

**Intergovernmental Oceanographic Commission**

Workshop Report No. 48



**IOCARIBE Mini-Symposium  
for the Regional Development  
of the IOC-UN (OETB) Programme  
on “Ocean Science in relation  
to Non-Living Resources (OSNLR)”**

Havana, Cuba, 4-7 December 1986

**Unesco**

# IOC Workshop Reports No. 48

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No.	Title	Publishing Body	Languages	No.	Title	Publishing Body	Languages
1	CCOP-IOC, 1974, Metallogenesis, Hydrocarbons and Tectonic Patterns in Eastern Asia (Report of the IDOE Workshop on); Bangkok, Thailand 24-29 September 1973 UNDP (CCOP), 138 pp.	Office of the Project Manager UNDP/CCOP c/o ESCAP Sala Santitham Bangkok 2, Thailand	English	16	Workshop on the Western Pacific, Tokyo, 19-20 February 1979.	IOC, Unesco Place de Fontenoy 75700 Paris, France	English French Russian
2	CICAR Ichthyoplankton Workshop, Mexico City, 16-27 July 1974 (Unesco Technical Paper in Marine Sciences, No. 20).	Division of Marine Sciences, Unesco Place de Fontenoy 75700 Paris, France	English (out of stock) Spanish (out of stock)	17	Joint IOC/WMO Workshop on Oceanographic Products and the IGOS Data Processing and Services System (IDPSS), Moscow, 9-11 April 1979.	IOC, Unesco Place de Fontenoy 75700 Paris, France	English
3	Report of the IOC/GFCM/ICSEM International Workshop on Marine Pollution in the Mediterranean, Monte Carlo, 9-14 September 1974.	IOC, Unesco Place de Fontenoy 75700 Paris, France	English French Spanish (out of stock)	17 Suppl.	Papers submitted to the Joint IOC/WMO Seminar on Oceanographic Products and the IGOS Data Processing and Services System, Moscow, 2-6 April 1979.	IOC, Unesco Place de Fontenoy 75700 Paris, France	English
4	Report of the Workshop on the Phenomenon known as "El Niño", Guayaquil, Ecuador, 4-12 December 1974.	FAO Via delle Terme di Caracalla 00100 Rome, Italy	English (out of stock) Spanish (out of stock)	18	IOC/Unesco Workshop on Syllabus for Training Marine Technicians, Miami, 22-26 May 1978 (Unesco reports in marine sciences, No. 4)	Division of Marine Sciences, Unesco Place de Fontenoy 75700 Paris, France	English (out of stock) French Spanish (out of stock) Russian
5	IDOE International Workshop on Marine Geology and Geophysics of the Caribbean Region and its Resources, Kingston, Jamaica, 17-22 February 1975.	IOC, Unesco Place de Fontenoy 75700 Paris, France	English (out of stock) Spanish	19	IOC Workshop on Marine Science Syllabus for Secondary Schools, Llantwit Major, Wales, U.K., 5-9 June 1978 (Unesco reports in marine sciences, No. 5).	Division of Marine Sciences, Unesco Place de Fontenoy 75700 Paris, France	English French Spanish Russian Arabic
6	Report of the CCOP/SOPAC-IOC IDOE International Workshop on Geology, Mineral Resources and Geophysics of the South Pacific, Suva, Fiji, 1-6 September 1975.	IOC, Unesco Place de Fontenoy 75700 Paris, France	English	20	Second CCOP-IOC Workshop on IDOE Studies of East Asia Tectonics and Resources, Bandung, Indonesia, 17-21 October 1978.	IOC, Unesco Place de Fontenoy 75700 Paris, France	English
7	Report of the Scientific Workshop to Initiate Planning for a Co-operative Investigation in the North and Central Western Indian Ocean, organized within the IDOE under the sponsorship of IOC/FAO (IOFC)/Unesco/EAC, Nairobi, Kenya, 25 March-2 April 1976.	IOC, Unesco Place de Fontenoy 75700 Paris, France	English French Spanish Russian	21	Second IDOE Symposium on Turbulence in the Ocean, Liège, Belgium, 7-18 May 1979.	IOC, Unesco Place de Fontenoy 75700 Paris, France	English French Spanish Russian
8	Joint IOC/FAO (IPFC)/UNEP International Workshop on Marine Pollution in East Asian Waters, Penang, 7-13 April 1976.	IOC, Unesco Place de Fontenoy 75700 Paris, France	English (out of stock)	22	Third IOC/WMO Workshop on Marine Pollution Monitoring, New Delhi, 11-15 February 1980.	IOC, Unesco Place de Fontenoy 75700 Paris, France	English French Spanish Russian
