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INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION
(of UNESCO)

SUMMARY REPORT OF THE *Ad hoc* EXPERT CONSULTATION ON IOC-UN(OALOS) PROGRAMME ON OCEAN SCIENCE IN RELATION TO NON-LIVING RESOURCES

Officers of the Programme on Ocean Sciences in Relation to Non-Living Resources (OSNLR) and experts from selected regions where OSNLR projects are successfully launched, met at UNESCO Headquarters to review the current progress and to prepare a report to the Twenty-fifth Session of the IOC Executive Council in response to the request made at the Sixteenth Session of the IOC Assembly, 7-21 March 1991.

The Group recommended IOC to organize an international conference on "Coastal Change: Past, Present and Future - Its Scientific Appraisal for Effective Coastal Management" (Annex V), to develop scientific guidelines for the management of coastal zone resources. The Group noted that a large number of scientists from developing countries are interest in participating in ODP research and recommended IOC to facilitate their involvement.

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1. OPENING

On behalf of the Intergovernmental Oceanographic Commission, Dr. K. Kitazawa, Technical Secretary of the IOC-UN(OALOS) Programme on Ocean Science in Relation to Non-Living Resources (OSNLR), welcomed the participants, especially first time participant Dr. L. Awosika. He also introduced Mr. R. Arthurton of the British Geological Survey, who is assisting the Secretariat on a part-time basis and Dr. A. Stefanon who will soon join the Secretariat seconded by the Government of Italy.

The Chairman OSNLR, Prof. M. Vigneaux, welcomed all the participants in particular the representative from the United Nations (UN/OALOS), Mr. R. Gruszka, and two experts from the regions where OSNLR projects are successfully launched. He also thanked seconded staff members at the Secretariat and stressed that without their assistance the OSNLR Programme could not make such a rapid development. The Chairman introduced the main purpose of this Meeting which should, in response to instructions made at the Sixteenth Session of the IOC Assembly, provide clear advice to the Twenty-fifth Session of the IOC Executive Council on organization of an international conference on coastal change, and on IOC's effective involvement in the Ocean Drilling Project (ODP).

2. ADMINISTRATIVE ARRANGEMENTS

2.1 ADOPTION OF THE AGENDA

The Technical Secretary introduced the Provisional Agenda. After agreeing to some amendments, the Group adopted the Agenda for the Meeting (Annex I).

2.2 DESIGNATION OF A RAPPORTEUR

Mr. R. Arthurton kindly accepted the invitation to serve as Rapporteur for the Meeting.

2.3 CONDUCT OF THE MEETING

Dr. C. Latouche, IOC Consultant, informed the Group of the arrangements for the Meeting and introduced the working documents.

The Technical Secretary informed the Meeting that due to current financial constraints only officers and experts from selected regions were invited to the Meeting. The List of Participants is given in Annex II.

3. INTERSESSIONAL ACTIVITIES

Dr. G. Kullenberg, Secretary IOC, presented his views and outlooks for OSNLR, noting the considerable interest in the regions, and interest by the United Nations Office for Ocean Affairs and the Law of the Sea (UN/OALOS). He stressed his view that OSNLR was concerned with developments in its economic, environmental and research aspects. It was about the rational use of resources, and building the capacity of Member States to develop their own knowledge base that would form an essential part of any management procedure, particularly regarding the coastal zone sub-programme. Regarding COMEMIR, the Secretary IOC recognized the need of a clear rationale, both locally and globally, in order to attract the necessary funding. There was a need to place OSNLR activities in an economic context. On ODP, there was a need to accommodate the aspirations of scientists from developing countries who wished to be involved in the scientific activities of the programme.

The Secretary IOC felt that the proposed IOC Conference on Coastal Change was timely. He envisaged its cost as perhaps US$100.000, with some US$25,000 from IOC. It was important to address the needs of a wide range of customers - not only scientists and engineers, but decision-makers and land planners. If success was to be achieved in funding the organization of the Conference, then it was necessary to present intellectual arguments to them.

The Secretary IOC requested the Group to identify the areas of priority for implementation of OSNLR within limited funds and informed that US$50,000-100,000 per year would be available. There is scope for supporting funds from TEMA and there may be regional components relevant to OSNLR, but there are many priority demands on this budget. The OSNLR plans should be fed into regional IOC meetings.

Dr. Latouche reported on activities related to the OSNLR Programme since the Third Session of the Programme's Guiding Group of Experts in Bordeaux in February 1989. In particular, he reviewed the decision at the Officers' Meeting in February 1991, to classify activities into three main sub-programmes - the Coastal Zone; COMEMIR; and Deep Sea Research, including ODP (IOC/INF-839). The state of implementation of the three thematic OSNLR sub-programmes and the relevant on-going and planned activities in various subsidiary bodies and/or regions was reviewed.

3.1 COASTAL ZONE

3.1.1 IOCEA

Dr. Awosika reviewed the Project on the Geology and Hydrodynamics of Nearshore Areas in the IOCEA Region in which countries along the west African coastlines, from Mauritania to Namibia, showed interest, although not all countries are participating in the first phase of the project activities. After the organization of the first IOCEA cruise in October 1989 (IOC/INF-846), analysis of data collected (bathymetric data, bottom sediments, currents, salinity) have been carried out. Clay mineralogy analysis of sediment samples collected during the cruise was carried out by a Nigerian scientist at the University of Southampton. A number of terrestrial geologists of the region also participated in the project.

