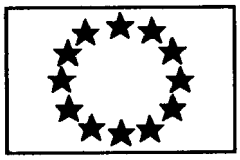
Intergovernmental Oceanographic Commission

Workshop Report No. 102



First IOC-CEC-SCOR Workshop on Coastal Ocean Advanced Science and Technology Study (COASTS)

Liège, Belgium
5-9 May 1994

UNESCO

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SUMMARY REPORT

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1. BACKGROUND

Coastal and shelf sea areas provide an endowed natural environment with extremely rich resources for the development of national economies. They also represent an area of great challenge for managers given the complexity of natural processes and the variety of issues in planning and management, including renewable and non-renewable resources development and conflict uses, pollution control, weather and micro-climatic forecasting and hazard prevention. In fact, they are crucial for sustainable development as specifically called for by the United Nations Conference on Environment and Development (UNCED), in particular Agenda 21, Chapter 17. However, on-going research and development and management programmes are often impaired by insufficient or inadequate data and information on physical-biological-chemical-geological processes, and a programme of international cooperation addressing these issues is necessary, to allow concerted action on common processes and methodological problems.

In view of this, an Expert Consultation for the IOC Programme on Coastal Ocean advanced Science and Technology Study (COASTS) was held in Liege, Belgium, 11-13 May 1991 (IOC Workshop Report No.73). A Programme Plan on COASTS was adopted during the Consultation which, among other things, proposed the organization of the First COASTS Workshop focusing on a comprehensive review of the coastal ocean circulation dynamics of the various scales and the implications for interaction with interdisciplinary processes.

2. OPENING

Prof. J.C.J. Nihoul, the host of the First COASTS Workshop, opened the meeting at 8:30 on 5 May 1994 in the University of Liège, Liège, Belgium. He introduced the Chairman and Coordinator of the IOC/COASTS Programme, Prof. Allan R. Robinson, who in turn introduced Dr. Kenneth Brink, the Joint Coordinator of the lst COASTS Workshop. Prof. Robinson then welcomed all the participants and briefed them on the background and objectives of the Workshop.

A list of participants is attached as Annex II.

A reception arranged by the Local Organizing Committee on the first day of the Workshop was attended by the Deputy Minister of the Environment of Belgium who delivered a speech. He welcomed the participants on behalf of the Government of Belgium and reiterated the support and interest of the Belgian Government in the COASTS programme. He wished the programme all success.

3. PRESENTATION

The Workshop was composed of three parts: (i) plenary presentation; (ii) trans-regional working group presentation and discussion; and (iii) final plenary session presentation. An agenda for the workshop is presented in Annex I.

For day 1 and most of day 2, plenary presentations were given on: (i) Physical and Dynamical Processes, Global and Interdisciplinary Processes, and Models and Data. Each lecture was of 25 minutes' duration with 10 minutes for discussion and comment.

In addition to the presentation of scientific papers, information was provided on a number of on-going coastal programmes.

Dr. J.Dronkers introduced the European Cooperation in coastal marine science (EC MAST) and provided insight on the funding, cooperating institutions, programmes and opportunities.

Dr. P.M. Holligan informed on the LOICZ Programme of IGBP.

Dr. K. Brink outlined the efforts of the United States in coastal ocean basic science funded by the National Science Foundation and the US Navy. The programme started in 1990 and focuses on modelling and interdisciplinary studies.

The representative of SCOR, Dr. B. Rothschild, expressed the interest of his organization in coastal studies and announced an award of medals in physical oceanographic research.

Prof. Robinson, on behalf of IOC, presented an overview on IOC coastal zone -related activities, particularly its efforts in the development of the coastal module of GOOS, the newly established *ad hoc* Working Group on Coastal Zone Activities, and the COASTS programme.

A selection of these reports is presented in Annex IV.