9	IOC/CMG/SCOR Second International Workshop on Marine Geoscience, Mauritius, 9-13 August 1976.	IOC, Unesco Place de Fontenoy 75700 Paris, France	English French Spanish Russian	23	WESTPAC Workshop on the Marine Geology and Geophysics of the North-West Pacific, Tokyo, 27-31 March 1980.	IOC, Unesco Place de Fontenoy 75700 Paris, France	English Russian
10	IOC/WMO Second Workshop on Marine Pollution (Petroleum) Monitoring, Monaco, 14-18 June 1976.	IOC, Unesco Place de Fontenoy 75700 Paris, France	English French Spanish (out of stock) Russian	24	WESTPAC Workshop on Coastal Transport of Pollutants, Tokyo, 27-31 March 1980.	IOC, Unesco Place de Fontenoy 75700 Paris, France	English (out of stock)
11	Report of the IOC/FAO/UNEP International Workshop on Marine Pollution in the Caribbean and Adjacent Regions, Port of Spain Trinidad, 13-17 December 1976.	IOC, Unesco Place de Fontenoy 75700 Paris, France	English Spanish (out of stock)	25	Workshop on the Intercalibration of Sampling Procedures of the IOC/WMO UNEP Pilot Project on Monitoring Background Levels of Selected Pollutants in Open-Ocean Waters, Bermuda, 11-26 January 1980.	IOC, Unesco Place de Fontenoy 75700 Paris, France	English (superseded by IOC Technical Series No. 22)
11 Suppl.	Collected contributions of invited lecturers and authors to the IOC/FAO/UNEP International Workshop on Marine Pollution in the Caribbean and Adjacent Regions, Port of Spain, Trinidad, 13-17 December 1976.	IOC, Unesco Place de Fontenoy 75700 Paris, France	English Spanish	26	IOC Workshop on Coastal Area Management in the Caribbean Region, Mexico City, 24 September-5 October 1979.	IOC, Unesco Place de Fontenoy 75700 Paris, France	English Spanish
12	Report of the IOC/ARIBE Interdisciplinary Workshop on Scientific Programmes in Support of Fisheries Projects, Fort-de-France, Martinique 28 November-2 December 1977.	IOC, Unesco Place de Fontenoy 75700 Paris, France	English French Spanish	27	CCOP/SOPAC-IOC Second International Workshop on Geology, Mineral Resources and Geophysics of the South Pacific, Nouméa, New Caledonia, 9-15 October 1980.	IOC, Unesco Place de Fontenoy 75700 Paris, France	English
13	Report of the IOC/ARIBE Workshop on Environmental Geology of the Caribbean Coastal Area, Port of Spain, Trinidad, 16-18 January 1978.	IOC, Unesco Place de Fontenoy 75700 Paris, France	English Spanish	28	FAO/IOC Workshop on the effects of environmental variation on the survival of larval pelagic fishes Lima, 20 April-5 May 1980.	IOC, Unesco Place de Fontenoy 75700 Paris, France	English
14	IOC/FAO/WHO/UNEP International Workshop on Marine Pollution in the Gulf of Guinea and Adjacent Areas, Abidjan, Ivory Coast, 2-9 May 1978.	IOC, Unesco Place de Fontenoy 75700 Paris, France	English French	29	WESTPAC Workshop on Marine biological methodology Tokyo, 9-14 February 1981.	IOC, Unesco Place de Fontenoy 75700 Paris, France	English
15	CCPS/FAO/IOC/UNEP International Workshop on Marine Pollution in the South-East Pacific, Santiago de Chile, 6-10 November 1978.	IOC, Unesco Place de Fontenoy 75700 Paris, France	English (out of stock)	30	International Workshop on Marine Pollution in the South-West Atlantic Montevideo, 10-14 November 1980.	IOC, Unesco Place de Fontenoy, 75700 Paris, France	English (out of stock) Spanish
				31	Third International Workshop on Marine Geoscience Heidelberg, 19-24 July 1982	IOC, Unesco Place de Fontenoy 75700 Paris, France	English French Spanish
				32	UNU/IOC/Unesco Workshop on International Co-operation in the Development of Marine Science and the Transfer of Technology in the context of the New Ocean Regime Paris, 27 September - 1 October 1982	IOC, Unesco Place de Fontenoy 75700 Paris, France	English French Spanish

