim was to enable the IOC Secretariat to exercise its functions so as to best serve UNESCO and the Member States, in accordance with the wishes expressed by the latter. Through this action several measures were initiated.

The operational flexibility in administrative terms includes:

(i) maintenance of official contact with IOC Member States;

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[2] Records of the Twenty-fourth Session of the General Conference, Paris, 20 October-20 November 1987, Volume 1: Resolutions

(ii) signature of certain correspondence after consultation and approval by relevant units in the UNESCO Secretariat, including Host-country Agreements between the host country and UNESCO regarding the organization of IOC meetings;

(iii) after instructions from IOC Governing Bodies, the General Conference or the Executive Board, on behalf of the IOC, signature of Memoranda of Understanding with regard to co-operation with other international organizations;

(iv) maintain direct contact with the Executive Heads of Member Organizations of ICSPRO, in his capacity as Secretary of ICSPRO, and take actions as requested by the Committee (ICSPRO);

(v) liaise with ICSU and provide support to its programmes, particularly IGBP; and take appropriate public relations and awareness-raising measures;

(vi) issue and accept invitations from other international bodies for participation in activities of mutual interest, including representation (as IOC of UNESCO) at appropriate scientific conferences, and the establishment of joint subsidiary bodies as needed, subject to availability of funds;

(vii) report directly to the Director-General on matters of concern to the IOC, maintaining close consultation with the ADG for Science and provide six-monthly reports.

Experience in implementation of these measures is fundamentally very positive. It has facilitated actions by reducing time requirements for administrative procedures and has moved decision-making and operating levels closer together. The IOC Governing Bodies have expressed their strong appreciation and satisfaction with the measures taken so far.

The operational financial flexibility provided through this action was more limited:

(i) signature of travel orders and certain limited purchases (e.g., office equipment);

(ii) management of funds made available to IOC, as done before, in accordance with the programme adopted by the General Conference.

The Sixteenth Session of the IOC Assembly (Paris, March 1991), reviewed the development of the Commission within UNESCO, in relation to the results of the Second World Climate Conference and the on-going preparation for UNCED. In this context, the IOC Chair reported to the Assembly on the series of consultations he had with the Director-General since the Twenty-third Session of the IOC Executive Council, March 1990. The Chair expressed the view that the successive consultations had led to a most satisfactory and fruitful clarification of the concept of functional autonomy as demonstrated by the DG/Note/90/30 of 31 August 1990, and DG/Note/91/3 of 11 January 1991 (referred to above). The former had reaffirmed the functional autonomy of the Commission within UNESCO, and the latter provided directives on the delegation of authority to the Secretary as agreed by the Chair of IOC and the Director-General.

The Assembly expressed its satisfaction with the progress made and its appreciation to the Director-General. Furthermore, the Assembly noted that giving effect to the concept of functional autonomy is an evolutionary process, requiring further consultations and negotiations in the light of experiences gained. It recognized that the exercise of functional autonomy implies greater responsibilities for the Commission and its Member States in ensuring that the IOC appropriately follows up its commitments. The Assembly adopted a series of Modalities of Support that IOC Member States could provide to ensure the success of activities promoted and co-ordinated by the IOC (Document SC/MD/97, Annex VIII).

The Assembly also instructed the Chair and Secretary IOC to continue identification of procedures for which measures could be taken to ensure an operational flexibility in administration

and financial terms for the IOC. It was felt that this should include, in particular, consideration of streamlining operating mechanisms of the IOC. To this end, the Assembly established the *ad hoc* Study Group for Development Operations, Structure and Statutes (DOSS).

Proposals made to the 27th General Conference of UNESCO

The report of the *ad hoc* Study Group DOSS was debated at the Seventeenth Session of the IOC Assembly, Paris, March 1993. The Secretary IOC regularly informed the Director-General about the developments in the IOC. He also drew attention to the proposals being made by the *ad hoc* Study Group. The Director-General confirmed to the Assembly his readiness to discuss various proposals with the IOC Officers, in the context of the ongoing reflections on optimum institutional arrangements at UNESCO. He also urged the Assembly to consider adjusting the frequency of meetings so as to achieve an increased economy of limited financial resources. He stressed that the General Conference is the forum to decide on specific measures for the IOC, e.g., through submission of Draft Resolutions based on the deliberations of the Assembly.

The Assembly accordingly adopted its Resolution XVII-20 which makes several specific proposals for measures to be taken to increase the recognition of the IOC; to enhance the development and implementation of IOC programmes; to help ensure dependable financial support to the IOC; and to streamline the organization and structure of the IOC. The Assembly considered that the proposed internal measures could be handled at the discretion of the Director-General.

