Intergovernmental Oceanographic Commission
Workshop Report No. 166

IOC-SOA International Workshop on Coastal Megacities: *Challenges of Growing Urbanisation of the World's Coastal Areas*

Organised in co-operation with the International Ocean Institute (IOI), Malta

Hangzhou, People's Republic of China
27–30 September 1999

UNESCO

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Abstract
The International Workshop on Coastal Megacities, ***Challenges of Growing Urbanisation of the World's Coastal Areas*** was held in Hangzhou, China, 27-30 September 1999, in co-operation with IOC (Intergovernmental Oceanographic Commission) and SOA (State Oceanic Administration, China), and with the collaboration of the International Ocean Institute. The workshop focused on the rapid development of coastal megacities and the relating environmental problems. Urban political leaders/officials in charge of city planning and coastal management from worldwide megacities (Jakarta, Shanghai, Buenos Aires, Lagos, Madras) were brought together with natural and social scientists working at the land-sea interface, and with national and local authorities concerned with coastal and sea management. Representatives from international organizations also contributed to the workshop. The workshop focused on three main themes: Managing the Coastal Environment; Social-Economic Development and Management; Solving Use Conflicts in Coastal Areas, and Integrated Approaches to Coastal Planning and Management in Megacities. The participants unanimously adopted the HANGZHOU DECLARATION, which calls for the application of the natural and social sciences to all stages of the integrated coastal area management process; the increase of education, training and public awareness on the interactions between coastal and urban environments; the establishment of a network of coastal megacities; and the assessment of the interrelationship between population pressure, poverty, affluence, environmental conditions and economic development.

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1. BACKGROUND

1.1 RATIONALE

The belts extending 60km from the coastline have become the most attractive part of the world and the rise of the coastal megacities has become one of the most important processes. Indeed, their population has doubled in the last 20 years and the average population of coastal megacities has increased by about one third.

By UN definition, a megacity is a city with a projected population of 8 million or more in the year 2000. In addition to swift population growth, the world is experiencing rapid urbanisation. Much of global population growth will occur in megacities. By the year 2005, half of the world's population is expected to live in urban areas. As developed nations tend to be highly urbanised already, most of the increased urbanisation is occurring in developing countries. Today, 9 of the 17 megacities are located in Asia. These are Beijing, Bombay, Calcutta, Jakarta, Osaka, Seoul, Shanghai, Tianjin, and Tokyo. Cities such as Bangkok, Dhaka, Karachi, and Manila are also on the verge of becoming megacities. By the year 2000, 13 of the world's largest cities will be located on or near the coast. Of all the megacities with a population greater than ten million, most of them are coastal megacities and will be located in the Asia Pacific rim.

While often the growth of megacities gives financial, social and cultural opportunities to its inhabitants, it can also bring economic crisis and a breakdown in the traditional social and cultural behaviour patterns that traditionally supported less urbanised populations. Problems common to megacities, particularly in developing countries, include inadequate land for development, underdeveloped infrastructure, water shortages, poor sanitation, air pollution and traffic congestion. Coastal megalopolis experience these as well as other special problems related to their coastal location, e.g. coastal erosion, the potential impact of sea water intrusion to freshwater supply, the loss of habitat for birds, fish and other wild life, the depletion of fishery resources as a food supply and public health problems related to sea food contamination, land subsidence due to construction and water extraction, the deterioration of marine environment as an area for amenity due to various sources of marine pollution and its threat to fisheries and tourism, natural disasters including extreme weathers, harmful algal blooms, and global warming and sea – level rise, conflicting uses of coastal areas, and so on. Most importantly and fundamentally, how to balance the rapid economic development and the preservation of coastal environment for sustainable development, as called for by Agenda 21, Chapter 17, is becoming a prominent issue that faces all the sea megalopolis. This is where the concept of Integrated Coastal Area Management (ICAM) becomes pertinent, where scientists and managers together would be able to provide an answer.

The comprehensive management system embodied in ICAM attempts to integrate policy and planning into a balanced program that addresses the multiple uses, economic potential, and unique environmental resources of the coastal zone. Integrated coastal area management provides a foundation for a process that will effectively manage and resolve existing coastal conflicts without reducing future options, which is important given that climate change, for example aggravates existing problems rather than generating fundamentally new ones. An integrated coastal management institutional framework could be developed for each megacity struggling with existing management issues. Without an integrated approach that considers both short-term and long-term issues, the effects of coastal disasters may well become more severe. Ultimately, a non-integrative approach will require more expensive reactive measures and/or the abandonment of certain areas.

During the UNCED preparatory process, the need to include the growth of coastal populations as well as the concentration of population in urban spaces, in programmes aimed at disseminating integrated management of coastal areas and islands was expressed. This was articulated in Agenda 21, the Conference's global agenda for action, which highlighted the importance of sustainable human settlements and emphasised cross-sectoral co-ordination, decentralisation of decision-making, and broad-based participatory approaches to management. The Second United Nations World Conference on Human Settlements (Habitat II - the 'City Summit') in Istanbul in 1996, took this point further in a

global agenda for co-operation by acknowledging the direct and vital contribution that productive and sustainable cities can make to social and economic advancement.

As the interlinkages between land and the sea become more and more apparent –particularly in the light of the predicted effects of climate change on the coastal zone, the Intergovernmental Oceanographic Commission of UNESCO (IOC being the only UN body solely dedicated to oceanography and marine sciences) is now starting to look at the coastal megacity issue from a marine science perspective through the implementation of its Marine Science for Integrated Coastal Area Management Programme (IOC/ICAM). It is clear that science is required for essentially all aspects of ICAM, including the sustainable management of coastal cities: mapping, establishment of baseline conditions, data management, quantification of problems and their causes, predictive modelling, impact assessment, formulation of mitigation measures, and systematic long-term monitoring. IOC in co-operation with other UN organisations has established several operational observing systems for the oceans and coastal areas: e.g. the Global Ocean Observing Systems (dealing with climate, pollution, state of coastal living resources), the Global Sea Level Observing Systems i) provide accurate descriptions of the present state of the oceans, including living resources; (ii) continuous forecasts of the future conditions of the sea for as far ahead as possible; and (iii) the basis for forecasts of climate change. These operational tools are also being developed with a view to forecast and model future conditions in the coastal area, hence their relevance to the megacities development and management.

In this perspective, and in collaboration with the State Oceanic Administration of China and the International Ocean Institute (IOI), IOC organised this international workshop, bringing together urban political leaders or officials in charge of city planning and coastal management from world-wide megacities together with natural and social scientists working at the land-sea interface, and with national and local authorities concerned with coastal and sea management. The contribution of science to the ICAM approach in general, and more specifically in the management of coastal megacities has been emphasised. Indeed, despite great differences in the social, economic and ecological conditions in countries, there is remarkable consistency in the lessons learned about the contributions of science to ICAM. They demonstrate that scientists and managers must work together as a team if scientific information generated for ICAM is to be relevant and properly applied for management purposes. Since the two professions have different perspectives and imperatives and approach the solution of problems differently, the objectives and priorities for programmes must be derived, tested and periodically re-evaluated by scientists and managers working together.

2. OPENING OF THE MEETING

The workshop was officially opened at 09.00, Monday 27 September 1999 in Hangzhou by Mr. Haiquing Li from the State Oceanic Administration. In his address, he welcomed the participants and reviewed the organisations that were involved in the formulation of this workshop, he also recalled the background that led up to the workshop and the approach that was envisioned to meet its objectives.

The Deputy Administrator of the State Oceanic Administration, Mr. Chen Lianzeng, expressed his congratulations to the organisers of the workshop and welcomed the participants. He thanked the Intergovernmental Oceanographic Commission of UNESCO, the State Oceanic Administration, SOA, and the International Ocean Institute, IOI for organising and supporting the workshop. He emphasised the interest of the People's Republic of China to host the workshop and looked forward to receive the recommendations of the meeting concerning the sustainable management of coastal megacities. His speech is provided in Annex III.

The Chairman of the Intergovernmental Oceanographic Commission, Prof. Su Jilan, expressed his congratulations to the organisers and welcomed the participants on behalf of the Executive Secretary IOC, Dr. Patricio Bernal. He reviewed the IOC activities related to Integrated Coastal Area Management undertaken by the Commission. He also emphasised that the workshop presents a unique

occasion to provide guidance for ICAM activities on coastal megacities. His speech is provided in Annex III.

The Deputy Mayor of Hangzhou, Mr. Ye Defan, extended his congratulations to the opening of the workshop and welcomed the participants on behalf of the City of Hangzhou. He gave an introduction to the geography and history of Hangzhou, focusing on the urbanisation of the city. He also welcomed the guidance that this workshop will provide for the planning and development of Hangzhou, as a large city. His speech is provided in Annex III.

3. ORGANISATIONAL ARRANGEMENTS

3.1 OBJECTIVES

The objectives of the workshop is to bring together urban political leaders in charge of city planning and coastal management in megacities, together with natural and social scientists working at the land-sea interface, and international organisations concerned with coastal and sea management. Together, they will identify and address issues related to coastal megacities development, and how to revitalise their marine heritage, taking advantage of the Integrated Coastal Area Management approach. A second objective is to summarise the ideas and recommendations of the meeting and working session and formulate a Declaration on Coastal Megacities addressed to intergovernmental and governmental organisations, local authorities, research and educational institutions. A selection of the presentations will be published in a special issue on Coastal Megacities in the Journal *Ocean & Coastal Management.*

3.2 PROGRAMME

The workshop Technical Secretaries, Mr. Haiquing Li (SOA) and Mr. Julian Barbière (IOC) introduced the programme and explained the rationale behind it. Mr. Barbière also informed the participants that, for personal reasons, it had been impossible for Profs. Robert Knecht and Biliana Cicin-Sain, Center of the Study of Marine Policy, University of Delaware, USA, to participate in the workshop. They both played an important role in organising and initiating this workshop.

It was proposed to the participants that two and a half days would be devoted to presentations and related discussions from city representatives, natural and social scientists and international organisations. The workshop began with a number of keynote speeches on marine scientific observation and inputs to integrated coastal area management and socio-economic transformation in the context of coastal megacities. Then, representatives from coastal megacities, e.g. Bombay, Buenos Aires, Jakarta, Lagos, Shanghai, were invited to give presentations on the development and management of their respective city in terms of coastal resources and environmental management. Scientists (natural and social) were invited to present their analyses of problems facing the coastal megacities and provide workable solutions to these problems affecting coastal cities

On the third day of the workshop, a field trip to the City of Shanghai was planned. The purpose of the field trip was to visit some of the urbanised and newly developed areas in Shanghai such as the Shanghai's container port area, Jinmao Mansion, China's tallest building and the harbour area of the Yangtze River. On the fourth day, in the afternoon, the participants were divided into three working groups to draw up conclusions and recommendations for the sustainable development of coastal megacities.

3.3 DOCUMENTS

Documentation and copies of the presentations and overheads were available during the workshop.

3.4 PARTICIPANTS

The workshop was attended by forty participants from ten countries (Argentina, Australia, Canada, China, France, Indonesia, the Netherlands, Nigeria, United Kingdom, USA) and international organisations such as Start Regional Centre for Temperate East Asia (APN), International Geographic Union (IGU), International Ocean Institute (IOI), United Nations Environment Programme (UNEP) and the World Bank. The list of participants is provided in Annex II.

4. PRESENTATIONS

4.1 KEY NOTE SPEECHES

Mr. Haiquing Li of the State Oceanic Administration presented the ICAM strategies of the People's Republic of China and emphasised the difficulties that a large country such as China confronts due to its long coast-line and increasing number of large cities.

The Representative of the Intergovernmental Oceanographic Commission, Mr. Julian Barbière, introduced the environmental problems that coastal megacities are experiencing related to their coastal location and the socio-economic consequences of marine and coastal degradation on sectors such as fisheries, tourism, and infrastructure developments. He also emphasised the need to develop management policies and strategies which integrate scientific observations and inputs.

The Executive Director of the International Ocean Institute, Dr. Gunnar Kullenberg, also welcomed the participants and thanked SOA and IOC for organising the workshop. In his address he reviewed issues related to ICAM such as the importance of legal and institutional framework and capacity building requirements. He also emphasised the importance of globalisation and addressed several questions related to research needs for managers involved in the development of Coastal Management plans.

4.2 SESSIONAL PRESENTATION

The 20 papers presented during the workshop were arranged in nine distinct sessions addressing the following topics:

1. Report from Coastal City Representatives
2. International Programmes on Urbanisation
3. Coastal Erosion, Land Reclamation, Coastal Habitat Restoration and Habitat
4. Coastal Waste, Pollution Monitoring and Management, Seafood Safety and Public Health
5. Climate Change, Global Warming and Natural Hazards-Mitigation Warning
6. Improving Fresh Water Supply- Problems and Solutions
7. Waterfront Revitalisation vis-à-vis Integrated Coastal Management
8. Port, Harbour Management, Marine Transportation: A method for Relieving Urban Congestion
9. Solving Use Conflicts in Coastal Areas, and Integrated Approach to Coastal Planning and Management

The abstracts of each presentation are to be found in alphabetical order in Annex IV.

5. WORKING SESSIONS

Three working groups relating to the issues that emerged from the presentations were established. Under each group, terms of reference were provided and questions (see below) answered and commented. The chairman of each group presented the results and recommendations in the final

plenary session. The recommendations from the three groups have been integrated in the text of the final version of the Hangzhou Declaration, adopted by the workshop.

The Groups addressed the following topics:

1. Integrated Planning of Coastal Areas
1. Education, Training and Public Awareness
2. Establishing a Network of Large Coastal Cities

(In italics are the terms of reference questions posed to the groups)

5.1 WORKING GROUP 1: INTEGRATED PLANNING OF COASTAL URBAN AREAS

Chairman: Evelia Rivera-Arriaga (USA)

What are the main issues highlighted by the city representatives?

Integrated Coastal Management is not utilised effectively in urban coastal planning and development. There is a need of improvement of the following issues:

(i) Database management;
(ii) Long-term capacity building and training;
(iii) Increase public awareness and support;
(iv) Co-ordination;
(v) Integrated planning.

How could social and natural sciences contribute to better integrated planning in coastal megacities in the three interconnected zones: Coastal Zone, Waterfront, Urban hinterland?

(i) Demonstrate physical-social-economical governance interconnection among drainage basins-coastal waterfront-oceans;
(ii) Provide forum for exchange of information;
(iii) Make graduate programmes more interdisciplinary;
(iv) Provide better economic valuation techniques;
(v) Help design better monitoring system and develop “key indicators”;
(vi) Develop information and data to improve E.I.S (Environmental Impact Survey) and E.I.R (Environmental Impact Research) process, e.g. modelling for predictions;
(vii) Constitute advisory committees for ICAM.

What could be the role of the following in this process?

(i) NGO’s: Increase public awareness and generate political advocacy for ICM and serve as “watch dog”;
(ii) Local Authorities: Serve as first line of decision making and be fully involved in planning process;
(iii) National Government: Delegate authority and support to local decision-makers and to adopt national polices, laws and frameworks to support;
(iv) Research Institutions: More management-oriented research and multidisciplinary training;
(v) International Organisations: Support financially ICM, adopt “urban ICM” as a priority area, exchange information and co-ordinate with each other.

What should the next workshop address?

(i) Focus on lessons learned, both success and failures, where urban coastal officials have utilised integrated planning methods in both developing and developed countries;
(ii) How to establish networks to continue sharing experiences and information

5.2 WORKING GROUP 2: EDUCATION, TRAINING AND PUBLIC AWARENESS

Chairman: Rhodora Azanza (Philippines)

What are the main issues highlighted in terms of education, training and public awareness in coastal megacities?

(i) No existing dedicated educational programme for addressing interactions between coastal and urban system;
(ii) Rapid development in these areas and negative impacts on coastal environments, hence the urgent need for attention to this educational case;
(iii) In view of the intersectoriality of the problem. There is an urgent need for dedicated educational programmes for public awareness.

If you were to develop an educational programme on Urban Ecology and its interaction with coastal ecology, how would you structure your programme?

(i) Approach elementary school systems, using coastal system to exemplify applications for other disciplines;
(ii) Dedicate study programmes at university level concerning coupling between urban and coastal systems.

Initial actions would include:

(i) A review and synthesis of on-going related programmes at the school level - for example, the Harmful algae bloom programme of the Philippines;
(ii) Assessment of existing nature of the problem requires that the programme co-ordinates natural and social sciences, which at the higher level, would include addressing intersectorial case studies.
(iii) As a priority, the programme might address human public health problems. Emphasise the systemic, interactive nature of most coastal/urban issues. Exert effort to influence other fields (public administration law, etc.) to incorporate coastal megacities case studies in curriculum.

How would you raise public awareness, and who should be the target audience?

Five target audiences:

(i) Schools - linkage between parents and schools.
(ii) Public Officials will provide information through university systems. Dialogue between those who create knowledge and those who use it;
(iii) Private sector - economic interests hidden in many commercial enterprises, e.g. recreation, shipping, insurance, mass media;
(iv) Youth - community-based groups as participatory audiences for environmental actions;
(v) Broadcast and other journalism outlets - Japan's Cartoon Character "Red Tide Monster".

What could be the role of the following in this process?

(i) NGOs: To serve as outreach centres to provide a mechanism through which experience, curricula could be multiplied and distributed. Act as coastal watchdogs and give feedback to educational systems;

(ii) Local Authority: To endorse and promote educational programmes. Also participate in educational process and act as a broker for the programmes;

(iii) National Governments: Actively endorse programmes. Facilitate into actions. Minister of education should communicate with colleagues through relevant international organisations, e.g. UNESCO. Legislative support and provide/enable funding;

(iv) Research Institutions: Outreach and research campaigns, generate curricula and Faculty support. Act as resources for expertise and the recognition of problems. Provide illustrative examples. Standardisation of protocols. Special set of research institution, e.g. national surveys and monitoring and forecasting institutions, especially for natural hazards and technological hazards, which would be partners in a programme;

(v) International Organisations: To provide financial and moral support. Serve as policy, debating and information exchange for technical support, generate support and co-ordination and establish networks of experts. Include potential development of fellowship programmes.

What should the next workshop address?

(i) Results from surveys of existing curricula, discussion of framework of formal (basic), and informational education;
(ii) Co-ordinate dialogue between educators, public officials, relevant private sectors and media representatives;
(iii) Exchange experience on public awareness campaigns, including media representatives.

5.3 WORKING GROUP 3: ESTABLISHING A NETWORK OF LARGE COASTAL CITIES

Chairman: Russell Arthurton (United Kingdom)

What would be the terms of reference of network of large coastal cities?