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## 1. OPENING

The IOCARIBE mini-symposium for the regional development of the IOC-UN (OETB) Programme on 'Ocean Science in Relation to Non-Living Resources (OSNLR)' was called to order by the Chairman of the National oceanographic Committee of Cuba and National Co-ordinator of the meeting, Mr Guillermo García Montero, at 9.45 a.m., on 4 December 1986, at the Hotel Riviera in Havana.

Mr García Montero, speaking on behalf of the National Oceanographic Committee, extended a most cordial welcome to the participating scientists from six countries of the IOCARIBE region, and stressed the importance of the topics to be discussed for Cuba and for the countries of the region and the need to approach them from a regional angle.

The list of participants is contained in Annex III.

## 2. ADMINISTRATIVE ARRANGEMENTS

### 2.1 Adoption of the agenda

The local co-ordinator submitted the provisional agenda to the mini-symposium for consideration and adoption; it was adopted without amendments. The agenda is contained in Annex I.

### 2.2 Designation of the Chairman and the Rapporteur for the session

The mini-symposium unanimously designated Professor Michel Vigneaux Chairman of the session. Dr Adolfo Molina-Cruz was designated Rapporteur.

IOC Assistant Secretary for IOCARIBE and Technical Secretary for the session, Dr Fernando Robles, described the administrative arrangements adopted jointly with the local organizers and suggested a provisional revised timetable, which was adopted by the mini-symposium. He also presented the apologies of Dr Malcolm Hendry and Captain Rafael Steer-Ruiz, who, owing to last-minute developments, were unable to attend the session. Nevertheless, Dr Hendry's paper would be presented and distributed to the participants by Jamaica's delegate to the second session of the IOCARIBE Subcommission, and Captain Steer-Ruiz's paper would be submitted by Dr George Vernet.

## 3. REVIEW OF THE STATE OF IMPLEMENTATION OF THE OSNLR PROGRAMME

Professor Michel Vigneaux, chairman of the Guiding Group of Experts on the OSNLR(1) Programme, presented this agenda item. He recalled that the first session of the Guiding Group of Experts (Paris, January 1985) had stressed the importance for OSNLR of the multidisciplinary nature of the programme and of focusing its attention on coastal area problems. In this context, he referred to the conceptual framework as defined by the Group and known as SETMY (Sea-Level Environments and Tectonics during the Last Million Years), and its relationship to economic and social aspects such as resources in shelf and coastal zones as well as adequate management of the coastal zone itself, inasmuch as it, too, has been defined as a resource. He concluded by stressing

(1) A list of acronyms and abbreviations is contained in Annex IV.

the importance of the IOCARIBE region as a zone of reference for these studies and practical applications as well as the need to back up these activities with a vigorous training, education and mutual assistance (TEMA) component.(1)

#### 4. IDENTIFICATION OF LOCAL SCIENTIFIC POTENTIAL AND POSSIBLE WAYS OF USING IT FOR RESEARCH IN MARINE SCIENCES AND ON NON-LIVING RESOURCES

As part of the presentation of this agenda item, two papers prepared by Professor Vigneaux were distributed and submitted. They were: (i) 'A Study of Relief Forms' and (ii) 'Oceanic Palaeo-Environments'.