Participants in the Workshop on the Development of OSNLR Programme in the IOCEA Region held in Abidjan (Cote d'Ivoire) in June 1991, recognized the need for sediment sampling in the major rivers of the region and analyzing them, together with other samples already collected, in order to complement the results of the data collected during the cruise. Air-photo interpretation should also be carried out. A second cruise has been planned on parts of the shelf not presently covered. Intensive training on shallow seismic survey techniques and related data analysis was proposed to develop further understanding of continental shelf structure in the west African region and to prepare a research plan of the second cruise. In conclusion, Dr. Awosika stressed that regional scientists are eager to proceed with related research, but due to shortage of funds this greatly restricts possible advancement.

The Group noted the problem of insufficient funding in analyzing some data and samples collected during the First IOCEA Cruise. **The Group supported** the line of action set out at the Abidjan Workshop **and recommended** both sponsoring agencies to maintain necessary funds. **The Group stressed** the necessity of providing basic equipment, e.g., a fine grained sediment analyzer.

Mr. R. Gruszka, Representative of UN(OALOS), presented the prevalence of coastal erosion in the west African region and recalled the need for development of low cost and primitive technology for erosion protection. A project proposal entitled "Low Cost Indigenous Technologies for Coastal Erosion Control in the West and Central African Region" (Annex III), was drawn up at the Meeting. Recognizing difficult local economic conditions in the region to implement expensive and high-technologically involved beach erosion control measures like sea walls, dykes, bulk-heads, etc., it is urgent to develop low cost and indigenous technologies with minimal cost and environmental damage. The proposed pilot project aims to be implemented through locally developed technologies and to improve those techniques.

The Group felt that the proposal will help to further develop the on-going OSNLR project in the region and **expressed** its full support.

3.1.2 Southwest Atlantic Region

Prof. L.M. Martins made available a document which is an overview of the on-going studies on coastal dynamics and problems related with coastal erosion in the region. These studies have been planned during the Fourth Regional OSNLR Meeting, Maldonado, Uruguay, 25-26 June 1991. They represent a support for the national coastal management programmes and for this reason they receive funds from various national funding agencies (FAPERS, TWAS, CNPq, CONICET).

Other activities relevant to OSNLR include the dissemination of a regional OSNLR Newsletter twice a year; the preparation of an exhaustive bibliography on Southwest Atlantic Marine Geoscience which is being printed; the organization of a co-operative research cruise with Germany.

The Group expressed appreciation to Prof. Martins for the activity of the OSNLR regional component regarding coastal evolution. **It recommended** IOC and UN(OALOS) to maintain support for the activity in the region on this topic. **The Group suggested** that another important activity of the region in the near future would also be developed under the framework of COMEMIR (see below 3.2).

Dr. A. Suzyumov, IOC/MRI Programme Officer, introduced the EQUARIDGE project which was carried out by **R.V. AKADEMIK NIKOLAI STRAKHOV** for a detailed survey of the equatorial segment of the Mid-Atlantic Ridge. The preliminary research results were reported in IOC/INF-850.

The Group suggested that a deep sea research project could be initiated in the region. Prof. Martins stressed that regional co-operative research should be focussed on the coastal zone since it is still in the initiation stage, but countries in the region, especially Brazil, are interested in ODP.

3.1.3 Mediterranean

Mr. G. Soares, Assistant Secretary IOC, informed the Group on IOC-ICSEM Workshop on Coastal Erosion, Valetta (Malta), 14-17 October 1991. Research studies to collect base-line data are essential prior to any remedial beach rehabilitation work. They should include: (i) the establishment of an environmental data-base using a specific case study; (ii) a subsequent 3-year data collection period; (iii) development of models on environmental management. Referring to the results of IOC-ICSEM Workshop held in Perpignan (France) in October 1990, he informed the Group that a joint IOC-ICSEM Regional Group for OSNLR was formulated in the Mediterranean region. An Action Plan was drafted for the development of coastal zone research, but the plan has not yet been finalized. A Workshop on coastal erosion in North Africa is planned in Algeria in November 1992.

Dr. Suzyumov informed the Group that a marine geological/geophysical cruise was carried out in June-July 1991 on board **R.V. GELENDZHIK** in the eastern Mediterranean Sea and Black Sea, and a follow-up cruise is planned in 1993 to study mud diapirism, mud volcanoes and fluid escape in the Black Sea and along the Mediterranean Ridge.

The Group noted this information but **regretted** that it could not provide appropriate guidance due to lack of documentation. **It recommended** the officer-in-charge of the regional programme to provide adequate documents for the next OSNLR Session.

3.1.4 IOCINCWIO

Mr. R. Arthurton introduced a proposal on coastal erosion studies in the western Indian Ocean region (Annex IV). The project aims to advise governments of the participating countries on effective planning and management strategies for the protection of the coastal marine environment, particularly in respect of coastal erosion. It also aims to provide the basic knowledge, data and level of training necessary for the implementation of the recommended strategies. It is intended to: (i) carry out bathymetrical and geological surveys

to monitor sedimentation and erosion on specific study sites in the coastal zone; (ii) to collate and interpret the results of the survey and monitoring programmes, compile appropriate maps and reports, and make recommendations to governments on coastal planning and management, particularly in respect of coastal erosion; and (iii) to carry out a comprehensive training programme for scientists in respect of geo-scientific survey and monitoring techniques in the coastal zone.

