Intergovernmental Oceanographic Commission
Reports of Governing and Major Subsidiary Bodies

IOC Sub-Commission for the Western Pacific

Second Session

Bangkok, Thailand, 25-29 January 1993

UNESCO

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IOC/SC-WESTPAC-II/3
Paris, 11 February 1993
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1. OPENING

1 The Chairman, Prof. Su Jilan, called the Session to order at 09.30 hours on 25 January 1993. He welcomed all the participants, expressed his great appreciation to the host, the Government of Thailand. He recalled the very important contribution of the late Prof. Nemoto and invited the Sub-Commission to honour Prof. Nemoto by a minute of silence. His speech is given in Annex IV.1. (The List of Participants is attached as Annex III).

2 The Secretary IOC recalled the major intersessional actions and developments. He welcomed all participants and thanked, on behalf of IOC, the Government of Thailand for the excellent arrangements made. His speech is given in Annex IV.2).

3 Dr. Suvit Vibulsresth, Deputy Secretary-General for the National Research Council of Thailand, welcomed all participants and reflected on the establishment of the IOC Regional Secretariat for WESTPAC in Bangkok. He recalled the considerable work of Thailand in marine sciences and he especially mentioned the recent development of a co-operation research project on marine surveillance using a network of buoys. This could be part of a regional contribution to the Global Ocean Observing System (GOOS). His speech is in Annex IV.3.

4 Ms. Chodchoi Eiumpong, Deputy Permanent Secretary for Ministry of Science, Technology and the Environment, formally declared the Session open. She recalled that the global environment is facing serious deterioration due to over exploitation of resources. This cannot be solved in isolation but requires much international co-operation. She recalled the development regarding the establishment of the Secretariat for WESTPAC and emphasized that while Thailand was providing considerable support, other Member States from the Pacific rim must also provide support to help ensure success. Her speech is in Annex IV.4.

2. ADMINISTRATIVE ARRANGEMENTS

2.1 ADOPTION OF THE AGENDA

5 The Chairman invited comments on the Provisional Agenda (Document IOC/SC-WESTPAC-II/1 prov.). The Delegate of China proposed that items on Ocean Mapping and OSNLR be added under Item 4, as Item 4.2.4 and 4.2.6, respectively, with appropriate adjustments. There were no other proposals and the Chairman concluded the Agenda was adopted with the two additions made by the Delegate of China (Annex I).

2.2 DESIGNATION OF RAPPORTEUR FOR THE SESSION

6 The Delegate of Japan suggested that the Delegation of Thailand be invited to provide the Rapporteur for the Session. This was seconded by China. Prof. Manuwadi Hungspreugs of the Thai Delegation was accordingly elected Rapporteur with acclamation, was congratulated by the Chairman and invited to join the podium.

2.3 CONDUCT OF THE SESSION

7 The Secretary IOC reviewed the organization of the Session, as being mainly in plenary, with *ad hoc* sessional working groups as required. He reviewed the documentation which had been provided and the revised indicative timetable. The Chairman, receiving no comments or alterations of the timetable, declared the indicative timetable as adopted.

3. REPORT ON INTERSESSIONAL ACTIVITIES

8 The Secretary IOC made an overall introduction to the Agenda Item referring to the Annotated Provisional Agenda and the Report on Intersessional Activities, 1 January 1990 - 31 December 1992 (Documents IOC/SC-WESTPAC-11/2 prov. and IOC/SC-WESTPAC-11/6, respectively). He recalled the Medium-Term Programme and Intersessional Work Plan for WESTPAC adopted at the First Session, Hangzhou, People's Republic of China, 5-9 February 1990. He presented the overall resource situation with respect to IOC-UNESCO, showing that

about 27% of funds for regional activities from IOC Regular Programme and IOC Trust Fund are provided to the Sub-Commission, amounting to about US$ 285,000 for 1990-1991. For the period 1991-1993 the total amount provided is about US$ 400,000, including the funds provided for the establishment of the regional secretariat of about US$ 100,000. He showed the distribution of the funds on various programme subjects and activities. The maximum for any given area (project) was about US$ 30,000. He also showed the overall budget development for IOC since 1975. There is a steady upward trend, with the funds increasing from about US$ 900,000 in 1975-1976 to about US$ 3.500,000 in 1992-1993. However, taking inflation into account, this did not represent a real increase in funding and was insufficient to meet requirements for programme development and the increased responsibilities of the IOC in global and regional co-operation and is certainly not sufficient to the responsibilities of the IOC for the follow-up of UNCED.

9 Finally, the Secretary IOC showed the trends in the activities of WESTPAC since about 1980, based on a review of the intersessional reports (Table 1). A steady increase is shown, but again the real increase taking into account inflation of financial resources at the IOC-UNESCO level, is limited. However, the increasing number of activities may indicate increased support or participation at national levels, as well as an increasing awareness of WESTPAC and its role.

TABLE 1
WESTPAC Intersessional Activities

Period	No. of Activities	Years	Activity per Year	Estimated Costs (in total) US$ 1,000
March 79-August 81	8	2.5	3	~130
August 81-August 83	7	2	3.5	~100
August 83-May 87	15	3.8	4	~220
January 87-December 89	19	3	>6	~260
January 90-December 92	25	3	>8	~400 with Secretariat

3.1 REGIONAL WESTPAC PROJECTS AND ACTIVITIES

10 For a general introduction for the intersessional activities in WESTPAC, Mr. Yihang Jiang referred to the Document IOC/SC-WESTPAC-II/6 and its Addendum and informed the Sub-Commission that the activities carried out during the intersessional period in the WESTPAC region were according to the Medium-Term Plan of the Sub-Commission with reference to Agenda Items 3.1, 3.2 and 3.3. A major intersessional activity was the IOC/WESTPAC Scientific Symposium, Penang, Malaysia, 2-6 December 1991 (see Agenda Item 3.3).

11 With regards to the programme on Ocean Science in Relation to Living Resources (OSLR), the IOC-FAO Workshop on the Identification of Penaeid Prawn Larvae and Postlarvae was held in Cleveland, Australia, 23-28 September 1990, with the participation of 16 scientists from 8 WESTPAC Member States. The Workshop examined the methodology needed for developing a reference database for use in subsequent numerical taxonomy. Techniques for obtaining a range of measurements from each specimen (characters such as telson length, length of segments on legs, etc.), were demonstrated and practiced. Measurements were carried out under a microscope, the success of this project relying on having accurate measurements from all countries.

12 Concern was expressed that since the UNESCO-IOC Manual on Harmful Marine Phytoplankton had been proposed and endorsed by the *ad hoc* intergovernmental Panel on Harmful Algal Blooms at its First Session, there appeared to be some duplication of efforts and there was a need to ensure co-ordination. It was suggested

that the regional and global manual be combined. An *ad hoc* Group of Experts has been formed to develop this manual and the work is in progress.

13 The regional Newsletter on Harmful Algal Blooms has been finalized and will be published as a special issue of the IOC Newsletter on Harmful Algal Blooms.

14 With respect to Ocean Science in Relation to Non-Living Resources (OSNLR), a Workshop on Preliminary Data Compilation had tentatively been planned for January 1993, in conjunction with this WESTPAC Session. The first information package and basic materials for the compilation of contributions have been circulated to the project participants. However, due to austerity measures, it was decided to postpone the Workshop.

15 Several activities were carried out in the field of Ocean Dynamics and Climate (ODC). A special session, jointly initiated by the CCCO Pacific Panel and the WESTPAC Project on Co-operative Study of Ocean Dynamics in the Northwest Pacific, on the Western Boundary Current and its Decadal Variation, was organized during the IOC/WESTPAC Symposium. A total of 6 papers were presented to the plenary session. It was also suggested that the project should cover the whole Western Pacific area instead of the Northwest Pacific. This attempt to link global programmes with regional efforts has proved to be a successful experience.

16 A Workshop on Climate Change and the Pacific was held in Tokyo, Japan, 9 June 1992, together with the CCCO Pacific Panel Session. Agreements on further implementation of this project and co-ordination with activities of the CCCO Pacific Panel were reached.

17 The meeting of the IOC/WESTPAC Scientific Steering Group on the Continental Shelf Circulation was held in Kuala Lumpur, Malaysia, 9-11 October 1991. Experts from Australia, China, Indonesia, Japan, Malaysia, Philippines and Thailand attended and contributed to the meeting. The implementation plan, divided into 6 sub-regions, has been published and distributed to the Member States (IOC Workshop Report No. 72).

18 In order to formulate an implementation plan for the project on Assessment of River Inputs to the Seas in the WESTPAC region, an Expert Consultation was held in Dalian, China, 10-11 April 1990. This Expert Consultation also reviewed the progress of the WESTPAC River Input Programme and recommended that more emphasis should be placed on developing a regional understanding of nutrient fluxes from rivers to the marine environment. The river systems to be studied under this project have been identified during the Consultation.

19 The IOC/WESTPAC Workshop on River Inputs of Nutrients to the Marine Environment in the Western Pacific, as planned in the Medium-Term Plan, was held in Penang, Malaysia, 26-29 November 1991, with 20 participants from 10 WESTPAC countries. The Workshop was divided into two parts: (i) the scientific presentations describing the state of knowledge on river transport of nutrients in their areas and (ii) the discussions on strategies and technical aspects of conducting studies on river transport of nutrients to the marine environment in relation to watershed characteristics, were successfully carried out. The workshop report was published as the IOC Workshop Report No. 79.

3.2 REGIONAL ASPECTS OF IOC GLOBAL PROGRAMMES

20 The Technical Secretary briefly presented the regional aspects of the IOC global programmes with regard to the World Climate Research Programme (WCRP), especially TOGA and WOCE, Marine Pollution Research and Monitoring (GIPME), Ocean Science in Relation to Living Resources (OSLR), Ocean Science in Relation to Non-living Resources (OSNLR) and the programme in ocean services.

3.3 WESTPAC SCIENTIFIC SYMPOSIUM AND FOLLOW-UP

21 The IOC/WESTPAC Scientific Symposium on Marine Science and Management of Marine Areas of the Western Pacific was successfully held in Penang, Malaysia 2-6 December 1991. Approximately 150 participants from 25 countries in and outside the WESTPAC region attended the Symposium. About 90 scientific papers were presented either at plenary sessions or at workshops organized in conjunction with the Symposium. The scientific

presentation covered 4 topics: (i) Ocean Variability and Links with Climate Change; (ii) Causes and Impacts of Sea-Level Change; (iii) Biogeochemical Processes; and (iv) Managing the Marine Environment.

22 The Symposium reviewed the progress of WESTPAC projects during the intersessional period and discussed further actions. The recommendations have been published in the IOC Workshop Report No. 76. The Proceedings are being published by the Local Organizing Commission of the Symposium.

23 During the intersessional period, IOC was represented at several regional meetings organized by other organizations where the IOC/WESTPAC regional programmes were presented and co-ordination and co-operation with these organizations have been encouraged.

24 **The Sub-Commission thanked** the IOC Secretariat for the introduction on the regional intersessional activities and expressed its appreciation for the recent issue of IOC/WESTPAC Information published by the Secretariat.

25 **The Sub-Commission was informed** on other activities which were carried out on a national and regional level.