##### 4.1 Coastal zones

This agenda item was illustrated by Dr Harris B. Stewart in his paper on 'Main Types of Marine Non-Living Resources in the Coastal Zones of the Caribbean Sea'.

##### 4.1.1 Structural geology and general geomorphology

This item was presented by Dr George Vernet, whose paper dealt with 'Geotectonics and Geomorphological and Sedimentary Characteristics Found in the Shelf and Coastal Area: Examples from the Caribbean Sea off the Coast of Colombia'.

##### 4.1.2 Coastal zone stability and coastal erosion and sedimentation

This topic was discussed in part in a paper presented by the Instituto de Oceanología de la Academia de Ciencias de Cuba entitled 'Stability, Erosion and Sedimentation of Coastal Areas: Cuba's Experience'. Dr José L. Juanes read the paper on behalf of the seven co-authors.

A second contribution on this item 'Geology and Non-Living Marine Resources of Jamaica's Coast and Adjacent Shelf, Bank and Deep-Sea Areas: A Review', was sent by Dr Malcom D. Hendry.

##### 4.1.3 Mineral deposits of the coastal and shelf zone

In the absence of Dr Simón Rodríguez, responsible for presenting this topic, the mini-symposium did not examine this agenda item. However, the paper by Dr Rodríguez, entitled 'Characteristics of the Mineral Deposits of the Venezuelan Coastal Strip and Continental Shelf', will be included in the supplement to this Summary Report.

##### 4.1.4 Environmental protection and coastal resources management

This agenda item was presented by Dr Robert Lankford in a paper of the same title.

##### 4.2 Deep-sea environments and palaeogeographical studies

This second aspect of the development of regional co-operative studies was dealt with in two papers. One was presented by Dr Adolfo Molina-Cruz and is entitled 'Deep-Sea Environments and Palaeo-Oceanographic Studies in the

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(1) A list of papers contributed to the mini-symposium is contained in Annex II. They will be published as a supplement to the Summary Report.

IOCARIBE Region'. The other, by Dr José R. Hernández Santana, is entitled 'Morphostructural Differentiation of the Bartlett Trench: Juncture Zone between the Caribbean Plate and the Cuban Microplate'.

## 5. RESEARCH PROJECT PROPOSALS FOR REGIONAL COMPONENTS OF OSNLR

After a lively and fruitful discussion on each of the topics and papers relating to agenda item 4, the mini-symposium set up two working groups to examine the proposals and recommendations regarding OSNLR regional projects: Working Group for OSNLR Project Proposals in the IOCARIBE Coastal Zones, Working Group for Deep-Sea Environments and Palaeogeographical Studies.

The two working groups presented their conclusions and recommendations to the mini-symposium plenary session, which in turn examined and ratified them as described under the following two agenda items.

As a contribution to the Working Group for Coastal Zones, Dr Georges Vernet presented a proposal entitled 'Project for Multilateral Investigations in Marine Geology in the Coastal Zones of the Caribbean' which will be included in the supplement to this Summary Report.

### 5.1 Coastal zones

The mini-symposium suggested that beach dynamics and monitoring be a priority project and it requested that the IOC Subcommission for the Caribbean and Adjacent Regions support this project initiative by facilitating the convening of meetings for the exchange and dissemination of information pertaining to the subject, including its methodological aspects.

The mini-symposium took note of Cuba's interest in assisting in the preparation of manuals on coastal area studies and methods that could be used in IOCARIBE activities.

The mini-symposium accepted Cuba's proposal that under the IOCARIBE OSNLR programme a panel of experts on coastal research be established for the purpose of assisting, on request, those IOCARIBE Member States which lacked the necessary national experts to address immediate and pressing problems in coastal area management.