This Resolution, together with the report of the Assembly, was transmitted to the 27th General Conference, Commission III. Basically, the debate strongly endorsed the proposals made by the IOC Assembly and transmitted to the General Conference by the Director-General.

Realizing that one of the major concerns of the IOC is to achieve dependable resources, the Director-General, on the basis of the support expressed by the 27th General Conference, in 1994 carried forward a proposal to provide a financial allocation to the IOC in the biennium 1996-1997. In order to facilitate this, he also indicated an intention to establish a Special Account for the IOC.

Experimental functional autonomy for IOC

In order to gain further experience as regards an operational flexibility in administrative and financial terms for IOC, the Director-General initiated a trial period as of 1 March 1995. This included authorization for the Secretary IOC, under the authority of the Director-General, to assume certain responsibilities within the limits of the total financial and staff resources put at his disposal. The delegation of authority included the following measures:

(i) **approval of workplans** and workplan amendments;

(ii) use of staff cost savings to recruit consultants, supernumeraries and fee contractors;

(iii) approval and signature of travel orders, including the possibility of reimbursing travelers for authorized travel upon receipt of proper invoices and ticket stubs;

(iv) the authority to determine the duration of contracts for consultants and supernumeraries and DSA rates for consultants;

(v) administration of established posts;

(vi) appointment of staff in the GS category after consulting a JPAB and DIR/PER, and of grades P-1 to P-3 in the professional category after consulting a SPAB, DIR/PER and ADG/MA; grade P-4/P-5 will be appointed by the DDG upon recommendation of IOC, as well as of DIR/PER and ADG/MA after consulting a SPAB;

(vii) signature of staff performance reports, within-grade increment forms and personnel action forms (subject to normal clearance by PER and BB);

(viii) authority to sign invitations to meetings and to States' parties, and agreements of co-operation with institutions and international organizations;

(ix) assignment of functions devolving upon the Director-General by virtue of the Rules of Procedure of intergovernmental committees (convening of sessions, preparation of the provisional agenda, implementation of the decisions taken, etc.), and representations of the Director-General at meetings of these bodies in his absence; and

(x) relations with the public and the media.

The AO/SC continues to act as the certifying officer of the IOC and all UNESCO rules, regulations and administrative procedures not specifically modified by the decision continue to apply to the IOC.

The Director-General specifically emphasized that these measures should not be interpreted to mean any dilution of accountability to him nor weakening of the prudent and cost-effective rules and procedures of the Organization; on the contrary, the Secretary IOC will be held even more strictly responsible to the Director-General for an efficient and successful management of the programme. It is also emphasized that the delegation of authority must not, in any way, appear to distance IOC from UNESCO. Not all of these measures were applied in 1995. However, so far, the experience gained with the applications is positive. The essential new measures are (i), (ii), (iv) and (vi) which, when applied, provide substantial operational flexibility. In particular, the application of these measures has achieved an increased development and strengthening of horizontal links. This is fully in line with the policy of increased decentralization adopted by UNESCO.

Eighteenth Session of the IOC Assembly

The Eighteenth Session of the IOC Assembly (Paris, June 1995) considered the evolution of the IOC within UNESCO following the DOSS report and the Second International Conference on Oceanography (November 1994) in light of the forthcoming 1998 United Nations Year of the Ocean, together with the proposals made by the Director-General set forth in the UNESCO Draft Programme and Budget for 1996-1997 and in the Draft Medium-Term Strategy, 1996-2001, The Chairman informed the Assembly regarding the discussions that had taken place at the 146th Session of the UNESCO Executive Board.

Following substantial debate the Assembly adopted its Resolution XVIII-1, by which it decided to continue the work of the *Ad hoc* Study Group on IOC Development, Operations, Structure and Statutes (DOSS) with a revised composition and terms of reference. These concern: the Statutes and Rules of Procedure of the IOC; the possibility of an IOC Pledging System; all aspects as regards geographical distribution; administrative and management matters. A progress report shall be provided to the IOC Executive Council in 1996.

The Assembly also considered the proposal for financial regulations for a Special Account for the IOC and adopted its Resolution XVIII-2: Financial Regulations applicable to the Special Account of the IOC.

New arrangements for the IOC proposed to the 28th General Conference and decisions of the General Conference

Pursuant to the Director-General's announcement in the Autumn of 1994, a Special Account for IOC was established within the UNESCO accounting system in January 1995 to which the existing IOC Trust Fund was transferred. Subsequently, the Director-General proposed new arrangements for the IOC which were presented to the Executive Board at its 146th Session in Document 146 EX/20.

This particularly included the proposed Financial Regulations for the Special Account. It also referred to the proposals made by the Director-General within the UNESCO Draft Programme and Budget for 1996-1997, with the aim to provide the regular programme support of UNESCO to IOC through a mechanism akin to a financial allocation. This would constitute an essential step towards provision of dependable resources for IOC.