The remainder of day 2 and day 3 was devoted to Trans-Regional Working Group Presentation and Discussion Sessions. The four parallel sessions were:

WGI	-	Western Ocean Boundaries
WGII	-	Eastern Ocean Boundaries
WGIII	-	Polar Ocean Boundaries
WGIV	-	Semi-Enclosed Seas, Islands and Australia

The Chairmen, the Rapporteurs, as well as some selected participants of the four working groups met on day 4 to prepare Final Plenary Session Presentation. On day 5, reports from the four working groups were made at the plenary, and addressed the following 3 questions: (i) What are the common scientific trends and dynamical analogies; (ii) What are the research needs and methodological issues; and (iii) What are the opportunities for cooperation and technology transfer. A chapter summarizing the presentations and discussions will be included in "The Sea" on Coastal Oceans.

4. DISCUSSION ON FUTURE COASTS ACTIVITIES

A Planning Meeting for the COASTS programme was held in conjunction with the First COASTS Global Workshop in Liege. The COASTS Steering Committee met on the afternoon of 8 May 1994, together with a group of invited guests and conducted a "think tank" type open discussion. The Committee then met again on the afternoon of 9 May 1994, and in light of the previous day's discussion and its preliminary assessment of the Workshop results, drafted recomendations for the Programme. The list of participants of both sessions is attached as Annex III.

The goal and objectives for the COASTS programme remain unchanged from those stated in IOC Workshop Report No.73. This Programme is conceived initially as a ten-year programme. With this in mind, it is recommended that:

(i) the major comprehensive Second COASTS Global Workshop be held in five years time (1999). Whereas the First COASTS Global Workshop (CGW-1) focused on phsycial processes and circulation (with some interdisciplinary interfaces), the Second (CGW-2) should be fully interdisciplinary and deal with interactive and coupled physical-biological-chemical-geological scientific processes on a global basis, which should provide the scientific basis for the technical development requisite for coastal management models, and be published as a companion set of Volumes of "The Sea" on Coastal Oceans.

(ii) because of the vast amount of coastal ocean research and related activities underway nationally and regionally, as a global programme, COASTS maintain a process orientation. Moreover, there should be a focused approach, i.e. COASTS should identify a few critical processes and attempt to synthesize and coordinate research effectively on a world wide basis, rather than presenting the community with a "Laundry list" of relevant processes. In this context, physical-biological interactions and sediment interactions centrally relevant to management applications would be prime candidates.

(iii) two more topics should be included in COASTS activities: (a) to facilitate the development and dissemination of a few simple Standard Remote Sensing Products, and (b) to foster and facilitate Community Modeling, including the development of standard generic models for coastal regimes and cooperative modeling.

(iv) training, including courses and exchange visits, is deemed an essential COASTS activity and a programme on this topic should be established. Existing IOC/UNESCO infrastructure should be used as much as possible but under a clear and definite COASTS rubric. Visits of developing countries' scientitists to advanced laboratories and universities should be typically 9-12 months' duration. It was also considered feasible and desirable to arrange similar visits of " high tech" graduate students to developing institutions.

(v) a small working meeting of 10-12 experts (e.g. the COASTS Steering Committee and the Chairpersons of the 4 CGW-1 Pan-regional Working Groups plus a few additional specialists) be held sometime in the late spring or summer of 1995, with a view to identifying and defining all (or at least several) pan-regions, i.e. the extended coastal segments and analogous regions which should naturally, from a geo-scientific viewpoint, be studied simultaneously or together. The agenda of the meeting should also include the assessment of the scientific
and practical feasibilities of carrying out research or fostering cooperative research in such pan-regions, and a discussion on the specifics of the process orientation of the COASTS programme.

In addition, the meeting discussed the selection criteria for carrying out a demonstration of the concept of COASTS. The discussion dealt with practical and scientific issues. To ensure the success of this endeavour, there should be adequate regional strength and activity to build upon.

5. PREPARATION OF THE WORKSHOP PROCEEDINGS

Two volumes of "The Sea" on Coastal Oceans will be published based on the workshop contributions: A - Processes and Methods; and B - Coastal Regions. The manuscripts are scheduled to be sent to the publisher in the last half of 1995, which will allow for a careful review and revision process.