3.4 ESTABLISHMENT OF THE IOC REGIONAL SECRETARIAT FOR WESTPAC

26 The Secretary IOC introduced the Items. He referred the delegations to Document IOC/SC-WESTPAC-II/Inf.1 prov., which provides details of the bilateral consultations between the Government of Thailand and IOC-UNESCO. He emphasized certain aspects of these consultations. He also recalled the sequential developments from the Fourth Session of the Regional Committee for WESTPAC (Bangkok, Thailand, June 1987) to the First Session of the Sub-Commission and the related decisions and instructions of the IOC Assembly at its Fifteenth and Sixteenth Sessions (Paris, July 1989 and March 1991, respectively) and of the IOC Executive Council at its Twenty-fifth Session, Paris, March 1992. He noted that in light of the progress made he had installed an IOC consultant during the period November 1990 to May 1992 in an interim office very kindly provided by the Department of Marine Science at Chulalongkorn University, and expressed his deep appreciation to the Department and the University for this generous support.

27 Finally, the Secretary IOC indicated the possible cost of staffing a regional secretariat and suggested that the Sub-Commission may consider in some detail and specify the tasks of the Secretariat, the requirements, related costs and where to find the related resources. He emphasized that there is a need to take into account that IOC is part of UNESCO and that UNESCO (or UN) rules of financial accounting are applicable for the Regional Secretariat.

28 **The Sub-Commission took note** of the information provided, endorsed the report and agreed that progress has been made. The Sub-Commission reiterated the priority of establishing the Regional Secretariat. It endorsed the proposal to set-up a small *ad hoc* intersessional Working Group on the Regional Secretariat (see also Item 9.3).

29 The Representative of WMO informed the Sub-Commission about the WMO Regional Associations II and V. **The Sub-Commission agreed** that the Regional Secretariat should establish direct link with the WMO Regional Office for Asia and Southwest Pacific to facilitate co-operation in matters of mutual interest.

30 **The Sub-Commission recalled** offers made at previous sessions on secondments from Member States to the Regional Secretariat and the offer by the USA, UNESCO, and others to support the Regional Secretariat, and questioned whether those offers were still valid in light of the time taken to establish the Secretariat.

3.5 UNCED

31 The Secretary IOC described IOC's participation in UNCED and its preparation, and references to IOC in Agenda 21, Chapter 17. This is available for the Sub-Commission, as is the Draft Action Plan for IOC Follow-

up to UNCED and implementation of Agenda 21: Overall Strategy and Goals (Document IOC-XVII/8 Annex 1). The Secretary IOC highlighted the structure and contents of that document.

32 **The Sub-Commission took note** of the information provided as regards UNCED and emphasized the need to ensure an adequate scientific input to the follow-up and implementation. The Sub-Commission urged all delegations to help create awareness of this need at national levels and increase the inter-sectorial dialogue.

4. PROGRAMME MATTERS

4.1 WESTPAC REGIONAL PROJECT: FUTURE DIRECTIONS, ACTION PLANS, RESOURCE REQUIREMENTS AND TEMA NEEDS

33 The Secretary IOC introduced the Agenda Item referring to the Annotated Provisional Agenda (Document IOC/SC-WESTPAC-II/2 prov.) and to the Medium Term Programme and Intersessional Work Plan for WESTPAC adopted at the First Session of the Sub-Commission (Document IOC/SC-WESTPAC-I/3, Annex VI). He reviewed the progress of the 9 projects and the additional proposal for the Assessment of Atmospheric Inputs of Pollutants to the Western Pacific. He reminded the Sub-Commission of the responsibilities with reference to the actions requested of it in the Annotated Agenda.

34 Following this introduction the Sub-Commission considered each of the 9 projects agreed upon at its First Session. Presentations were made by the project co-ordinators, or their representatives, with subsequent discussion as follows:

(I) Harmful Algal Blooms in the Western Pacific (WESTPAC-HAB)

35 Dr. Yasuwo Fukuyo, on behalf of Dr. Okaichi, informed the Sub-Commission on the progress achieved during the intersessional period, especially since the IOC/WESTPAC Symposium. He indicated that the project group conducted several kinds of efforts, such as operation of co-operative research, development of the manual and the Newsletter for the regional Harmful Algal Bloom Studies. The Sub-Commission was informed that the regional manual and the above-mentioned Newsletter will be combined with the global efforts in the respective topics. However, the guiding materials on taxonomy is necessary to supplement to the global manual which may include many phytoplankton species.

36 He suggested that the establishment of an operative regional network consisting of the project leader and national co-ordinators is very important for the future development of the project. He further suggested that a regional training workshop on taxonomy should be considered. It could be organized together with a global HAB training course on taxonomy.

37 Dr. Hallegraeff informed the Sub-Commission on the development of the IOC-UNESCO Manual on Harmful Marine Phytoplankton which will serve also as the guidance for the regional project. He further indicated that the suggestion made by Dr. Fukuyo on the preparation of guiding materials on taxonomy is necessary for the regional studies.

38 The Sub-Commission was informed that a CIDA-ASEAN training course will probably be organized in 1994. It would be appropriate if the IOC/WESTPAC could join this effort and support the participation from other WESTPAC countries, also with a view to obtain co-ordination.

39 **The Sub-Commission was also informed** of training activities in the global programme of HAB, one of which will focus on the WESTPAC region.

40 **The Sub-Commission noted** with satisfaction the progress of the project and encouraged the Secretary IOC and Member States concerned to approach CIDA to seek a closer co-operation and co-ordination with the organization of this project and to allocate necessary funds to support the training activity.

41 **The Sub-Commission agreed** that the name of the project should be changed to Harmful Algal Blooms in the Western Pacific (WESTPAC-HAB) to ensure close interaction with the global programme.

(ii) Recruitment of Penaeid Prawns in the Indo-Western Pacific Region

42 Dr. Ian Poiner introduced this Agenda Item, on behalf of Dr. Staples. The meeting of the National Co-ordinators reinforced the commitment of each participating country in the concept and philosophy of the Penaeid Prawn Recruitment Programme (PREP). The meeting noted that progress was slow and that, with increased resources, the quality of data and level of analysis could be raised considerably. The meeting recommended that, given the limited resources available, in-country training should be given the highest priority. Several National Co-ordinators also expressed disappointment about the failure of the UNDP proposal and intend to write to UNDP showing their concerns.

43 A six week mission to 6 countries by the PREP Technical co-ordinator and a consultant to confer about sampling techniques and install a database package and train participants in its use, was carried out in April-May 1991.

44 A further expert mission to conduct in-country field training was planned for April 1993 and a Workshop on further training in database management and data analyses was been proposed to be held within 12 months.

45 The Representative from FAO informed the Sub-Commission that PREP is considered as small but successful project. It has been able to establish a network of shrimp scientists and benefitted relevant institutions in the region. FAO much appreciated the input provided by its Technical Co-ordinator despite the shortage of funds faced by PREP. In order to assist PREP in continuing its activities, FAO has prepared and submitted a proposal, entitled Co-operative Assessment of the Shrimp Fisheries in the ASEAN and Adjacent Region, for consideration and support by a number of donor agencies. It is hoped that a positive response from the interested donors would assist IOC-FAO in implementing the activities for PREP in the near future.

46 **The Sub-Commission noted** with satisfaction the implementation of the project, welcomed the co-operation with FAO and encouraged the Secretary IOC to strengthen the co-operation with FAO along the lines on which the project has been developed. A joint IOC-FAO PREP workshop should be organized within the time-frame identified.

(iii) Paleogeographic Mapping

47 Mr. Li Haiqing, speaking on behalf of Prof. Wang Pinxian, reported on the progress of the project. He informed the Sub-Commission that the information package on the last glacial period (15,000 - 20,000 years BP) had been prepared and sent to identified scientists in the region. A workshop on preliminary data compilation was planned for January 1993 in conjunction with this Session. Six participants have been identified. However, it was decided to postpone the workshop until required funds are available.

48 **The Sub-Commission noted** the efforts that have been made and decided to organize the Workshop when the time and venue were identified, together with the required funds.

(iv) Tectonics and its Impact on the Coastal Zone

49 Dr. Hideo Kagami informed the Sub-Commission on the progress made with regard to this project and indicated that a new and thorough review of the project had been conducted. The work plan for 1993-1996 was thus reformulated and discussed at the Second Asian Marine Geology Conference (Tokyo, Japan, August 1992), and at the 29th international Geological Congress (Kyoto, Japan, August 1992). Six pilot projects have been proposed:

(a) uplifting and subsidence of coastal mountains, coastal plains and adjacent areas;
(b) the nature and the underlying geologic processes of strike-slip faults;
(c) sea-level change due to dynamic deformation of the Geoid;

(d) Kinematics of the triple junction system;
(e) central arc-rifting in the active volcanic ridge;
(f) Backarc Basin processes and paleo-environmental study in the monsoon region.

50 The new structure of the project is attached as Annex V of this report.

51 The Representative of CCOP informed the Sub-Commission on the progress of CCOP programmes and expressed his Organization's willingness to continue close co-operation with IOC/WESTPAC on relevant projects with regard to marine geological studies.

52 **The Sub-Commission noted** the high relevance of this project for coastal area problems in the region, and for coastal area development and emphasized that an interaction with relevant institutions dealing with those problems should be established.

53 **The Sub-Commission adopted** the proposal made by the project leader and urged Member States to identify the date and venue for the planned workshop, as well as further financial support to this project.

54 **The Sub-Commission agreed** that in view of the increased demand to study tectonic aspects in the coastal zone, the project should be renamed as Tectonics and its Impacts on the Coastal Zone.

(v) Climate Records in Long Lived Corals

55 Dr. Michel Pichon introduced the Agenda Item for Dr. J. Baker. He informed the Sub-Commission that expert's visit to participating countries to determine the availability and suitability of massive corals in the WESTPAC region was planned and will be undertaken when the expert concerned is available.

56 He also indicated that, for density banding, a training programme at a Master degree level could be carried out at AIMS for students enrolled at the James Cook University, and that the required studentship would be sought from relevant Australian agencies.

57 The UNESCO Representative provided additional information to the Sub-Commission on the expertise and studies going on in the region by a student from the USA. Some samples of corals and respective data are also available. **The Sub-Commission noted** with interest this information and encouraged the project leader to consult with the person in question and assess the information and data for use in the regional project.

58 **The Sub-Commission further encouraged** Member States to identify competent students and to approach relevant Australian agencies for the necessary fellowship to carry out the study.

(vi) Co-operative Studies of Ocean Dynamics in the Western Pacific

59 This project was introduced by Dr. Keisuke Taira, for Dr. Yamagata. In order to study western boundary currents and their possible impacts on the global climate changes, it has been suggested the project should be renamed as "Co-operative Studies of Ocean Dynamics in the Western Pacific". He informed the Sub-Commission that the Project on Circulation Research of the East Asian Marginal Seas (CREAMS), focussing on the marginal seas in the northwestern part of the Pacific, will begin and continue for 3 years.

60 **The Sub-Commission recognized** the importance of the project in the sense that it could be an important element for studying climate change and could also address the uncertainties as far as the ocean is concerned.

61 **The Sub-Commission agreed** to change the name of the project to cover the wider and important scientific aspects. It noted with appreciation the support from the Ministry of Education, Science and Culture of Japan.

(vii) Co-operative Research Study of the Continental Shelf Circulation in the Western Pacific

62 Prof. Su Jilan presented the development of this project in different sub-regions addressing different driving forces. For the Gulf of Thailand the project plan has been prepared with participation of scientist from Thailand, Vietnam, Australia and Japan. The implementation of the plan needs further co-ordination and funding.

63 Studies in the East China Sea have been carried out by a joint China-Japan co-operative study, focussing on water exchange between the Kuroshio and the shelf water. The co-operation in the Gulf of Tonkin and the Sulu Sea are under consultation between interested Member States.