To promote the sharing of knowledge and experience in ICAM as it relates to large coastal cities by:
(i) Promoting wide participation at all levels, top to bottom;
(ii) Involving local authorities and national governments, e.g. NGOs in major infrastructural development;
(iii) Involving Private Sector and promoting partnership with Public Sector;
(iv) Aiming to ensure that funding agencies understand the implication of development;
(v) Promoting ICAM as a dynamic process whose benefits over a range of time scale need to be demonstrated by scientific knowledge;
(vi) Encouraging existing twinning relationships between cities to encompass ICAM ideals;
(vii) Promoting ICAM in coastal cities in the wider context of watersheds and the coastal ocean, a regional view.

What could be the role of natural and social science in this network?

(i) Linkage with scientific-oriented networks already established, e.g. APN;
(ii) Need for international organisations to present a common front on ICAM-related matters, present duplications of effort. Make best out of research resources e.g. IOC, UNEP, FAO, WB;
(iii) Aim to break existing barriers between Natural and Social Sciences, perhaps by promoting bridging research;
(iv) Facilitate access of information on scientific research resources relating to urban ICAM.

Other points:

(i) Difficulty in translating ICAM in developed width to the developing world where resources and political support are lacking;
(ii) ICAM networks already quite well developed covering mainly rural coastal communities. Are urban communities lagging behind?

(iii) IOC regarded as a suitable and respected "umbrella" organisation to be the "Intergovernmental voice" of ICAM, but is it too oriented to the West side?

What should the next workshop address?

Urban ICAM – is it working?

6. CLOSING OF THE WORKSHOP

Ms. Anna Widén, IOC thanked the participants for their enthusiastic and active contribution to the workshop, and the SOA staff for being very helpful. She mentioned that the objective of the workshop was to gather representatives from megacities, international organisations and social and natural scientists in order to, at a first stage, identify and discuss the environmental problems related to megacities. Further, she noted the good work of the working groups to concretise the presentations and come up with recommendations for the Hangzhou Declaration. She also emphasised the importance of networking and using the Hangzhou Declaration as a tool for implementation of the recommendations to governments, NGOs and other organisations.

ANNEX I

PROGRAMME OF THE WORKSHOP

MONDAY 27 September

09:00-09:30	**Opening:** Mr. Chen Lianzeng, SOA Deputy Administrator Prof. Su Jilan, IOC Chairman Mr. Ye Defan, Deputy Mayor of Hangzhou
09:30-10:30	**Keynote Speeches** Dr. Li Haiquing, SOA Mr. Julian Barbière, IOC Dr. Gunnar Kullenberg, IOI
10:30-11:00	Coffee break
11:00-13:00	**Session 1: Report from Coastal City Representatives** Mr. Wu Nianzu, Shanghai Municipal Government Mr. Peter Olubunmi Santos, Lagos State Ministry of Environment Mr. Mochamand Sidaarta, Jakarta Coastal Area Reclamation Management Board
13:00-14:30	Lunch
14:30-16:00	Dr. Raj Murthy, National Water Research Institute, Ontario Lic. Miguel Linares, Secretaria del Medio Ambiente, Buenos Aires Dr. R. Rajagopalan, IOI
16:00-16:30	Coffee break
16:30-18:00	**Session 2: International Programmes on Urbanisation** Mr. D Debruin, East Asia Environment and Social Development Unit, World Bank Dr. Yihang Jiang, East Asian Seas/Regional Co-ordination Unit, UNEP
19:00	Reception

TUESDAY 28

09:00-10:30	**Session 2: International Programmes Addressing Urbanisation Issues** Dr. Zhibin Wan, Asia-Pacific Network Discussion Keynote Speech Dr. Yeu-man Yeung, Hong Kong Institute of Asia Pacific Studies
10:30-11:00	Coffee break

11:00-12:30 **Parallel Sessions**

Session 3: Coastal Erosion, Land Reclamation, Coastal Habitat Restoration and Habitat	**Session 4: Coastal Waste, Pollution Monitoring and Management, Seafood Safety and Public Health**
Dr. Linda Cuttriss Mr. Tjoek Soeprapto	Dr. Mike Huber Dr. Rhodora Azanza Dr. Guan Daoming

12:30-14:00 Lunch

14:00-15:30

Session 5: Climate Change, Global Warming and Natural Hazards-Mitigation Warning	**Session 6: Improving Fresh Water Supply- Problems and Solutions**
Dr. Russell Arthurton Prof. Wang Xinian	Dr. Oude Essink Dr. Ruan Guoling

15:30-16:00 Coffee break

16:00-18:00

Session 7: Waterfront Revitalisation vis-à-vis Integrated Coastal Management	**Session 8: Port, Harbour Management, Marine Transportation: A Method for Relieving Urban Congestion**
Dr. Adalberto Vallega	Mr. Richard Delaney Mr. Yang Huaxiong

18:00-18:15 Field Trip Information

WEDNESDAY 29

08:00 Field Trip to Shanghai

THURSDAY 30

09:00-09:30 **Session 3: Coastal Erosion, Land Reclamation, Coastal Habitat Restoration and Habitat (Cont.)**
DR. WANG YING

09:30-11:30 **Session 9: Solving Use Conflicts in Coastal Areas, and Integrated Approach to Coastal Planning and Management**
Ms. Evelia Rivera-Arriaga
Dr. Yves Henocque
Dr. Douglas Sherman

11:30-13:00 **Session 10: Working Groups**

13:00-14:30 Lunch

14:30-18:00 **Session 11: Workshop Conclusions and Recommendations**

14:30-16:00 Conclusions and Recommendations

16:00-16:30 Coffee break

16:30-18:00 Conclusions

ANNEX II

LIST OF PARTICIPANTS

ARGENTINA

Miguel A. Linares
Secretary of the Environment Buenos Aires.
Av. De Mayo 575
1084 Buenos Aires
Argentina
Tel: 54-11 4323-9722
Fax: 54-11 4345 0829
E-mail: mlinares@cvcti.com.ar

AUSTRALIA

Linda Cuttriss
Ecocentrics Australia
P.O. Box 1241 St. Kilda South
Victoria 3182
Australia
Tel: 61.3.95346929
Fax: 61.59.568591
E-mail: cuttriss@ecocentrics.com.au

Michael Huber
Global Coastal Strategies
P.O. Box 606 Wynnum
4178 Brisbane
Australia
Tel: 61-7-38934511
Fax: 61-7-38934522
E-mail: huber@corplink.com.au

CANADA

Raj Murthy
Environment Canada, National Water
Research Institute
867 Lake Shore Rd.
P.O. Box 5050
Burlington, Ontario L7R4A6
Canada
Tel: 1-905 3364920
Fax: 1-905 3366230
E-mail: raj.murthy@cciw.ca

People's Republic of CHINA

Ande Fan
Second Institute of SOA
9 Xixihexia,
Hangzhou 310012
P.R. China
Tel: 86-571 8076924
Fax: 86-571 8071539
E-mail: aaxfan@public1.hz.zj.cn

Chen Lianzeng
State Oceanic Administration
1 Fuxingmenwai Ave.
Beijing 100860
P.R. China
Tel: 86-10 68032211
Fax: 86-10 68030799

Daoming Guan
National Environmental Monitoring Centre
SOA
42, Linghe street
Dalian 116023
P.R. China
Tel: 86-411 4671429
E-mail: dmguan@nmemc.gov.cn

Hu Debin
Ministry of Land & Resources
37 Guanyingyuan, Xicheng
Beijing
P.R. China
Tel: 86-10 66127075
Fax: 86-10 66127005
E-mail: dbhu@yeah.net

Yue-man Yeung
Professor of Geography
Head of Shaw College
Director, Hong Kong Institute of Asia-Pacific
Studies
Shatin, Hong Kong
China
Tel: (852) 2609 8777 / 2609 7351
Fax: (852) 2603 5215 / 2603 5427
Email: ymyeung@cuhk.edu.hk

Gu Deyu
Third Institute of Oceanography, SOA
178 Daxue Road, Xiamen
Fujian
P.R.China
Tel: 86- 592 2094205
Fax: 86-592 2086646
E-mail: gudeyu@public.xm.fj.cn

Jianping Xu
2nd Institute of Oceanography, SOA
No.9 Xixihexia Road
Hangzhou
P.R. China
Tel/Fax: 86-571 8803499
E-mail: sioxu@zgb.com.cn

Li Haiqing
Department of International Co-operation, SOA
1, Fuxingmenwai Ave.
Beijing 100860
P.R. China
Tel: 86-10 68042694
Fax: 86-10 68030799
E-mail: depicsoa@public.east.cn.net

Liu Li-hua
Tianjin Oceanic Administration
143 Pukou Road Hexi District
Tianjin
P.R. China
Tel: 86-22 23282554
Fax: 86-22 23285236

Liu Renqing
2nd Instit. Of Oceanogr. SOA
No.9. Xixihexia Road
Hangzhou
P.R. China
Tel: 86-571 8076924
E-mail: kjc_sio@mail.hz.zj.cn

Liu Yonggang
2nd Instit. of Oceanography SOA
No.9 Xixihexia Road
Hangzhou
P.R. China
Tel: 86-571 8844071
E-mail: yg-liu@263.net

Jiang Jianguo
Division of Marine Environmental Management State Environmental Protection Administration (SEPA)
No.115 Xizhimennei Nanxiaojie
Beijing 100035
P.R. China
Tel/Fax: 86-10 66111421
E-mail: tymd@cenpok.net

Shen Rong
Chinese National Commission for UNESCO
37# Damucanghutong Xidan
Beijing 100816,
P.R. China
Tel: 86-10 66096883
Fax: 86-10 66017912
E-mail: rongshen@hotmail.com

Song Lianqing
2nd Instit. of Oceanography SOA
No.9 Xixihexia Road
Hangzhou
P.R. China
Tel: 86-571 8076924-2332

Ruan Guoling
Institute of Seawater Desalination, SOA
P.O. Box 52
Tianjin
P.R. China
Tel: 86-22 23699949
Fax: 86-22 23360732
E-mail: glruan@public.tjuc.com.cn

Sun Yuhua
2nd Instit. of Oceanography SOA
No.9 Xixihexia Road
Hangzhou
P.R. China
Tel: 86-571 8076924-2512
E-mail: ckjorc@public.qd.sd.cn

Tan Gongke
China-Korea Joint Ocean Research Center
1-302, 6th Bld. 19 Nanling Rd.
Hing-Tech Zone
Qingdao 266101
P.R. China
Tel: 86-532 894987
Fax: 86-532 894779

Ning Shu-chen
Director of Tianjin Oceanic Administration
143 Pukou Road Hexi District
Tianjin
P.R. China
Tel: 86-22 23282554
Fax: 86-22 23285236
E-mail: toa@tjlink.tisti.ac.cn

Park Jin Kyun
Korea-China Joint Ocean Research Center
1-302, 6th Bld. 19 Nanling Rd.
Hing-Tech Zone
Qingdao 266101
P.R. China
Tel: 86-5321 8898265
E-mail: ckjorc@public.qd.cn

Wang Kangshan
2nd Instit. of Oceanography SOA
No.9 Xixihexia Road
Hangzhou
P.R. China
Tel: 86-571 8064219

Wang Xinian
National Marine Environment Forecasting Center
No.8 Dahuisi Haidian Division
Beijing
P.R. China
Tel: 86-10 62173615
Fax: 86-10 62173620
E-mail: x.n.wang@263.net

Qin Li
IOI China Operational Center
93 Liuwei Rd, Hedong District
Tianjin 300171
P.R. China
Tel: 86 22 24301292
E-mail: qinli@public1.tpt.tj.cn

Xu Hong
Environmental Protection Bureau of Zhejiang Province
No.43 Tianmushan Road
Hangzhou
P.R. China
Tel: 86-571 7055421, 7055420
Fax: 86-571 7054190
E-mail: zepb.516@zepb.zj.cninfo.net
zepb516@zepb.zj.cninfo.net

Tianhu Xu
National Marine Data and Information Service
93 Liuwei Road, Hedong District
Tianjin 300171
P.R. China
Tel/Fax: 86-22 24301292
E-mail: ioi@netra.nmdis.gov.cn

Ying Wang
Dean, School of GeoScience, Nanjing University
Nanjing University,
Nanjing 210093
P.R. China
Tel: 86-25 3593736
Fax: 86-25 3595387
E-mail: wangying@nju.edu.cn

Zhang Qing
2nd Instit. of Oceanography SOA
No. 9 Xixihexia Road
Hangzhou
P.R. China
Tel: 86-571 8064174
E-mail: siosoa@mial.hz.zj.cn

Zhou Qinghai
State Oceanic Administration
No.1 Fuxingmenwai Ave.
Beijing 100860
P.R. China
Tel: 86-10 68032211-5608

Xu Dongfeng
2nd Instit. of Oceanography SOA
No.9 Xixihexia Road
Hangzhou
P.R. China
Tel : 86-571 8076924-2481
E-mail : xu-df@263.net

Xia Xiaoming
2nd Instit. of Oceanography SOA
No.9. Xixihexia Road
Hangzhou
P.R. China
Tel: 86-571-8076924-2338
E-mail: xiaxm@mail.hz.zj.cn.

Yang Huaxiong
Ministry of Communication of P.R.C
11 Jianguomennei Ave.
Beijing 100736
P.R. China
Tel: 86-10 65292626
Fax: 86-10 65292626

FRANCE

Yves Henocque
Coastal and Marine Environment Laboratory
IFREMER, Toulon
IFREMER B.P.330
83507 La Seyne S/Mer
France
Tel: 33-4 94304907
E-mail: yves.henocque@ifremer.fr

INDONESIA

Bambang Barata
PT.Pembarguman Pluit Jaya
(Jakarta Local-Government Owned Company)
JL. Pluit NO.1, Jakarta 14450
Indonesia
Tel: 62-21 6614330
Fax: 62-21 6695294
E-mail: prgvealev@indosat.net

Thamrin Djamain
Jakarta City Government-Pluit State Owned Co.
Jl.Pluit
Jakarta
Indonesia
Tel: 62-21 6692301
E-mail: ppjredev@indo.sat.net

Mochamad Sidarta
Jakarta Waterfront Implementation Board
Jl.Lodan No.7, Taman Impian Jaya Ancol, Jakarta
14430
Indonesia
Tel: 62-21 6450466
Fax: 62-21 6450468
E-mail: drta@cbn.net.id
pantura@cbn.net.ida

Tjoek Azis Soeprapto
Marine Geological Institute
Jln. Dr. Junjunan No.236-Bandung
Indonesia
Tel: 62-22 632151
Fax: 62-22 6017887
E-mail: doelmgi@ibm.net

ITALY

Adalberto Vallega
International Geographical Union
C/O University of Genoa Dept. Polis Salita S.Agostino
37 16122 Genoa
Italy
Tel: 39-10 2095858
Fax 39-10 2095907
E-mail: vallega@polis.unige.it

NETHERLANDS

Gualbert Oude Essink
University Utrecht, Inst. of Earth Sciences,
Department of Geophysics
P.O. Box 80021
3508 TA Utrecht
The Netherlands
Tel: 31-30 2535142
Fax: 31-30 2535030
E-mail: g.oude.essink@geo.uu.nl

NIGERIA

Peter Olubunmi Santos
Dept. of Drainage Erosion Land Reclamation
Min. of the Environment Physical Planning
P.O. Box 6707
Ikeja, Lagos
Nigeria
Tel: 234-1 4961685
E-mail: amanciocanti@aol.com

PHILIPPINES

Rhodora Azanza
Marine Science Institute University of the Philippines
Diliman, Quezon City 1101
The Philippines
Tel: 63-2 9215967
Fax: 63-29215967
E-mail: rhod@msi01.cs.upd.edu.ph

UNITED KINGDOM

Russell Arthurton
Coastal Geoscience Consultant
5A Church Lane
Grimston Leicester
LE14 3BY
United Kingdom
Tel/Fax: 44-1664 823107
E-mail: r.arthurton@btinternet.com

UNITED STATES OF AMERICA

Richard Delaney
Urban Harbors Institute
Univ. of Massachusetts Boston
110 Morrissey Blvd.
Boston, MA 02125
USA
Tel: 1-617 2875570
Fax: 1-617 2875575
E-mail: rich.delaney@umb.edu

Evelia Rivera-Arriaga
University of Delaware Center for the Study of Marine Policy
301 Robinson Hall
Newark DE 19716
USA
Tel: 1-302 8318086
Fax: 1-302 8313668
E-mail: 23092@udel.edu

Douglas Sherman
Dept. of Geography Univ. of Southern California,
90089-0255
USA
Tel: 1-213 740-0061
Fax: 1- 213 740-0056
E-mail: sherman@usc.edu

APN

Wan Zhibin
Start Regional Center for Temperate East Asia. C/O Institute of Atmoshperic Physics
Chinese Academy of Sciences
Bldg. No.7, QiJiaHuoZi, De Wai Street, Chao Yang District
Beijing 100029
P.R. China
Tel: 86-10 62041317
Fax: 86-10 62045230
E-mail: sec@ast590.tea.ac.cn

INTERNATIONAL OCEAN INSTITUTE (IOI)

Gunnar Kullenberg
International Ocean Institute
P.O. Box 3
Gzira GZR01
Malta
Tel: 356-346528
Fax: 356-346502
E-mail: ioimla@kimmunet.net.mt

R.Rajagopalan
International Ocean Institute
ICSR Building IIT
Madras
Chennai 600036
India
Tel: 91-44 2301338
Fax: 91-44 4458805
E-mail: ioi@v.snl.com

UNEP (EAS/RCU)

Jiang Yihang
United Nations Environmental Program
UNEP EAS/RCU
United Nations Building, 10th floor, Block B
Rachadamnern-Nok Avenue
Bangkok 10200 Thailand
Tel: 66-2 2882084
Fax: 66- 2 2812428
E-mail: jiang.unescap@un.org

WORLD BANK

Dirk De Bruin
EASES, MC 8-243
The World Bank Group
1818 H Street, N.W
Washington, D.C. 20433
USA
Fax: 1-202 477 6391
E-mail: ddebruin@worldbank.org

IOC SECRETARIAT

Julian Barbière (**Technical Secretary**)
Intergovernmental Oceanographic Commission
Unesco, 1 Rue Miollis
75732 Paris Cedex 15
France
Tel: 33-1 45684045
Fax: 33-1 45685812
E-mail: j.barbiere@unesco.org

Su Jilan
Center for Coastal and Atmospheric Research
The Hong Kong University of Science and Technology
Clear Water Bay
Kowloon, Hong Kong
P.R. China
Tel: 86-852 23586675
Fax: 86-852 23581582
E-mail: jlsu@ust.hk

Anna Widén
Intergovernmental Oceanographic Commission UNESCO
1 rue Miollis
75732 Paris Cedex 15
France
Tel: 33-1 45683994
Fax: 33-1 45685812
E-mail: a.widen@unesco.org

ANNEX III

OPENING ADDRESSES

ADDRESS BY THE DEPUTY ADMINISTRATOR, SOA, MR. CHEN LIANZENG

The respected Prof. Su Jilan, Chairman of IOC,
The respected Mr. Ye Defan, Mayor of Hangzhou,
Distinguished representatives of coastal cities and international organisations,
Dear experts,
Ladies and gentlemen,

First of all, please allow me to extend, on behalf of the State Oceanic Administration of China and Mr. Zhang Dengyi, the Administrator who is unfortunately unable to come due to unforeseen reason, our warmest welcome to the representatives of various coastal cities and international organisations, as well as scientists and experts, for coming to China and participate in the International Workshop on Coastal Megacities, being inaugurated here in the beautiful city of Hangzhou. This represents a new field of co-operation in terms of ICM between the State Oceanic Administration of China and the IOC.