6. CLOSURE

Prof. Robinson expressed his appreciation to the Local Organizing Committee for the excellent arrangements made, and to the sponsors of the Workshop for their support. He also thanked the participants for their interest in and constructive contributions to the Workshop. The Workshop was closed at 12:30 on 9 May 1994.

ANNEX I

AGENDA

5 May 1994

OPENING REMARKS

8.30-8.40	**Welcome to University of Liège,** Professor J.C.J. Nihoul
8.40-8.55	**COASTS Workshop and Program,** Professor A.R. Robinson

PHYSICAL AND DYNAMICAL PROCESSES
- Chairman, A.R. Robinson

8.55-9.30	**Wind Effects,** K. H. Brink
9.30-10.05	**Air-Sea Interactions, Waves and Surface Boundary Layer,** S.Larsen
10.05-10.40	**Tidal Effects,** J.H. Simpson
10.40-11.10	*Coffee Break*
11.10-11.45	**Buoyancy Effects,** E. Hill
11.45-12.20	**Deep Sea Forcings and Exchange Processes,** K. H. Brink
12.20-12.55	**Topographic Effects, Straits and Bottom Boundary Layer,** J.H.Trowbridge
12.55-14.25	*Lunch*

GLOBAL AND INTERDISCIPLINARY PROCESSES

- Chairman, J.C.J. Nihoul

14.25-15.00 **Water Mass Formation, Ice Dynamics and Climate Effects,** T.H.Kinder

15.00-15.35 **Global Sea Level Changes, Coastal Effects and Feedbacks,** R. Stewart (presented by A.R. Robinson)

15.35-16.10 **Biological Productivity and Ecosystem Dynamics,** R. Wollast

16.10-16.40 *Coffee Break*

16.40-17.15 **Biogeochemical Processes, the Coastal Ocean and the Carbon Cycle,**

P.M. Holligan

17.15-17.50 **Sediment Transport and Terigeneous Fluxes,** W. Ying

17.50-18.25 **Recruitment,** B. Rothschild

18.25 *Reception by the Organizing Committee*

6 May 1994

MODELS AND DATA
- Chairman, K. Brink

8.30-9.05 **Remote Sensing Measurements,** J.C.J. Nihoul et al

9.05-9.40 **Hydrographic, Biological and Chemical Measurements,** L.Prieur

9.40-10.15 **Current and Sea Level Measurements,** T. Dickey

10.15-10.45 *Coffee Break*

10.45-11.20 **Boundary Fluxes,** W. Brown

11.20-11.55 **Statistical Methods and Data Analysis,** J.C.J. Nihoul et al

11.55-12.30 **Numerical Models of Coastal Ocean Circulation,** D. Haidvogel

12.30-14.00 *Lunch*

14.00-14.35 **Coupled Physical, Biological and Chemical Coastal Models,** J.C.J. Nihoul

14.35-15.10 **Data Assimilation and Model Verification,** A.R. Robinson

15.10-16.00 **Related Programs and Activities in Coastal Ocean Science, Technology and Management,** J. Dronkers. K. Brink. A.R.Robinson

16.00-16.30 Coffee Break

TRANS-REGIONAL WORKING GROUP PRESENTATION AND DISCUSSION

SESSIONS

Four parallel sessions for Trans-Regional Working Groups (working groups on comparable coastal ocean regions).

WGI: Western Ocean Boundaries
WGII: Eastern Ocean Boundaries
WGIII: Polar Ocean Boundaries
WGIV: Semi-Enclosed Seas, Islands and Australia

16.30-18.30 **TRWGs Sessions 1**

(The list of presentations is attached; each presentation is allowed 35 minutes: 25 for presenting, 10 for discussion)