64 For future implementation, Prof. Su Jilan informed the Sub-Commission that a Training Workshop on Numerical Modelling of Coastal Circulation is planned for August 1993, and Japan agreed to support it with available funds for the Workshop and an amount of US 10,000 should be borne by IOC/WESTPAC.

65 The Delegate of China informed the Sub-Commission that due to modification of the previous cruise plan it is necessary to find additional funds for the joint cruise for Sulu Sea investigation.

66 **The Sub-Commission recognized** the importance of this project also for the prediction and control of impacts of accidental oil spills like the one which recently occurred in this region, as well as in other areas and suggested that the Training Workshop on Numerical Modelling for Coastal Circulation should be carried out. **It noted** the information provided by the Representative of ESCAP in this respect and invited a co-operation between ESCAP and IOC/WESTPAC in this matter.

67 **The Sub-Commission encouraged** the Government of China to favourably consider the proposed joint cruise for Sulu Sea investigation to enhance the implementation of the project.

68 **The Sub-Commission agreed** that the CREAMS should be included in this project since the studies will be mainly carried out in the continental shelf areas.

(viii) Assessment of River Inputs

69 Dr. Manuwadi Hungspreugs introduced the progress made in this project, reviewing its development since the Fourth Session of the IOC Regional Committee for WESTPAC. She indicated that as discussed at the Experts Consultation (Dalian, China, April 1990), the project will be focussed on the nutrient transportation in the river systems selected for the study. The workshop held in Penang, Malaysia, December 1991, reviewed existing knowledge in the region. These papers have been published in the IOC Workshop Report No. 79. She suggested an inter-calibration exercise amongst the participating laboratories should be planned for the follow-up activities of the Workshop. However, it has not been organized due to various constraints. She suggested that this inter-calibration exercise should be organized as soon as possible. Dr. Manuwadi further suggested that the joint Workshop of the WESTPAC River Inputs project and the Eutrophication Project, as proposed in the Medium-Term Plan of the Sub-Commission, should be organized during the next intersessional period. Several delegates informed the Sub-Commission of their national interests and projects related to this project.

70 **The Sub-Commission noted** with satisfaction the progress made in this project. However, **it further urged** participating laboratories and the Secretary IOC to carry out the planned intercalibration exercise by correspondence amongst the laboratories without further delay.

(ix) International Mussel Watch

71 Dr. Manuwadi introduced the structure and development of the project. Ms. Monthip Tabucanon also presented views to develop the project by indicating the importance of identifying the national institutions and scientists who are interested in, and have carried out, the relevant studies in the region. She also indicated that training on methodology and standard procedures are necessary for the implementation of the project, especially for those laboratories not yet familiar with the methodology, and expressed that the Environmental Research and Training Center is willing to host such kind of training activities.

72 **The Sub-Commission was informed** by the Secretary IOC on the general development and progress in International Mussel Watch Programmes, but particularly in the Caribbean and the South American region, with the co-operation of IOC, UNEP and IAEA, and strong support of US-NOAA. Some standard methods and manuals have been published.

73 **The Sub-Commission noted** the efforts made by International Mussel Watch Programme and by other marine scientific institutions **and urged** Member States and project co-ordinators to build-up an infrastructure for this project.

74 **The Sub-Commission noted** the recent development in this respect, and expected the standard materials to be distributed when available. The intersessional activities have been defined and are shown in Table 2(A) of Recommendation IOC/SC-WESTPAC-II.2.

75 As suggested at the IOC/WESTPAC Symposium, Prof. Zhang Jin prepared a proposal on the Assessment of Atmospheric Inputs of Pollutants to the WESTPAC region, referring to Document IOC/SC-WESTPAC-II/Inf.5. He emphasized atmospherical transport of pollutants as an important source of contaminant for the marine environment. He indicated that compared to river inputs of pollutants in some areas, it is more important to assess the atmospheric input in most coastal areas within the WESTPAC region.

76 He recommended to the Sub-Commission that the relevant study on deposition of nutrients and trace species should be stimulated in the coastal areas of the WESTPAC region.

77 Several delegates expressed their interest in this proposal and informed the Sub-Commission of their on-going national programmes.

78 **The Sub-Commission expressed appreciation** to Prof. Zhang **and noted** the important role of assessing atmospheric transport of pollutants in the region and its potential contribution to the GOOS monitoring programme and **agreed** to accept this proposal as one of the projects within the programme on Marine Pollution Research and Monitoring of the Sub-Commission. The intersessional activities have been defined and are shown in the Table 2(A).

4.2 REGIONAL COMPONENTS OF IOC GLOBAL PROGRAMMES

79 The Secretary IOC introduced the item referring to the Annotated Provisional Agenda and the Report on Intersessional Activities (Documents IOC/SC-WESTPAC-II/2 prov. and IOC/SC-WESTPAC-II/6, respectively). He pointed out that the table provided in the Report on Intersessional Activities basically reflects the actions carried out in relation to the 9 projects adopted at the First Session of the Sub-Commission (Hangzhou, February 1990), and that within each programme area there are a number of additional activities which have been carried out in WESTPAC as part of the IOC global subject area programmes. These are also providing substantial support to the regional activities and the 9 projects of the Sub-Commission. Hence the tabular presentation in the Report on Intersessional Activities has been organized with an identification of the relevant IOC global programme within which subject area the respective project of the Sub-Commission naturally falls. He then briefly presented such additional activities, in the order of the sub-items of the Agenda.

4.2.1 GIPME

80 Through the groups of experts, GEMSI and GEEP, two regional workshops were organized in China on the use of sediments in marine pollution research and monitoring (Dalian, China, April 1990) and one biological effects of marine pollution (Xiamen, China, October 1992) with participation mainly from the WESTPAC region. A planning meeting for the field phase of the Asia and Pacific regional component of the International Mussel Watch, sponsored by IOC and UNEP, was organized in Japan, January 1993, at the invitation and support of Japan. In co-operation with UNEP-COBSEA, the IOC-GIPME organized two expert missions in the region in 1990-1991.

81 Additional developments in this programme are presented in the Annotated Agenda, especially as regards the joint meeting of the IOC-UNEP Intergovernmental Panel and its Bureau.

82 **The Sub-Commission recalled** its planned activities in 1993-1994; the nutrient intercalibration exercise; the joint symposium with HAB; and the further development of the International Mussel Watch Project.

83 The Delegate of Japan informed the Sub-Commission that **T.S. UNITAKA-MARU**, Tokyo University of Fisheries, is carrying our observations in the Persian Gulf, 14-26 February 1993, as part of the IOC-UNEP-ROPME programme on assessment of impacts on the marine environment of the Gulf War. A workshop is currently organized on this matter by ROPME-IOC-UNEP.

84 The Delegate of Thailand emphasized the importance of biological effects studies. The Secretariat confirmed that many scientists from the region are participating in this work and that reports and manuals are available and can be obtained through the IOC Secretariat. The Sub-Commission was informed by the WMO Representative about the joint WMO-IOC-UNEP project for provision of information in marine pollution emergencies. **The Sub-Commission noted** the importance of this project and the related co-operation internationally and nationally and urged Delegations to follow this matter up at national levels through ensuring appropriate contacts between national institutions.

85 **The Sub-Commission was also informed** about the on-going coastal zone monitoring projects and related assessments (see also Item 5.3).

86 This includes the Workshop on Pilot Monitoring of Coral Reefs organized on the occasion of the Guam International Coral Reef Symposium (July 1992), as part of the development of the pilot experiments for monitoring potential impacts of climate change in the marine and coastal environments, organized jointly by IOC, UNEP, WMO, UNESCO and IUCN. The Workshop resulted in identification of a number of laboratories willing to participate and in an agreement to use the Manual on Coral Reef Monitoring developed through the related ASEAN-Australian project with expert input *inter alia* from the Australian Institute for Marine Sciences (AIMS). The IOC Secretariat has received the Manual and has formally contacted the potentially participating Member States and laboratories (see also Item 5.3)

4.2.2 WCRP, especially TOGA and WOCE

87 The IOC is now, following the signature of the Memorandum of Understanding in 1992 with WMO and ICSU, a co-sponsor of the WCRP at an equal level with the other Organizations. This has entered into force as of January 1993. As a consequence, the CCCO has been disbanded, and the responsibility for the scientific leadership at WCRP now fully rests with JSC. The Intergovernmental Panels for TOGA and WOCE are continuing and are reporting to IOC and WMO. The recent reports of the Panels are available to the Sub-Commission here.

88 Additional activities which should be mentioned in the field of Ocean Dynamics and Climate (ODC) are:

(i) The mid-term international TOGA Symposium (Hawaii, USA, July 1990), sponsored by WMO, IOC, ICSU, and the related follow-up. An action of particular interest to the WESTPAC region in this context is the establishment of the International Research Center for Climate Prediction, proposed and endorsed at the recent TOGA Board meeting in 1992. At the international level this is co-sponsored by WMO, IOC and ICSU/IGBP.

(ii) The Workshop on Pilot Monitoring of Coral Reefs organized on the occasion of the Guam International Coral Reef Symposium (July 1992), as part of the development of the pilot experiments for monitoring potential impacts of climate change in the marine and coastal environments organized, jointly by IOC, UNEP, WMO, UNESCO and IUCN. The Workshop resulted in identification of a number of laboratories willing to participate, and in and agreement to use the Manual on Coral Reef Monitoring developed through the related ASEAN-Australian project, with expert input *inter alia* from the Australian Institute

for Marine Sciences (AIMS). The IOC Secretariat has received the manual and has formally contacted the potentially participating Member States and laboratories.

89 **The Sub-Commission noted** the importance of WCRP in general and TOGA in particular. The Delegate of Australia provided further information on the International Research Centre for Climate Prediction, and informed that Australia is hosting a Workshop in March 1993 to assess the interest of Member States in this region. He also provided information on the on-going Intensive Observing Period of the TOGA-COARE. Several Delegates, including Thailand, Japan, Indonesia, China, provided information on the participation of their countries in TOGA and WOCE, and planned activities in the forthcoming years. The data provision and exchange programme was specifically brought up by the Delegate of China (see also Item 4.2.5).

90 **The Sub-Commission noted** these very important contributions of its Member States to the WCRP and related matters. **The Sub-Commission also noted** the important assessment work going on within the IPCC, and urged delegations to ensure that intersectoral linkages are established and functioning at the national level and likewise, at the international level. The Secretary IOC recalled that the IOC is actively participating in, and contributing to, the work of the IPCC and its Working Groups. He also informed the Sub-Commission about the global coastal area conference which is being convened under the auspicious of the IPCC in November 1993, in Holland with co-sponsorship *inter alia* of the IOC.

4.2.3 OSLR, especially Harmful Algal Bloom Programme (HABP)

91 The joint IOC-FAO OSLR Programme is built around 3 components:

(i) HAB component, with the *ad hoc* IOC-FAO Intergovernmental Panel and the interactions with the related SCOR and ICES activities, as well as the regular international symposia (1993 in France). Co-ordination and interaction is also maintained with the relevant actions in the GIPME Programme (nutrients, river inputs, biological effects). The report of the *ad hoc* Intergovernmental Panel is available (Document IOC-FAO/IPHAB-I/3, Paris, June 1992). A special Newsletter on HAB is now regularly produced. The regional inputs to this Newsletter, including inputs from WESTPAC, are obtained from regional co-ordinators.

(ii) The Global Ecosystem Dynamics (GLOBEC) component which is jointly supported by IOC and SCOR and guided by a joint SCOR-IOC scientific committee; this component is also a project of the ICSU-IGBP.