The idea of having this meeting was inspired by the United Nations Conference on Environment and Development, and particularly Agenda 21, which called for sustainable development of coastal areas through joint efforts of all governments. It was also inspired by HABITAT II – a city summit held in Istanbul, Turkey in June 1996 under the auspices of the United Nations Educational, Science and Cultural Organisation (UNESCO), where the role of cities in sustainable development was the main focus.

As you all know, the coastal area is the most dynamic area where the atmosphere, lithosphere, biosphere and hydrosphere meet. About 60 percent of the world's population live in the coastal area, and particularly in coastal cities which provide the locomotive of world's economy. According to a projection of UN Population Fund, by 2015, of all the megacities larger than 10 million, the following are the sea megalopolis: Tokyo, Bombay, Madras, Lagos, Shanghai, Tianjin, Jakarta, Karachi, New York, Metro Manila, Los Angeles, Buenos Aires, Istanbul, Rio de Janeiro, Osaka and Lima. While the coastal megacities experience the similar development process of normal megacities, they have their special problems, such as freshwater supply, transportation, land subsidence, waste disposal at sea and marine pollution, depletion of fishery resources, natural marine disasters, and most importantly, the balance of rapid economic development and the preservation of coastal environment for sustainable development. Therefore, the aim of this workshop is to bring together the national and local urban management authorities and natural and social scientists, to address the issue of coastal cities, and especially the coastal megacities, with a view to ensuring sustainable development of the coastal cities which we believe, will be one of the most important field of action for the next millennium.

China has a coastline of 18,000 kilometres and some 6,500 coastal islands. There are 8 coastal provinces, 2 coastal megacities under the direct control of the Central Government, and 1 coastal autonomous region, with some 90 medium and small-sized coastal cities and some 100 coastal countries. Like many other coastal countries, more than 40 percent of the Chinese population, meaning that some 500 million people live within the coastal areas, and this trend is still continuing at a high speed. The Chinese Government has established the ocean management authorities at the provincial and municipal levels, so as to promote the integrated coastal area management, and the sustainable development of coastal cities.

Since this workshop is the first of this kind to address the coastal city issues, I would hope that based on your discussions and deliberations, this workshop will not only come up with recommendations as to how to tackle the problems of general nature facing the world's coastal cities, and coastal megacities

in particular, but also come up with good suggestions as to how to solve the problems facing the coastal areas and coastal city management in China through exchange of ideas.

Finally, taking advantage of this opportunity, I would like to thank, first of all, Dr. Gunnar Kullenberg, the former Executive Secretary IOC and the current Executive Director of the International Ocean Institute, who is here with us today and Mr. Zhang Dengyi, the SOA Administrator, who sat in a cosy little French Bar in the rainy winter in Paris in 1997 and cooked up the idea of organising this workshop. I would like to thank IOC, particularly Prof. Su Jilan, the Chairman of IOC, Dr. Bernal, the present Executive Secretary IOC and his staff for the strong support and hard work to make the workshop possible. I would also like to thank UNESCO and the Chinese National Commission for UNESCO for the continued support to this workshop. I would like to express my appreciation to the municipal government of Hangzhou for its contribution to the workshop. My appreciation also goes to the Second Institute of Oceanography, SOA, for the excellent arrangement of the workshop. Last but not least, I would like to thank all the participants for coming to China and contribute to the workshop.

I wish the meeting every success, and all of you a pleasant stay in Hangzhou and China.

Thank you for your attention.

ADDRESS BY THE IOC CHAIRMAN, PROF. SU JILAN

Mr. Chen Lianzeng, Deputy Administrator of SOA
Mr. Mr. Ye Defan , Deputy Mayor of Hangzhou
Representative of the National Commission of China to UNESCO
Dr. Gunnar Kullenberg, Executive Director of IOI

Dear Participants,
Ladies and gentlemen,

It is a great honour for me today to welcome all of you in my home town of Hangzhou, and also to express on behalf of the Intergovernmental Oceanographic Commission, and particularly Dr. Patricio Bernal, the Executive Secretary IOC, my most sincere congratulations to the organisers of the IOC-SOA International Workshop on Coastal Megacities. Unfortunately, Dr. Patricio Bernal was not able to join our meeting due to other important commitments. I am pleased to see that today in this room we have participants from the five continents, this reflects the fact that the issue that will be addressed during this workshop, that is the growing urbanisation in coastal areas is a world-wide phenomenon.

As the newly elected IOC Chairman, I feel it is my duty to tell you a little bit more on the work of the Commission. Science is at the core of UNESCO's mission. It is the reason why IOC was created as part of UNESCO. However, since the establishment of the Commission 40 years ago, many things have changed. Although IOC's mandate, as part of UNESCO, is solidly based in science, our work is not bounded by the traditional limits of the scientific endeavour. The ocean has always had some societal use, but imperfect regulations and insufficient institutional arrangements today put those uses at risk. This is a major concern for all Member States of UNESCO and IOC. Over the past decades, the main focus of the IOC activities was on the open sea and achievements of the Commission are well known, for example contribution to the global atmospheric research programmes, leadership in ocean component of the world, the establishment of the Global Ocean Observing System, and many others. Gradually, the interest in coastal zone studies has rapidly increased, and today activities related to coastal zone research and monitoring occupy one of the priority area of the commission. It is within this new context that IOC established in 1998 a programme fully dedicated to Integrated Coastal Area Management, addressing in particular the role of marine science inputs and observations in the process concerned by Integrated Coastal Management.

During the last years IOC has arranged a number of important scientific meetings on the management of the coastal zone, training courses and interesting publications. To a certain degree this workshop occupies a unique place among other meetings as the organisers succeeded to bring together policy makers of different level, provincial and local, governmental and international, as well as distinguished scientists with the objective to share experiences and provide guidance for the sustainable management of coastal megacities.

A little more than a year ago, IOC and the Korean Maritime Institute organised a workshop in Seoul on the Challenges of Implementing Integrated Coastal Management. The workshop adopted the 'Seoul Statement', which among other things recommended the initiation of a Global Ocean Forum for exchange of views, discussion of new developments. It also called for "*International organisations, national governments, donor organisations, and others to focus increased their attention on the growing trend toward urbanisation of coastal areas and, especially on coastal megacities, given their explosive growth and the pressing problems of their great populations*".
Considering the fact that 2.6 billion people live in large urban complex, and that most these cities are located in coastal areas, it is clear that we are facing a formidable challenge in terms of health care and preserving ecological systems.

I hope that the Workshop will be able to formulate concrete recommendations on establishing effective mechanisms for achieving integrated coastal and ocean management in the context of megacities. One very important goal is to reach policy makers and management authorities to help ensure that the environment and the resources of coastal zones are given the priority they deserve in national and municipal policy as major economic assets. The issue is clearly multifaceted, and will require the participation of society as a whole. The role of socio-economy, science and technology sectors as a mean to achieve sustainable development should be understood, accepted and used.

This workshop is one step in the right direction. I wish all of you here today our very best wishes in your searches for solutions.

Thank you.

ADDRESS BY THE DEPUTY-MAYOR OF HANGZHOU, MR. YE DEFAN

Distinguished guests, Ladies and Gentlemen,

In the season of refreshing autumn time with sweet Osmanthus fragrance in the air, our city is pleased to host the international workshop on coastal megacities. On behalf of Hangzhou Municipal Government and its citizens, I would like to take this opportunity to express my sincere congratulations to this high-level international workshop and my warmest welcome to all distinguished guests present here today.

This workshop will discuss about planning, management, exploration and environmental protection of megacity coastal areas, which will be certain to bring a widespread and profound influence on the future social and economic development of those megacities. Now, please allow me to take this opportunity to give you a brief survey of the City of Hangzhou.

As one of the seven ancient capitals in China, Hangzhou is a National Key Scenic and Tourism City with rich historical and cultural heritage. It is the capital city of Zhejiang Province and one of the important cities in the Yangtze River Delta. It has 5,000 years of historical culture since the ‘Liangzhu Civilisation’ and has over 2,200 years of history since the establishment of the city in 222 B.C. Hangzhou has been historically reputed as ‘the City of Culture’, ‘Land of Fish and Rice’, ‘County of silk’, ‘Capital of Tea’. It also has a well-known reputation as ‘Paradise on Earth’.

Located at the Southeast coast of China at 30°15' North (north latitude) and 120°16E (east longitude), the City of Hangzhou covers an area of 683 square kilometres with a population of 1.72 million. The city has a national level scenic resort, the West Lake Scenic Resort, covering a total area of 60 square kilometres. The West Lake is actually a lagoon formed by the withdrawal of the sea 12,000 years ago. Covering a lake area of 5.6 square kilometres, the West Lake is like a pearl or gem in the city. It has been cherished by the local people as a treasure endowed by the nature from generation to generation. Since1950s, great efforts have been made to protect and develop the West Lake scenic zone. The surrounding hills are getting greener and Lake Water getting clearer, adding lustre to the natural scenic spots and cultural relics. The West Lake Scenic Zone boasts over 100 scenic sports and historical sites, of which 5 historical cities are under the protection of the State, 35 of the Province, and 25 of the municipality.

Winding through the city from Southwest to Northeast, the Qiantang River is 605 kilometres long and flows to the East Sea through the Hangzhou Bay. The magnificent view of the Qiantang River Tidal Bore is world-wide famous. The Qiantang River is the 'Mother River' of the city of Hangzhou, and has been carefully protected and used by the local people. The water quality of the Qiantang River has been kept as sources of drinking water. We have built high quality embankments along the Qiantang River, which could guarantee the safety of Hangzhou under the circumstance of a catastrophic flood. At the upper reaches of the Qiantang River, there is the 'Two Rivers & One Lake' national scenic zone, that is the Fuchun River, the Xinan River and the Thousand Islands Lake. The zone boasts not only unique and charming landscape, but also variety of historical and cultural relics, thus got the fame as 'Golden Tourism Line'.

Taking the advantage of the West Lake Scenic Zone and the Two Rivers & One Lake Scenic Zone, the city has attracted thousands upon thousands of tourists. In 1998, the city received about half million foreign tourists and 22 million domestic tourists. The tourism revenue accounted for 16.5 per cent of the city's GDP.

Hangzhou has enjoyed prosperous economy since ancient time. Dated back to more than 1,400 years ago in the Sui Dynasty, Hangzhou was selected as one of the three important foreign trade cities of the nation with Guangzhou and Yangzhou. At present, Hangzhou is not only an important city in the Yangtze River Delta but also a very important transportation hub in Southeast coast of China. Three bridges have been built cross the Qiantang River. Railways and expressways in the city radiate in all directions. Besides the Jianqiao airport, a new international airport is now under construction on the southern bank of Qiantang River and its first phase project will be finished and open to traffic next year. In addition, the Qiantang River and other inland river navigation is quite convenient. It takes only over one hour from the city proper to the Shanghai harbour or the Ningbo harbour either by expressway or railway. In the past 20 years since the implementation of the reform and opening policy, Hangzhou has kept a steady and rapid growth in its economy. In 1998, its GDP reached 113.5 billion RMB with an increase of 11.2 per cent than last year. Its comprehensive economic strength ranked the second place among all the provincial capitals of the nation.

Hangzhou is striding toward the 21st century with the goal of creating the city strong in economy and famous for historical culture. By the year of 2010, the city is expected to present its new vision to the world as an economically developed city as well as an international scenic and tourism city.

However, comparing with other developed metropolises, there is still a lot of work for us to do to improve our city's economic and cultural development. We are eager to learn more advanced experience from other cities. I am confident that the city is going to benefit from hosting the workshop. We would deeply appreciate if you would like to offer your ideas and opinions about the urban construction and social development of the city.

At last, I wish a complete success to the workshop, and every one of you an enjoyable stay in Hangzhou.

ANNEX IV

ABSTRACTS OF THE PRESENTATIONS

MARINE-RELATED PHYSICAL NATURAL HAZARDS AFFECTING COASTAL MEGACITIES, WARNING AND MITIGATION

by Russell Arthurton

The fast-growing, coastal megacities of the world are expanding into areas already vulnerable to marine-related, physical natural hazards, or, because of physical environmental changes, will become vulnerable within the time-scale of city planning. The hazards comprise those due to extreme events, such as storm surge and tsunami, that may be catastrophic in their impacts; and those that relate to continuing changes over the long-term, notably global sea-level rise, sedimentary consolidation and coastal erosion. These changes may be exacerbated by human activities, including the production of 'greenhouse' gases and over-abstraction of groundwater; while not necessarily threatening catastrophic loss of life or destruction of property, they may have important future economic and social implications.

There are two complementary approaches to hazard mitigation – hazard constraint, and vulnerability reduction. Science can contribute to the planning and implementation of sustainable adaptive measures. It can improve the quantification of hazard incidence and severity, predicting return periods and magnitudes; and it can define the geographical limits of vulnerability in a range of possible scenarios over time-scales appropriate to the planning cycle.

Contemporary, high risk, hazard scenarios for existing city developments demand an approach that focuses primarily on effective warning networks and emergency planning; long-term, incremental hazards that are forecast to affect both developed and peri-urban areas require a strategic planning approach, perhaps including relocation and, if affordable, protective capital works. The choice of measures should be informed by the best possible predictive information on hazards and on vulnerability, with socio-economic evaluation so that the costs and benefits of the possible options can be appraised. Collection of reliable baseline and monitoring data relating to the hazards in local, regional and global perspectives is an essential precursor to the development of a predictive facility.

SEAFOOD POISONING FROM HARMFUL ALGAL BLOOMS IN COASTAL AREAS

by Rhodora V. Azanza

As a consequence of the increasing demand for seafood, aquaculture and wild harvest of shellfish and finfish have recently expanded and intensified. Over the last two decades, harmful phytoplankton blooms have caused economic disasters and negative public health impacts in many coastal areas. Poisoning from harmful algae include Paralytic Shellfish Poisoning (PSP), Diarrhetic Shellfish Poisoning (DSP), Neurotoxic Shellfish Poisoning (NSP), Amnesic Shellfish Poisoning (ASP) and Ciguatera Fish Poisoning (CFP). PSP seems to be the most serious problem based on published reports.

Positive shellfish transvectors of PSP include *Perna viridis, Crassostrea sp., Anadara sp., Mytilus sp. and Placopecten sp.* among others. Planktivorous fish like *Sardinella sp.* and *Decapterus macrosoma* have also been found to accumulate PSP toxins. Virtually all edible shellfish in affected bodies of water can potentially become vectors of DSP, NSP, ASP and PSP depending upon the causative organisms in bloom. Ciguatera Fish Poisoning has been prevalent in tropical areas and resulting from consumption of reef fish as *Sphyraena barracuda*. Regulatory measures to protect public health from possible toxicity from these harmful phytoplankton have been put in place in many countries but need to be enhanced or initiated in others.

RESTORATION AND MANAGEMENT OF COASTAL ECOSYSTEMS AND HABITATS ON THE COAST OF MELBOURNE, AUSTRALIA

by Linda Cuttriss and Eric Bird

Melbourne, a city of 3.2 million people has extensive suburbs which have spread along the coast of Port Phillip Bay, especially to the south east of the city. The municipality of Bayside has a seafront road dividing the suburban hinterland from the coastal fringe. From Beach Road, a public reserve of lawns, gardens and bushland up to 100 metres wide ends in cliffs and bluffs that overlook sandy beaches, rocky shores and the nearshore waters of Port Phillip Bay. Each of the components of the Bayside coastline presents management problems.

Beach Road carries substantial traffic flow producing noise, pollution and safety problems which detract significantly from the recreation and conservation values of the coastal fringe. Over the 165 years since Melbourne was established, habitat loss, weed invasion and erosion have reduced biodiversity in the coastal reserve. In recent years, the Bayside Council and local conservation groups have undertaken weed removal and revegetation projects to restore coastal habitats.

In the past, actively receding cliffs have threatened to undermine Beach Road so in the 1940s and 1950s cliffs were stabilised by building basal sea walls and planting the slopes with grasses and shrubs. Many beaches have diminished or disappeared as a result of reflection scour from these seawalls and in recent decades most have been restored by beach renourishment.

Water quality in Port Phillip Bay is generally good as sewage and non-hazardous industrial wastes are piped to treatment plants before discharge into the bay. The main source of marine pollution is now from stormwater drains and ships that dock at the Ports of Melbourne and Geelong. Of particular concern is the introduction of exotic marine organisms from discharged ballast water. Collection of shellfish has caused depletion of intertidal rocky shore communities. Regulations which prohibit shellfish collection are supported by multilingual signs, enforcement officers and community education programs.

All aspects of Melbourne’s coastline are interrelated and interactive. It is necessary to apply integrated planning and management to ensure their optimum use and conservation.

URBAN DEVELOPMENT AND COASTAL RESOURCES, ENVIRONMENTAL PLANNING

by Dick de Bruin

More than 60% of the world's population lives in a 60-kilometer wide strip of the global habitable zones. It is expected that in the next generation about 6 billion people will occupy this area, the present size of the world's population. A major share will live in the expanding Mega Cities in this zone. To look at these cities is to look at our future, prospects are uncertain at best. There is no right set of answers, there are however many sets of promising answers.

The relationship between 'Megacity' and 'water and environment' is obvious, in particular in coastal zones. There exists a permanent tension between natural habitat and manmade provisions in these areas. Here, the impact of human life on its environment has caused tremendous distortions on the habitat of the Megacity. Without a sustainable environment, some cities may become themselves unsustainable human habitats. A gradually declining environment is often approached as part of life, so structural improvement and restoration is hampered by lack of funds due to decreased allocations. On the other hand, a sudden distortion in a populated area is mostly approached as a disaster, and funds for repair and relief are quickly generated. This striking difference in the way severe distortions in populated areas are handled has everything to do with policies and politics on both municipal and national levels.