7 May 1994

8.30-10.50 **TRWGs Sessions 2**

10.50-11.20 Coffee Break

11.20-13.05 **TRWGs Sessions 2**

13.05-14.35 Lunch

14.35-16.20 **TRWGs Sessions 3**

16.20-16.50 Coffee Break

16.50-18.35 **TRWGs Sessions 3**

20.30 Workshop Dinner at the Maison de la Métallurgie et de l'Industrie de Liège

8 May 1994

MEETING OF WORKING GROUP CHAIRMEN, RAPPORTEURS AND SELECTED PARTICIPANTS TO PREPARE FINAL PLENARY SESSION PRESENTATIONS

p.m. **MEETING OF COASTS STEERING COMMITTEE**

9 May 1994

Final Plenary Session Reports from the four Working Groups

8.30-12.30 **Plenary Session**

1. What are the common scientif1c trends and dynamical analogies?

2. What are the research needs and methodological issues?

3. What are the opportunities for cooperation and technology transfer? General discussion and recommendations

10.30-11.00 *Coffee Break*

12.30-14.00 *Lunch*

14.00-18.00 **Meeting of COASTS Steering Committee**

TRANS-REGIONAL WORKING GROUP PRESENTATIONS

Map Segment No | Coastal Region(s)

WG I : Western Ocean Boundaries

1. **Northeastern North America, from Cape Hatteras to the Hudson Strait, including Georges Bank and the Grand Banks (NENA),** J. Loder

2. **Southeast and North America, Hatteras to Yucatan, Gulf of Mexico included (SENA),** W. Boicourt

4. **Northeast South America, Amazon Cone to Abrolhas (NESA),** B. de Castro

5. **Southeast South America, Abrolhas to Tierra del Fuego (SESA),** S M. Piccolo

10. **Eastern Asia, Kamchatka to Eastern Coast of Philippines (EAS),** D. Hu

12. **Bohai Sea, Yellow Sea and East China Sea (BYECS),** J. Su

16. **Northwestern Indian Ocean, tip of India to Mozambique Northern Border (point C: Cape Delgado) (NWIO),** S. Shetye

17. **Southwestern Indian Ocean, point C to southern end of Agulhes and Bank, including Madagascar (SWIO),** E. Schumann

G II: Eastern Ocean Boundaries

6. **Western South America, West Coast of Southern America (WSA),** T. Strub

7. **Western Central and North America, Panama up to and including Gulf of California (WCNA),** A. Badan-Dangon

8. **Western North America, tip of Baja to Vancouver Island (WNA),** B. Hickey

18. **Southwestern Shelf of Africa, Benguela System (SWSA),** F. Shillington

19. **Equatorial Western Africa, l() N - 10 S (EWA),** E. Ajao

20. **Central Eastern North Atlantic (CENA),** D. Barton

21. **North Celtic Shelf Seas (NCSS),** J. H. Simpson

23. **Iceland Faeroe and Norwegian Coasts (IFN),** B. Hansen

WG III: Polar Ocean Boundaries

9. **Northern Pacific Boundary, Vancouver Island plus Outside of the Aleutians an d Inside but not on Bering Sea Shelf also East Coast of Kamchatka (NPB),** T. Royer

24. **West Arctic, Western Arctic until 105E (WA),** G. Zubakin

25. **Eastern Arctic, Laptev and East Siberia (EA),** V. Pavlov

26. **Bering Sea and its Shelf (BSS),** J. Shumacher/P. Stabeno

27. **Northern North America and East Greenland (NNAEG)**

28. **Davis Strait, Hudson Bay and Adjacent Area (DSHBAS),** G. Ingram

34. **Ross and Weddel Seas (RWS),** E. Hofmann/A. Robinson

35. **Remaining Antarctic Shelves (RAS),** A. Klepikov

WG IV: Semi-Enclosed Seas, Islands and Australia

3. **Caribbean, its Islands and Adjacent Regions (CAR),** A. Gallegos/A. Badan-Dangon

11. **Sea of Okhotsk and Japan Sea (SOJ),** L. Gramm-Osipov

13. **Inner Southeast Asia, Taiwan to Java Sea (ISEA)**

14. **Outer Southeast Asia, Region of Deep Straits (Banda Sea included) (OSEA),** D. Arief