Mr. R. Arthurton plans to visit the region on behalf of IOC in March/April 1992, to obtain support of countries to the project proposal; identify available resources (both manpower and facilities) in each country, training needs, and to establish a network of marine geologists in the region to develop OSNLR activities. He will revise the project proposal, taking into account the conclusions and opinions of local officials, obtained during the mission. The revised proposal will be presented for endorsement to the IOCINCWIO Session to be held in Mauritius in September 1992, after being reviewed by local experts at the planned IOCINCWIO pre-session symposium.

The Technical Secretary informed the Group that IOC Secretariat will approach possible funding agencies, i.e., UNDP and possible bilateral aid agencies, with the project proposal.

The Group supported the proposed project and **requested** the IOC Secretariat to follow it up as planned.

3.2 COMEMIR

Dr. C. Latouche introduced a paper on this subject. He reminded the Group of the general objectives of the sub-programme: to determine the records of environmental changes preserved in continental margin sediments and to assess their mineral resources, particularly authigenic minerals. For this reason part of the strategy is to look at the world wind gyral system by studying selected sites related to boundary currents such as the Canary and Benguela system; Peru/Chile current system; Brazil current system.

In order to plan the development of research, regional workshops have been planned for 1991-1992. Up to now, 3 workshops have been held in Portugal, Morocco and Chile.

(i) The Iberian Peninsula Meeting, Lisbon, Portugal, 13-15 May 1991, was organized at the Geological Survey of Portugal in Lisbon, under the responsibility of Dr. P. Cook. Eighteen participants from Portugal, UK, France, Germany and Spain attended. The aim of the Meeting was to prepare a project proposal to be submitted for funding by the EEC (MAST II completion), or by other sources of funding. The project is entitled: "Phosphatic and Associated Sediments on the Western Iberian Margin : A Record of Ocean Change" was prepared within the framework of COMEMIR.

(ii) The Northwest Africa Workshop, Rabat, Morocco, 22-26 October 1991, was organized by Prof. J. Lucas (University of Strasbourg) and Dr. C. Augris (IFREMER, France) at the Institut Scientifique de Rabat. The first part of the Workshop (22-23 October 1991) was devoted to training with the presentation of 13 lectures relating to the main characteristics of the Continental Shelf off Mauritania and Morocco and was attended by 60 persons from the region. The second part of the Workshop (24-26 October 1991) was focussed on the elaboration of a regional programme related to COMEMIR with 15 participants from Senegal, Mauritania, Morocco and France. The Workshop drafted a regional programme entitled "Sedimentation et Mineraux Authigènes sur la Marge Océanique - Sénégal, Mauritanie, Maroc (SEMAUMAR)".

(iii) The Workshop on Sedimentary Phosphate Rocks of the Pacific South American Margin was organized at the University of Chile, 6-8 January 1992, with 25 participants from Chile, Peru, USA and Germany. The main topics were on adequate trace of the location of primary phosphatic beds, and relation between the deposits located in the Miocene sedimentary basin on land and those off-shore. The Workshop was assisted by NSF (USA) and CONICET (Chile).

(iv) A preliminary plan for the development of a COMEMIR component in the southwest Atlantic has been submitted by the OSNLR Regional Group to the relevant Brazilian authorities. Support to organize a COMEMIR Workshop of Brazil current region in November 1992 in Porto Alegre (Brazil) has been offered by CNPq.

The Group recognized that IOC's role has been useful and critical in the development of the proposals, and **noted** that a major part of its OSNLR budget for 1990-1991 budget has been devoted to COMEMIR, particularly as support for the organization of the two meetings of the Scientific Committee, Paris, May and November 1990, and the Workshop in Rabat in October 1991. **It expressed** that funding to implement the research has to be sought from other sources such as funding agencies and that IOC can only facilitate this using its limited funds as seed money. **The Group concluded** that IOC's available Regular Programme budget should now be provided to other sub-programmes. Nevertheless, taking into account IOC's interest to date for the region and also the offer of financial support from Brazil, **it recommended** IOC to support the COMEMIR Workshop in Brazil planned in November 1992, with modest funding.

4. AN INTERNATIONAL CONFERENCE ON COASTAL CHANGES: PAST, PRESENT AND FUTURE

Mr. R. Arthurton introduced the subject by way of a draft paper, listing objectives, policy consideration and plan of action. It was pointed out that the title should include reference to coastal management and the proposed title was modified to: **Coastal Change: Past, Present and Future - Its Scientific Appraisal for Effective Coastal Management.** There was a consensus that the Conference would aim to support the planning and management of the coastal zone through the scientific study of coastal change, leading to impact assessment and the prediction of future change and have about 100-150 participants.

The Group recognized that guidelines for the management of coastal zone resources based on the submitted scientific papers would be the final product of the Conference. **It endorsed** the preliminary planning of the Conference (Annex V) which will be submitted to the Twenty-fifth Session of the IOC Executive Council.

The Chairman informed the Group of an offer of a meeting opportunity by the organizer of the Marine Exhibition (BORDOMER) to be held in Bordeaux, France, in November 1992. **The Group suggested** that the offer would be in good timing to consolidate the OSNLR components following the results of the UN Conference on Environmental and Development (UNCED) to be held in Rio de Janeiro in June 1992. **It recommended** IOC to accept and use the offer for an initial follow-up to UNCED.