Megacities in coastal zones are always related to an important port. Given its size, such a port is important for the development of a national economy, so its impact goes even beyond the scale of the nearby metropolis. Rush hour traffic in Megacities creates gridlock, the situation can even be worse if the regular commodity flow to and from the nearby port will mix with this slow moving air polluting daily feature. Sea, port, and related adequate hinterland connections include physical and geographic restrictions (and obstructions) for the development of a Megacity in a coastal zone.

'Sustainable environment in a city habitat' has everything to do with adequate planning and effective infrastructure, and with integrated solutions to achieving sustainable developments for human life in the metropolis. For this, adequate policies are needed, as well as consistent political interest and decision-making. It is obvious that 'city development' and 'national planning' do not always run parallel. Urban policies are often even in opposition to government policies. This difference can hamper the development of a sustainable environment and habitat in a Megacity area.

This Keynote contribution elaborates on the above issues, illustrated with examples and metaphors. It places the Bank's activities in the context of its Urban Development Program in developing countries.

(The findings, interpretations and conclusions expressed in this paper are entirely those of the author and should not be attributed in any manner to the World Bank, to its affiliated organisations, or to members of its Board of Executive Directors or the countries they represent.)

RECENT TRENDS IN MARINE TRANSPORTATION SYSTEMS IN THE UNITED STATES: OPTIONS FOR COASTAL MEGACITIES

by Richard F. Delaney

Historically, waterborne ferry services have served as primary transportation links carrying passengers, goods and vehicles since the earliest waterfront settlements in many coastal countries. However, the reliance on ferry systems has greatly diminished in many countries during this century with the overwhelming dominance of the automobile and the accompanying construction of highways, bridges, and tunnels. Today’s large cities and emerging megacities will need new strategies and techniques to address the increasingly serious economic and environmental impacts caused by traffic and its congestion in the cities.

One element of those strategies may well be a renewed reliance on marine transportation systems. Despite the huge presence of the automobile especially in U.S. coastal cities, there remain a significant number of locations where water transportation is the most effective method of travel; and some coastal urban areas are experiencing a resurgence in ferry service as new types of transportation pressures have surfaced in recent years.

This presentation is based on studies conducted by the Urban Harbours Institute at the University of Massachusetts Boston and particularly one report prepared by Charles Norris entitled Assessment of Ferries as Alternatives to Land-Based Transportation. A number of marine ferry systems in some of the largest cities in the United States (New York, San Francisco, Boston, Seattle) and representing a variety of urban and geographical situations will be examined to demonstrate how this mode of mass transportation can be most effectively utilised to address transportation congestion and the serious economic and environmental impacts caused by traffic congestion.

Some of the key findings of the studies show that: 1. since 1980’s, the market for passenger ferries in densely populated urban waterfront cities in the US has returned with a combination of old routes being restored and new water routes being established to fill emerging newtransit niches; 2. that ferry systems can provide more efficient transportation connections than land based alternatives in travel time and distance, trip cost and energy; 3. and that qualitative factors such as smooth intermodal

connections, safety and comfort, and reliability will contribute to the expected continued increase in the use of marine ferry systems; 4. that the use of alternative fuels such as natural gas may make marine ferry systems even more effective.

IMPROVING FRESH WATER SUPPLY - PROBLEMS AND SOLUTIONS

by Oude Essink

Many coastal regions in the world experience an intensive salt water intrusion in aquifer systems due to natural and anthropogenic causes. The salinisation of these groundwater systems can lead to a severe deterioration of the quality of existing fresh groundwater resources. In this paper, problems associated with these water resources are discussed, such as upcoming of saline groundwater caused by overpumping and salt water intrusion caused by global mean sea level rise. Possible human activities to compensate and control the salinisation of coastal aquifers are presented. Most countermeasures appear to be expensive, laborious and should be taken in time. As such, sustainable management of fresh groundwater resources in these coastal regions requires extensive co-operation between authorities and water users. Finally, an introduction to numerical modelling of variable-density groundwater flow is given to demonstrate a means how to obtain more (quantitative) information on the salinisation of the subsoil.

URBAN COMMUNITIES AND ENVIRONMENTAL MANAGEMENT IN FRANCE: THE EXAMPLE OF THE TOULON BAY CONTRACT

by Yves Henocque

A Bay Contract is a statutory and co-ordinating tool related to the 1992 French Water Law. It helps in the definition and implementation of :

- collective and concerted management planning of waters (continental and marine) and associated ecosystems, in order to respond to user needs, preserve and protect aquatic systems, and develop the water resource in a sustainable way ;
- continuous co-ordination with the help of a co-ordinating unit between the municipalities concerned.

The Bay Contract process has been defined in such a way that stakeholders can develop a sense of ownership of their own bay once they have identified common objectives and a common vision of their bay's future.

The first step corresponds to an Environmental Assessment leading to objectives identification, priority actions and their estimated cost, and the necessary institutional arrangements for the co-ordination and implementation of actions.

In this presentation, we will describe the case of the Toulon Bay "Rade de Toulon" which has just been given the official green light as a Bay Contract.

WHAT ARE THE CONDITIONS AT STAKE IN THIS BAY CONTRACT?

Including 14 municipalities, the area is located in the Eastern part of the French Mediterranean coast, with a coastline of more than 70 km and a superficy (land + marine waters) of about 340 Km^2.
About 350,000 inhabitants are living within the area, with a growing population inflicting an important pressure (uses, inputs) in the coastal zone.
Tourism (hotels, beaches, leisure boats...) is moderately developed and could have a strong potential as an economic alternative to declining sectors like shipyards. In this way, it is considered that the natural heritage of the area (coastal zone) is of the utmost importance for the future development of the bay,

and as such has to be protected and restored. Ownership, equity and co-ordination between the different stakeholders are the key words for the success of the Bay Contract.

DIAGNOSTIC MAIN RESULTS

From the numerous data, although sometimes disparate and thus difficult to compare, it has been stated that the coastal waters were fairly contaminated from the different economic activities taking place in the area. This is especially true in the inner part of the bay "Petite Rade" where waters and sediments are highly contaminated either from fecal coliforms, some heavy metals (Mercury, Lead, Zinc and Copper) or organic pollutants (TBT, PCB, Hydrocarbons). As a typical hydrodynamic phenomena in the Mediterranean, these contaminated sediments are regularly (windy conditions) redistributed in the water column and in the bay, acting as a polluting reservoir. In spite of a lack of data, the relative biodiversity and productivity observed in the bay, especially in its outer part, deserve to be more thoroughly examined in order to promote an appropriate management. In the years coming, biological competition could worsen through the extension of the green algae *Caulerpa taxifolia.*

The landward part of the area and its drainage basin need further investigations in spite of recent improvements in the used waters collecting and treatment networks. Still, urban and industrial inputs and rainwater non point sources need to be better identified and controlled.

As for the upholding and/or the development of economic activities around and in the bay, it has been noted that some of them are potentially conflicting (ex: Navy, commercial and leisure ports) and limited in some places by the poor environment quality (fishing, aquaculture, tourism).

OBJECTIVES IDENTIFICATION

Two main objectives have been selected:

1. To restore the coastal waters quality
2. enhance the natural heritage and the economic development of the bay and its drainage basin.

The sub-objectives are :

1. To restore the coastal waters quality
   - Restore the bathing water's quality
   - Restore the farming water's quality
   - Preserve the marine flora and fauna
   - Reconquest of the near shore

2. To enhance the natural heritage and the economic development of the bay and its drainage basin

   - Uphold the industry and port activities
   - Create the environmental conditions for tourism development
   - Optimise the balance between uses and space in the bay and its drainage basin
   - Management of flooding risk
   - Development of economic activities related to the sea
   - Assessment of the Bay Contract actions and results (Observatory)
   - Information and sensitisation of stakeholders and public
   - Setting up of a Good Practice Charter

As a preliminary step, each of these sub-objectives has been provided with a first round of possible actions which will have to be chosen in the next phase coming.

RESEARCH, MONITORING AND MANAGEMENT OF COASTAL WASTE AND POLLUTION

by Michael Huber

Large cities are a major source of coastal marine pollution. Encompassing the full range of human activities, they also generate the full range of anthropogenic contaminants that potentially threaten public health and the environment. Sewage, solid waste, and various contaminants in urban runoff and atmospheric emissions are issues of concern for all cities, while the relative importance of contaminants from industrial sources depends upon the industrial base of the city.

Environmental change and risks to human health are inevitable consequences of the growth of coastal megacities. Management efforts should focus first and foremost on determining the acceptable limits of change and risk and on establishing concrete social and environmental management goals and objectives. These are largely societal decisions but should be informed by scientific, economic, and social assessment that is both objective and holistic. Simple steps such as institutional co-ordination and a qualitative consideration of the value of marine ecosystems can yield significant benefits in this regard even where there are severe institutional, financial, technical, and social constraints.

After clear objectives have been set, priorities for action should be determined on the basis of maximising the overall benefits to society per unit investment, i.e. on maximising net benefits. This may appear obvious, but all too often does not occur because the relative importance of different pollution problems is not compared, because there is a perception that technologically advanced approaches are always preferable, because of imbalanced public and political perceptions of relative risks, because of short-term considerations, and for other reasons. Approaches to sewage management are used as an example.

Monitoring is a key tool for environmental management, but poorly conceived monitoring programs often consume large amounts of money and other resources without providing much information that is useful in management. Beginning with the initial design phase, monitoring should be developed as a management, not a scientific, exercise, and driven by management needs. The objectives of the program and uses of the information derived from monitoring need to be clearly stated at the outset. Monitoring should strive to provide early warning of impending environmental problems. It is also desirable to specify in advance the management interventions that will be taken in the event that monitoring detects a worrisome or unacceptable environmental change.

HIGHLIGHTING THE CONTRIBUTIONS OF MARINE AND COASTAL AREA RESEARCH AND OBSERVATIONS TOWARDS SUSTAINABLE DEVELOPMENT OF LARGE COASTAL URBANISATIONS

by Gunnar Kullenberg

The presentation will aim to illustrate contributions of marine research, ocean and coastal zone observations to various aspects of social development, precaution, environment, and economy of large coastal urbanisations, e.g. for planning purposes of using land and coastal areas for different, often competing and conflicting, sector applications; for land reclamation, sediment budgets, coastline and sea level changes; shipping and coastal transportation; for hinter-land uses and zoning; for fresh water and ground water use and protection; for waste management including sewage treatment and disposal, and other land-based pollution, and other land-based pollution management; for sustainable use of marine living resources and exploitational and exploration and exploitation of coastal and shelf seas non-living resources which all can be used for the benefit of the coastal population and the urban development. Many of the problems associated with large-scale urbanisation and population migration towards such centres are coupled with lack of integrated planning and lack of adequate information and coastal zone conditions and processes, and lack of understanding or not taking into account impacts of constructions, exploitations and waste disposals into coastal waters. This may well also be

coupled to the non-linear growth of the continued population and resource use pressure on the environment. The coastal ecosystem can cope with a certain pressure, beyond which collapses occur. The problem is to balance development and environmental uses of coastal resources.

Scientific understanding and adequate surveying of changing conditions can forecast inputs and collapses. The risk sources and the risks of the population, property and infrastructures also increase in a non-linear fashion due to the multi-sectoral uses and the inter-dependence of various processes and sectors. Science can help quantify disasters but also hazardous situations, as well as coastal changes and their implications. This is becoming an indispensable part of adequate risk management. Scientific information and approaches can also be used in raising public awareness, and in education. The education of young people may be particularly important.

The interaction between social and natural sciences will be emphasised. This is demonstrated by the need to find solutions to the problems that are socially and not only technologically acceptable. Finally a co-management model is presented based on the application of the 'oceanic circle' model of Professor Mann Borgese. The use of such a model is illustrated in some large coastal urbanisation centres in Europe and South America.

It is suggested that a co-operative network of large coastal urban centres could benefit from exchanges of experiences and that co-operation could help sharing of resources, pooling of knowledge, so as to help solve the investment needs in building a knowledge base fit for decision making purposes.

BUENOS AIRES AND ITS RIVER; MANAGEMENT PLAN FOR THE METROPOLITAN COASTLINE

by Miguel A. Linares

The River Plate represents a namesake basin outlet extending to part of the territories of Argentina, Bolivia, Brazil, Paraguay and Uruguay. Two large rivers flow into it - the Paraná River with an approximate flow of 17,000 m^3/sec and the Uruguay River with about 5,000 m^3//sec, both of which convey a great amount of suspended material that give the water its distinctive color. Another outstanding feature is its low depth and its deposition and erosion areas known as morphological units, such as Banco de Ortiz, Barra del Indio and the southern coastline (Franja Costera Sur) itself.

The limited mean depth of the river hinders its self-depuration. Yet there exist some characteristics that favor such process - richness and variety of plankton, important flow and great dynamics embracing the tidal regime which cyclically transports contaminant loads upstream and downstream, meteorological conditions, fresh and salt water density differences and the contribution of its tributaries. Both water and suspended material circulation characteristics are the result of an interaction between the oceanic tidal wave and its related current flows. Low waters follow the natural course of the river and high waters follow the tidal wave direction towards the upper River Plate.

The City of Buenos Aires was fonded in 1536 on the southern coastline of the River Plate. Since then, its steady growth has been boosted by its natural harbor condition and the important immigration settled in Argentina as from last century. Today, Buenos Aires has 3,000,000 inhabitants throughout a surface of 192 Km^2 divided into 47 districts. Added to the suburban population, this makes up 14,000,000 inhabitants who commute between the city and its outskirts every day by means of the railway which travels mainly along the coast. Consequently, 50% of the country's population is settled in the metropolitan area of Buenos Aires. For years, the coastline where the city is settled has undergone a disorderly and environmentally unsustainable growth worsened by erosion-sedimentation and flood phenomena caused by extraordinary seasonal-storm tides over the coast. Since the beginning of this century, untreated sewer liquids have been dumped in the River Plate waters, its consequent contamination being the major problem currently faced by the city. Industrial premises with depurating plants are scarce and most of them are connected to the sewer system. On the other

hand, the population consumes about 500 liters of drinking water per person, one of the highest figures in the world.

With this situation ahead, taken over by the Government of the City of Buenos Aires in 1996, an interdisciplinary Metropolitan Coastline Management Plan was introduced based on the following course of action:

1. Community autodiagnoses carried out in every district of the city to help the people become aware of existing problems and foster the change, acting as agents for local growth.
2. A Directing Plan for medium and long-term coastal projects to guarantee a legitimate use of the system -economic, transport, recreational and educational activities, among others- and to avoid, at the same time, coast floods and water contamination.
3. Implementation of technical co-operation systems for industrial rationalization with the support of the World Bank, Eximbank and the Environment Protection Agency of the United States.

This presentation shall then include a diagnosis of River Plate's southern coastline initial situation, with satellite photographs illustrating the system's dynamics and a later presentation of the City's Coastline Management Plan, with the aim of being enriched by the contributions of this workshop and cooperating with other coastal cities to solve our common problems together.

INTEGRATED COASTAL MANAGEMENT OF MUMBAI (BOMBAY), INDIA: A COASTAL CITY REPORT

by R. Murthy, Arun B. Inamdar and Y.R. Rao

Mumbai Metropolitan Region (MMR) is the largest of metropolitan coastal city in India with a population of 16 million inhabitants and extending over an area of 4500 sq. km. The region experienced tremendous growth over the years due to rapid industrialisation, urbanisation. MMR is also the major centre of economic activity in India. As a result there is a continuous and constant influx of population from the rest of the country. The high population density and the uneven growth rate have resulted in several environmental problems in MMR coastal region. Integrated Coastal Management (ICM) - a framework of integration of environmental goals into the economic developmental activities with stakeholder’s participation provides an effective tool for sustainable development of urban coastal regions of World’s cities.

Several aspects of MMR suffers from a wide variety of environmental as well as social problems due to unplanned and non-integrated sectoral developmental activities that are to be addressed for any meaningful implementation of ICM measures of MMR coastal region. Although the primary cause of these problems is attributed to population pressure, the land use pattern and concentrated industrialisation aggravates the problem. The land-filling operations (indiscriminate waste disposal), indiscriminate sand mining and ill-planned land reclamation are putting enormous pressure on the wetland ecosystem and threatened mangroves and other coastal ecosystems. The rapid urbanisation has also put a strain on services like housing, water supply, waste management and has led to the growth of slums of sub-standard housing and congestion. The annual rainfall (180cm -250 cm) received in a short span of 3 to 4 months (June - September) on many occasions results in flooding in the low lying areas of the city. Although Mumbai has relatively better water supply and waste water management systems compared to other cities in the country, they fall much shorter than requirements. The region has some very high polluting industries that include chemicals, fertilisers, iron & steel, petrochemicals, pharmaceuticals, thermal power station, etc. which release either semi-treated or untreated waste material into the atmosphere as well as coastal waters. Indiscriminate waste disposal on land has resulted in the degradation of aesthetic value of coastal beaches and this coupled with poor water quality has diminished the tourism and recreational value of the coastal areas. The air quality in several areas of the city has exceeded standards established by WHO due to large number of poorly

maintained transport vehicles and much smoke emitting industries. The recently completed or proposed Effluent Treatment Plants and ocean outfalls for the disposal of waste material is expected to improve the marine water quality of the region. A comprehensive ICM plan incorporating state-of-the art scientific, technological and socio-economic aspects would be beneficial for an orderly development of the Mumbai coastal region.

CONSTRUCTION OF THE EAST COAST ROAD IN INDIA

by R. Rajagopalan

The ongoing construction of the East Coast Road (ECR) in South India presents all the features of use conflict in the coastal zone. The planned highway from Madras to Kanyakumari, with the financial assistance of the Asian Development Bank, hugs the shoreline over its entire length of 730 km. The Government of the local state of Tamil Nadu, the Highways Department and the industry view the ECR as being vital for the development of the state and the welfare of the local communities. Environmentalists, however, argue that the ecological damage that would result from the construction and use of the highway would far outweigh the supposed benefits; that a proper environmental impact assessment had not been made and the project violated the Coastal Regulation Zone Rules framed by the central government; and that the project would benefit outsiders more than the local people. Public hearings, public interest litigation, commissions of enquiry and heated debates in the press have been gone through without a clear solution emerging. Even while the NGOs are pushing for an alternate inland alignment of the highway, construction work is apace, though at a slower pace than planned.