15. **Eastern Indian Ocean, South Coast of Indonesia to tip of India (EIO),** S. Shetye

22. **North Sea and Baltic (NSB),** J. Rodhe

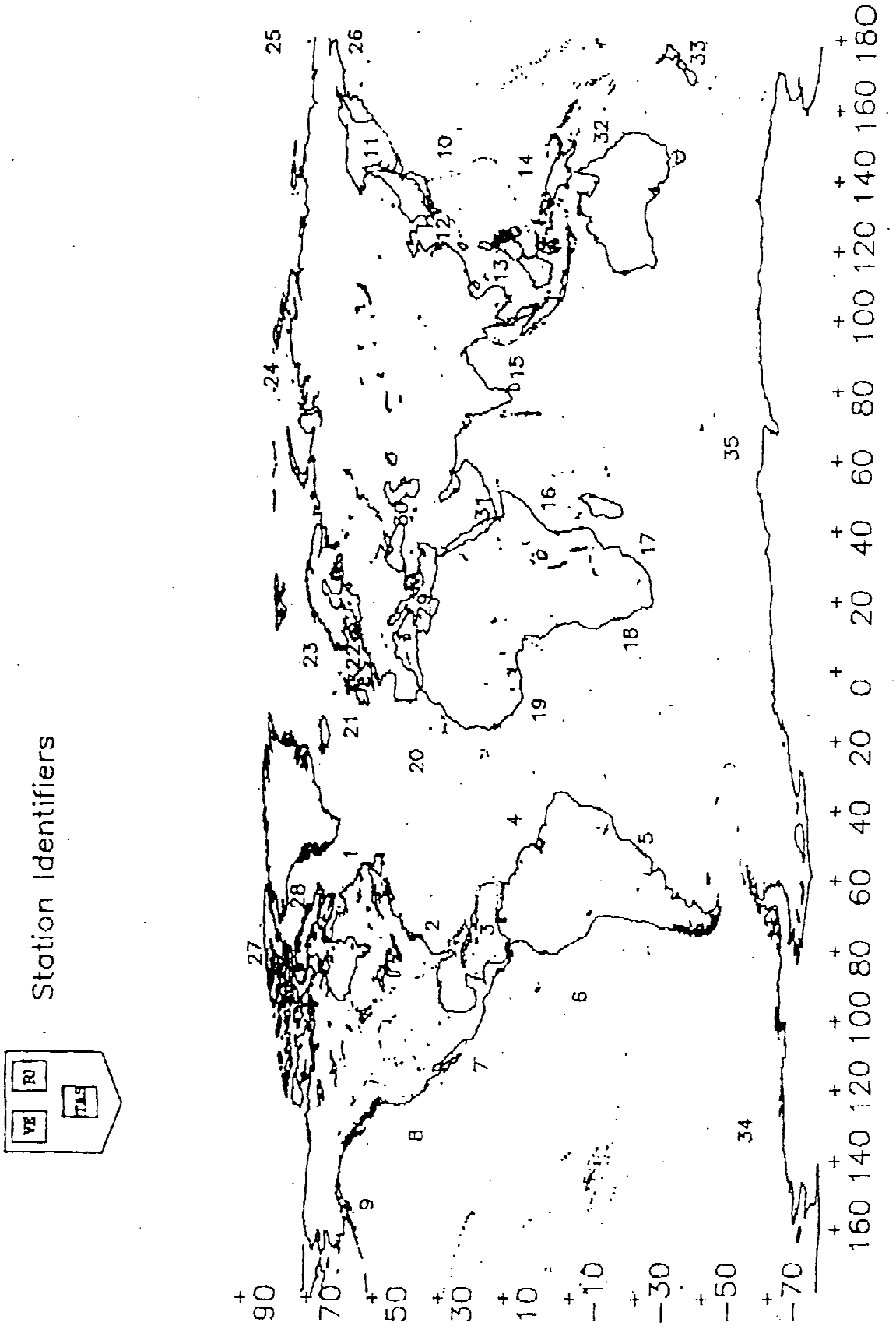
29. **Mediterranean Sea Shelf and Islands (MSS),** A. Theocharis