For coastal zones, the mini-symposium recommended the following priority research project proposals:

#### Project No. 1 - Substrate mapping, sample collecting and analysis

In addition to the bathymetric mapping project, IOCARIBE should urge Member States to undertake the production of substrate maps based on the sea bed samples obtained from vessels or by divers. Simple sand/mud ratios would be determined and the samples stored for later analysis to detect minerals of potential economic value.

#### Project No. 2 - Preparation of geomorphological maps of the coastal areas

As recommended by SC-IOCARIBE-I/3, Annex IV, page 7, Member States should undertake the preparation of maps showing the coastal distribution of such features as lagoons, seagrass beds, mangroves, sand beaches, barrier islands, reefs, headlands and cliffs, harbours, industrial areas, etc. The availability of such maps is a prerequisite for any coastal area management plan.

Project No. 3 - Beach dynamics and monitoring

Because beaches in the Caribbean are a major non-living resource, research on the dynamics of the beach system and a programme to monitor changes on selected beaches are essential elements that should precede any attempt to establish policies to manage and preserve this resource.

The mini-symposium considered that training was an essential component of each of these projects. The Cuban and French delegates offered to provide training. These generous offers of training courses were referred to SC-IOCARIBE-II, and the IOC and IOCARIBE Secretariats will make sure that these offers are taken up.

The training component should include the preparation of manuals describing the various techniques and methodologies of sampling, mapping, beach monitoring and sample analysis. France can offer training courses in early 1988. Cuba would combine its training proposal with the study of a designated pilot zone at Varadero Beach, and is prepared to initiate this training programme as soon as it is approved by IOC.

5.2 Deep-sea environments and palaeogeographical studies

The mini-symposium considered that development of human resources in the field of deep-sea environments had been very limited and that there was therefore a need to stimulate such development.

The following project proposals were identified and discussed:

Project No. 1 - Quaternary Palaeo-oceanographic Studies

Palaeo-oceanographic studies have stressed, among other things, that: (1) during the Quaternary some beaches have been stripped as a result of climatic deterioration; and (2) climatic changes have altered ocean circulation and rainfall, with corresponding effects on biological production and river discharge, respectively. This process has, in turn, affected the sedimentary and mineralogical evolution of marine basins, both biophysically and stratigraphically.

The frequency with which these climatic changes have taken place and the attendant morphological effects on the sedimentary process have yet to be ascertained. A 'complementary palaeo-oceanography', taking into account coastal, benthonic, planktonic, and mid-depth aspects, has likewise yet to be fully developed.

For many reasons, the IOCARIBE region has been regarded as a natural laboratory for palaeo-oceanographic studies.

Accordingly, and taking advantage of the fact that the Dirección General de Geografía of the Secretaría de Programación y Presupuesto of Mexico has undertaken detailed bathymetric studies in the region, the Universidad Nacional Autónoma de México (UNAM) intends to carry out paleo-oceanographic studies in the Bay of Campeche and the Yucatan Basin and it is willing to make those studies available to the entire IOCARIBE region.

The palaeo-oceanographic studies will also contribute to a considerably more detailed stratigraphy of the region as well as a greater understanding of the fluctuating behaviour of climatic and oceanographic processes. The Mexican



scientific community, and particularly the teams at the Universidad Nacional Autónoma de México (UNAM) and the Dirección General de Geografía of the Secretaría de Programación y Presupuesto, are in a position to carry out the aforementioned studies because they have the essential resources, such as an oceanographic vessel (B/O Justo Sierra) and the basic equipment. It would be desirable, however, for the project to be structured on the basis of regional co-operation, and it is hoped that Cuba, Venezuela, Colombia, Trinidad and Tobago, Costa Rica, the United States of America, France and the Soviet Union will participate. Such co-operation would be highly beneficial, as it would produce a wealth of palaeo-oceanographic, stratigraphic, geomorphological and cartographic knowledge, and it would also encourage a unification of criteria on methodology, nomenclature and symbols.

#### RECOMMENDATION

It is recommended that the aforementioned Member States be encouraged to participate in the project and that support be sought for a course on the most recent findings in palaeo-oceanology and sedimentology in the IOCARIBE region. In principle, the course can be held in Mexico City, subject to the co-operation of a number of experts who have done work in the region.