ENVIRONMENTAL CONSEQUENCES OF UNCONTROLLED DEVELOPMENT IN LAGOS STATE

by P. O. Santos

This paper presents a brief discussion on the "Environmental Consequences of uncontrolled development in Lagos State", which arguably is one of the most populous urban centres in the Continent of Africa. Though, the smallest of the 36 States in the Federal Republic of Nigeria in terms of land mass, it occupies just a paltry 0.4 per cent of the total 3,577 square kilometres land mass of the nation. With a population of about 10 million and an annual population growth rate of about 9 per cent, it exceeds the Nigeria national population growth rate. This astronomical population growth rate which is attributed to lack of proper planning, has led to slum growth and its attendant problems of flooding, pollution, and inadequate housing and poor transportation. This scenario invariably lead to rise in the poverty level of the residents as well as increase in crime wave.

The first chapter presents the historical background to the evolution of Lagos State from a small Yoruba tribe settlement in the 15th Century into a large slave market which metamorphosed into a fishing settlement by the turn of 19th century, of about 600,000 people. By 1960, the city had grown to a population of 1.5 million. It presently has a population of about 10 million and a projection of about 22 million people by the year 2025. The factors responsible for this among others include high concentration of socio-economic activities, with about 60% of the total industries in Nigeria sited in Lagos. Apart from human causes, nature also contributes in no small measure to the urban development problems of the State. This forms the kernel of chapter two. This is particularly so in the area of the geo-physical setting of the State which is predominantly low-lying, sandy barrier/lagoon system. Also, the high rainfall intensities coupled with low soil permeability in the hydromorphic and the artificially compacted soil results in high water retention. However due to low gradient heads, the runoff is very low.

Chapter three of this paper discusses in details specific environmental problems in Lagos which are classified into natural and man-made causes. The natural causes include flat topography of the region,

high intensity and long duration of rainfall, high water table, sunshine of high intensity, low soil permeability and the proximity of the city to the sea. Man-made causes include unplanned and uncoordinated development, poor highway and watercourse design and construction, inadequate waste disposal infrastructure and lack of adequate and proper maintenance programme amongst others. The consequences of these problems on the city, as well as on the inhabitants, are well known. For instances, flooding leads to loss of lives and property. It can also result in health hazards and economic loss. In the same way, improper disposal and management of solid waste and untreated sewerage have their consequential effects on the society. In fact, untreated sewerage in Lagos has led to contamination of groundwater, pollution of lagoon and loss of biodiversity.

Chapter four captures efforts of modern planning which dates back to 1927 when the Lagos Executive Development Board was created with the mandate to eradicate slums in certain areas of the Lagos Metropolis. Regrettably however, the development concentrated on the Lagos Island and the immediate environment while the rest of Lagos metropolis was neglected. Efforts to redress this unfortunate and unfavourable trend in the 60's and the 70's however, did not yield the desired results due to short- sightedness and poor planning on the part of successive governments.

Chapter five focuses on the regional economic activities in the city as it relates to industries, agriculture, fisheries, forestry and transport. For instance, unpublished record shows the decline in tree crops production as against the expansion of maize and cassava production. There is also being a steady decline in fishing activities due to pollution of the various water bodies and resultant threat to aquatic life and the entire marine eco-system.

In conclusion, Lagos will continue to experience rapid population and socio-economic activities. These will exacerbate the already bad environmental hazards. The need then arises for an integrated management approach to developmental infrastructure and exploitation of coastal resources.

SCIENCE AND MANAGEMENT IN THE URBAN OCEAN

by Douglas J. Sherman

The juxtaposition of intense human development with dynamic and sensitive coastal environments creates a daunting array of management issues. The problems associated with pollution, increased demands for space and services, coastal natural hazards, port development, and preservation of open space and ecosystems require the close attention of coastal zone managers in order that the advantages of living in the urban ocean are not overshadowed. The development of rationale solutions for many of these problems requires close co-operation between coastal managers and scientists. This is also a key attribute of Integrated Coastal Management.

Many of the issues facing coastal megacities are exemplified in the experiences of Los Angeles. L.A. is the second largest city in the United States, with a metropolitan population of approximately 13 million. The population continues to grow as people are drawn to the region because of a vibrant economy, the pleasant climate, and because of perceived amenities associated with images of southern California. The urbanisation of the Los Angeles shore has brought with it many of the issues common to coastal megacities. First, there has been rapid population growth, from as few as 1700 residents recorded in the 1850 census. Second, there has been a collapse of local commercial fisheries. Third, Los Angeles is threatened by a suite of natural hazards, including earthquakes, tsunami, beach erosion, and coastal flooding. Fourth, sewage treatment and waste disposal are chronic management challenges. Finally, the management and development of coastally dependent industry, especially oriented towards recreation and tourism, remains a key economic challenge.

This paper will provide a general overview of the Los Angeles Urban Ocean, and focus more closely on the challenges of water quality and public health, and natural hazards. Case studies of non-point source pollution, the value of coastal recreation, and beach erosion will be highlighted. The

perspective will focus on the interface between scientific research and the development/application of management policy.

THE JAKARTA WATERFRONT DEVELOPMENT PROGRAM (THE JWDP) "REBIRTH OF JAKARTA"

by Lt. General Sutiyoso

The Jakarta Waterfront Development Program (The JWDP) "Rebirth of Jakarta" comprises of reclamation area ± 2,700 Ha long 32 km of Jakarta Bay and developments of approximately 2,700 Ha of existing poor services areas adjoining the area to be reclaimed. It has an overarching environmental and social betterment objectives to generate funds, to revitalise and develop the waterfront of Jakarta, to assume its place as the Front Door of the City of the Nation, and place its position along with the big cities in the world.

The objectives are:

- To revitalise the Waterfront area, to be the nerve centre of economic life, nationally and regionally.

- To address the existing problems of North Jakarta. At the present time, there are a number of problems occurring in North Jakarta, which begin within the larger metropolitan area and beyond and ultimately impact upon and concentrate along the waterfront. This applies to issues of drainage, flooding, water quality, transport and accessibility. As a result the area suffers from increasing obsolescence and environmental and social degeneration.

- To redirect the current growth of the city of Jakarta away from its recent push to the south and to provide investment opportunities those are more in keeping with the needs of the coming year.

These programs create new challenges for private and public participation and creating a new base line and precedence for evaluating developments throughout Jakarta.

WATERFRONT REVITALIZATION *VIS-À-VIS* INTEGRATED COASTAL MANAGEMENT

by Adalberto Vallega

The basic objective of the paper is to discuss the trends of waterfront development in the context of the urbanised coastal areas and the possible integration between waterfront organisation and the integrated management of the coastal area. To deal with this subject first the external environment influencing waterfront evolution is considered, focusing on global change, the globalisation of the international economic system, and geopolitical change.

The diffusion of waterfront re-vitalisation programmes is considered in the context of the urban growth of coastal areas, concentrating attention on the numerical increase of megacities and proto-megacities. The ekistics theory, according to which urban growth will lead to the creation of the ecumenopolis (planetary urban system) including the marine ecumenopolis (urbanisation of all the continental belts) is considered with the aim of foreshadowing the possible role which could be played by maritime waterfronts in this context between now and the end of the 21st century.

The focus then shifts to the waterfront itself considering the historical triggers for waterfront revitalisation plans. Hoyle's model of the evolution of port-city relationships stimulated by the retreat

of seaport functions from the waterfront area is considered jointly with Vigarié's model of coastal industrialisation. Based on this approach a model of the parallel evolution of a coastal management approach and waterfront revitalisation is sketched. In this context the waterfront functions are incorporated into the coastal use structure by adopting a matrix-based representation. The expanding basis for conflicts between the waterfront functions is emphasised.

In the present state of the art, four organisational models of waterfront organisation may be identified: the American, Japanese, North European and Mediterranean. Each model is marked by its own set of relationships between the waterfront and the city and by the social perception of its role in local development. A framework of options occurring in waterfront revitalisation is presented with the aim of responding to two questions:

i. how the waterfront may be designed to be consistent with sustainable development, in that acting as a top rank spatial system conforming to the basic objective of integrated management of the coastal area;

ii. whether and how the waterfront could act as a leading spatial system to carry out integrated management of the coastal area within which it is located.

Discussion of the former question leads to design of the optimum choice among the possible objectives of waterfront management in order to optimise the consistency of waterfront development in relation to the concept of sustainability. As regards the latter question, the waterfront is considered as the core sub-system of the coastal system and its organisation is reckoned to include high rank functions of the coastal area. Reasoning then leads to focus on the design of waterfronts able to optimise their integration into the coastal system, and their development within coastal management.

To realise this prospect an international programme on Waterfront Coastal Area Integration (WCAI) may be thought of as desirable in order to pursue two basic goals:

i. to explore how coastal area management and waterfront planning may usefully interact generating a long-term positive feedback;

ii. to build up the Optimum Waterfront Design (OWD), intended as a planning and management model to be used as a reference basis for planning individual waterfronts where these aim at integration with coastal management strategies.

COASTAL MEGA-CITIES IN ASIA: TRANSFORMATION, SUSTAINABILITY AND MANAGEMENT

by Yue-man Yeung

Mega coastal cities (megahydropoli) have emerged as a major phenomenon in late 20th century. Some 60 percent of the world's population, or nearly 3 billion people, live in or within 100 km of a seacoast. The physical and socioeconomic transformation in Asia in its large coastal cities are examined. The wide range of problems they face through over-utilisation and misuse of resources in their immediate area as well as their hinterlands' are outlined. Issues of sustainability or otherwise in the present pattern of development are raised. How coastal cities can be managed is discussed by reference to successful practices and examples in Asia and elsewhere.

MARINE ENVIRONMENT RESPONSE TO CITY DEVELOPMENT-REGIONAL PROGRAMME OF ACTION FOR GPA/LBA

by Yihang Jiang

The development of coastal cities in the Asia and Pacific region has put very strong impacts to the marine and coastal environments, in particular the degradation of health of marine and coastal environment, modification of marine habitats, destroy of marine and coastal ecosystems.

The information used by this paper is based on the information in the region with regard to the land-based pollution to the marine environment, in particular the Regional Review and Regional Programme of Actions for the GPA/LBA. Some reference are made to the Transboundary Diagnostic Analysis for the South China Sea, prepared under the GEF Block B support.

The paper focuses on the existing problems of land-based pollution from coastal cities, the causes of these problems, and paths of the pollutants to the marine and coastal environments. The impact of the pollution to the marine and coastal environments is also indicated.

Requirements to solve the problems are suggested and some introduction on the activities prepared by UNEP is also presented.

SHANGHAI'S URBAN DEVELOPMENT AND THE PROTECTION OF MARITIME ENVIRONMENT

by Wu Nianzu

1. Shanghai has benefited in its development from its coastal location

Shanghai has made achievements in its social and economic development and urban construction in the past ten years.

- Rapid and sustained economic growth;
- Accelerated strategic industrial restructuring;
- Fast changes in the city's outlook;
- Better exploitation of maritime resources.

2. Strengthen the protection of maritime environment amid development

The city government has carried out its work in this regard in the following aspects:

- Increasing investment in environmental protection;
- Completing a batch of large environment projects;
- Improving ecological environment in a number of heavily polluted areas;
- Strengthening law enforcement in environment protection and education.

3. Intensify pollution control and promote the protection of maritime environment

Shanghai will enhance maritime environment protection and resource conservation in the following aspects:

- Carrying out water treatment with the Suzhou Creek as a priority;
- Promoting harmless disposal, reduction and recycling of solid wastes by way of cineration, biochemical treatment and comprehensive utilisation;
- Preventing and treating pollution amid industrial restructuring;
- Developing technology to improve pollution prevention and treatment and environment protection.

APN'S PLACE IN THE GLOBAL CHANGE COMMUNITY

by Zhibin Wan

In this presentation I would like to introduce you to the Asia-Pacific Network for Global Change Research (APN), an intergovernmental organisation whose mission is to foster global environmental change research in the Asia-Pacific region, increase developing country participation in that research, and strengthen interaction between the science community and policy makers.

The presentation will cover the APN's place in the global change community, its background and structure and its strategy for promoting global change research in Asia. Its activities revolving urbanisation issues will also be introduced.

ANNEX V

THE HANGZHOU DECLARATION

The workshop participants agree/note/emphasise :

that the world in the late 20th century has witnessed an unprecedented economic and social transformation, in form of coastal urbanisation. A result has been massive migration to coastal areas, and the emergence of coastal megacities as major centres of population and economic growth;

that the growth of coastal megacities has implied that they are areas of economic, social and cultural opportunities, as well as high consumption and poverty, and the quality of their marine and coastal environment is often rapidly degrading due to the increased pressure of population and urban development;

that the environmental degradation may lead to enhanced poverty for large parts of the population;

that this phenomenon has become urgent, particularly in developing countries;

that the contributions of natural and social sciences in the development, planning and management of coastal megacities have been neglected, but can make sustainable contributions to that issue, and that there is a need to consider urban and coastal systems as an integrated entity in the coastal area.

Therefore, recommend :

i) that Integrated Coastal Area Management (ICAM), including sustainable urban and coastal systems, should be recognised as the appropriate tool to effectively address the management and planning of coastal urban areas, and that natural and social sciences should inform this process from start to the end;

ii) that education, training and public awareness need to be increased in order to ensure that the interactions between coastal and urban environment are clearly appreciated and understood;

iii) that a network of coastal megacities should be established in order to provide a global forum for exchange on coastal urban planning management, science, technology and education;

iv) that case studies/assessments, possibly resulting in indicators, should be carried out on the inter-relationships between population pressure, poverty, affluence, environmental conditions and economic development.

P.T.O. to see annex

ANNEX TO THE HANGZHOU DECLARATION

The workshop participants agree/note/emphasise :

- the coastal population growth has reached critical thresholds—more than half of the world's population, according to the most realistic estimates, lives in coastal areas and is expected to develop uninterruptedly in the following decades;

- this process has been associated with that of the population growth and tourist pressure increase and therefore has proceeded with the creation and expansion of extended urban coverage generating megalopolitan areas in many parts of the world;

- coastal megacities (cities with 8 million inhabitants or more) have increased in number in such a way as to become the key component of the megapolitan coastal areas;

- small coastal cities (3 to 8 million inhabitants) are also proliferating;

- the most populated megacities are located in the developing world, and this spatial process is expected to accelerate in the twenty-first century;

- urban growth and expansion has been intensively influenced by and contributed to global change — namely, atmospheric warming and subsequent acceleration in biogeochemical cycles, including coastal erosion — and the rise of new resource uses bringing about increasingly complicated coastal use patterns;

- coastal cities have become key spatial elements of globalisation processes;

- these spatial processes, influenced by an accelerated change in global environmental conditions, and the rise of the "global village" in international economic and financial relationships, and international tourism, have provoked acceleration in human pressure on the local ecosystems and natural resources, as well as cultural heritage;

- in this unprecedented changing context, the revitalisation of maritime waterfronts has spread over the world;

- individual waterfronts have acquired increasing relevance to the local economic development, and in many coastal regions and islands, they have become key policy tools to deal with globalisation processes, especially tourism development;

- the growth of coastal and island cities and that of waterfront revitalisation are processes linked by feed-back profoundly influencing urban and regional policy in terms of both ecological and economic management.

RECOMMEND

intergovernmental and governmental organisations,
local authorities,
research and educational institutions
to

ESTABLISH co-operation aimed at tackling the ecological and social impacts from the expanding coastal urbanisation, and optimising sustainable development of coastal and island cities;

ENCOURAGE approaches aimed at considering jointly the ecological and economic dimensions of these processes with a view to optimising the management of natural resources and cultural heritage;

TRIGGER inter-disciplinary approaches to coastal organisation and holistic views of changing coastal urban structures and organisation in order to optimise the design of policy aimed at pursuing effective urban sustainable development;

ENCOURAGE actions to integrate and co-ordinate the international, multi-national, national and local scales in education, integrated planning of coastal cities and global networking;

ENCOURAGE natural and social scientists to:

- make graduate programmes more interdisciplinary, e.g. dedicate educational programmes for addressing interactions between coastal and urban systems for both public administrators and students;
- provide better economic valuation techniques;
- demonstrate physical-social-economic governance interconnection among drainage basins-coastal waterfront oceans;
- develop information and data to improve Environmental Information Systems and forecasting models;
- act as a link with science-oriented networks already established, such as the Asia - Pacific Network (APN);
- facilitate access of information on scientific research resources relating to urban ICAM;
- address intersectorial case studies;

RAISE the level of public attention and education with regards to health risks due to rapid development of urban areas and negative impact on coastal environment;

DEVELOP and structure educational programmes on Urban Ecology and its interaction with Coastal Ecology by:

- approaching elementary school systems, using coastal systems to exemplify applications for other disciplines, e.g. physics, chemistry, mathematics, social science and reviewing and synthesising of on-going related programmes at the school level – for example, the Harmful Algae Bloom programme of the Philippines;
- dedicating study programmes at the university level concerning coupling between urban and coastal systems and
- assessing of existing, on-going university programmes related to ICAM and their relationship to the coastal megacity issues;

EMPHASIZE the systemic, interactive nature of most coastal/urban issues and EXERT effort to influence other fields (Public Administration Law, etc.) to incorporate coastal megacities case studies in curriculum;

RECOGNIZE specific target audiences and RAISE public awareness, in particular with:

- schools as linkage between parents and schools;
- public officials by providing educated information through university systems and the private sector;
- youth and community-based groups as participatory audiences for environmental actions;
- broadcasting organisations and other journalism outlets;

ESTABLISH a network of large coastal cities with the following terms of reference:

- promote the sharing of knowledge at all levels-top to bottom, and experiences in ICAM as it relates to large coastal cities;
- involving local authorities, national governments and NGOs in major infrastructural coastal development;
- involve private sector and promote partnership with public sector;
- ensure that funding agencies understand the implications of development;
- promoting ICAM as a dynamic process whose benefits over a range of time scales need to be demonstrated by scientific knowledge;
- encourage existing running relationships between cities to encompass ICAM ideals;
- promote ICAM in coastal cities in the wider context of watersheds and the coastal ocean.

in particular,
the intergovernmental and international organisations
to

PLACE coastal megacities on their agenda carrying out monitoring and evaluation of the population growth of coastal and island cities and the subsequent ecological, social and cultural impacts, and convening initiatives aimed at building up co-operation between cities and between States;

CARRY OUT analyses of case studies useful for the design of sustainable development-oriented urban policy;

ENCOURAGE the integration of urban policy and coastal management programmes with a view to pursuing holistic and effective approaches to the whole coastal context;