30. **Black Sea Shelf and Caspian Shelf (BCS),** Ü. Ünlüata/E. Ozsoy

31. **The Gulf and Red Sea (TGRS),** C. Sheppard

32. **Australia and Southwest Pacific Shelves (ASWPS),** J. Church

33. **New Zealand Shelf and Rest of the World's Islands (NZSRWI),** J. Sharples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ANNEX II

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ANNEX III
LIST OF PARTICIPANTS FOR THE PLANNING MEETING OF COASTS STEERING COMMITTEE

SESSION 1: 8 MAY 1994

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D. Arief (INDONESIA)
A. Badan-Dangon (MEXICO)
K. Brink (USA)
S. Djenidi (BELGIUM)
B.M. de Castro Filho (BRAZIL)
B. Hansen (FAEROE ISLANDS)
S. Larsen (DENMARK)
H. Li (FRANCE)
G.C. Mahika (TANZANIA)
Y. Mikhailichenko (RUSSIA)
J.C.J. Nihoul (BELGIUM)
A.R. Robinson (USA)
B. Rothschild (USA)
S.R. Shetye (INDIA)
NT.Q. Sloan (USA)
J. Su (CHINA)

SESSION 2: 9 MAY 1994

K. Brink (USA)
S. Djenidi (BELGIUM)
H. Li (FRANCE)
J.C.J. Nihoul (BELGIUM)
A.R. Robinson (USA)
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ANNEX IV

SELECTION OF REPORTS ON COASTAL PROGRAMMES

United States

Coastal ocean basic research (including both coastal oceanography and coastal meteorology) is conducted in the United States with support from a diversity of federal agencies. Most of these agencies have specific tasks to accomplish, so their research is consequently directed to specific objectives. Only the National Science Foundation (NSF) is nominally free to sponsor studies defined only by scientific interest. NSF is thus one of the primary agencies sponsoring individual small-science programs. The Office of Naval Research (ONR) has a mandate to support research having long-term naval applications, but it has historically also been a primary sponsor of curiosity-driven ocean research.

Other agencies have more specifically mission-driven programs. The Minerals Management Service (MMS) is responsible for assessing risks associated with mineral exploitation over the continental margin and has consequently sponsored, for example, several major field studies to quantify regional shelf circulation. The Department of Energy (DOE) is responsible for studying the fate of energy bi-products in the environment, and is consequently sponsoring a major interdisciplinary study on the region of Gulf Stream separation, off North Carolina. The National Oceanic and Atmospheric Administration (NOAA) has a broad mandate to deal with issues in the coastal ocean. It has major ongoing efforts in fisheries oceanography and coastal meteorology, for example. In addition, it has a growing Coastal Ocean Program (COP) office that sponsors fixed-term studies to address NOAA needs. Finally, NOAA is the lead U.S. agency for the Global Ocean Observing System (GOOS), and is in the process of developing a coastal component for this effort.

At present, there are two large, specifically coastal science programs driven by the U.S. scientific community. The first, Land Margin Ecosystem Research (LMER) is conducting a sequence of systematic interdisciplinary studies of individual estuaries. LMER funds come primarily from NSF, but with substantial support from other sources. The second major program, Coastal Ocean Processes (CoOP) is focused on regions offshore of the surf zone and outside of estuaries. CoOP includes marine meteorology as well as more traditional oceanographic disciplines. A primary CoOP goal is to address how biological, chemical and geological phenomena are affected by cross-margin transports. At present, CoOP has underway two pilot studies (one on larval dispersal over the inner shelf and one on air/sea chemical fluxes), and is making plans for a major process study to take place some time in the late 1990s off the west coast of the United States. CoOP research funds come primarily from NSF and ONR. Neither LMER nor CoOP have, at present, any explicit ties to international programs, but they are currently exploring means to associate with the International Geosphere-Biosphere Program (IGBP) Land-Ocean Interaction in the Coastal Zone (LOICZ) effort.