#### Project No. 2 - Geotectonic, morphostructural and geodynamic studies of deep trenches

One of the most complex and least-studied geostructures in the Caribbean region is the deep riftogenetic trough known as the Bartlett Trench: a juncture zone between the Caribbean plate and the Cuban microplate formed by a number of overlapping geotectonic processes. A number of geoscientific studies have shown that there is an eastward development of the morphostructural plane of the adjacent emerged territories and dorsals as well as of the trench itself.

A complex geodynamic polygon has been established in eastern Cuba to study the interacting system comprising morphostructures, recent slow tectonic movements and seismic activity, with several objectives.

Interdisciplinary studies of the morphostructures of eastern Cuba and emerged territories along the juncture zone (Grand Cayman, Little Cayman and Cayman Brac Islands, Swan Island, Jamaica, Cuba, Hispaniola and Puerto Rico), and the Bartlett Trench will make it possible to determine their geotectonic, morphostructural and geodynamic development stages. This is important not only for the area, but for an understanding of the evolutionary pattern of the whole Mexican and Caribbean region through a neomobilistic approach in the light of the new global plate tectonics. The findings of such studies will be of theoretical and methodological importance for research on the tectonosphere of the area and from the social and economic points of view, it will furnish the necessary data for the first stages of seismic studies which will be of great value for land-use planning in the countries of the region.

#### RECOMMENDATION

It is recommended that IOCARIBE undertake, within the context of IOC international co-operation, complex geophysical studies aimed at in-depth research on the geological-tectonic and morphostructural features of the Bartlett Trench, with a view to the preparation of palaeotectonic and palaeogeomorphological maps; that it encourage Member States to undertake morphostructural and geodynamic studies; that it facilitate the establishment

of a regional geoscientific data bank and exchange of geological-geomorphological data; that, in the context of the Organization's activities, biannual scientific meetings be held on the structural geomorphology and geodynamics of basins and deep trenches; and that it organize a methodological workshop on this topic in order to standardize the theoretical and conceptual principles of the complex study of underwater relief in deep-sea environments.

## 6. ACTIVITIES IN SUPPORT OF SELECTED RESEARCH PROJECTS

### 6.1 Oceanographic data and products

To supplement the specific recommendations set forth in the detailed proposals put forward under items 5.1 and 5.2, the mini-symposium recommended to the IOC Secretariat for IOCARIBE that the possibility of establishing a regional geological and geophysical data bank be studied. Such a data bank would maintain appropriate co-ordination with the World Data Center, in Boulder, Colorado, United States of America. It also recommended that this proposal be submitted for consideration to the IOC Working Committee on International Oceanographic Data Exchange (WC-IODE).

### 6.2 Ocean mapping

Dr Nestor Duch Gary, Chairman of the Editorial Committee of IBCCA and Chief Editor of the Bathymetric Mapping Project gave a detailed account of the decisions of the first meeting of the Editorial Committee. Among the main results of that meeting, he highlighted the following:

The Editorial Committee discussed and adopted its terms of reference.

Existing national charts on scales of 1:1,000,000 and above were assessed.

The Member States' interest in and potential for participation in the project were identified. Communications were later sent to Member States having representatives on the Editorial Committee but who were absent from the meeting, to explore their interest in participating.

A diagram and number of basic charts and their specifications was designed.

Dr Duch Gary likewise broached the problem of incorporating new technology in mapping references and theory.

Dr Harris Stewart reported on his country's decision to provide the broadest support and facilities for the IBCCA project.

Mr Alfredo Ramos informed the meeting of Cuba's great interest in participating in this project.

### 6.3 Facilities and infrastructure

Dr Georges Vernet, on behalf of Captain Rafael Steer-Ruiz, presented a detailed report on the main elements needed to implement OSNLR projects in the IOCARIBE region. These included: (i) logistic support; (ii) support for expert training; and (iii) budgetary support. The complete report on this agenda item will be included in the supplement to this report.