CONVENE systematic discussions on the policy of coastal and island cities in order to share experiences, stimulate co-operation and improve policies;

ADOPT urban ICAM as a priority area and financially support ICAM;

SERVE as policy debating and information exchange fora with a view to increase technical support, co-ordination, and networking of experts;

CONSIDER the potential development of fellowship programmes;

EXCHANGE info and co-ordinating with each other and to provide financial and moral support;

CONSIDER that IOC as the initiator of this workshop should continue to play a leading and co-ordinating role in this process, and RECOMMEND the organisation of a second workshop within two years, on the following aspects:

- integrate success and failure case studies where urban coastal officials have utilised integrated planning methods in both developing and developed countries;
- analyse how to establish networks to continue sharing experiences and information;
- consider results from surveys of existing curricula, discussion of framework of formal and informal education;
- establish a dialogue between educators, public officials, relevant private sectors, media representatives;
- exchange experiences on public awareness campaigns – including the role of mass media.

the international research programmes
to

INCLUDE coastal and island urbanisation in their research projects in order to serve as a basis for designing effective urban and regional policies;

COOPERATE with intergovernmental organisations, governments and local authorities to optimise the use of scientific knowledge for policy purposes;

DESIGN models aimed at integrating ecosystem-concerned and social planning on the local scale, including measures dealing with natural disasters and extreme events;

PROMOTE monitoring-oriented research and multi-disciplinary training;

ACT as resources for expertise and the recognition of problems providing illustrative examples and standardisation of protocols;

LINK UP research institutions, in particular national surveys, monitoring and forecasting institutions, especially for natural hazards and technological hazards, which would be partners in programmes, as well as generator of research campaigns.

invite
governmental organisations
to

OPTMISE their collaboration with the intergovernmental organisations and international research programmes, adopt laws and actively endorse programmes in order to design and carry out effective national policy for dealing with the special issues of coastal and island cities; and taking benefit from the globalisation processes by involving coastal economic and social organisations, further delegate authority and support to local decision- makers and integrated planning frameworks;

CONVENE national programmes aimed at monitoring coastal and island cities and encouraging the implementation of local sustainable policies;

COMMUNICATE between Ministers of education through relevant international organisations such as UNESCO.

local authorities
to

GIVE attention to the growth of coastal and island cities, considering the impacts these have undergone from global change, and their involvement in globalisation processes;

PURSUE the sustainable development of the coastal cities by integrating the ecological, social and cultural policies and bearing in mind the rights of future generations;

CONSIDERING the protection of the ecosystem’s integrity, and the safeguarding of the local cultural heritage as the basis for effective urban policy;

ATTRIBUTE BASIC IMPORTANCE to the need to protect the local natural and cultural landscape as a basic resource for economic development, and as a key component of the heritage to transmit to future generations;

CONSIDER the management of fresh water resources, and the protection of ecological and cultural diversity as cardinal components of the local policy;

INTEGRATE physical planning, aimed at managing the ecological contexts, with social planning aimed at improving quality of life, and with consistent planning aimed at dealing with natural disasters and extreme events;

ENDORSE and promote educational programmes and participate in educational process acting as broker for the programmes.

non-governmental organisations
to

COOPERATE with local authorities to implement policies aimed at dealing with urban growth and associated impacts effectively, and optimise policy pursuing sustainable development;

DISSEMINATE information on the issues and prospects of the coastal and island cities in order to stimulate social participation in the design and operation of effective policy;

COOPERATE with research institutions involved in the monitoring of the coastal cities and the design of policy and planning approaches;

GENERATE political advocacy for ICAM;

SERVE as outreach centres to provide a mechanism through which, experience, curricula could be multiplied –and distributed;

ACT as coastal watchdogs and give feedback to educational systems;

CONSTITUTE advisory municipal committees for ICAM.

in particular,
the main coastal and island cities
to

SET UP effective partnerships aimed at sharing experiences and implement policy and planning; and, with this in mind;

ESTABLISH an International Coastal City Watch Institute (ICCWI) with the task of monitoring and evaluating urbanisation processes in coastal areas, and providing useful and appropriately selected information, data and scientific materials to decision-making centres concerned on any scale;

INCLUDE a permanent consultation mechanism between intergovernmental and governmental organisations, and research institutions in the context of the International Coastal City Watch Institute.

ANNEX VI

LIST OF ACRONYMS

ASP	Amnesic Shellfish Poisoning
APN	Asia-Pacific Network
CFP	Ciguatera Fish Poisoning
DSP	Diarrhetic Shellfish Poisoning
ECR	East Coast Road
EIR	Environmental Impact Research
EIS	Environmental Impact Survey
FAO	Food & Agricultural Organisation
GEF	Global Environment Facility
GPA/LBA	Global Programme of Action for the Protection of the Marine Environment of Land-based Activities
ICAM	Integrated Coastal Area Management
ICM	Integrated Coastal Management
IGU	International Geographic Union
IOI	International Ocean Institute
IOC	Intergovernmental Oceanographic Commission (of UNESCO)
JWDP	Jakarta Waterfront Development Programme
MMR	Mumbai Metropolitan Region
NGO	Non-Governmental Organisation
NSP	Neurotoxic Shellfish Poisoning
OWD	Optimum Waterfront Design
PCB	Polychlorinated Biphenyls
PSP	Paralytic Shellfish Poisoning
SOA	State Oceanic Administration
TBT	Tributyltin
UNCED	United Nations Conference on Environment and Development (Rio de Janeiro, 1992)
UN	United Nations
UNEP	United Nations Environment Programme
WB	World Bank
WCAI	Waterfront Coastal Area Integration
WHO	World Health Organisation

IOC Workshop Reports

The Scientific Workshops of the Intergovernmental Oceanographic Commission are sometimes jointly sponsored with other intergovernmental or non-governmental bodies. In most cases, IOC assures responsibility for printing, and copies may be requested from:

Intergovernmental Oceanographic Commission – UNESCO
1, rue Miollis, 75732 Paris Cedex 15, France

No.	Title	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),	E (out of stock)
2	CICAR Ichthyoplankton Workshop, Mexico City, 16-27 July 1974 (UNESCO Technical Paper in Marine Sciences, No. 20).	E (out of stock) S (out of stock)
3	Report of the IOC/GFCM/ICSEM International Workshop on Marine Pollution in the Mediterranean; Monte Carlo, 9-14 September 1974.	E,F E (out of stock)
4	Report of the Workshop on the Phenomenon known as 'El Niño'; Guayaquil, Ecuador, 4-12 December 1974.	E (out of stock) S (out of stock)
5	IDOE International Workshop on Marine Geology and Geophysics of the Caribbean Region and its Resources; Kingston, Jamaica, 17-22 February 1975	E (out of stock) S
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.	E
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.	E, F,S, R
8	Joint IOC/FAO (IPFC)/UNEP International Workshop on Marine Pollution in East Asian Waters; Penang, 7-13 April 1976	E (out of stock)
9	IOC/CMG/SCOR Second International Workshop on Marine Geoscience; Mauritius 9-13 August 1976.	E, F, S, R
10	IOC/WMO Second Workshop on Marine Pollution (Petroleum) Monitoring; Monaco, 14-18 June 1976	E, F E (out of stock) R
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.	E, S (out of stock)
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	E (out of stock), S
12	Report of the IOCARIBE Interdisciplinary Workshop on Scientific Programmes in Support of Fisheries Projects; Fort-de-France, Martinique, 28 November-2 December 1977.	E, F, S
13	Report of the IOCARIBE Workshop on Environmental Geology of the Caribbean Coastal Area; Port of Spain, Trinidad, 16-18 January 1978.	E, S
14	IOC/FAO/WHO/UNEP International Workshop on Marine Pollution in the Gulf of Guinea and Adjacent Areas; Abidjan, Côte d'Ivoire, 2-9 May 1978	E, F
15	CPPS/FAO/IOC/UNEP International Workshop on Marine Pollution in the South-East Pacific; Santiago de Chile, 6-10 November 1978.	E (out of stock)
16	Workshop on the Western Pacific, Tokyo, 19-20 February 1979.	E, F, R
17	Joint IOC/WMO Workshop on Oceanographic Products and the IGOSS Data Processing and Services System (IDPSS); Moscow, 9-11 April 1979.	E
17 suppl.	Papers submitted to the Joint IOC/WMO Seminar on Oceano-graphic Products and the IGOSS Data Processing and Services System; Moscow, 2-6 April 1979.	E
18	IOC/UNESCO Workshop on Syllabus for Training Marine Technicians; Miami, U.S.A., 22-26 May 1978 (UNESCO reports in marine sciences, No. 4 published by the Division of Marine Sciences, UNESCO).	E (out of stock), F, S (out of tock), R
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, published by the Division of Marine Sciences, UNESCO).	E (out of stock), S, R, Ar
20	Second CCOP-IOC Workshop on IDOE Studies of East Asia Tectonics and Resources; Bandung, Indonesia, 17-21 October 1978	E
21	Second IDOE Symposium on Turbulence in the Ocean; Liège, Belgium, 7-18 May 1979.	E, F, S, R
22	Third IOC/WMO Workshop on Marine Pollution Monitoring; New Delhi, 11-15 February 1980.	E, F, S, R
23	WESTPAC Workshop on the Marine Geology and Geophysics of the North-West Pacific; Tokyo, 27-31 March 1980.	E, R
24	WESTPAC Workshop on Coastal Transport of Pollutants; Tokyo, Japan, 27-31 March 1980.	E (out of stock)
25	Workshop on the Inter-calibration 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.	E (Superseded by IOC Technical Series No.22)
26	IOC Workshop on Coastal Area Management in the Caribbean Region; Mexico City, 24 September- 5 October 1979.	E, S
27	CCOP/SOPAC-IOC Second International Workshop on Geology, Mineral Resources and Geophysics of the South Pacific; Nouméa, New Caledonia, 9-15 October 1980.	E
28	FAO/IOC Workshop on the effects of environmental variation on the survival of larval pelagic fishes. Lima, 20 April-5 May 1980.	E
29	WESTPAC Workshop on Marine Biological Methodology; Tokyo, 9-14 February 1981.	E
30	International Workshop on Marine Pollution in the South-West Atlantic; Montevideo, 10-14 November 1980.	E (out of stock) S
31	Third International Workshop on Marine Geoscience; Heidelberg, 19-24 July 1982.	E, F, S
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, France, 27 September-1 October 1982.	E, F, S
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, France, 27 September-1 October 1982.	E
33	Workshop on the IREP Component of the IOC Programme on Ocean Science in Relation to Living Resources (OSLR); Halifax, 26-30 September 1963.	E
34	IOC Workshop on Regional Co-operation in Marine Science in the Central Eastern Atlantic (Western Africa); Tenerife, 12-17 December 1963.	E, F, S
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.	E
36	IOC/FAO Workshop on the Improved Uses of Research Vessels; Lisbon, Portugal, 28 May-2 June 1984.	E
36 Suppl.	Papers submitted to the IOC/FAO Workshop on the Improved Uses of Research Vessels; Lisbon, 28 May-2 June 1984	E
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.	E
38	IOC/ROPME/UNEP Symposium on Fate and Fluxes of Oil Pollutants in the Kuwait Action Plan Region; Basrah, Iraq, 8-12 January 1984.	E
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.	E
40	IOC Workshop on the Technical Aspects of Tsunami Analysis, Prediction and Communications; Sidney, B.C., Canada, 29-31 July 1985.	E
40 Suppl.	First International Tsunami Workshop on Tsunami Analysis, Prediction and Communications, Submitted Papers; Sidney, B.C., Canada, 29 July-1 August 1985.	E
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.	E
43	IOC Workshop on the Results of MEDALPEX and Future Oceano-graphic Programmes in the Western Mediterranean; Venice, Italy, 23-25 October 1985.	E
44	IOC-FAO Workshop on Recruitment in Tropical Coastal Demersal Communities; Ciudad del Carmen, Campeche, Mexico, 21-25 April 1986.	E (out of stock) S
44 Suppl.	IOC-FAO Workshop on Recruitment in Tropical Coastal Demersal Communities, Submitted Papers; Ciudad del Carmen, Campeche, Mexico, 21-25 April 1986.	E
45	IOCARIBE Workshop on Physical Oceanography and Climate; Cartagena, Colombia, 19-22 August 1986.	E
46	Reunión de Trabajo para Desarrollo del Programa "Ciencia Oceánica en Relación a los Recursos No Vivos en la Región del Atlántico Sud-occidental"; Porto Alegre, Brasil, 7-11 de abril de 1986.	S
47	IOC Symposium on Marine Science in the Western Pacific:	E

No.	Title	Languages	No.	Title	Languages	No.	Title	Languages
	The Indo-Pacific Convergence; Townsville, 1-6 December 1966							
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.	E, S	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.	E, S	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.	E, S
49	AGU-IOC-WMO-CPPS Chapman Conference: An International Symposium on 'El Niño'; Guayaquil, Ecuador, 27-31 October 1986.	E	49	AGU-IOC-WMO-CPPS Chapman Conference: An International Symposium on 'El Niño'; Guayaquil, Ecuador, 27-31 October 1986.	E	49	AGU-IOC-WMO-CPPS Chapman Conference: An International Symposium on 'El Niño'; Guayaquil, Ecuador, 27-31 October 1986.	E
50	CCALR-IOC Scientific Seminar on Antarctic Ocean Variability and its Influence on Marine Living Resources, particularly Krill (organized in collaboration with SCAR and SCOR); Paris, France, 2-6 June 1987.	E	50	CCALR-IOC Scientific Seminar on Antarctic Ocean Variability and its Influence on Marine Living Resources, particularly Krill (organized in collaboration with SCAR and SCOR); Paris, France, 2-6 June 1987.	E	50	CCALR-IOC Scientific Seminar on Antarctic Ocean Variability and its Influence on Marine Living Resources, particularly Krill (organized in collaboration with SCAR and SCOR); Paris, France, 2-6 June 1987.	E
51	CCOP/SOPAC-IOC Workshop on Coastal Processes in the South Pacific Island Nations; Lae, Papua-New Guinea, 1-8 October 1987.	E	51	CCOP/SOPAC-IOC Workshop on Coastal Processes in the South Pacific Island Nations; Lae, Papua-New Guinea, 1-8 October 1987.	E	51	CCOP/SOPAC-IOC Workshop on Coastal Processes in the South Pacific Island Nations; Lae, Papua-New Guinea, 1-8 October 1987.	E
52	SCOR-IOC-UNESCO Symposium on Vertical Motion in the Equatorial Upper Ocean and its Effects upon Living Resources and the Atmosphere; Paris, France, 6-10 May 1985.	E	52	SCOR-IOC-UNESCO Symposium on Vertical Motion in the Equatorial Upper Ocean and its Effects upon Living Resources and the Atmosphere; Paris, France, 6-10 May 1985.	E	52	SCOR-IOC-UNESCO Symposium on Vertical Motion in the Equatorial Upper Ocean and its Effects upon Living Resources and the Atmosphere; Paris, France, 6-10 May 1985.	E
53	IOC Workshop on the Biological Effects of Pollutants; Oslo, 11-29 August 1986.	E	53	IOC Workshop on the Biological Effects of Pollutants; Oslo, 11-29 August 1986.	E	53	IOC Workshop on the Biological Effects of Pollutants; Oslo, 11-29 August 1986.	E
54	Workshop on Sea-Level Measurements in Hostile Conditions; Bidston, UK, 28-31 March 1988.	E	54	Workshop on Sea-Level Measurements in Hostile Conditions; Bidston, UK, 28-31 March 1988.	E	54	Workshop on Sea-Level Measurements in Hostile Conditions; Bidston, UK, 28-31 March 1988.	E
55	IBCCA Workshop on Data Sources and Compilation, Boulder, Colorado, 18-19 July 1988.	E	55	IBCCA Workshop on Data Sources and Compilation, Boulder, Colorado, 18-19 July 1988.	E	55	IBCCA Workshop on Data Sources and Compilation, Boulder, Colorado, 18-19 July 1988.	E
56	IOC-FAO Workshop on Recruitment of Penaeid Prawns in the Indo-West Pacific Region (PREP); Cleveland, Australia, 24-30 July 1988.	E	56	IOC-FAO Workshop on Recruitment of Penaeid Prawns in the Indo-West Pacific Region (PREP); Cleveland, Australia, 24-30 July 1988.	E	56	IOC-FAO Workshop on Recruitment of Penaeid Prawns in the Indo-West Pacific Region (PREP); Cleveland, Australia, 24-30 July 1988.	E
57	IOC Workshop on International Co-operation in the Study of Red Tides and Ocean Blooms; Takamatsu, Japan, 16-17 November 1987.	E	57	IOC Workshop on International Co-operation in the Study of Red Tides and Ocean Blooms; Takamatsu, Japan, 16-17 November 1987.	E	57	IOC Workshop on International Co-operation in the Study of Red Tides and Ocean Blooms; Takamatsu, Japan, 16-17 November 1987.	E
58	International Workshop on the Technical Aspects of the Tsunami Warning System; Novosibirsk, USSR, 4-5 August 1989.	E	58	International Workshop on the Technical Aspects of the Tsunami Warning System; Novosibirsk, USSR, 4-5 August 1989.	E	58	International Workshop on the Technical Aspects of the Tsunami Warning System; Novosibirsk, USSR, 4-5 August 1989.	E
58 Suppl.	Second International Workshop on the Technical Aspects of Tsunami Warning Systems, Tsunami Analysis, Preparedness, Observation and Instrumentation. Submitted Papers; Novosibirsk, USSR, 4-5 August 1989.	E	58 Suppl.	Second International Workshop on the Technical Aspects of Tsunami Warning Systems, Tsunami Analysis, Preparedness, Observation and Instrumentation. Submitted Papers; Novosibirsk, USSR, 4-5 August 1989.	E	58 Suppl.	Second International Workshop on the Technical Aspects of Tsunami Warning Systems, Tsunami Analysis, Preparedness, Observation and Instrumentation. Submitted Papers; Novosibirsk, USSR, 4-5 August 1989.	E
59	IOC-UNEP Regional Workshop to Review Priorities for Marine Pollution Monitoring Research, Control and Abatement in the Wider Caribbean; San José, Costa Rica, 24-30 August 1989.	E, F, S	59	IOC-UNEP Regional Workshop to Review Priorities for Marine Pollution Monitoring Research, Control and Abatement in the Wider Caribbean; San José, Costa Rica, 24-30 August 1989.	E, F, S	59	IOC-UNEP Regional Workshop to Review Priorities for Marine Pollution Monitoring Research, Control and Abatement in the Wider Caribbean; San José, Costa Rica, 24-30 August 1989.	E, F, S
60	IOC Workshop to Define IOCARIBE-TRODERP proposals; Caracas, Venezuela, 12-16 September 1989.	E	60	IOC Workshop to Define IOCARIBE-TRODERP proposals; Caracas, Venezuela, 12-16 September 1989.	E	60	IOC Workshop to Define IOCARIBE-TRODERP proposals; Caracas, Venezuela, 12-16 September 1989.	E
61	Second IOC Workshop on the Biological Effects of Pollutants; Bermuda, 10 September-2 October 1988.	E	61	Second IOC Workshop on the Biological Effects of Pollutants; Bermuda, 10 September-2 October 1988.	E	61	Second IOC Workshop on the Biological Effects of Pollutants; Bermuda, 10 September-2 October 1988.	E
62	Second 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; Accra, Ghana, 13-17 June 1988.	E	62	Second 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; Accra, Ghana, 13-17 June 1988.	E	62	Second 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; Accra, Ghana, 13-17 June 1988.	E
63	IOC/WESTPAC Workshop on Co-operative Study of the Continental Shelf Circulation in the Western Pacific; Bangkok, Thailand, 31 October-3 November 1989.	E	63	IOC/WESTPAC Workshop on Co-operative Study of the Continental Shelf Circulation in the Western Pacific; Bangkok, Thailand, 31 October-3 November 1989.	E	63	IOC/WESTPAC Workshop on Co-operative Study of the Continental Shelf Circulation in the Western Pacific; Bangkok, Thailand, 31 October-3 November 1989.	E
64	Second IOC-FAO Workshop on Recruitment of Penaeid Prawns in the Indo-West Pacific Region (PREP); Phuket, Thailand, 25-31 September 1989.	E	64	Second IOC-FAO Workshop on Recruitment of Penaeid Prawns in the Indo-West Pacific Region (PREP); Phuket, Thailand, 25-31 September 1989.	E	64	Second IOC-FAO Workshop on Recruitment of Penaeid Prawns in the Indo-West Pacific Region (PREP); Phuket, Thailand, 25-31 September 1989.	E
65	Second IOC Workshop on Sardine/Anchovy Recruitment Project (SARP) in the Southwest Atlantic; Montevideo, Uruguay, 21-23 August 1989.	E	65	Second IOC Workshop on Sardine/Anchovy Recruitment Project (SARP) in the Southwest Atlantic; Montevideo, Uruguay, 21-23 August 1989.	E	65	Second IOC Workshop on Sardine/Anchovy Recruitment Project (SARP) in the Southwest Atlantic; Montevideo, Uruguay, 21-23 August 1989.	E
66	IOC ad hoc Expert Consultation on Sardine/Anchovy Recruitment Programme; La Jolla, California, U.S.A., 1989	E	66	IOC ad hoc Expert Consultation on Sardine/Anchovy Recruitment Programme; La Jolla, California, U.S.A., 1989	E	66	IOC ad hoc Expert Consultation on Sardine/Anchovy Recruitment Programme; La Jolla, California, U.S.A., 1989	E
67	Interdisciplinary Seminar on Research Problems in the IOCARIBE Region; Caracas, Venezuela, 28 November-1 December 1989.	E (out of stock)	67	Interdisciplinary Seminar on Research Problems in the IOCARIBE Region; Caracas, Venezuela, 28 November-1 December 1989.	E (out of stock)	67	Interdisciplinary Seminar on Research Problems in the IOCARIBE Region; Caracas, Venezuela, 28 November-1 December 1989.	E (out of stock)
68	International Workshop on Marine Acoustics; Beijing,	E	68		E	68		E