(iii) The International Recruitment Experiment (IREP), which is presently under revision. A proposal for this component will be presented to the IOC-XVII (March 1993), with special emphasis on the scientific questions relating to stock abundance in tropical and sub-tropical coastal zones.

92 **The Sub-Commission recalled** its up-coming activities in this area (Newsletter and Manual on HAB). **It also noted** the course in taxonomy organized by IOC in Denmark in 1993, with support of DANIDA. **The Sub-Commission also took note** of the international conferences on harmful algal blooms and related matters, being organized in France, 1993, with support of the IOC, and in Japan in 1995. The two previous ones: 1989 (Sweden) and 1991 (Rhode Island, USA), were also supported by IOC, as part of its efforts within the HAB Programme. **The Sub-Commission agreed** that support through IOC-WESTPAC should be provided to ensure expertise to national workshops, and emphasized that in-country workshops were recommended as a in-country means to enhance national capabilities in this HAB field.

93 Information was provided about preparation of standards and reference materials for toxins (Thailand, USA) and the need for cultures and species identification stations. Co-operation between Denmark and Japan is perusing the species identification problems. In this context, the need for specimen banks was also brought up. **The Sub-Commission emphasized** that the development in this important field of HAB must be closely followed by the programme network, and solicited national/regional submissions to the HAB Newsletter now in regular production.

4.2.4 OSNLR

94 The joint IOC-UN(OALOS)-OSNLR Programme is gradually focussing attention on problem areas relevant to coastal area management. This is centered around problems related to coastal erosion, sedimentary budgets, coastal profiles and use of the coastal zone as a resource in its own right. An international conference is being planned for 1994 on the theme "Coastal changes; past, present, and future - tools for coastal area management". The programme for this conference will be considered by the IOC Assembly at its Seventeenth Session.

95 The IOC-UN Symposium on Ocean Science in Relation to Non-Living Resources was organized as a part of 29th International Geological Congress in Kyoto, Japan, August 1992. Discussion following the Symposium pointed out to promote studies on the coastal zone and marine phosphate resources.

96 **The Sub-Commission took note** of this information and the relevance of the programme to coastal area problems. **The Sub-Commission also recalled** its agreed actions in this field during the coming years (ref. Item 4.1).

4.2.5 IODE and Related Matters

97 The Technical Secretary introduced the item referring to the Report on Intersessional Activities and the Annotated Provisional Agenda (Document IOC/SC-WESTPAC-II/6 and II/2, respectively). He briefly reviewed the relevant activities, noting that the IODE system is currently being revised so as to adopt to requirements of large regional/global programmes and the future GOOS.

98 The Delegate of China provided information on the development of the NODC in China, the data delivery and the establishment of the World Data Center D for oceanography. He confirmed that a training course in marine information management had been arranged at the National Oceanographic Date Centre, Tianjin, in China in October 1992, for WESTPAC Member States. He reiterated that such training should also be arranged in the future.

99 The Delegate of Japan provided much information about the RNODC for WESTPAC in Japan. He noted with great regret that data are not being delivered from Member States at an acceptable level. Cruise summary reports are not received by the RNODC at the level which is to be expected.

100 **The Sub-Commission took note** of this information with alarm since it suggested that the obligations of Member States working in the Sub-Commission programmes, as well as other programmes under an international agreed umbrella, were not fulfilled. **The Sub-Commission requested** delegations to investigate this matter at the national level and help remedy the situation.

101 The Delegate of Japan also informed the Sub-Commission about a number of training activities in IODE, OCEAN-PC and related matters at the RNODC in Japan. He noted the recent development of a special data bank at the RNODC for ADCP data and regretted that so far only data from Japan had been delivered.

102 The Delegate of Thailand reminded the Sub-Commission that delivery of data requires that the scientists providing the data are ensured on how the data will be used and that proper acknowledgement is being made by users. This is part of the intergovernmentally agreed IODE system, and indeed one of the reasons for having the IODE system. It appears, however, that it is most appropriate to create a database on databases so that users can contact directly the data holder. This will indeed meet the immediate needs, but it will not cater for the role of the IODE system of ensuring preservation of the data. The RNODCs, WDCs and NODCs are constitutionally obliged to ensure the storage of data received. This is an important part of the IODE system. The most recent initiative of the IODE in a related matter in the oceanographic data rescue and archiving project now being proposed by the IODE Committee.

103 The Sub-Commission was informed about the success of the central ASEAN database which recognizes several of the problems raised in the discussions. **The Sub-Commission requested** the RNODCs and NODCs to establish contact with the relevant structure of ASEAN so as to perhaps ensure that the WESTPAC data exchange efforts could also benefit from this activity and insight.

104 The Delegate of Thailand informed the Sub-Commission about the national activities in the Gulf of Thailand as regards to the development of a systematic ocean observing system on an operational basis and its data exchange and data availability strategy. **The Sub-Commission noted** this with great interest and **considered** it also under Agenda Item 5.

105 The Delegate of Australia informed the Sub-Commission about the operation of the specialized oceanographic centre and the data exchange policy-data delivery through the Australian NODC, which is a very active participant in IODE.

106 The Delegate of Japan informed the foundation of the El Niño Monitoring Center at the Japan Meteorological Agency. The Center publishes Monthly Ocean Report from February 1993 on synoptic and time-series data of ocean and atmosphere relating to the El Niño.

107 The Representative of UNESCO reminded the Sub-Commission of the project of UNESCO-IODC to create a database on databases, which had been proposed and developed some years ago.

108 It would perhaps be a good idea to revise this project in light of the present situation. **The Sub-Commission concurred** to this proposal and agreed that this should be included as an action item in the future programme (see Item 9).

109 The Secretary IOC suggested that the training courses which had been conducted in the region be used to create a network of experts in the region which could help stimulate exchange of data and marine information. He also recalled the successful development of the regional marine information exchange network in the Western Indian Ocean, with a similar development now being initiated in the central-eastern Atlantic region, with support from IOC and national donors. He suggested that the Sub-Commission might consider some similar developments. He recalled that this is to be seen in the context also of ASFIS/ASFA, and he reminded the Sub-Commission about this important joint FAO-IOC-UN global programme.

4.2.6 Ocean Mapping

110 The Delegate of China provided information on the state of development of the International Bathymetric Chart of the Western Pacific (IBCWP) which was agreed upon at the First Session of the Sub-Commission. The meeting of the *ad hoc* Group of Experts on Ocean Mapping in the WESTPAC Region was convened and proposed that an Editorial Board should be established which has been endorsed by the IOC Assembly in 1991. **The Sub-Commission agreed** that the First Session of the Editorial Board should be organized as soon as possible and the Secretary IOC was requested to endeavour to identify funds for such a meeting soonest.

111 The Delegate of China also informed the Sub-Commission that several steps had been taken in China to initiate the work, such as cataloguing the date to be used for compiling the chart and a national Editorial Board has been established.

112 The meeting of Committee on Geological Atlas of the Pacific and Atlantic Oceans was held at the Hydrographic Office of Japan, August 1992 to discuss and implement the Pacific Atlas project.

113 **The Sub-Commission requested** the Delegations to help ensure that similar preparatory work was undertaken at a national level by other members of the Editorial Board. **The Chief Editor was requested** to initiated as much work as possible, in order to ensure that the meeting of the Editorial Board be as efficient and productive as possible.

114 **The Sub-Commission encouraged** the members of the Editorial Board to initiate the same actions at their national levels and **it recommended** the Chief Editor to pursue the initiation of the work as much as possible, so as to ensure that the first editorial meeting can be as productive as possible.

115 The Delegate of Japan informed the Sub-Commission about the development of the GAPA project.

5. GLOBAL OCEAN OBSERVING SYSTEM (GOOS) AND REGIONAL INPUTS

5.1 REGIONAL COMPONENT OF GOOS AND ITS PILOT PROJECTS AND RELATED INTERACTION WITH ON-GOING REGIONAL PROJECTS

116 The Secretary IOC recalled the history of GOOS from the adoption by the Fifteenth Session of the IOC Assembly of the principle that a system to ensure adequate retrieval of systematic ocean observations was needed; to the Second World Climate Conference (October - November 1990) endorsement of the need to develop a GOOS with a climate module providing the ocean component of the Global Climate Observing System; to the decision of the IOC Assembly at its Sixteenth Session to undertake Development of a Global Ocean Observing System (GOOS), the establishment of the GOOS support office in the IOC Secretariat and the decision to participate in the development of the GCOS (Resolution XVI 8); and the Resolution XVI-16 on IOC's further contribution to UNCED, including the formally adopted Statement and Declaration on a Global Ocean Observing System which had been transmitted to UNCED; and the inclusion of GOOS development in Agenda 21, Chapter 17, part E, with the IOC identified as the Lead Agency for its implementation, in co-operation with WMO, UNEP and other international Organizations. The Secretary IOC recalled the establishment by the Twenty-fifth Session of the IOC Executive Council (March 1992) of the Intergovernmental IOC Committee for GOOS and a scientific and technical body for GOOS planning, comparable to the Joint Scientific and Technical Committee for GCOS. This is co-sponsored by WMO, IOC, ICSU and UNEP, through an MOU signed in 1991-1992. The Secretary IOC also informed the Sub-Commission that an MOU on co-operation in the development of GOOS had been negotiated with ICSU, WMO and UNEP, and was expected to be completed in February 1993. The Secretary IOC drew the attention of the Sub-Commission to the status reports on GOOS being prepared by the IOC Secretariat (Document IOC/INF-879) and the Draft GOOS Development Plan (Document IOC/EC-XXV/8 Annex 1) which has been circulated to Member States for comments and which will be further discussed at the First Session of the IOC Committee for GOOS, Paris, 16-19 February 1993. He informed the Sub-Commission about preparations for that session, in particular the formulation of a proposed GOOS Development Strategy. The development of GOOS is proposed to follow a modular form addressing the needs of different sectors and concerns of society, as: climate, marine pollution, marine living resources, coastal zone problems, improved weather forecasting, particularly at sea, so as to increase safety at sea. GOOS is clearly also highly relevant for the implementation of the Conventions adopted a UNCED. The development of GOOS should not be seen as a new programme, but rather as an attempt to ensure that many existing elements are glued together so that an operational system can be achieved, adequately covering the needs for systematic ocean observations, with new developments as required, and founded on a solid scientific approach. For this to succeed there is clearly a need to obtain governmental commitments and to work through an intergovernmental organization. The Sub-Commission was called upon to help at national levels in this endeavour, and to ensure that national nominations to the IOC Committee for GOOS are made if not already done. Other requests of the Sub-Commission were identified in the Annotated Provisional Agenda (Document IOC/SC-WESTPAC-II/2 prov.).

117 Several delegations provided in-depth information on national developments regarding GOOS, including the gradual establishment of regional or sub-regional systematic ocean observations, which should be considered as contributions to the development of GOOS. These are summarized in Annex VI. The observer from Norway presented the development of the European SEAWATCH System and a similar system in the Gulf of Thailand. The Delegate of Thailand further informed about the systematic development at the national level of observations in form of a Marine Surveillance and Information System - SEAWATCH Thailand - by NRCT and its interfacing to different user groups. The Delegates of Australia and Japan informed the Sub-Commission about national development. In Australia a working group has been formed to prepare a draft strategic plan for future development of GOOS/GCOS activities. Information on this will be provided to the Intergovernmental meeting on WCP, Geneva, April 1993.

118 The Representative of WMO informed the Sub-Commission that WMO and the national meteorological services regard GOOS as a very important development and that WMO co-operates with IOC in this matter. At the national level it was likewise most important that proper co-operation be established between the different services and national institutions involved in this development and potentially able to contribute to it. A well co-operated effort is needed for us to succeed.