5. DEEP-SEA DRILLING PROGRAMME

This item was introducted by Dr. C. Latouche. He first reminded that the IOC Assembly, at its Fifteenth Session, recommended that the Secretary IOC study possible ways and means for IOC, to act as a mechanism to facilitate the involvement of developing Member States in the International Ocean Drilling Programme (ODP). In pursuance of this recommendation, the IOC Secretariat, with the assistance of Dr. G.B. Munsch (former Executive Secretary of the European Sciences Foundation (ESF) Consortium), drafted a plan of action.

The formation of a network of scientists in developing countries interested in ODP is its first objective. To this end, a letter explaining the whole operation was sent out (October/November 1991) to selected contact points from developing Member States. Out of a total of 204, 60 replies (about 30%) mostly originating from India, China and Brazil were received by 15 January 1992. Key scientists of the network (about 12) would be identified in various countries, taking into account criteria such as: specially enthusiastic position/status, ODP experience and scientific papers.

IOC was invited to participate as an observer in the Meeting of the JOIDES Executive Committee, Bonn, Germany, 14-15 January 1992, where the IOC Plan of Action and the possible creation of a developing countries' consortium for ODP was considered.

One final goal is to use the network to disseminate scientific information to scientists and decision-makers of developing countries and to encourage funding agencies to support the involvement of developing countries in ODP. Plans for country visits by IOC representatives have been prepared to disseminate more efficiently the importance and significance of ODP, at decision-making levels in the countries, and also in order to collect information of all potential and willingness to participate in ODP. The largest number of replies were received from India and Pakistan and it is anticipated to first visit these countries. Further visits could concern China and then South America. Participation of IOC representatives and of a few developing country scientists in the ODP Session of the Twenty-sixth International Geological Congress, Kyoto, Japan, August 1992, is also anticipated to provide supplementary information on involvement of developing countries in ODP.

Costs for the implementation of the initial Plan of Action, including country visits, IOC representative's participation in the Executive Committee meetings and IGC, has been estimated at US$75,000 for the coming biennium.

Concerning the question on how best IOC can facilitate developing countries involvement, there are various ways to encourage developing countries, first facilitating links between these countries and ODP to assist them in organizing training programmes. IOC could act as an agency to recommend scientists from developing countries to participate in ODP cruises and relevant research activities, and to assist scientists interested in post-cruise research.

The Group noted that a large number of scientists from developing countries expressed interest in participating in ODP research. Some governments are willing to provide support for their scientists to participate in ODP. **The Group felt** that ODP should also consider mechanisms to further support the involvement of developing countries.

Regarding IOC's role and the relevant report to present to the Executive Council, **the Group recommended** the Executive Council to recognize the wide level of interest for ODP, and to formally urge the Executive Committee of ODP to send its senior members to visit developing countries to explain the programme and its benefits. **The Group also recommended** the IOC Secretariat to initiate the proposed Action Plan if necessary funds are available.

6. TEMA ACTIVITIES RELATED TO THE OSNLR PROGRAMME

The Technical Secretary summarized TEMA activities which had taken place during 1991. Four individual study grants out of 26 were provided to OSNLR related proposals for scientists from developing Member States, enabling them to attend international meetings and research cruises. In total, 50 scientists were assisted to participate in 6 workshops. Among them, the Workshop on Continental Margin Environment and Mineral Resources in the IOCEA region, held in Rabat (Morocco), was directly related to OSNLR and 14 local scientists and planners participated. He further informed the Group that the IOC Advanced Training Course on Nearshore Sedimentation and the Evolution of Coastal Environment was being held in Kuala Lumpur from 17 to 29 February 1992, with financial and technical assistance of the Government of Germany. Fifteen young scientists participated in the 2-week course. The Technical Secretary explained that due to budget constraints such training courses could only be organized if the necessary funds are provided by Member States or funding agencies.

It is no doubt that the training component in each project plays an important role to help ensure success. Encouraging the participation of scientists from developing Member States in project activities through training is a most important action.

The Group reaffirmed the importance of the training component of the OSNLR Programme and **recommended** leaders of projects to strengthen training components and improve communications with the Secretariat for better implementation.

The Technical Secretary informed the Group that a project on coastal erosion studies in the east African region (see 3.1.4) was being developed with the assistance of Mr. Arthurton, through joint efforts of TEMA . When the project is finalized, IOC Secretariat will seek possible assistance funds to mobilize it, through the TEMA Programme. He also expressed that IOC will co-operate, through TEMA activities, with UN(OALOS) in the preparation of the project document on coastal erosion protection in west Africa (see 3.1.1) and for implementation.

The Group recognized that such an effort, through TEMA, to develop extra-budgetary projects, is necessary in order to link research projects to the benefit of Member States and **recommended** the IOC Secretariat to continue its efforts.

7. CO-OPERATION WITH OTHER PROGRAMMES

The Group was invited to the Twentieth Annual Session of the IGCP Board held in UNESCO Headquarters, 5 February 1992. The Vice-Chairman, Dr. P.J. Cook, outlined current activities of OSNLR Programme with particular attention to coastal changes. He emphasized that after the successful conclusion of IGCP's Phosphorites Project, COMEMIR project is now starting as one of the OSNLR projects and stressed that OSNLR participates as an ex-officio member of the IGCP project 274 on sea-level changes. IGCP Board welcomed such co-operation at the project level and requested to strengthen it. Initiation of a pilot project on comprehensive studies of global changes through correlation of land and ocean sediment records was proposed through joint research with OSNLR and IGCP.