IOC

The focus of the IOC on coastal zones is fairly recent, but has achieved strong interest in relation to the preparations for and follow-up to the UN Conference on Environment and Development (UNCED), Rio 1992. This interest will certainly remain and increase over the coming decades.

Over the past years, IOC has made efforts in coastal research through global as well as regional programmes. Regional coastal research projects have been carried out in most of the regional subsidiary bodies. In the Caribbean, the project on "Global Change and Coastal Land Loss: Management and decision-making for a sustainable development for the Caribbean and Adjacent Regions" has been formulated, with emphasis on monitoring of climate changes and shoreline variations. As part of that project, the First IOC/IOCARIBE-UNEP Training Course on Monitoring and Control of Shoreline Changes in the Caribbean Region was held in Port-of-Spain, Trinidad and Tobago, 21-30 July 1993.

In the western Indian Ocean, an IOC-UNEP-WMO-SAREC Planning Workshop on an Integrated Approach to Coastal Erosion, Sea-Level Changes and their Impacts, was held in Zanzibar, Tanzania, 17-21 January 1994. The Workshop reviewed the coastal erosion problems in the region as a result of natural processes and increasingly harmful human activities, and sea-level variations; the IOC-UNEP-WMO Pilot Activity on Sea-Level Changes and Associated Coastal Impacts, the GLOSS network in the region and the GOOS coastal pilot monitoring activities, were discussed an an integrated approach to the existing coastal monitoring and research projects was adopted.

In the eastern Atlantic, the IOCEA project on Sediment Budget along the West African Coast is aimed at studying the sedimentary fluxes from the continent to the coastal zones as well as the sedimentary dynamics of the shelf of the Bay of Benin. To this end, an oceanographic cruise was organized in the Gulf of Guinea in October 1989, which involved 6 countries along the west coast of Africa and covered the continental shelf from longitudes 4° to 8° W. A symposium was organized in Nigeria from 17-20 May 1994 based on the cruise studies.

In the western Pacific, a programme on study of continental shelf circulation has been prepared and an Implementation Plan has been developed. Six sub-regions (Gulf of Thailand, northwest coast of Borneo, Malacca Strait and the Andaman Sea, Pacific/Indian Ocean through flow region, East China Sea and the Sulu Sea) have been identified for studies. At the Second Session of the Sub-Commission for the Western Pacific (Bangkok, 25-29 January 1993), the Malacca Strait, the Gulf of Thailand and the Gulf of Tonkin were pinpointed as areas for intensive interdisciplinary research.

In addition, IOC regional coastal zone activities also include such pollution-oriented projects as the assessment of river/atmospheric inputs and mussel watch as well as study of harmful algal blooms.

On a global basis, apart from the COASTS programme which is introduced in IOC Workshop Report No. 73 and in the present Workshop Report, the development of the coastal module of GOOS is another important endeavour of IOC in relation to coastal research and monitoring. Six pilot projects have been identified in the context of Pilot Projects of the Long-Term Global Monitoring System of Coastal and Near-Shore Phenomena Related to Climate: (i) Monitoring of Coral Reef Ecosystems; (ii) Mangrove Communities; (iii) Monitoring Plankton Community Structure; (iv) Coastal Circulation Monitoring; (v) Monitoring of Sea-Level Changes and Associated Coastal Impacts; and (vi) Monitoring of Organic Carbon Accumulation in Surface Coastal Sediments. These projects are considered as contributions to the coastal module of GOOS and are being developed jointly with WMO, UNEP and IUCN. An I-GOOS Intersessional *ad hoc* Group on the GOOS objectives has been established, *inter alia*, to identify more precisely the GOOS objectives in relation to providing data and services in support of planning the sustainable management of coastal areas by Member States, and the possible nature of coastal zone activities in GOOS.