6.4 TEMA activities

The mini-symposium decided that the questions falling under this item had been sufficiently discussed under items 5.1 and 5.2.

7. ADOPTION OF THE SUMMARY REPORT AND RECOMMENDATIONS

The mini-symposium adopted the summary report.

8. CLOSURE

The local co-ordinator, Mr Guillermo García Montero, stressed the calibre and importance of the topics discussed, in particular for the research undertaken by Cuban institutions.

The Chairman thanked the local organizers; he also highlighted the work carried out by the IOC Technical Secretariat and the convenience of the facilities provided by the local organizers.

The mini-symposium rose at 8.00 p.m. on 6 December 1986.

ANNEX I

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ANNEX II

LIST OF PAPERS CONTRIBUTED

- |   |  |
|---|--|
| HENDRY, M.  | Geology and Non-Living Marine Resources of Jamaica's Coast and Adjacent Shelf, Bank and Deep-Sea Areas: A Review   |
| HERNANDEZ, J.<br>GONZALES, R.;<br>ARTRAGA, F.   | Morphostructural Differentiation of the Bartlett Trench: Juncture Zone between the Caribbean Plate and the Cuban Microplate                                      |
| GARCIA MONTERO, G.<br>JUANES, J.<br>RAMIREZ, E.<br>FOYO, J.<br>CABALLERO, M.<br>SALAZAR, R.<br>TRISTA, E. | Stability, Erosion and Sedimentation of Coastal Areas: Cuba's Experience   |
| LANKFORD, R.  | Environmental Protection and Coastal Resources Management  |
| MOLINA-CRUZ, A.   | Deep-Sea Environments and Palaeo-Oceanographic Studies in the IOCARIBE Region  |
| RODRIGUEZ, S.   | Characteristics of the Mineral Deposits of the Venezuelan Coastal Strip and Continental Shelf  |
| STEER-RUIZ, R.  | Facilities and Infrastructure for Research on Marine Non-Living Resources in the Caribbean Region  |
| STEWART, H.   | Main Types of Marine Non-Living Resources in the Coastal Zones of the Caribbean Sea  |
| VERNETTE, G.  | Geotectonics and Geomorphological and Sedimentary Characteristics Found in the Shelf and Coastal Area: Examples from the Caribbean Sea off the Coast of Colombia |
|   | Project for Multilateral Investigations in Marine Geology in the Coastal Zones of the Caribbean  |
| VIGNEAUX, M.  | Review of the State of Implementation of the OSNLR Programme   |
|   | A Study of Relief Forms  |
|   | Oceanic Palaeo-environments  |

ANNEX III

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ANNEX IV

LIST OF ACRONYMS AND ABBREVIATIONS

IOC	Intergovernmental Oceanographic Commission
IBCCA	International Bathymetric Chart of the Caribbean Sea and Part of the Pacific Ocean Off Central America
IOCARIBE	IOC Subcommission for the Caribbean and Adjacent Regions
IODE	International Oceanographic Data Exchange
OSLR	Ocean Science in Relation to Living Resources
OSNLR	Ocean Science in Relation to Non-Living Resources
SETMY	Sea-Level Environment and Tectonics during the Last Million Years
TEMA	Training, Education and Mutual Assistance in the Marine Sciences
UNAM	Universidad Nacional Autónoma de México
UN(OETB)	United Nations Ocean Economics and Technology Branch