The Group agreed to enlarge co-operation at the research level and project implementation. **The Group showed** strong interest in the proposed pilot project and **requested** the Secretariat to study with IGCP Secretariat and other interested Divisions of UNESCO, appropriate ways and means to initiate it and to report at the next Officers Meeting.

The Technical Secretary informed that it is intended to hold a half-day special Session on OSNLR Programme with about 10 selected papers during the Twenty-sixth International Geological Congress, 24 August to 3 September 1992, in Kyoto (Japan). The main purpose of this Session is to introduce to the geological community particular regional activities of OSNLR. Prof. H. Kagami will act as the convener of the Session with the assistance of Dr. C. Latouche.

The Group noted the arrangements and **encouraged** OSNLR participation in IGC. **It requested** the IOC Secretariat to provide travel assistance for at least 2 participants who would present regional activities.

The Technical Secretary reported that 2 SEATAR Transect Maps on Crustal Structure of the Banda Sea and of Java-Kalimantan-Sarawak-South China Sea were recently published by CCOP Office in Bangkok and a similar map of the Korean Peninsula-Japan Sea-Japan-Pacific is in preparation for printing. **The Group expressed** its satisfaction and **thanked** the CCOP Office and Prof. C.S. Hutchison, the overall Co-ordinator of SEATAR Transect Map Project, for their efforts. It **recommended** that IOC maintains such joint work with other organizations.

8. PRIORITIES AND BUDGET FOR 1992-1993

After reviewing current activities and proposed plans by project groups and considering available limited resources, **the Group identified** priority areas to which the OSNLR Programme should provide assistance. First priority should be given to 4 projects related to coastal changes. The project on the Continental Margin Studies in IOCEA Region which initiated with a regional cruise of **R.V. SARKIM BAKA** in October 1989, and various follow-up research is to be encouraged. In 1992, it will be necessary to train scientists on shallow seismic survey techniques, in order to prepare the second regional cruise planned in 1993, and comprehensive post-cruise research to conclude the previous cruise. The coastal erosion studies in east Africa should also be supported with an advisory mission and a regional Workshop to draft a development project. A

regional COMEMIR Workshop of southwest Atlantic is planned to be organized in Brazil in November 1992. Since the local Brazilian organizer received the necessary financial assistance for domestic arrangements, it would be a successful Workshop if OSNLR could assist participation from the neighbouring countries, as well as one or two international experts. Preparatory work to organize an international conference on Coastal Change described in the previous section (see 4) is also a priority activity. OSNLR's participation in IGC is desirable. Three participants for ODP Session and two for OSNLR Session should be assisted. Budget for these activities are estimated as follows:

Project Activity	Total Budget	1992	1993
Nearshore & Continental Margin Studies in IOCEA	US$ 50 000	20 000	30 000
Coastal Erosion Studies in E. Africa	20 000	8 000	12 000
Regional COMEMIR Workshop in Brazil	10 000	10 000	---
Preparation of the Conference	15 000	5 000	10 000
Participation in IGC	30 000	30 000	----
TOTAL	**US$125 000**	**73 000**	**52 000**

The Group emphasized that although the above requested budget for the first priority area is beyond available UNESCO's Regular Programme budget for OSNLR, it is critical to implement these activities. **The Group urged** the Secretary IOC to take necessary steps to maintain funds needed and **appeal** to Member States to consider extra-budgetary contribution for these projects.

In addition to the above activities, **the Group identified** the following as priority areas: (i) facilitating the involvement of developing countries in the Ocean Drilling Programme (ODP); (ii) coastal studies in the Mediterranean Sea region; (iii) palaeogeographic mapping in WESTPAC; (iv) global co-ordination of COMEMIR project; and (v) palaeogeographic mapping in the southwest Atlantic. As described in detail in the previous section (see 5), IOC Secretariat took the initiative on how to assist the participation of scientists from developing Member States in ODP research. Activities include country visits of ODP experts, Workshop and assistance for the participation of scientists in the ODP post-cruise research. Although no formal OSNLR research project exists in the Mediterranean Sea at this stage, it is intended to initiate a project on coastal erosion. In 1992, a Workshop on the palaeogeographic mapping project is planned to be held in the WESTPAC region to compile existing data and to precise data exchange format and method of data processing. COMEMIR has been developed on a regional basis, but there is a need to co-ordinate regional COMEMIR projects under a global view to avoid duplication of efforts, as well as activating exchange of research results among projects. The regional palaeogeographic mapping project in the southwest Atlantic is carried out by individual countries and there is a need to hold a Workshop to unify legends and data exchange format. Budget estimation is as follows:

Project Activity	Total Budget	1992	1993
Developing Countries participation in ODP	US$ 78 000	23 000	55 000
Coastal studies in Mediterranean Sea	15 000	5 000	10 000
Palaeogeographic mapping in WESTPAC	20 000	10 000	10 000
Global co-ordination of COMEMIR project	25 000	10 000	15 000
Palaeogeographic mapping in SW Atlantic	15 000	5 000	10 000
TOTAL	**US$153 000**	**53 000**	**100 000**

The Group recognized that since the available budget is so tight there is an urgent need to seek extra-budgetary resources and **recommends** both sponsoring Agencies, IOC and UN(OALOS), as well as their Member States, to consider possible additional funds.

9. OFFICERS FOR THE INTERSESSIONAL PERIOD AND DATES FOR THE NEXT SESSION

The Chairman, Prof. M. Vigneaux informed the Group that since he was elected as the Chairman of the IOC Committee for TEMA in March 1991, he found some difficulty in carrying out his double role. He expressed his wish to concentrate on the TEMA Programme.