No.	Title	Languages	No.	Title	Languages	No.	Title	Languages
	China, 26-30 March 1990.							
69	IOC-SCAR Workshop on Sea-Level Measurements in the Antarctica; Leningrad, USSR, 28-31 May 1990.	E	69	IOC-SCAR Workshop on Sea-Level Measurements in the Antarctica; Leningrad, USSR, 28-31 May 1990.	E	69	IOC-SCAR Workshop on Sea-Level Measurements in the Antarctica; Leningrad, USSR, 28-31 May 1990.	E
69 Suppl.	IOC-SCAR Workshop on Sea-Level Measurements in the Antarctica; Submitted Papers; Leningrad, USSR, 28-31 May 1990.	E	69 Suppl.	IOC-SCAR Workshop on Sea-Level Measurements in the Antarctica; Submitted Papers; Leningrad, USSR, 28-31 May 1990.	E	69 Suppl.	IOC-SCAR Workshop on Sea-Level Measurements in the Antarctica; Submitted Papers; Leningrad, USSR, 28-31 May 1990.	E
70	IOC-SAREC-UNEP-FAO-IAEA-WHO Workshop on Regional Aspects of Marine Pollution; Mauritius, 29 October - 9 November 1990.	E	70	IOC-SAREC-UNEP-FAO-IAEA-WHO Workshop on Regional Aspects of Marine Pollution; Mauritius, 29 October - 9 November 1990.	E	70	IOC-SAREC-UNEP-FAO-IAEA-WHO Workshop on Regional Aspects of Marine Pollution; Mauritius, 29 October - 9 November 1990.	E
71	IOC-FAO Workshop on the Identification of Penaeid Prawn Larvae and Postlarvae; Cleveland, Australia, 23-28 September 1990.	E	71	IOC-FAO Workshop on the Identification of Penaeid Prawn Larvae and Postlarvae; Cleveland, Australia, 23-28 September 1990.	E	71	IOC-FAO Workshop on the Identification of Penaeid Prawn Larvae and Postlarvae; Cleveland, Australia, 23-28 September 1990.	E
72	IOC/WESTPAC Scientific Steering Group Meeting on Co-Operative Study of the Continental Shelf Circulation in the Western Pacific; Kuala Lumpur; Malaysia, 9-11 October 1990.	E	72	IOC/WESTPAC Scientific Steering Group Meeting on Co-Operative Study of the Continental Shelf Circulation in the Western Pacific; Kuala Lumpur; Malaysia, 9-11 October 1990.	E	72	IOC/WESTPAC Scientific Steering Group Meeting on Co-Operative Study of the Continental Shelf Circulation in the Western Pacific; Kuala Lumpur; Malaysia, 9-11 October 1990.	E
73	Expert Consultation for the IOC Programme on Coastal Ocean Advanced Science and Technology Study; Liège, Belgium, 11-13 May 1991.	E	73	Expert Consultation for the IOC Programme on Coastal Ocean Advanced Science and Technology Study; Liège, Belgium, 11-13 May 1991.	E	73	Expert Consultation for the IOC Programme on Coastal Ocean Advanced Science and Technology Study; Liège, Belgium, 11-13 May 1991.	E
74	IOC-UNEP Review Meeting on Oceanographic Processes of Transport and Distribution of Pollutants in the Sea; Zagreb, Yugoslavia, 15-18 May 1989.	E	74	IOC-UNEP Review Meeting on Oceanographic Processes of Transport and Distribution of Pollutants in the Sea; Zagreb, Yugoslavia, 15-18 May 1989.	E	74	IOC-UNEP Review Meeting on Oceanographic Processes of Transport and Distribution of Pollutants in the Sea; Zagreb, Yugoslavia, 15-18 May 1989.	E
75	IOC-SCOR Workshop on Global Ocean Ecosystem Dynamics; Solomons, Maryland, U.S.A., 29 April-2 May 1991.	E	75	IOC-SCOR Workshop on Global Ocean Ecosystem Dynamics; Solomons, Maryland, U.S.A., 29 April-2 May 1991.	E	75	IOC-SCOR Workshop on Global Ocean Ecosystem Dynamics; Solomons, Maryland, U.S.A., 29 April-2 May 1991.	E
76	IOC/WESTPAC Scientific Symposium on Marine Science and Management of Marine Areas of the Western Pacific; Penang, Malaysia, 2-6 December 1991.	E	76	IOC/WESTPAC Scientific Symposium on Marine Science and Management of Marine Areas of the Western Pacific; Penang, Malaysia, 2-6 December 1991.	E	76	IOC/WESTPAC Scientific Symposium on Marine Science and Management of Marine Areas of the Western Pacific; Penang, Malaysia, 2-6 December 1991.	E
77	IOC-SAREC-KMFRI Regional Workshop on Causes and Consequences of Sea-Level Changes on the Western Indian Ocean Coasts and Islands; Mombasa, Kenya, 24-28 June 1991.	E	77	IOC-SAREC-KMFRI Regional Workshop on Causes and Consequences of Sea-Level Changes on the Western Indian Ocean Coasts and Islands; Mombasa, Kenya, 24-28 June 1991.	E	77	IOC-SAREC-KMFRI Regional Workshop on Causes and Consequences of Sea-Level Changes on the Western Indian Ocean Coasts and Islands; Mombasa, Kenya, 24-28 June 1991.	E
78	IOC-CEC-ICES-WMO-ICSU Ocean Climate Data Workshop Goddard Space Flight Center; Greenbelt, Maryland, U.S.A., 18-21 February 1992.	E	78	IOC-CEC-ICES-WMO-ICSU Ocean Climate Data Workshop Goddard Space Flight Center; Greenbelt, Maryland, U.S.A., 18-21 February 1992.	E	78	IOC-CEC-ICES-WMO-ICSU Ocean Climate Data Workshop Goddard Space Flight Center; Greenbelt, Maryland, U.S.A., 18-21 February 1992.	E
79	IOC/WESTPAC Workshop on River Inputs of Nutrients to the Marine Environment in the WESTPAC Region; Penang, Malaysia, 26-29 November 1991.	E	79	IOC/WESTPAC Workshop on River Inputs of Nutrients to the Marine Environment in the WESTPAC Region; Penang, Malaysia, 26-29 November 1991.	E	79	IOC/WESTPAC Workshop on River Inputs of Nutrients to the Marine Environment in the WESTPAC Region; Penang, Malaysia, 26-29 November 1991.	E
80	IOC-SCOR Workshop on Programme Development for Harmful Algae Blooms; Newport, U.S.A. 2-3 November 1991.	E	80	IOC-SCOR Workshop on Programme Development for Harmful Algae Blooms; Newport, U.S.A. 2-3 November 1991.	E	80	IOC-SCOR Workshop on Programme Development for Harmful Algae Blooms; Newport, U.S.A. 2-3 November 1991.	E
81	Joint IAPSO-IOC Workshop on Sea Level Measurements and Quality Control; Paris, France, 12-13 October 1992.	E	81	Joint IAPSO-IOC Workshop on Sea Level Measurements and Quality Control; Paris, France, 12-13 October 1992.	E	81	Joint IAPSO-IOC Workshop on Sea Level Measurements and Quality Control; Paris, France, 12-13 October 1992.	E
82	BORDOMER 92: International Convention on Rational Use of Coastal Zones. A Preparatory Meeting for the Organization of an International Conference on Coastal Change; Bordeaux, France, 30 September-2 October 1992.	E	82	BORDOMER 92: International Convention on Rational Use of Coastal Zones. A Preparatory Meeting for the Organization of an International Conference on Coastal Change; Bordeaux, France, 30 September-2 October 1992.	E	82	BORDOMER 92: International Convention on Rational Use of Coastal Zones. A Preparatory Meeting for the Organization of an International Conference on Coastal Change; Bordeaux, France, 30 September-2 October 1992.	E
83	IOC Workshop on Donor Collaboration in the Development of Marine Scientific Research Capabilities in the Western Indian Ocean Region; Brussels, Belgium, 12-13 October 1992.	E	83	IOC Workshop on Donor Collaboration in the Development of Marine Scientific Research Capabilities in the Western Indian Ocean Region; Brussels, Belgium, 12-13 October 1992.	E	83	IOC Workshop on Donor Collaboration in the Development of Marine Scientific Research Capabilities in the Western Indian Ocean Region; Brussels, Belgium, 12-13 October 1992.	E
84	Workshop on Atlantic Ocean Climate Variability; Moscow, Russian Federation, 13-17 July 1992	E	84	Workshop on Atlantic Ocean Climate Variability; Moscow, Russian Federation, 13-17 July 1992	E	84	Workshop on Atlantic Ocean Climate Variability; Moscow, Russian Federation, 13-17 July 1992	E
85	IOC Workshop on Coastal Oceanography in Relation to Integrated Coastal Zone Management; Kona, Hawaii, 1-5 June 1992.	E	85	IOC Workshop on Coastal Oceanography in Relation to Integrated Coastal Zone Management; Kona, Hawaii, 1-5 June 1992.	E	85	IOC Workshop on Coastal Oceanography in Relation to Integrated Coastal Zone Management; Kona, Hawaii, 1-5 June 1992.	E
86	International Workshop on the Black Sea; Varna, Bulgaria, 30 September – 4 October 1991	E	86	International Workshop on the Black Sea; Varna, Bulgaria, 30 September – 4 October 1991	E	86	International Workshop on the Black Sea; Varna, Bulgaria, 30 September – 4 October 1991	E
87	Taller de trabajo sobre efectos biológicos del fenómeno «El Niño» en ecosistemas costeros del Pacífico Sudeste; Santa Cruz, Galápagos, Ecuador, 5-14 de octubre de 1989.	S only (summary in E, F, S)	87	Taller de trabajo sobre efectos biológicos del fenómeno «El Niño» en ecosistemas costeros del Pacífico Sudeste; Santa Cruz, Galápagos, Ecuador, 5-14 de octubre de 1989.	S only (summary in E, F, S)	87	Taller de trabajo sobre efectos biológicos del fenómeno «El Niño» en ecosistemas costeros del Pacífico Sudeste; Santa Cruz, Galápagos, Ecuador, 5-14 de octubre de 1989.	S only (summary in E, F, S)
88	IOC-CEC-ICSU-ICES Regional Workshop for Member States of Eastern and Northern Europe (GODAR Project); Obninsk, Russia, 17-20 May 1993.	E	88	IOC-CEC-ICSU-ICES Regional Workshop for Member States of Eastern and Northern Europe (GODAR Project); Obninsk, Russia, 17-20 May 1993.	E	88	IOC-CEC-ICSU-ICES Regional Workshop for Member States of Eastern and Northern Europe (GODAR Project); Obninsk, Russia, 17-20 May 1993.	E

No.	Title	Languages
89	IOC-ICSEM Workshop on Ocean Sciences in Non-Living Resources; Perpignan, France, 15-20 October 1990.	E
90	IOC Seminar on Integrated Coastal Management; New Orleans, U.S.A., 17-18 July 1993.	E
91	Hydroblack'91 CTD Intercalibration Workshop; Woods Hole, U.S.A., 1-10 December 1991.	E
92	Réunion de travail IOCEA-OSNLR sur le Projet « Budgets sédimentaires le long de la côte occidentale d'Afrique » Abidjan, côte d'Ivoire, 26-28 juin 1991.	E
93	IOC-UNEP Workshop on Impacts of Sea-Level Rise due to Global Warming. Dhaka, Bangladesh, 16-19 November 1992.	E
94	BMTC-IOC-POLARMAR International Workshop on Training Requirements in the Field of Eutrophication in Semi-enclosed Seas and Harmful Algal Blooms, Bremerhaven, Germany, 29 September-3 October 1992.	E
95	SAREC-IOC Workshop on Donor Collaboration in the Development of Marine Scientific Research Capabilities in the Western Indian Ocean Region; Brussels, Belgium, 23-25 November 1993.	E
96	IOC-UNEP-WMO-SAREC Planning Workshop on an Integrated Approach to Coastal Erosion, Sea Level Changes and their Impacts; Zanzibar, United Republic of Tanzania, 17-21 January 1994.	E
96 Suppl.	IOC-UNEP-WMO-SAREC Planning Workshop on an Integrated Approach to Coastal Erosion, Sea Level Changes and their Impacts; Submitted Papers 1. Coastal Erosion; Zanzibar, United Republic of Tanzania 17-21 January 1994.	E
96 Suppl	IOC-UNEP-WMO-SAREC Planning Workshop on an Integrated Approach to Coastal Erosion, Sea Level Changes and their Impacts; Submitted Papers 2. Sea Level; Zanzibar, United Republic of Tanzania 17-21 January 1994.	E
97	IOC Workshop on Small Island Oceanography in Relation to Sustainable Economic Development and Coastal Area Management of Small Island Development States; Fort-de-France, Martinique, 8-10 November, 1993.	E
98	CoMSBlack '92A Physical and Chemical Intercalibration Workshop; Erdemli, Turkey, 15-29 January 1993.	E
99	IOC-SAREC Field Study Exercise on Nutrients in Tropical Marine Waters; Mombasa, Kenya, 5-15 April 1994.	E
100	IOC-SOA-NOAA Regional Workshop for Member States of the Western Pacific - GODAR-II (Global Oceanographic Data Archeology and Rescue Project); Tianjin, China, 8-11 March 1994.	E
101	IOC Regional Science Planning Workshop on Harmful Algal Blooms; Montevideo, Uruguay, 15-17 June 1994.	E
102	First IOC Workshop on Coastal Ocean Advanced Science and Technology Study (COASTS); Liège, Belgium, 5-9 May 1994.	E
103	IOC Workshop on GIS Applications in the Coastal Zone Management of Small Island Developing States; Barbados, 20-22 April 1994.	E
104	Workshop on Integrated Coastal Management; Dartmouth, Canada, 19-20 September 1994.	E
105	BORDOMER 95: Conference on Coastal Change; Bordeaux, France, 6-10 February 1995.	E
105 Suppl.	Conference on Coastal Change: Proceedings; Bordeaux, France, 6-10 February 1995	E
106	IOC/WESTPAC Workshop on the Paleographic Map; Bali, Indonesia, 20-21 October 1994.	E
107	IOC-ICSU-NIO-NOAA Regional Workshop for Member States of the Indian Ocean - GODAR-III; Dona Paula, Goa, India, 6-9 December 1994.	E
108	UNESCO-IHP-IOC-IAEA Workshop on Sea-Level Rise and the Multidisciplinary Studies of Environmental Processes in the Caspian Sea Region; Paris, France, 9-12 May 1995.	E
108 Suppl.	UNESCO-IHP-IOC-IAEA Workshop on Sea-Level Rise and the Multidisciplinary Studies of Environmental Processes in the Caspian Sea Region; Submitted Papers; Paris, France, 9-12 May 1995.	E
109	First IOC-UNEP CEPPOL Symposium; San José, Costa Rica, 14-15 April 1993.	E
110	IOC-ICSU-CEC regional Workshop for Member States of the Mediterranean - GODAR-IV (Global Oceanographic Data Archeology and Rescue Project) Foundation for International Studies, University of Malta, Valletta, Malta, 25-28 April 1995.	E
111	Chapman Conference on the Circulation of the Intra-Americas Sea; La Parguera, Puerto Rico, 22-26 January 1995.	E
112	IOC-IAEA-UNEP Group of Experts on Standards and Reference Materials (GESREM) Workshop; Miami, U.S.A., 7-8 December 1993.	E
113	IOC Regional Workshop on Marine Debris and Waste Management in the Gulf of Guinea; Lagos, Nigeria, 14-16 December 1994.	E
114	International Workshop on Integrated Coastal Zone Management (ICZM) Karachi, Pakistan; 10-14 October 1994.	E
115	IOC/GLOSS-IAPSO Workshop on Sea Level Variability and Southern Ocean Dynamics; Bordeaux, France, 31 January 1995	E
116	IOC/WESTPAC International Scientific Symposium on Sustainability of Marine Environment: Review of the WESTPAC Programme, with Particular Reference to ICAM, Bali, Indonesia, 22-26 November 1994.	E
117	Joint IOC-CIDA-Sida (SAREC) Workshop on the Benefits of Improved Relationships between International Development Agencies, the IOC and other Multilateral Inter-governmental Organizations in the Delivery of Ocean, Marine Affairs and Fisheries Programmes; Sidney B.C., Canada, 26-28 September 1995.	E
118	IOC-UNEP-NOAA-Sea Grant Fourth Caribbean Marine Debris Workshop; La Romana, Santo Domingo, 21-24 August 1995.	E
119	IOC Workshop on Ocean Colour Data Requirements and Utilization; Sydney B.C., Canada, 21-22 September 1995.	E
120	International Training Workshop on Integrated Coastal Management; Tampa, Florida, U.S.A., 15-17 July 1995.	E
121	IOC-EU-BSH-NOAA-(WDC-A) International Workshop on Oceanographic Biological and Chemical Data Management, Hamburg, Germany, 20-23 May 1996.	E
122	IOC-EU-BSH-NOAA-(WDC-A) International Workshop on Oceanographic Biological and Chemical Data Management, Hamburg, Germany, 20-23 May 1996.	E
123	Second IOC Regional Science Planning Workshop on Harmful Algal Blooms in South America; Mar del Plata, Argentina, 30 October - 1 November 1995.	E, S
124	GLOBEC-IOC-SAHFOS-MBA Workshop on the Analysis of Time Series with Particular Reference to the Continuous Plankton Recorder Survey; Plymouth, U.K.,4-7 May 1993.	E
125	Atelier sous-régional de la COI sur les ressources marines vivantes du Golfe de Guinée ; Cotonou, Bénin, 1-4 juillet 1996.	E
126	IOC-UNEP-PERSGA-ACOPS-IUCN Workshop on Oceanographic Input to Integrated Coastal Zone Management in the Red Sea and Gulf of Aden. Jeddah,	E