No.	Title	Publishing Body	Languages	No.	Title	Publishing Body	Languages
32 Suppl.	Papers submitted to the UNU/IOC/Unesco Workshop on International Co-operation in the Development of Marine Science and the Transfer of Technology in the Context of the New Ocean Regime Paris, 27 September-1 October 1982	IOC, Unesco Place de Fontenoy 75700 Paris, France	English	40	IOC Workshop on the Technical Aspects of Tsunami Analyses, Prediction and Communications Sidney, B.C., Canada, 29-31 July 1985 (in press)	IOC, Unesco Place de Fontenoy 75700 Paris, France	English
33	Workshop on the IREP Component of the IOC Programme on Ocean Science in Relation to Living Resources (OSLR) Halifax, 26-30 September 1983	IOC, Unesco Place de Fontenoy 75700 Paris, France	English	41	First Workshop of Participants in the Joint FAO/IOC/WHO/IAEA/UNEP Project on Monitoring of Pollution in the Marine Environment of the West and Central African Region (WACAF/2) Dakar, Senegal, 28 October - 1 November 1985	IOC, Unesco Place de Fontenoy 75700 Paris, France	English
34	IOC Workshop on Regional Co-operation in Marine Science in the Central Eastern Atlantic (Western Africa) Tenerife 12-17 December 1983	IOC, Unesco Place de Fontenoy 75700 Paris, France	English French Spanish	42	IOC/UNEP Inter-calibration Workshop on Dissolved/Dispersed Hydrocarbons in Seawater Bermuda, USA, 3-14 December 1984 (in press)	IOC, Unesco Place de Fontenoy 75700 Paris, France	English
35	CCOP/SOPAC-IOC-UNU Workshop on Basic Geo-scientific Marine Research Required for Assessment of Minerals and Hydrocarbons in the South Pacific Suva, Fiji, 3-7 October 1983	IOC, Unesco Place de Fontenoy 75700 Paris, France	English	43	IOC Workshop on the Results of MEDALPEX and Future Oceanographic Programmes in the Western Mediterranean Venice, Italy, 23-25 October 1985	IOC, Unesco Place de Fontenoy 75700 Paris, France	English
36	IOC/FAO Workshop on the Improved Uses of Research Vessels Lisbon, 28 May - 2 June 1984	IOC, Unesco Place de Fontenoy 75700 Paris, France	English	44	IOC/FAO Workshop on Recruitment in Tropical Coastal Demersal Communities Ciudad del Carmen, Campeche, Mexico, 21-25 April 1986	IOC, Unesco Place de Fontenoy 75700 Paris, France	English
36 Suppl.	Papers submitted to the IOC-FAO Workshop on Improved Uses of Research Vessels Lisbon, 28 May-2 June 1984	IOC, Unesco Place de Fontenoy 75700 Paris, France	English	45	IOCARIBE Workshop on Physical Oceanography and Climate Cartagena, Colombia, 19-22 August 1986	IOC, Unesco Place de Fontenoy 75700 Paris, France	English
37	IOC/Unesco Workshop on Regional Co-operation in Marine Science in the Central Indian Ocean and Adjacent Seas and Gulfs Colombo, 8-13 July 1985	IOC, Unesco Place de Fontenoy 75700 Paris, France	English	46	Reunión de Trabajo para Desarrollo del Programa «Ciencia Oceanica en Relación a los Recursos No vivos en la Región del Atlantico Sudoccidental» Porto Alegre, Brazil 7-11 de Abril de 1986 (in press)	IOC, Unesco Place de Fontenoy 75700 Paris, France	Spanish
38	IOC/ROPME/UNEP Symposium on Fate and Fluxes of Oil Pollutants in the Kuwait Action Plan Region Basrah, Iraq, 8-12 January 1984	IOC, Unesco Place de Fontenoy 75700 Paris, France	English	47	IOC Symposium on Marine Science in the Western Pacific: The Indo-Pacific Convergence Townsville, 1-6 December 1986 (in press)	IOC, Unesco Place de Fontenoy 75700 Paris, France	English
39	CCOP (SOPAC)-IOC-IFREMER-ORSTOM Workshop on the Uses of Submersibles and Remotely Operated Vehicles in the South Pacific Suva, Fiji, 24-29 September 1985	IOC, Unesco Place de Fontenoy 75700 Paris, France	English	48	IOCARIBE Mini-Symposium for the Regional Development of the IOC-UN (OETB) Programme on "Ocean Science in Relation to Non-Living Resources (OSNLR)"	IOC, Unesco Place de Fontenoy 75700 Paris, France	English Spanish