119 **The Sub-Commission took note** of the information and **urged** Member States to pursue the national development and establish relevant national mechanisms following the examples provided in the discussion here. **The Sub-Commission requested** its officers to follow this closely in the intersessional period and help ensure that adequate information and communication is provided intersessional, and that national reports are provided on further developments to the Third Session of the Sub-Commission.

120 **The Sub-Commission fully endorsed** the approach of building on existing systems, including IGOSS, GLOSS, WWW, IODE, DBCP, MARPOLMON, and **realized** the need to co-ordinate with these existing elements and also regional developments. **The Sub-Commission also emphasized** that the individual national programmes will be considerably strengthened through a regional co-operation and co-ordination of ocean observations, and that their value will be much more enlarged than a mere sum of the individual efforts. **The Sub-Commission called** upon its officers, and in particular the First Vice-Chairman, to follow this matter closely, intersessionally. Informal consultations may be called to take into account the possible need to set-up a regional group for GOOS development as a body of WESTPAC Sub-Commission.

121 **The Sub-Commission noted** that many relevant activities are on-going or underway in the regional co-operation programme, including regional GLOSS, Mussel Watch, River Inputs, Drifting Buoy Co-operation, WOCE and TOGA efforts, preparation of maps (paleogeographic and bathymetric), HAB-WESTPAC. All these efforts can contribute to the gradual development of a regionally co-ordinated GOOS serving all Member States in the region, as well as the global community.

122 **The Sub-Commission finally urged** delegations to follow-up this matter at national levels and help create awareness of GOOS developments and needs at senior government levels.

5.2 COASTAL ZONE AND STATE OF THE ENVIRONMENT MODULE OF GOOS AND RESOURCES REQUIREMENTS

123 The Technical Secretary informed the Sub-Commission about the development of the GOOS Pilot Projects, with special reference to the pilot projects on coral reef and mangroves, sea-level change and coastal ocean circulation. He informed the Session about the Pilot Projects on Mangroves and Coral Reefs formulated at the UNEP-IOC-WMO-IUCN Meeting of Experts (Monaco, December 1991), and about the further development of the Guam International Coral Reef Symposium (July 1992). The IOC Secretariat is following up the plan developed there for the coral reefs pilot monitoring.

124 Pilot project proposals on sea-level change and coastal ocean circulation have been prepared and distributed to the Meeting. Initially the effort in coastal ocean circulation will be focussed on the WESTPAC region due to the existing corresponding project of the Sub-Commission.

125 **The Sub-Commission noted** the development of the pilot projects and **instructed** the officers of the Sub-Commission to take appropriate action on this matter following the First Session of IOC Committee on GOOS (Paris, February 1993).

6. WESTPAC ACTION PLAN

6.1 REGIONAL ACTION PLAN FOR FOLLOW-UP TO UNCED

126 The Secretary IOC introduced the item referring to the Annotated Provisional Agenda (Document IOC/SC-WESTPAC-II/2) and the draft Action Plan for IOC Follow-up to UNCED and Implementation of Agenda 21: Overall Strategy and Goals (Document IOC-XVII/8 Annex 1) which had been made available to the Sub-Commission. He briefly reviewed the structure of that document and emphasized that it is addressing a set of specific issues. These are based on Agenda 21, chapter 17 and include:

(i) Coastal Area Development-Management;
(ii) Marine Pollution from land-used sources;

(iii) Climate variability and impacts;
(iv) Role of oceans in climate and global systems;
(v) Changes in UV radiation;
(vi) Living marine resources;
(vii) Marine species-biological diversity;
(viii) Institutional and capacity building.

127 The IOC Assembly is expected to review the document and agree on priorities, resources allocations and time-schedules. The Secretary IOC emphasized the role of the Sub-Commission as a regional body "responsible for the promotion, development and co-ordination of the Commission's marine scientific research programmes, ocean services and related activities" in mobilizing the marine science and services communities for the follow-up to UNCED. This is required in order to help ensure that adequate scientific input is provided to this follow-up nationally and internationally. He urged delegations present at this Session to help follow-up this matter at national levels and create awareness of the role of marine sciences and services in this context at senior governmental levels in the Member States. The Secretary IOC noted that several of the projects of the Sub-Commission were relevant for several of the issues and invited the Sub-Commission to identify actions in the programme which respond to the issues as well as possible additional areas of action. He suggested as examples the inputs of the projects on coastal and shelf seas circulation, sea-level observations, river input and mussel watch, towards integrated coastal zone (or area) management; the input of the ocean observations to marine pollution emergencies (ref. oil spill); the contribution of the river input and atmospheric input studies to the land-used sources of marine pollution problem; the input of PREP and WESTPAC-HAB to the management of living marine resources; the regional GOOS for the health of the ocean, coastal zone and climate problem areas.

128 The Secretary IOC suggested that the programme components considered in this context should be a medium to long-term undertaking. In this context he also invited ideas on major trends to be considered in a possible preliminary IOC contribution to the Fourth UNESCO Medium Term Plan (1996-2001). The Representative of UNESCO informed about the convening by ESCAP of a coordinating meeting for the implementation of UNCED follow-up in the region, 1-3 February 1993, and invited the Sub-Commission to provide input to him for that meeting.

129 The Chairman presented a case-study he had carried out of research resulting in practical application for coastal area management. He suggested the Sub-Commission elaborate on the possibility of joint, integrated scientific interdisciplinary studies aimed at solving practical problems such as identified through the UNCED issues. He proposed the possibility of such an action for the Gulf of Thailand and Gulf of Tonkin. Such studies would involve several of the individual projects of the Sub-Commission working together towards providing a scientifically well-founded information basis for management of coastal areas and shelf seas.

130 The Delegate of Japan informed the Sub-Commission about the participation of Japan in the LOICZ project and its relevance to fluxes and interactions. These studies aim at the East China Sea. The Delegate of China informed the Session about an integrated ocean management study being implemented as a case-study in China, with support from GEF, East Asian Seas Marine Pollution Prevention Programme, with establishment of a test or pilot area for detailed studies. This could provide preliminary results in a few years and be a case for presentation at a WESTPAC Symposium.

131 The Representative of WMO informed about a joint proposal of WMO and IOC to enhance marine observations in the region being prepared for UNDP-GEF as regional co-operation towards follow-up to UNCED. He emphasized the importance of co-operation between sectors in the implementation and follow-up to UNCED.

132 The UNESCO Representative referred to coral reef studies showing possible effects of global-regional changes and human influences. He suggested that the Sub-Commission consider the possibility of preparing a proposal for GEF funding as a Joint regional undertaking - involving most if not all - of the Sub-Commission Member States. **The Sub-Commission agreed** to pursue this, possibly through a working group. **It also endorsed** the proposals made by the Chairman and the Secretary IOC that case studies be initiated, and be prepared for

presentation at a possible mid-term major WESTPAC symposium. **It also requested** the present project leaders, or their representative, to discuss the integrated science projects further and report under Agenda Item 9.

6.2 ACTION PLAN FOR THE SUB-COMMISSION FOR 1993-1996

133 The Secretary IOC invited the Sub-Commission to review the Medium-Term Programme and Intersessional Work Plan for WESTPAC (1990-1995) adopted at its First Session, Hangzhou, China, February 1990, in light of the accomplishments intersessional and the deliberations at the present Session under Agenda Item 4 and 5, and prepare an action plan for 1993-1996. This should include the actions of the Sub-Commission as priority actions for that biennium clearly identified with an estimated and realistic costing and identification of the funding sources. He recalled the decision of the Sub-Commission at its First Session that a major multi-disciplinary symposium should become the principal intersessional activity, and invited the Sub-Commission to consider the organization of such a symposium in 1994-1995, bearing in mind the success of the Penang Symposium, Malaysia, 1991.

134 The Secretary suggested that the Sub-Commission may wish to identify programme actions in three categories, namely;

(i) projects or actions which are to be supported for implementation through IOC;
(ii) projects which should be targeted towards bilateral or multilateral donors;
(iii) projects which consider to be important, but for which funds are not available and for which a process needs to be initiated to make governments aware of needs and requirements for funding, and which task of sensitizing and awareness creation rests with the national delegates of the Sub-Commission to activate at national levels.

135 The Secretary emphasized that the Sub-Commission cannot look only to IOC for funding and he suggested that these same considerations be used in the elaborations under Agenda Item 9. He finally presented a table which had been prepared in consultation with the Chairman which could facilitate the work. He suggested that the Sub-Commission reviews briefly the situation in plenary and charges the Secretariat and the former assistant to the Chairman from the Delegation of Australia to complete such a tabular presentation of the 1993-1996 programme under Item 9.

136 The Chairman referred to the Penang Symposium, December 1991, and the learning process involved in the transformation of scientific research into results and applications useful for management and development. He emphasized that the Symposium had brought many scientists from the region together coming from different national institutions, and had initiated a dialogue and a contact between them, as well as an exchange on the various problems they are facing. He considered that perhaps results from a joint interdisciplinary Gulf of Thailand study could be available of the end of 1995, and he supported the organization of a symposium.

137 The Delegate of Australia supported the tabular overview presentation of the projects and the programme as a whole, with priorities, cost-estimates and shared, identified responsibilities. He emphasized the importance of showing the linkages to other programmes. Such an overview presentation also constitutes a profiling exercise, would certainly facilitate the spreading of information about the WESTPAC Sub-Commission and its role nationally and internationally. He also supported the continued organization by the Sub-Commission intersessional of a major symposium.

138 The Delegate of Indonesia appreciated the invitation by the Chairman that Indonesia considers hosting the symposium and he would bring this matter up with the relevant authorities in Indonesia. **The Sub-Commission took note** of this with appreciation. **The Sub-Commission also called** upon delegations to help spread awareness of its existence and role at all national levels, and provide information about the programme to relevant national authorities. **It concurred** with the tabular presentation form and **agreed** to organize a major symposium early 1995 or late 1994. **It realized** that additional funding beyond the means of the IOC regular programme must be provided. This and the tabular action presentation will be further considered under Agenda Item 9.

139 **The Sub-Commission adopted Recommendation SC-WESTPAC-II.1** and the title and programme outline for the Third IOC/WESTPAC Intersessional Scientific Symposium.

7. CO-OPERATION WITH OTHER ORGANIZATIONS

7.1 ASEAN

140 Dr. Ampan Pintukanok introduced the projects which have been carried out and are being carried out in the ASEAN region, taking Thailand as example. She informed the Sub-Commission on the scope and scientific coverage of these projects, referring to bilateral and international co-operation in the region in the field of marine sciences and coastal zone management. Scientific information and knowledge have been gained from these projects as bases for further development of marine sciences in the region. However, inter-sectorial co-operation and co-ordination need to be strengthened in the region.

141 Information on various programmes and projects initiated by organizations and donors was provided to the Sub-Commission with regard to marine science and services in the region.

142 **The Sub-Commission noted** the progress achieved in the region and expressed its willingness to co-operate with organizations concerned, as well as on-going programmes in the area. This requires further information on the development of marine sciences related programmes in the region.

7.2 UNEP

143 Information on UNEP activities were also presented to the Sub-Commission, especially on the East Asian Seas Action Plan and COBSEA.

7.3 CCOP

144 The Representative from CCOP introduced to the Sub-Commission the programmes which have been developed by the Organization, especially in the field of marine geology and geophysics. He expressed the need for and willingness of CCOP to co-operate with IOC/WESTPAC, as in the past few years and increase this co-operation and co-ordination.