No.	Title	Languages
108	UNESCO-IHP-IOC-IAEA Workshop on Sea-Level Rise and the Multidisciplinary Studies of Environmental Processes in the Caspian Sea Region; Paris, France, 9-12 May 1995.	E
108 Suppl.	UNESCO-IHP-IOC-IAEA Workshop on Sea-Level Rise and the Multidisciplinary Studies of Environmental Processes in the Caspian Sea Region; Submitted Papers; Paris, France, 9-12 May 1995.	E
109	First IOC-UNEP CEPPOL Symposium; San José, Costa Rica, 14-15 April 1993.	E
110	IOC-ICSU-CEC regional Workshop for Member States of the Mediterranean - GODAR-IV (Global Oceanographic Data Archeology and Rescue Project) Foundation for International Studies, University of Malta, Valletta, Malta, 25-28 April 1995.	E
111	Chapman Conference on the Circulation of the Intra-Americas Sea; La Parguera, Puerto Rico, 22-26 January 1995.	E
112	IOC-IAEA-UNEP Group of Experts on Standards and Reference Materials (GESREM) Workshop; Miami, U.S.A., 7-8 December 1993.	E
113	IOC Regional Workshop on Marine Debris and Waste Management in the Gulf of Guinea; Lagos, Nigeria, 14-16 December 1994.	E
114	International Workshop on Integrated Coastal Zone Management (ICZM) Karachi, Pakistan; 10-14 October 1994.	E
115	IOC/GLOSS-IAPSO Workshop on Sea Level Variability and Southern Ocean Dynamics; Bordeaux, France, 31 January 1995	E
116	IOC/WESTPAC International Scientific Symposium on Sustainability of Marine Environment: Review of the WESTPAC Programme, with Particular Reference to ICAM, Bali, Indonesia, 22-26 November 1994.	E
117	Joint IOC-CIDA-Sida (SAREC) Workshop on the Benefits of Improved Relationships between International Development Agencies, the IOC and other Multilateral Inter-governmental Organizations in the Delivery of Ocean, Marine Affairs and Fisheries Programmes; Sidney B.C., Canada, 26-28 September 1995.	E
118	IOC-UNEP-NOAA-Sea Grant Fourth Caribbean Marine Debris Workshop; La Romana, Santo Domingo, 21-24 August 1995.	E
119	IOC Workshop on Ocean Colour Data Requirements and Utilization; Sydney B.C., Canada, 21-22 September 1995.	E
120	International Training Workshop on Integrated Coastal Management; Tampa, Florida, U.S.A., 15-17 July 1995.	E
121	IOC-EU-BSH-NOAA-(WDC-A) International Workshop on Oceanographic Biological and Chemical Data Management, Hamburg, Germany, 20-23 May 1996.	E
122	IOC-EU-BSH-NOAA-(WDC-A) International Workshop on Oceanographic Biological and Chemical Data Management, Hamburg, Germany, 20-23 May 1996.	E
123	Second IOC Regional Science Planning Workshop on Harmful Algal Blooms in South America; Mar del Plata, Argentina, 30 October - 1 November 1995.	E, S
124	GLOBEC-IOC-SAHFOS-MBA Workshop on the Analysis of Time Series with Particular Reference to the Continuous Plankton Recorder Survey; Plymouth, U.K.,4-7 May 1993.	E
125	Atelier sous-régional de la COI sur les ressources marines vivantes du Golfe de Guinée ; Cotonou, Bénin, 1-4 juillet 1996.	E
126		E

No.	Title	Languages	No.	Title	Languages	No.	Title	Languages
	Saudi Arabia, 8 October 1995.							
127	IOC Regional Workshop for Member States of the Caribbean and South America GODAR-V (Global Oceanographic Data Archeology and Rescue Project); Cartagena de Indias, Colombia, 8-11 October 1996.	E	127	IOC Regional Workshop for Member States of the Caribbean and South America GODAR-V (Global Oceanographic Data Archeology and Rescue Project); Cartagena de Indias, Colombia, 8-11 October 1996.	E	127	IOC Regional Workshop for Member States of the Caribbean and South America GODAR-V (Global Oceanographic Data Archeology and Rescue Project); Cartagena de Indias, Colombia, 8-11 October 1996.	E
128	Atelier IOC-Banque Mondiale-Sida/SAREC-ONE sur la Gestion Intégrée des Zones Côtières ; Nosy Bé, Madagascar, 14-18 octobre 1996.	E	128	Atelier IOC-Banque Mondiale-Sida/SAREC-ONE sur la Gestion Intégrée des Zones Côtières ; Nosy Bé, Madagascar, 14-18 octobre 1996.	E	128	Atelier IOC-Banque Mondiale-Sida/SAREC-ONE sur la Gestion Intégrée des Zones Côtières ; Nosy Bé, Madagascar, 14-18 octobre 1996.	E
129	Gas and Fluids in Marine Sediments, Amsterdam, the Netherlands; 27-29 January 1997.	E	129	Gas and Fluids in Marine Sediments, Amsterdam, the Netherlands; 27-29 January 1997.	E	129	Gas and Fluids in Marine Sediments, Amsterdam, the Netherlands; 27-29 January 1997.	E
130	Atelier régional de la COI sur l'océanographie côtière et la gestion de la zone côtière ;Moroni, RFI des Comores, 16-19 décembre 1996.	E	130	Atelier régional de la COI sur l'océanographie côtière et la gestion de la zone côtière ;Moroni, RFI des Comores, 16-19 décembre 1996.	E	130	Atelier régional de la COI sur l'océanographie côtière et la gestion de la zone côtière ;Moroni, RFI des Comores, 16-19 décembre 1996.	E
131	GOOS Coastal Module Planning Workshop; Miami, USA, 24-28 February 1997	E	131	GOOS Coastal Module Planning Workshop; Miami, USA, 24-28 February 1997	E	131	GOOS Coastal Module Planning Workshop; Miami, USA, 24-28 February 1997	E
132	Third IOC-FANSA Workshop; Punta-Arenas, Chile, 28-30 July 1997	S/E	132	Third IOC-FANSA Workshop; Punta-Arenas, Chile, 28-30 July 1997	S/E	132	Third IOC-FANSA Workshop; Punta-Arenas, Chile, 28-30 July 1997	S/E
133	Joint IOC-CIESM Training Workshop on Sea-level Observations and Analysis for the Countries of the Mediterranean and Black Seas; Birkenhead, U.K., 16-27 June 1997.	E	133	Joint IOC-CIESM Training Workshop on Sea-level Observations and Analysis for the Countries of the Mediterranean and Black Seas; Birkenhead, U.K., 16-27 June 1997.	E	133	Joint IOC-CIESM Training Workshop on Sea-level Observations and Analysis for the Countries of the Mediterranean and Black Seas; Birkenhead, U.K., 16-27 June 1997.	E
134	IOC/WESTPAC-CCOP Workshop on Paleogeographic Mapping (Holocene Optimum); Shanghai, China, 27-29 May 1997.	E	134	IOC/WESTPAC-CCOP Workshop on Paleogeographic Mapping (Holocene Optimum); Shanghai, China, 27-29 May 1997.	E	134	IOC/WESTPAC-CCOP Workshop on Paleogeographic Mapping (Holocene Optimum); Shanghai, China, 27-29 May 1997.	E
135	Regional Workshop on Integrated Coastal Zone Management; Chabahar, Iran; February 1996.	E	135	Regional Workshop on Integrated Coastal Zone Management; Chabahar, Iran; February 1996.	E	135	Regional Workshop on Integrated Coastal Zone Management; Chabahar, Iran; February 1996.	E
136	IOC Regional Workshop for Member States of Western Africa (GODAR-VI); Accra, Ghana, 22-25 April 1997.	E	136	IOC Regional Workshop for Member States of Western Africa (GODAR-VI); Accra, Ghana, 22-25 April 1997.	E	136	IOC Regional Workshop for Member States of Western Africa (GODAR-VI); Accra, Ghana, 22-25 April 1997.	E
137	GOOS Planning Workshop for Living Marine Resources, Dartmouth, USA; 1-5 March 1996.	E	137	GOOS Planning Workshop for Living Marine Resources, Dartmouth, USA; 1-5 March 1996.	E	137	GOOS Planning Workshop for Living Marine Resources, Dartmouth, USA; 1-5 March 1996.	E
138	Gestión de Sistemas Oceanográficos del Pacífico Oriental; Concepción, Chile, 9-16 de abril de 1996.	S	138	Gestión de Sistemas Oceanográficos del Pacífico Oriental; Concepción, Chile, 9-16 de abril de 1996.	S	138	Gestión de Sistemas Oceanográficos del Pacífico Oriental; Concepción, Chile, 9-16 de abril de 1996.	S
139	Sistemas Oceanográficos del Atlántico Sudoccidental, Taller, TEMA;Furg, Rio Grande, Brasil, 3-11 de noviembre de 1997	S	139	Sistemas Oceanográficos del Atlántico Sudoccidental, Taller, TEMA;Furg, Rio Grande, Brasil, 3-11 de noviembre de 1997	S	139	Sistemas Oceanográficos del Atlántico Sudoccidental, Taller, TEMA;Furg, Rio Grande, Brasil, 3-11 de noviembre de 1997	S
140	IOC Workshop on GOOS Capacity Building for the Mediterranean Region; Valletta, Malta, 26-29 November 1997.	E	140	IOC Workshop on GOOS Capacity Building for the Mediterranean Region; Valletta, Malta, 26-29 November 1997.	E	140	IOC Workshop on GOOS Capacity Building for the Mediterranean Region; Valletta, Malta, 26-29 November 1997.	E
141	IOC/WESTPAC Workshop on Co-operative Study in the Gulf of Thailand: A Science Plan; Bangkok, Thailand, 25-28 February 1997.	E	141	IOC/WESTPAC Workshop on Co-operative Study in the Gulf of Thailand: A Science Plan; Bangkok, Thailand, 25-28 February 1997.	E	141	IOC/WESTPAC Workshop on Co-operative Study in the Gulf of Thailand: A Science Plan; Bangkok, Thailand, 25-28 February 1997.	E
142	Pelagic Biogeography ICoPB II. Proceedings of the 2nd International Conference. Final Report of SCOR/IOC Working Group 93; Noordwijkerhout, The Netherlands, 9-14 July 1995.	E	142	Pelagic Biogeography ICoPB II. Proceedings of the 2nd International Conference. Final Report of SCOR/IOC Working Group 93; Noordwijkerhout, The Netherlands, 9-14 July 1995.	E	142	Pelagic Biogeography ICoPB II. Proceedings of the 2nd International Conference. Final Report of SCOR/IOC Working Group 93; Noordwijkerhout, The Netherlands, 9-14 July 1995.	E
143	Geosphere-biosphere coupling: Carbonate Mud Mounds and Cold Water Reefs; Gent, Belgium, 7–11 February 1998.	E	143	Geosphere-biosphere coupling: Carbonate Mud Mounds and Cold Water Reefs; Gent, Belgium, 7–11 February 1998.	E	143	Geosphere-biosphere coupling: Carbonate Mud Mounds and Cold Water Reefs; Gent, Belgium, 7–11 February 1998.	E
144	IOC-SOPAC Workshop Report on Pacific Regional Global Ocean Observing Systems; Suva, Fiji, 13-17 February 1998.	E	144	IOC-SOPAC Workshop Report on Pacific Regional Global Ocean Observing Systems; Suva, Fiji, 13-17 February 1998.	E	144	IOC-SOPAC Workshop Report on Pacific Regional Global Ocean Observing Systems; Suva, Fiji, 13-17 February 1998.	E
145	IOC-Black Sea Regional Committee Workshop: 'Black Sea Fluxes' Istanbul, Turkey, 10-12 June 1997.	E	145	IOC-Black Sea Regional Committee Workshop: 'Black Sea Fluxes' Istanbul, Turkey, 10-12 June 1997.	E	145	IOC-Black Sea Regional Committee Workshop: 'Black Sea Fluxes' Istanbul, Turkey, 10-12 June 1997.	E
146	Living Marine Resources Panel Meeting, Paris, France, 23-25 March 1998.	E	146	Living Marine Resources Panel Meeting, Paris, France, 23-25 March 1998.	E	146	Living Marine Resources Panel Meeting, Paris, France, 23-25 March 1998.	E
147	IOC-SOA International Training Workshop on the Intregration of Marine Sciences into the Process of Integrated Coastal Management, Dalian, China, 19-24 May 1997.	E	147	IOC-SOA International Training Workshop on the Intregration of Marine Sciences into the Process of Integrated Coastal Management, Dalian, China, 19-24 May 1997.	E	147	IOC-SOA International Training Workshop on the Intregration of Marine Sciences into the Process of Integrated Coastal Management, Dalian, China, 19-24 May 1997.	E
148	IOC/WESTPAC International Scientific Symposium – Role of Ocean Sciences for Sustainable Development Okinawa, Japan, 2-7 February 1998.	E	148	IOC/WESTPAC International Scientific Symposium – Role of Ocean Sciences for Sustainable Development Okinawa, Japan, 2-7 February 1998.	E	148	IOC/WESTPAC International Scientific Symposium – Role of Ocean Sciences for Sustainable Development Okinawa, Japan, 2-7 February 1998.	E
149	Workshops on Marine Debris & Waste Management in the Gulf of Guinea, 1995-97.	E	149	Workshops on Marine Debris & Waste Management in the Gulf of Guinea, 1995-97.	E	149	Workshops on Marine Debris & Waste Management in the Gulf of Guinea, 1995-97.	E
150	First IOCARIBE-ANCA Workshop Havana, Cuba, 29 June-1 July 1998.	E	150	First IOCARIBE-ANCA Workshop Havana, Cuba, 29 June-1 July 1998.	E	150	First IOCARIBE-ANCA Workshop Havana, Cuba, 29 June-1 July 1998.	E
151	Taller Pluridisciplinario TEMA sobre Redes del Gran Caribe en Gestión Integrada de Áreas	S	151		S	151		S

No.	Title	Languages
	Costeras Cartagena de Indias, Colombia, 7-12 de septiembre de 1998.	
152	Workshop on Data for Sustainable Integrated Coastal Management (SICOM) Maputo, Mozambique, 18-22 July 1998	E
153	IOC/WESTPAC-Sida (SAREC) Workshop on Atmospheric Inputs of Pollutants to the Marine Environment Qingdao, China, 24-26 June 1998	E
154	IOC-Sida-Flanders-SFRI Workshop on Ocean Data Management in the IOCINCWIO Region (ODINEA project) Capetown, South Africa, 30 November-11 December 1998.	E
155	Science of the Mediterranean Sea and its applications UNESCO, Paris 29-31 July 1997	E
156	IOC-LUC-KMFRI Workshop on RECOSCIX-WIO in the Year 2000 and Beyond, Mombasa, Kenya, 12-16 April 1999	E
157	'98 IOC-KMI International Workshop on Integrated Coastal Management (ICM), Seoul, Republic of Korea 16-18 April 1998	E
158	The IOCARIBE Users and the Global Ocean Observing System (GOOS) Capacity Building Workshop, San José, Costa Rica, 22-24 April 1999	E
159	Oceanic Fronts and Related Phenomena (Konstantin Federov Memorial Symposium) – Proceedings, Pushkin, Russian Federation, 18-22 May 1998	E
160	Under preparation	
161	Under preparation	
162	Under preparation	
163	Under preparation	
164	IOC-Sida-Flanders-MCM Third Workshop on Ocean Data Management in the IOCINCWIO Region (ODINEA Project), Cape Town, South Africa, 29 November – 11 December 1999	E
165	An African Conference on Sustainable Integrated Management; Proceedings of the Workshops. An Integrated Approach, (PACSICOM), Maputo, Mozambique, 18 –25 July 1998	E, F
166	IOC-SOA International Workshop on Coastal Megacities: Challenges of Growing Urbanization of the World's Coastal Areas; Hangzhou, P.R. China, 27 –30 September 1999	E