The Group acknowledged Prof. Vigneaux's continuous efforts to develop the OSNLR Programme, however, **the Group felt** that election of the new chairman could not take place since there were only a few participants at the Consultation. However, **the Group agreed** that the Vice-Chairman, Dr. P. J. Cook, shall act as an interim chairman until the next full-scale Session. **The Group urged** the Secretary IOC to arrange the next Session with full participation of the OSNLR Guiding Group as soon as possible, preferably in 1993.

10. ADOPTION OF THE SUMMARY REPORT AND CLOSURE

The Group adopted the Summary Report.

The Chairman thanked the participants for their contribution to the Meeting, particularly valuable reports presented by Prof. Martins and Dr. Awosika. He stressed that success of the OSNLR Programme depends heavily on the implementation of regional research activities and urged all parties interested in the Programme to consider strengthening links between scientific research and regional development projects to ensure better chances to obtain extra support.

The Meeting was closed at 1200 hours on Friday, 7 February 1992.

ANNEX I

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ANNEX II

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ANNEX III

OSNLR/WEST AFRICAN PROGRAMME (Possible Project)

Pilot Project:	**Low Cost Indigenous Technologies for Coastal Erosion Control in the West and Central African Region**
Participating Countries:	Coastal States in the West and Central African Region

BACKGROUND

Coastal erosion is prevalent all along the low lying predominantly sandy coast in the West and Central African Region. In response to requests by states in the region and as part of the West and Central African Action Plan of UNEP during the period 1983-1985, a number of studies on the causes and control of coastal erosion were undertaken (WACAF 3). As part of the plan of action for the development of OSNLR in the IOCEA region, an OSNLR Consultative Group of Experts met in Abidjan, 2-5 November 1988, under the auspices of IOC to formulate a project "Sediment Budget along the West African Coast".

This project had two components:

(a) a study of sedimentary fluxes from the continent to the coastal zone;

(b) a study of sedimentary dynamics of the shelf off the Bay of Benin.

As a follow-up to the second component, a sea cruise on board Nigeria's **R.V. SARKIM BARKA** was undertaken between 10-25 October 1989, with fourteen participating scientists from the region. The sea cruise served as a training medium for scientists in collecting oceanographic data related to coastal erosion. A report of the cruise data had been submitted to IOC. However, some aspects of the data are yet to be analyzed due to lack of funds. Recognizing the need to fund pilot projects in combating coastal erosion, UNEP (OCA/PAC) in collaboration with OAU organized a workshop in Accra, Ghana, 28 March - 2 April 1990 on the implementation of pilot projects for combating coastal erosion along selected sites in the region. At this meeting a pilot project consisting of groins (groins) was proposed for a site close to Cotonou harbour in Benin Republic. Unfortunately, since the meeting, the whole idea became engulfed by administrative and funding bottlenecks.

The low technology method for combating coastal erosion being used in Ghana has been very successful and could have wide application in the region. Scientists at the Nigerian Institute for Oceanography and Marine Research, Lagos, had proposed the use of disused oil field hoses, permeable timber groins, home-made gabions for example, for combating beach erosion (Ibe 1988). Such low cost and indigenous technologies involve minimal cost and environmental damage. Recognizing the poor economic conditions of the countries in this region to implement expensive and high technologically involved beach erosion control measures like sea walls, dykes, bulk heads, etc., the UN Office for Ocean Affairs and the Law of the Sea, in collaboration with IOC (OSNLR), has expressed interest in assisting in the development and implementation of pilot projects along some coastal sites to be identified in the region. This would include assistance in securing extra-budgetary funding for the pilot projects. Such pilot projects will involve the development and implementation of any such available indigenous methods most appropriate to sites to be selected.

COMPONENTS OF PILOT PROJECT PREPARATION

1. Upon endorsement in principle, of the project by the OSNLR officers and then by the IOC Executive Council in March 1992, (a project of this type has already been accepted in principle by UN (OALOS), the IOC-UN(OALOS) will need the countries of the West and Central African Region to confirm their interest and commitment to the proposed pilot project and to request assistance. The IOC-UN(OALOS) will also require documentation from Ghana, Nigeria and other States in the region on the types of indigenous technologies and material available.

2. Consultants from the region (coastal engineer, marine geologist/physical oceanographer) will be commissioned to prepare a draft project document which will subsequently serve as a working document for a meeting of experts, responsible officers/scientists from the region.

3. In consultation with and possibly with attendance by IOC-UN(OALOS), the above-mentioned meeting would then be convened with a view to reaching an agreement on the form, content and duration of a pilot project. Sites, in order of erosion severity and depending upon information/data, will be identified for project implementation.

4. Based on the outcome of the meeting, including the final project document, the UN/OALOS-IOC will seek to secure extra-budgetary funding from UNDP among other sources.

ANNEX IV

PROJECT OUTLINE ON COASTAL EROSION IN EAST AFRICA

Project Title: **COASTAL EROSION IN THE WESTERN INDIAN OCEAN REGION - Its Scientific Appraisal and its Management**

BACKGROUND

The Project falls within the general field of Environmental Management and related specifically to the Coastal Zone. Coastal Zone Management concerns the ways in which Man may develop and exploit the Coastal Zone Resource in a sustainable way with a scientific understanding of the natural and anthropomorphic processes acting on it, and, accepting Man's influence, striving to work harmoniously with these processes rather than against them.