145 He informed the Sub-Commission on recent co-operation with relevant institutions on the development of paleogeographic map geo-tectonic maps and invited IOC for co-operation in future activities.

146 He also informed the Session on regional conferences planned in coming years and invited IOC to co-sponsor these activities.

147 The Secretary IOC informed the Sub-Commission of his appreciation and awareness of the co-operation between CCOP and IOC and confirmed his wish to continue to co-operate with CCOP on related projects.

7.4 OTHER UN BODIES

148 The WMO Representative expressed his satisfaction on the close co-operation which has been established between WMO and IOC on a global level and indicated that the Member States of WMO and IOC gained benefits from the long-standing co-operation. However, he emphasized that co-operation between WMO regional associations and IOC regional subsidiary bodies should be strengthened at the regional level, thus contributing to the follow-up activities to UNCED, especially in capacity building.

149 The Secretary IOC expressed appreciation to the Representative of WMO and informed the Session that, during recent discussions with WMO, closer co-operation at a regional level has been proposed by both Organizations. He also referred to the IOC-WMO data rescue and archiving project and suggested that this should be activated in the region.

150 The UNESCO Representative commented on contributions that had been made towards WESTPAC programmes particularly in marine pollution and coral reef monitoring under COMAR and introduced recent developments with regard to the El Niño study. He indicated that assessment of existing handwritten meteorological data should be further considered. He also indicated that future UNESCO inputs dealing with the marine environment would be harmonized with WESTPAC programmes.

151 The Secretary IOC informed the Sub-Commission about the IOC co-operation with other agencies through the ICSPRO mechanism, including UN, UNESCO, FAO, WMO, IMO, and now also IAEA and UNEP, with the IOC serving as the secretariat. He recalled that collaboration with IMO and IAEA is extensive within the GIPME programme, but also in the context of ocean observations.

152 The Representative of ESCAP informed the Sub-Commission about relevant activities of his organization. These are mainly of a policy-oriented nature, and include *inter alia*: promotion of co-operation at policy level with technical assistance and scientific assessments; preparation of guidelines for management of mangroves, coral reefs, island ecosystems; preparation of coastal environmental management plans; preparation of directories. ESCAP has established a regional working group on marine environment and oceanographic studies which has submitted proposals on policy studies and monitoring of the marine environment to UNDP. He considered that ESCAP was interested in co-operation. The Sub-Commission is invited to provide relevant information to the ESCAP Secretariat on overall activities of the Sub-Commission and IOC and invite, within the context of the ICSPRO agreement, a closer co-operation and co-ordination between the bodies. **The Sub-Commission noted** that Prof. Su Jilan was a member of the ESCAP Regional Working Group and had injected the importance of research into its considerations, resulting in it adopting coastal circulation studies as one of the tasks for implementation. **The Sub-Commission requested** its Chairman to serve as the liaison between the ESCAP Working Group and the Sub-Commission and help ensure co-ordination. The Representative also provided an Information Paper to the Sub-Commission.

7.5 SEAFDEC

153 The Representative of SEAFDEC informed the Sub-Commission on the activities which have been carried out by his Organization, especially in fishery studies and related training activities. He indicated that, for the continuation of these activities, basic oceanographic data are essential and invited IOC to provide necessary data on a regular period.

154 He also informed the Sub-Commission that a new research vessel with equipment is now available and will start its cruise in March 1993. He invited IOC/WESTPAC to consider possible co-operation as regards to observation and measurements.

8. TEMA; REGIONAL IMPLEMENTATION AND UNESCO-IOC COMPREHENSIVE PLAN FOR A MAJOR ASSISTANCE PROGRAMME AND CAPACITY BUILDING IN RELATION TO UNCED

155 The Technical Secretary introduced this Agenda Item by briefly reviewing the training activities which have been carried out during the last intersessional period in the WESTPAC region, which covered wide scientific and technical aspects. He emphasized that according to experiences gained, the training activities and capacity building should be designed and carried out within the programme development and implementation during the next intersessional period. The Sub-Commission should identify TEMA requirements amongst those which have been mentioned during the discussion on programme matters.

156 The Secretary IOC informed the Sub-Commission on the experiences with regard to capacity building in other IOC regional bodies. He emphasized that well-defined co-ordination for capacity building at a regional level will facilitate the establishment of national infrastructures of marine science.

157 **The Sub-Commission noted** the need to apply, for the benefit of the Member States and the regional co-operation, the knowledge and capacity obtained from various training activities carried over several years. **The Sub-Commission agreed** that the officers should review to what extent this is achieved intersessionally and report

at the next session of the Sub-Commission. The training activities for next intersessional period are given in Table 2 (a) of Recommendation SC-WESTPAC-II.2.

9. PROGRAMME, BUDGET

9.1 MEDIUM-TERM PLAN OF SUB-COMMISSION'S PROJECTS

158 The Technical Secretary introduced this Agenda Item by showing draft tables prepared by a small group based on the discussions during the Session. The estimated costs and implementation calendar of activities for the next intersessional period were also introduced to the meeting. The Sub-Commission carefully examined the draft table, action by action, and identified the priorities of these actions, taking into account that the next intersessional scientific symposium would be an essential activity for the Sub-Commission.

159 **The Sub-Commission endorsed** the activities to be carried in out the next intersessional period with some modifications. These activities are attached as Table 2 (A).

160 **The Sub-Commission adopted Recommendation SC-WESTPAC-II.2.**

9.2 ACTIONS WITHIN IOC PROGRAMME IN WESTPAC

161 **The Sub-Commission reviewed** expected activities relevant to WESTPAC in the region within the overall IOC Programme, and activities related to awareness creation (Table 2 (B)).

162 The Sub-Commission formed an International Scientific Committee to prepare the proposed Symposium, composed of the Officers of the Sub-Commission and scientists from Member States. An indicative programme was prepared by the Sub-Commission as shown is the Annex VIII.

9.3 REGIONAL SECRETARIAT FOR WESTPAC

163 The Sub-Commission initiated consideration of this Agenda Item already on the first day of the Session, with the Representative of the Ministry of Foreign Affairs (MFA) of Thailand in attendance. **The Sub-Commission expressed** its great appreciation for this. The Chairman recalled the information provided under Agenda Item 3.4 and the related Document IOC/SC-WESTPAC-II/Inf.1. Then he invited the Representative of the Ministry of Foreign Affairs (MFA), Thailand, to further inform the Sub-Commission.

164 The Representative of the MFA referred to the draft Letter of Exchange in the version which had been most recently transmitted from IOC-UNESCO, dated 15 January 1993, which has been received by the Department of Treaty and Legal Affairs of the MFA. This has now been transmitted to the Ministry for further analysis. This is being done on a basis of four points:

(i) the offer of Thailand;
(ii) the 1947 United Nations Convention on Privileges and Immunities of Specialized Agencies;
(iii) the Agreement between the Government of Thailand and the United Nations Educational, Scientific and Cultural Organization, signed 6 September B.E. 2504 (1961) by the Minister of Foreign Affairs and on 25 August 1961 by the Acting Director-General of UNESCO;
(iv) the relevant Thai Cabinet Resolutions on hosting of international bodies in Thailand.

165 The Representative stated that he hoped this analysis would be finalized in the next week or so. Then the Secretary-General of the NRCT will submit the Letter of Exchange as a proforma to the Cabinet for approval. The Representative of MFA further confirmed that the information provided in the Document IOC/SC-WESTPAC-II/Inf.1 was in accordance with the development since he entered this matter.

166 The Secretary IOC recalled the 4 points referred to by the Representative of the MFA, in particular the fourth. He indicated that one such Cabinet Resolution suggested changes in the 1961 Agreement (point (iii)

referred to above) and therefore could not be endorsed by the Legal Adviser of UNESCO for the signature of the Director-General of UNESCO.

167 **The Sub-Commission expressed** its appreciation to the Representative of the MFA and the sincere expectations that any legal or treaty problems would now be solved in the near future.

168 The Sub-Commission established an *ad hoc* intersessional working group to consider:

(i) the tasks of the IOC Regional Secretariat for WESTPAC;
(ii) the requirements in form of staff and equipment to fulfil these tasks and requirements;
(iii) the resources needed to meet the tasks and requirements;
(iv) alternatives for an interim secretariat.

169 The Chairman of the intersessional Working Group, Dr. R. Green presented the report of the Group. After discussion and review, this was adopted by the Sub-Commission as given in the Annex V.

The Sub-Commission adopted its Recommendation SC-WESTPAC-II.3.

9.4 PROFILING OF IOC AND WESTPAC

170 The Chairman indicated the necessity to approach various organizations and governments to address the importance of the marine and coastal environment. He also stressed the need to inform the governments and organizations of IOC activities and the WESTPAC Programme, which have been, and are being carried out, in order to ensure the success of implementing the programmes and projects planned by the Commission and Sub-Commission, as well as to facilitate effective co-operation and co-ordination at different levels.

171 **The Sub-Commission recognized** that profiling of IOC and WESTPAC should be carried out at 3 levels: (i) national level: institutions and scientists should inform and consult with relevant national authorities about planned actions. This will facilitate the establishment of a national infrastructure for marine sciences and resources: (ii) regional level: the Officers of the Sub-Commission and the Secretary IOC are encouraged to contact relevant organizations and their regional offices in this region, to ensure appropriate co-operation and co-ordination. This action should be undertaken by the Regional Secretariat when established; (iii) international level: the profiling of IOC and WESTPAC through the IOC Assembly, UNESCO, and Member States at large.

172 **The Sub-Commission decided** that a brochure showing the WESTPAC Sub-Commission and its programme should be prepared and distributed (Table 2 (B)).

173 **The Sub-Commission also decided** that one or more proposals should be prepared intercessional and submitted, via appropriate national and international channels, to GEF (UNDP, WB, UNEP) for funding. These proposals should be of a regional or sub-regional nature and build on the WESTPAC projects and help bind together these projects into interdisciplinary and application oriented activities, directly involving scientists from the region. **The Sub-Commission decided** that a working group should prepare these proposals intersessionally over the next 6-12 months, under the leadership of the Chairman with support from Australia (Mr. R. Harriss) and the IOC Secretariat. **The Sub-Commission emphasized** that this approach was a natural result of its regional co-operative programme and **urged** all delegations and Member States to actively support this initiative at national levels, ensuring that the proposals will be appropriately endorsed and submitted through the relevant governmental channels

10. ELECTION OF CHAIRMAN AND VICE-CHAIRMEN

174 The Chairman invited nominations for Chairman, first and second Vice-Chairmen in that order. The Delegate of Thailand nominated Prof. Su Jilan of China to be elected as Chairman. This proposal was seconded by the Delegate of Japan and unanimously supported. Prof. Su was therefore elected by acclamation.

175 The Delegate of China proposed Prof. Tomio Asai of Japan as the First Vice-Chairman. This proposal was seconded by the Delegate of Australia and Prof. Asai was elected as the First Vice-Chairman by acclamation.

176 The Delegate of Australia nominated Prof. Manuwadi Hungspreugs of Thailand as the Second Vice-Chairwoman. The Delegate of Indonesia seconded the proposal. Prof. Manuwadi was elected as the Second Vice-Chairwoman by acclamation.