In order to put the various coastal zone related activities in a reasonably logical framework, the IOC Assembly, in March 1993, established a mechanism in the form of an open-ended *ad hoc* Intersessional Working Group on Coastal Zone Activities, with some 50 members from 25 countries. The first task of the Group has been to address research, monitoring, assessment and service requirements for integrated coastal zone management. A comprehensive report will be prepared by this Group for submission to the Eighteenth Session of the IOC Assembly in 1995.

European Union*

The coastal ocean is a region of the global hydrosphere that has special societal and scientific importance. With estuaries and the continental shelf and slope, it represents about 15% of the ocean surface and less than 0.5% of its volume. It has also been estimated that, disproportinately, it accounts for about 25% of the global ocean primary productivity, 80% of the global organic matter burial, 90% of the mineralisation in marine sedimcnts, 80% of the global sink of suspended river load and associated elements and pollutants, and more than 50% of the present-day global carbonate deposition. Thus, the coastal zone, the interface between land, oceans and atmosphere, is a key area in which to study global processes.

At the same time, some 200 million of 580 million Europeans live within 50 km of the coast, and demands for space and other resources and conflicts between various user groups (e.g., industry, agriculture, fisheries, tourism) have highlighted the need for a prudent approach to coastal zone management. Scarcely any of the 143,000 km of European coastline is left which has not been altered or affected in some way by human activities. The Mediterranean Basin is now the largest focal point for tourist activities in the world There is thus a large vested interest in increasing our understanding of the coastal zone, its functioning and its resilience.

The European Union has been funding coastal science projects since the mid 1980s and is currently giving support to research on the coastal zone in the frame of two programmes: ENVIRONMENT and MARINE SCIENCE AND TECHNOLOGY (MAST). The coverage of the coastal zone in two different programmes reflects the high diversity of coastal regions which comprise not only the coastline itself but also coastal plains, marshes, estuaries, embayments and shelf seas.

The ENVIRONMENT Research Programme is concerned with the environment as a whole at local, regional and global levels, focussing both on processes and impacts. For the former, one seeks to understand the functioning of the whole as a system; for the latter, one looks at natural and anthropogenic perturbations of the system. It also seeks, through research in the natural and in the socioeconomic sciences, to establish a firm scientific basis for implementing the concept of sustainable development in coastal regions.

The MARINE SCIENCE AND TECHNOLOGY Research Programme aims at establishing a scientific and technological basis for the exploration, management, protection and exploitation of European coastal waters and the seas surrounding the Community. The strategic research aspect has been strengthened recently in view of studying the dynamics of exploited marine systems, managing the marine environment as a resource and a human living space, and permitting cooperative management of such systems by European coastal nations.

About 65 projects from both ENVIRONMENT and MAST Programmes can be identified as being of direct relevance to coastal sciences research. They fall into the following subject areas:

wetlands
dynamics of shelf ecosystems
eutrophication
biogeochemistry
ecotoxicology
UV-B radiation effects

* by

Klaus-Günther Barthel, Elisabeth Lipiatou and Canice Nolan
European Commission
Directorate General for Science, Research and Development

atmospheric interactions
climate change
climate change impacts
coastal morphodynamics
coastal engineering and shore protection
methods for monitoring, forecasting and management
societal and economic issues

Between 1991 and 1994, abolut 42 million ECU have been allocated by the European Union. to coasta l research, and in the now starting 4th Framework Programme (1994-1995) the EU will strengthen its activities by a substantial increase of funds in this important scctor. The protection of the coastline, the preservation of marine and terrestrial habitats in the coast al zone and the development and management of coastal regions as a resource and an amenity are interdependent processes and can only be achieved by an integrate d approach transgressing national boundaries. The European Union provides, in this context, the necessar y framework conditions to coordinate national research, and to facilitate the implementation of management and protection measures in the member states.

Catalogues with project synopses and brochures describing goals, implementation and perspectives of th e European Union's coastal research policy can be obtained from: European Commission, DG XII. 1 Information and Communication, Rue de la Loi 200. B-1049 Bruxellcs. Belgium.

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