The Executive Board, after having examined the matter, requested the Director-General to provide further clarification to the 147th Session of the Executive Board and decided to postpone the decision regarding the Financial Regulations for the Special Account to that Session of the Board. Further clarification was provided by the Director-General to the 147th Session of the Executive Board in Document 147 EX/4, also taking into account the relevant deliberations of the IOC Assembly at its Eighteenth Session (Paris, June 1995).

The Executive Board in its final recommendations to the 28th General Conference on the proposed budget for 1996-1997 and additional recommendations concerning documents 28 C/4 and 28 C/5. recommended that “the budget provisions concerning the UNESCO Intergovernmental Oceanographic Commission (IOC) and the World Heritage Centre (WHC) shall not be subject to adjustments by transfer of funds to other parts of the budget”.

The General Conference endorsed this recommendation and confirmed that the resources proposed to be provided to the IOC through a financial allocation should be given a special budgetary protection and a protected staff provision retained within the UNESCO Staffing and Manning Table. The proposal to provide regular programme support from UNESCO to the IOC through a financial allocation was considered premature although the basic principle of securing dependable resources to the Commission was fully endorsed by the General Conference. This is reflected in the decision that the resources provided for programme costs for IOC are incompressible.

10. PUBLICATIONS

A complete list of available titles is found in Document IOC/INF-700 rev. 10. The following titles issued in **1995 were:**

IOC Manuals and Guides

31 vol. 1: Amnesic Shellfish Poisoning. 1995. 18 pp. (English)

IOC Workshop Reports

105 Conference on Coastal Change. Bordeaux, France. 1995. 127 pp. (English)

106 IOC/WESTPAC Workshop on the Palaeographic Map. Bali, Indonesia. 1994. 10pp. (English)

107 IOC-ICSU-NIO-NOAA Regional Workshop for Member States of the Indian Ocean - GODAR III. Dona Paula, Goa, India. 1994. 50 pp. (English)

108 UNESCO-IHP-IOC-IAEA Workshop on Sea-level Rise and the Multidisciplinary Studies on Environmental Processes in the Caspian Region. Paris, France. 1995 26 pp. (English)

108 Suppl. Submitted Papers to the UNESCO-IHP-IOC-IAEA Workshop on Sea-level Rise and the Multidisciplinary Studies on Environmental Processes in the Casipan Region. Paris, France. 1995. 89 pp. (English)

109 First IOC-UNEP CEPPOL Symposium. San José, Costa Rica. 1994. 26 pp. (English)

110 IOC-CEC-EMC-NOAA Regional Workshop for Member States Bordering the Mediterranean Sea. Valletta, Malta. 1995. 68 pp. (English)

111 Chapman Conference on the Circulation of the Intra-American Sea. La Parguera, Puerto Rico. 1995.68 pp. (English)

112 IOC-IAEA-UNEP Group of Experts on Standards and Reference Materials (GESREM) Workshop. Miami, USA. 1993. 8 pp. (English)

113 IOC Regional Workshop on Marine Debris and Waste Management in the Gulf of Guinea. Lagos, Nigeria. 1994. 21 pp. (English)

114 IOC Workshop on Integrated Coastal Zone Management. Karachi, Pakistan. 1994 62 pp. (English)

115 IOC/GLOSS-IAPSO Workshop on Sea-level Variability and Southern Ocean Syna,ics. Bordeaux, France. 1995 .46 pp. (English)

116 IOC/WESTPAC International Scientific Symposium on Sustainability of the Marine Environment: Reviez of the WESTPAC Programme, with Particular Reference to ICAM, Bali, Indonesia, 1994. 145 pp. (English)

IOC Training Course Reports

31 COI-CEADO Curso Regional de Capacitation en Gestion de Dates e Information Oceanograficos. Buenos Aires, Argentina. 19 pp. 1994. (Spanish)

32 IOC-FAO-UNEP Training Course on Nutrient Analysis and Water Quality Monitoring. Zanzibar, Tanzania. 1994. 17 pp. (English)

33 IOC-IOMAC Advanced Training Course on Marine Geology and Geophysics off Pakistan. Karachi, Pakistan. 1994. 14 pp. (English)

34 Training Course on Managment of Marine Data and Information for the Mediterranean Region: Valletta, Malta. 1995. 16 pp. (English)

Non-serial Titles

ASFA: The First Twenty Years. An Outline History of Aquatic Sciences and Fisheries Abstracts, 1971-1990. Document IOC/INF-994. 1995. 74pp. (English)

Harmful Algae: An International Directory of Experts in Toxic and Harmful Algae and their Effects on Fisheries and Public Health. Document IOC/INF-1015. 1995. 128 pp. (English)