Coastal Zone Management concerns the risks of threats posed, for example, to life, property and ecosystems by flooding, coastal erosion and marine pollution; it concerns the exploitation of living and non-living resources within the coastal zone; and it relates to the amenity value of the zone, of particular importance to tourism-based economies. The management issues are complex and demand a comprehensive, scientifically supported strategy.

Countries in the region recognize the urgent need for Coastal Zone Management. All are concerned, for example, about the threat posed by coastal erosion, both as it occurs today and how it will be affected by Man's increasing impact and by possible changes of sea level. The Government of the Seychelles has recently published an Environmental Management Plan in which coastal erosion and related environmental issues have been highlighted.

The proposed Project makes a contribution to, and will be enhanced by, the IOC/UN(OALOS) Programme on Ocean Science in Relation to Non-Living Resources (OSNLR), and is particularly relevant to the concept of the Coastal Zone as a Resource in its own right (CZAR), as defined by the Guiding Group of Experts on OSNLR.

A commitment by the IOC Regional Committee for the Co-operative Investigation in the North and Central Western Indian Ocean (IOCINCWIO) to encourage research in the Western Indian Ocean region was agreed at its meeting in Arusha, Tanzania, in 1987. The substantial training element in the proposed Project is recognized as forming a part of the IOC/TEMA Programme (Training, Education and Mutual Assistance in Marine Sciences).

OBJECTIVES

The Project aims to advise governments of the participating countries on effective planning and management strategies for the protection of the coastal marine environment, particularly in respect of coastal erosion. It also aims to provide the basic knowledge, data and level of training necessary for the implementation of the recommended strategies following completion of the Project.

The Project's immediate objectives are:

(i) to bathymetrically and geologically survey and to monitor sedimentation and erosion on specific study sites in the coastal zone identified and recognized by the respective participating countries as having particular erosional problems (one or more study site in each country);

(ii) to collate and interpret the results of the survey and monitoring programmes, compile appropriate maps and reports, and make recommendations to governments on strategies for coastal planning and management, particularly in respect of coastal erosion.

(iii) to carry out a comprehensive training programme for scientists from the participating countries in respect of geoscientific survey and monitoring techniques in the coastal zone.

MAJOR OUTPUTS

1. Trained scientific personnel (10-15) from the participating country.

2. Contoured topographic/bathymetric maps (3-5) of the selected sites (the seaward and landward limits of the sites and the map scales to be defined on local considerations).

3. Geological maps of the coastal zone (3-5) showing distribution of principals rock and sediment types, including coral reefs (map scales to be defined on local considerations).

4. Reports (3) describing the geology of the sites, their three-dimensional structure, the ages of their components, and their history of formation and erosion.

5. Maps (3) quantifying coastal change (erosion and accretion), and showing sources of beach sands, their transport regimes and their sinks; non-mobile sand resources (with an indication of their possible use for beach recharge); terrigenous sediment input and contamination; special features of fringing coral reefs; the wave climate and coastal current regime.

6. Recommendations and guidelines for governments, advising on appropriate and cost-effective strategies for coastal zone planning and management, particularly in respect of coastal erosion.

INSTITUTIONAL FRAMEWORK

It is suggested that the Project be administrated by IOC and guided by a Co-ordinating committee consisting of: (i) Project Leader; (ii) representatives of participating countries; (iii) observers from funding agencies; and (iv) technical advisers.

ACTIVITIES

1. The initial activity will be a comprehensive desk study carried out by the Project Leader to assess existing survey data, make a preliminary interpretation (including remote-sensed/air-photo interpretation) and identify the principal gaps in knowledge of the coastal zone of the region. In the light of this study, to appraise sites suggested for detailed investigation by the participating countries.

2. The survey of the coastal sites will include topographic levelling and geological survey onshore in the hinterland and shore zones. For the seabed survey in coastal waters, a range of marine survey techniques will be carried out on a pre-determined grid of survey lines using a survey vessel appropriate to shallow water operations and coral-fringed coasts. Geophysical techniques will include echo-sounding to establish bathymetric profiles, side-scan sonar to record the surface texture of the seabed in the vicinity of the survey line, and boomer shallow seismic profiling to establish the sub-seabed geology. Physical sampling of materials onshore, and on and under the seabed will follow the geophysical survey, with analytical techniques carried out either locally (Particle Size Analysis), or as an external service (Age determination).

Following the survey activities, the acquired data will be entered into an appropriate database, then interpreted and compiled into map and section formats, incorporating any other relevant, existing information. Such information will include aerial photographs and satellite imagery, relevant, for example, to the distribution of coral reefs and terrigenous contamination; and any previous onshore and offshore survey information, published and unpublished. A survey report will be prepared for each site.

3. As soon as practicable, a programme of regular monitoring of erosion, sedimentation and sediment transport will be implemented at each site. Besides monitoring, data will be collected on the wave climate and current regime affecting each site. The aims will be to assess rates of coastal change, particularly of recession and beach sand wasting; to establish the principal factors, natural and anthropogenic, controlling coastal change; and to assess the processes and rates of natural replenishment of beach sand. The monitoring of coral reef health may be required at some sites.

4. The assessments made under Activity 3 above and the content of geological survey reports will serve as a basis for the preparation of recommendations to governments of the participating countries, advising on appropriate strategies for coastal zone planning and management, particularly in respect of coastal erosion. The recommendations will be supported by thematic maps relating specifically to coastal erosion issues, compiled from the results of the geological survey and the monitoring programmes, and will include guidelines applicable to coastal zone management beyond the study sites.