177 In order to help ensure an effective implementation of programmes during the next intersessional period, a division of work for the officers of the Sub-Commission was proposed and adopted by the Sub-Commission. This division of responsibilities is indicated as follows:

(i) Programmes and Projects (Chair);
(ii) Symposium (First Vice-Chair);
(iii) Co-operation with other international organizations (Chair);
(iv) Follow-up to UNCED and integrated coastal management (Second Vice Chair);
(v) Regional GOOS - Climate module (First Vice-Chair);
(vi) GOOS - coastal and other modules (Chair);
(vii) TEMA and capacity building (Second-Vice Chair assisted by First-Chair);
(viii) RNODC, data exchange and marine information management (First-Vice Chair);
(ix) Newsletter (Chair and Second Vice-Chair);
(x) Brochure (Second Vice-Chair and Chair).

11. DATE AND PLACE OF NEXT SESSION

178 The Sub-Commission proposed to organize the next Session at the beginning of 1996, with possible venue in Japan subject to agreement of Japan. The Delegate of Japan expressed his appreciation for this opportunity and informed the Session he will propose this to his Government.

179 **The Sub-Commission adopted** Recommendation SC-WESTPAC-II.4.

12. ADOPTION OF THE SUMMARY REPORT

180 The Sub-Commission reviewed the draft report and unanimously adopted it, together with the recommendations. The Sub-Commission received a draft resolution for the Seventeenth Session of the IOC Assembly and endorsed it after revision for transmittance to the Assembly.

13. CLOSURE

The Secretary IOC expressed on behalf of the IOC his great appreciation to all Delegates, the Rapporteur, the Chairman and to the Government of Thailand and the Local Organizing Committee for their co-operation in the conduct of the Session. The Delegate of Australia expressed the thanks of all delegations to the host country, the Kingdom of Thailand, and to the Chairman and the all secretariat for the conduct of the Session.

181 On behalf of Member States, the Delegate of Australia, Dr. R. Green, thanked the Government of Thailand for hosting this Session. He also thanked the IOC Secretariat for hard work during the Session.

182 **The Sub-Commission expressed** its appreciation to the host country for the excellent arrangements ensuring the success of the Session.

183 The Chairman closed the Session at 12.30 hours on 29 January 1993.

ANNEX I

AGENDA

1. **OPENING**

2. **ADMINISTRATIVE ARRANGEMENTS**

   2.1 ADOPTION OF THE AGENDA
   2.2 DESIGNATION OF RAPPORTEUR FOR THE SESSION
   2.3 CONDUCT OF THE SESSION

3. **REPORT ON INTERSESSIONAL ACTIVITIES**

   3.1 REGIONAL WESTPAC PROJECTS AND ACTIVITIES
   3.2 REGIONAL ASPECTS OF IOC GLOBAL PROGRAMMES
   3.3 WESTPAC SCIENTIFIC SYMPOSIUM AND FOLLOW-UP
   3.4 ESTABLISHMENT OF THE IOC REGIONAL SECRETARIAT FOR WESTPAC
   3.5 UNCED

4. **PROGRAMME MATTERS**

   4.1 WESTPAC REGIONAL PROJECT; FUTURE DIRECTIONS, ACTION PLANS, RESOURCE REQUIREMENTS AND TEMA NEEDS
   4.2 REGIONAL COMPONENTS OF IOC GLOBAL PROGRAMMES

      4.2.1 GIPME
      4.2.2 WCRP, especially TOGA and WOCE
      4.2.3 OSLR, especially Harmful Algal Bloom Programme (HABP)
      4.2.4 OSNLR
      4.2.5 IODE and Related Matters
      4.2.6 Ocean Mapping

5. **GLOBAL OCEAN OBSERVING SYSTEM (GOOS) AND REGIONAL INPUTS**

   5.1 REGIONAL COMPONENT OF GOOS AND IT'S PILOT PROJECTS AND RELATED INTERACTION WITH ON-GOING REGIONAL PROJECTS
   5.2 COASTAL ZONE AND STATE OF THE ENVIRONMENT MODULE OF GOOS AND RESOURCES REQUIREMENTS

6. **WESTPAC ACTION PLAN**

   6.1 REGIONAL ACTION PLAN FOR FOLLOW-UP TO UNCED
   6.2 ACTION PLAN FOR THE SUB-COMMISSION FOR 1993-1996

7. **CO-OPERATION WITH OTHER ORGANIZATIONS**

   7.1 ASEAN
   7.2 UNEP
   7.3 CCOP
   7.4 OTHER UN BODIES
   7.5 SEAFDEC

8. **TEMA; REGIONAL IMPLEMENTATION AND UNESCO-IOC COMPREHENSIVE PLAN FOR A MAJOR ASSISTANCE PROGRAMME AND CAPACITY BUILDING IN RELATION TO UNCED**

9. PROGRAMME, BUDGET

- 9.1 MEDIUM-TERM PLAN OF SUB-COMMISSION'S PROJECTS
- 9.2 ACTIONS WITH AN IOC PROGRAMME IN WESTPAC
- 9.3 REGIONAL SECRETARIAT FOR WESTPAC
- 9.4 PROFILING OF IOC AND WESTPAC

10. ELECTION OF CHAIRMAN AND VICE-CHAIRMEN

11. DATE AND PLACE OF NEXT SESSION

12. ADOPTION OF THE SUMMARY REPORT

13. CLOSURE

ANNEX II

RECOMMENDATIONS

Recommendation SC-WESTPAC-II.1

INTERNATIONAL WESTPAC SYMPOSIUM

The IOC Sub-Commission for the Western Pacific,

Recalling its decision at its First Session that a major multi-disciplinary symposium should became a principal intersessional activity of the Sub-Commission,

Having reviewed the output and results of the IOC/WESTPAC Scientific Symposium on Marine Science and Management of Marine Areas of the Western Pacific (Penang, Malaysia, 2-6 December 1991),

Thanking the Government of Malaysia for having hosted it,

Having formulated its programme for the period 1993-1996,

Bearing in mind the need for presentation and exchange of scientific results in an interdisciplinary forum,

Recognizing the success of the Penang Symposium;

Recommends that a major international IOC-WESTPAC Marine Science Symposium be organized in 1994 or 1995;

Recommends further that regional and global international bodies be invited to support the symposium as appropriate;

Establishes an interim scientific planning committee to formulate a detailed proposal for the scope, contents and structure of the symposium.

Recommendation SC-WESTPAC-II.2

THE WORK PROGRAMME OF THE SUB-COMMISSION AND BUDGET 1993-96

The IOC Sub-Commission for the Western Pacific,

Having reviewed the implementation of the programme during the intersessional period,

Noting that a considerable amount of training has been carried out in the region through various mechanisms,

Noting further that competent human resources are available in the region,

Noting and taking into account the results of UNCED 1992 and the importance of proper response and follow-up on a regional and national level,

Emphasizes that the future regional co-operative programme should be more geared towards active research projects, institutional strengthening with related capacity building, and practical applications than so far;

Stresses the need for an increasing dialogue between the marine science and ocean observations related institutions and relevant governmental departments, so as to increase the awareness of the role of the marine science activities and ocean services, especially observations, for environment and development;

Decides to adopt the programme of work for the regional co-operation over the period 1993-96 as indicated in Tables 2 (A) and (B);

Urges Member States of the region to participate in, and support the implementation of the regional co-operative programme to the best of their interests and capabilities;

Urges further the IOC, other organizations and donor agencies to support the programme implementation with an increasing budget allocation.

Annex to Recommendation SC-WESTPAC-II.2

Table 2A. Programme and Budget 1993-1996

Programme Area, Project Title and Actions; Project Leader	**Priority and potential estimated cost (funds required)**	**Implementation and potential funding responsibility and Time Schedule, Location**	**Participants**	**Relevance to and part of UNCED; Relationship to IOC Programme**
MARINE POLLUTION River Inputs Intercalibration exercise by correspondence (1) Prof. Manuwadi Hungspreugs	High 3K	Project Leader and IOC 1993 IOC: 2K	Participating Laboratories	GOOS
River samplings Analysis (2,3)	national	Member States 1993-1994	Member States	
Joint Symposium of RI/HAB/Circulation (1,2)	High 8K	Member States, (joint with the Symposium) IOC: 8K 1994	Member States IOC	
Mussel Watch Ms. Monthip Siratana Tabucanon Identify Network and Info. Circulation (1)	High 2K	Project Leader and Member States IOC: 2K 1993	Member States	

	Priority and potential estimated cost (funds required)	Implementation and potential funding responsibility and Time Schedule, Location	Participants	Relevance to and part of UNCED; Relationship to IOC Programme
Training Workshop on Methods of Sampling and Analysis (2,3)	Mid 20K	Member States and IOC IOC: 10K 10K DONOR : (UNEP) 1994	Member States	International Mussel Watch
Atmospheric Inputs (1,2) Planning Workshop for Preparing action plan	High 6K	Member States (jointly with Symposium) IOC: 6K 1994	Member States	
OCEAN DYNAMICS AND CLIMATE Banding of Coral Reefs Expert Visit, P. Isdale (1)	High 8K	Australian Experts and Member States IOC 8K Mid 1993	Member States	Climate Change Programmes
Masters Training (2,3)	Mid 120K	Australian Agencies and Member States AIDAS: 120K 1994-1995	Member States concerned	
Ocean Dynamics in Western Pacific Planing Workshop (1,2)	Mid 12K	Project leader and IOC DONOR: 10K (Japan) IOC: 2K	Member States	GOOS Pilot project

Programme Area, Project Title and Actions; Project Leader	**Priority and potential estimated cost (funds required)**	**Implementation and potential funding responsibility and Time Schedule, Location**	**Participants**	**Relevance to and part of UNCED; Relationship to IOC Programme**
<u>Continental Shelf Circulation</u> Prof. Su Training Workshop on Numerical Modelling (1,2)	High 20K	Member States and IOC DONOR : 10 K (Japan) IOC 10K Aug. 1993		GOOS Pilot Project on Coastal Circulation
Joint China-Philippines Cruise in the Sulu Sea (2)	Mid 5k	Project Leader and IOC IOC: 5K for travel support	Scientists from China and Philippines	GOOS Pilot Project on Coastal Circulation
CREAMS Planing Workshop (2)	High 15K	Project Leader, participating Institutes. Donor : 15 K	Participating institutes	
Joint Symposium of RI/HAB/Circulation (1,2)	High 8K	Member States (joint with the Symposium IOC: 8K 1994	Member states IOC	
OSLR <u>WESTPAC-HAB</u> Training Workshop on Taxonomy (2)	High Mid or Low 30K	Member States and IOC DONOR: 20K (German) 1994 DONOR :10K (Japan)	Member States	ASEAN, CIDA Marine Science Project IOC HAB

Programme Area, Project Title and Actions; Project Leader	**Priority and potential estimated cost (funds required)**	**Implementation and potentiai funding responsibility and Time Schedule, Location**	**Participants**	**Relevance to and part of UNCED; Relationship to IOC Programme**
Leaflet Series (1,2)	High 6K	Member States Project Leader IOC: 3K DONOR: 3k (Japan) 1993-1995	Member States	
Expert Mission (in-country Training)	Mid 30K	Project Leader and experts concerned DONOR: 25 K (Japan) IOC: 5K 1993-1995	Member States	Global HAB
Joint Symposium RI/HAB/Circulation (1,2)	High 10K	Member States (Joint with the Symposium) DONOR: 10 K (Japan) 1994	Member States concerned	
<u>PREP</u> Expert Visit (in country training) (1,2) D. Staples	High 10K	Member States and Co-ordinator FAO: 5k IOC: 5K	Member States concerned	FAO proposal to donor agencies
Training Workshop on data base Management and Analysis + PREP Project Plan (1,2)	High 20K	Member States and IOC FAO 10K IOC 10K	Member States	Australian ACIAR Prawn Ecology Project (Thai/Malaysia) .....(ASEAN)

Programme Area, Project Title and Actions; Project Leader	**Priority and potential estimated cost (funds required)**	**Implementation and potential funding responsibility and Time Schedule, Location**	**Participants**	**Relevance to and part of UNCED; Relationship to IOC Programme**
OSNLR Tectonics and its Impacts on the Coastal Zone H. Kagami Planning and Project Development Workshop (1,2)	High 8K	Member States IOC: 5K DONOR : 3K (CCOP) 1994 with Symposium	Member States	
Palaeogeographic Map Wang and Bradshaw Preliminary Map Compilation Workshop (1,2)	High 10K	Member States/IOC 5K Japan: Australia: China: 3rd quarter 1993	Member States	

1: Activities which should be mainly implemented through support of IOC;
2: Activities which should be mainly implemented through support of donors (national, bilateral, international)
3: Activities where funds not available and Governments must be made aware.