5. The training of scientists from the participating countries will take place in workshops organized on a regional basis, and also as on-the-job training under the guidance and supervision of visiting experts. The training will cover all aspects of data acquisition in the coastal zone and will include survey techniques for the coastal hinterland, the shore zone and the sub-tidal areas. It will also cover monitoring, remote sensing and some physical analytical techniques.

More advanced training will include the interpretation of geophysical survey data, and the integration of that interpretation with sampling data leading to compilation of geological maps and sections for the chosen sites. Finally, training will be given in the interpretation of present-day processes of sedimentation and erosion in the context of long-term coastal changes; also in the formulation of recommendations and guidelines for coastal management. A total of four workshops is envisaged.

PROJECT PERIOD

Five years with the possibility of extension.

ANNEX V

PROPOSED IOC CONFERENCE, THROUGH OSNLR

CONFERENCE TITLE: **COASTAL CHANGE: Past, Present and Future - Coastal Management through Scientific Research**

Global Objectives:

The conference aims to promote the planning, management and development of the coastal environment through the scientific study of coastal change, leading to impact assessment and the prediction of future change. The time scales of past changes provide a reference perspective and range from tens to thousands of years, but in particular, the last 2000 years. The conference will be of global rather than just regional relevance. The conference will highlight the value of the scientific documentation and understanding of environmental change in the coastal zone, whether a result of Man's activities or of natural process, to effective decision-making by all those concerned with the proper management of that zone.

A target size of 100-150 participants is envisaged, with planning and economic disciplines included, as well as geoscientists. For best results numbers should not exceed 150, and in any case there is unlikely to be funding to support a conference larger than this.

Outputs:

It is envisaged that a manual or guidelines for the sustainable development of the coastal zone will be produced for the conference. This will contain scientific papers that are set in an appropriate context for the benefit of non-geoscientific users. The possibility of including some of the scientific papers in a thematic volume of an international journal is also being considered.

Format:

A duration of five days is envisaged, with three or four devoted to a mix of scientific papers and workshop sessions, ensuring the fullest possible involvement of the participants. The fifth day will be spent on site or field visits; this will not necessarily be the last day. The workshop sessions will be held on specific topics, carefully chosen to bridge the various disciplines present. The session topics will be determined by the scientific committee.

Speakers:

The conference will feature invited speakers covering the various topic areas that are selected; these speakers will, where appropriate, be invited to lead the workshop sessions.

Date:

A date in 1994 is proposed.

Venue:

The venue should have easy and cheap international access and suitable logistic support. It should be in a country where the problems of the coastal zone are significant and locally recognized. Another important criterion is the likely availability of local commercial sponsorship. Such sponsorhip is likely to come from countries with active, major coastal works.

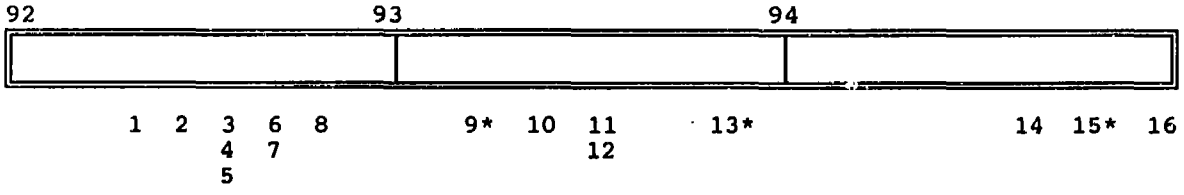
It is the view of the meeting that there are suitable countries that would fulfil the criteria both in south-east Asia e.g., Malaysian or Indonesia and in north-west Europe such as the Netherlands.

The meeting feels that the south-east Asian option would be the most appropriate to the spirit of the conference and proposes to investigate the possibilities of a country in this region offering itself as a venue.

Preliminary invitations for hosting the conference have been received from Cuba and from Nigeria. These invitations are gratefully acknowledged.

Plan of Action:

		ACTION ON ↓
1.	Decide on dates and preferred venue	OSNLR
2.	Confirm agreement of host organization	OSNLR
3.	Book conference hall	OSNLR
4.	Appoint Local Organizing Committee (OC)	OSNLR
5.	Appoint Scientific Planning Committee (SC)	OSNLR
6.	Prepare general programme and topic listing	SC
7.	Establish sponsorship agreements	OC/HOST
8.	Arrange invited speakers	SC
9.	Print and distribute **FIRST CIRCULAR**	OC
10.	Collation of First Circular response	OC
11.	Prepare Scientific Programme/Field Visits	SC
12.	Research delegate accommodation	OC
13.	Print and distribute **SECOND CIRCULAR**	OC
14.	Prepare Abstracts and other conference papers	OC
15.	**CONFERENCE**	HOST/OC/SC
16.	Arrange editing and publication, as appropriate	OC/SC



Budget and Anticipated Supports:

The funding envisaged from IOC and the UN in support of the conference is about US$25.000.

Additional financial support from agency and commercial sources is anticipated. A provisional target for this additional support is US$100,000. This target should be achieved if the chosen venue is in a region where there are strong commercial interests in the coastal zone.

Actions requested from the Executive Council:

(i) approval of proposal for conference dates;
(ii) approval of proposal on conference venue.