Table 2B: ACTIONS OUTSIDE OF THE WESTPAC PROJECTS

Programme Area and Action	Priority Cost	Implementation Responsibility, Schedule	Participation	Relationships
Sub-Commission: Convening of Officers Meeting (1)	High 8K	Officers/Chair Secretariat,IOC 1995/1996	Officers Secretariat	
Sub-Commission: Third Session (1)	High 15K	Chair Secretariat IOC 1995/1996	Member States	All Programme and Co-operation
Sub-Commission: Organization of Symposium (1,2)	High 10K	Committee Secretariat 1994/1995	Scientists Member States	Other Organizations; All Programme
GOOS: Interaction with other Programmes		Officers Member States		
Coral Reef Pilot Monitoring (1,2) (GOOS)	High	Secretariat Participants IOC, UNEP, WMO, IUCN	Member States and Laboratories	
Regional GLOSS (1,2) (GOOS)	High	Member States	Member States and Laboratories	
Coastal Ocean Circulation Pilot Monitoring (GOOS) (1,2)	Medium	Coordinator Member states		

Programme Area and Action	Priority Cost	Implementation Responsibility, Schedule	Participation	Relationships
Ocean Mapping WESTPAC (1,2)	Medium 15K	Chief Editor Member States IOC: 10K Donor: 5K (China)	Member States	
Sub-Regional Developments (Seawatch type) (2,3)		Member States		
Profiling: Dialogue at National Levels/Awareness Creation	High	Delegates Heads of Institutions Officers	Member States Institutions	
Preparation of Brochure (1,2)	High 10K	Officers	"	
National Reporting to the Sub-Commission	Medium	Delegations	Member States	
National Workshop in Vietnam, and support marine sciences development in Vietnam	High	IOC, UNESCO participation programme	Vietnam, Experts	
UNCED Follow-up specifically: Preparation of Case Studies for Symposium	High	Selected Member States, Officers and Secretariat		
Preparation of GEF Proposal (1)	High 15K	Officers Working Group Secretariat		
Co-operation with other Organizations	High	Officers, Secretariat Member States	All	All

Programme Area and Action	Priority Cost	Implementation Responsibility, Schedule	Participation	Relationships
Interaction with Donors	High	Member Sates Secretariat	All	All
Review of Application and use of TEMA Activities	Medium	Officers Secretariat	Member States Trainees	
Establishment of a Regional Secretariat	High	Member States Thailand IOC Secretariat	All	All
ODC/WCRP: TOGA, WOCE and Use of Results (2,3)	High	Member States Secretariat	All	All
OSLR: Training Course on Taxonomy, harmful algae species Copenhagen 1993 (1,2)	High 30K	Secretariat Experts	Interested Member States	
GLOBEC Development	Medium	Secretariat Experts	Interested Member States	
IODE: Data Exchange and Marine Information Management Training Courses **Establishment of Contact with ASEAN Data Centre**	High to Medium	Member States RNODC Japan NODCS RNODC, NODCs	Interested Member States	

Recommendation SC-WESTPAC-II.3

ESTABLISHMENT OF AN IOC REGIONAL SECRETARIAT FOR THE SUB-COMMISSION FOR THE WESTERN PACIFIC

The IOC Sub-Commission for the Western Pacific,

Recalling the Resolution X-11 A of the Tenth Session of the IOC Assembly (Paris, November 1977) inviting all interested Member States and international organization to provide personnel and for financial support for the establishment of a full-time WESTPAC Secretariat to be located in the region,

Recalling further the information of the Delegate of Thailand provided to the Sub-Commission (the Regional Committee) of his Government's willingness to provide office space for an IOC Secretariat for the Sub-Commission,

Noting the condition that the budget and Secretariat required for the effective functioning of the proposed regional Sub-Commission will be made available, for the establishment of the regional Sub-Commission as stipulated by the IOC Manual (IOC/INF-785 section 5.2),

Recalling also the offer of the Delegates of Thailand to establish the Regional Secretariat with the provision of office facilities and one secretary and one clerk and a cash allocation for operational costs, made at its First Session,

Recognizing the considerable efforts made so far to establish formally the Secretariat,

Noting with concern that the Secretariat has not yet been established;

Urges the Government of Thailand and UNESCO to move expeditiously to an acceptable arrangement for the establishment of the Secretariat;

Urges further the IOC Assembly to help ensure through appropriate mechanisms and means that the required UNESCO staff, in particular the Head of the Secretariat, is made available as soon as possible;

Urges likewise Member States individually to support through appropriate mechanisms the provision from UNESCO of the required senior staff;

Urges further Member States to provide support in form of seconded staff to the development of the Secretariat into a functioning entity;

Urges Member States also to provide financial resources to the Secretariat through the IOC Trust Fund, for the operation of the Secretariat, as well as for the implementation of the Sub-Commission programme.

Recommendation SC-WESTPAC-II.4

DATA AND PLACE OF NEXT SESSION

The IOC Sub-Commission for the Western Pacific,

Bearing in mind the need for a sufficient time period between sessions of the Sub-Commission to allow a reasonable implementation of its programmes,

Recalling its decision at its First Session to have a three-year time-span between its regular sessions,

Decides that its next session should be in early 1996;

Requests its Officers, in Consultation with Secretary IOC, to decide on further arrangements for the Third Session, including place and exact dates.

ANNEX III

LIST OF PARTICIPANTS

I. MEMBER STATES

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ANNEX IV

ADDRESSES

1. Opening Address by Professor Su Jilan, Acting Chairman of WESTPAC

Distinguished Delegates,
Ladies and Gentlemen

I wish to formally open the Second Session of the IOC Sub-Commission for the Western Pacific and to welcome all participants to this important gathering. As you all know, the establishment of our Sub-Commission was a result of the outstanding leadership and persistent effort of the late Professor Nemoto and other prominent scientists. Professor Takahisa Nemoto was elected as the first Chairman of the SC-WESTPAC First Session in Hangzhou in February 1990. Unfortunately he fell ill soon afterwards and passed away in August 1990. We all feel a dear loss of his scientific leadership and personal warmth. May I ask you to join me in a one-minute silence to pay our tribute to Professor Nemoto.

Thank you.

During the next few days we sill review the accomplishments of WESTPAC during the last three years; we will also be informed about the development of global, as well as other regional ocean science matters that are of concern to us. We will then plan our activities for the next three years in the light of our past accomplishments and the development around us. I am glad that our deliberation is taking place in this beautiful city of Bangkok. As I recall, at the First Session most of the delegates preferred to have the Second Session at Bangkok. Their expressed reason was that Bangkok would be the location of the WESTPAC Secretariat. Only until now that I realize they also have a reason because this is my first trip to this lovely city.

I wish to express my sincere appreciation to our host country, Royal Thailand and I also like to thank the National Research Council of Thailand for organizing this session.

Thank you.

2. Address by Gunnar Kullenberg, Secretary IOC

Mr.Chairman , Professor Su,
Honoured Deputy Permanent Secretary for Ministry of Science, Technology and Environment, Ms.Chodchoi,
Honoured Deputy Secretary-General, NRCT Dr.Suvit,
Honoured Delegates, Ladies and Gentlemen

It is a great honour for me to be here and participate in the Second Session of the IOC Sub-Commission for the Western Pacific as Secretary IOC and weclome you all behalf of IOC.

First let me thank the government of Thailand for hosting the session and for making such excellent arrangements. I am also happy that so many delegate are here and I warmly welcome you all. I am a little unhappy that we are not meeting in the Regional Secretariat for WESTPAC- we thought we would since we were

so close to it in late 91 and middle 92 and the building where it was to be is ready. But perhaps the session can help.

This is the fourth IOC regional subsidiary body meeting I attended in eight weeks:

2-7 December 1992 IOCARIBE-IV, Mexico
14-18 December 1992 IOCINCWIO-III, Mauritius
17-21 January 1993 IOCEA-III, Senegal
25-30 January 1993 WESTPAC-II, Thailand

Since we met in Hangzhou, China, almost excactly three years ago much has happened, which is important for our work and much of which we have no direct influence over. The geopolitical situation changed dramatically, and this is having much influence on what we are trying to do, and is a basic condition which we have to adjust to.

The Second World Climate Conference was held in October/November 1990 with IOC as a co-sponsor in the sense that UNESCO and its IOC were both referred to. There we managed to get afirm acknowledgement that the oceans are a part of the climate system, and the need for development of the global ocean observing system was endorsed by the Conference.

The UN Conference on Environment and Development was held in Rio de Janerio in June 1992, and provided us with two legal instruments in the new conventions and a framework for Action in Agenda 21 for the comming decades. This is addressed to the governments, but to the UN system will have to play a role in the implementation.

I would like to make some remarks in the light of this.

First, the climate system research as regards the role of the oceans. It is too early to determine the outcome of WOCE, but TOGA is providing very interesting results. These results tend to confirm the possibility to forecast seasonal and interannual climate variabilities through a combination of systematic, scientifically sound ocean observations and coupled atmosphere-ocean models capable of using the assimilated data. This major achievement was realized by WCRP-TOGA which IOC is co-sponsoring with WMO and ICSU. Its usefulness at the national level has been demonstrated by its application to the management of agriculture and fisheries in Peru. Western Pacific could also use it in a similar way. The result would appear to confirm that once the science base in reasonably accurate, and an information base is available in the form of reliable data, then well-grounded management decisions can be made. Such progress is also an example of the possibilities provided by international research and observational efforts developed and coordinated through agreed intergovernmental procedures, to help anticipate and forecast environmental events which otherwise lead to disasters and possible conflicts. Other examples of events which we may soon be able to adequately anticipate and forewarn include droughts, shifts in seasonality, monsoon variability and cyclone frequencies. The ability to adequately forecast these variabilities, as well as climate zone changes, is the essence of preventing environmentally driven disasters and conflicts.

Let us then dwell a bit on UNCED. Much effort was devoted by the IOC to preparations for UNCED 92 and input to the negotiations for the Framework Convention on Climate Change (FCCC). The IOC actively participated in UNCED and was identified by name as having the leading role to play, in cooperation with WMO and UNEP, in the development of the Global Ocean Observing System (GOOS.) Specific reference is made to the need for IOC to fully formulate a strategy to provide training and technical assistance for developing countries through its TEMA programme (Agenda 21, Chapter 17, para 17.103). The IOC is also referred to in the context of the role of the oceans and all seas in attenuating potential climate change and the need to carry

out analyses, assessments and systematic observations of the role of oceans as a carbon sink (Agenda 21, Chapter 17, 17.102). All of these matters are also of great relevance to the implementation of the UN FCCC.

The Programmes of the IOC have a critical role to play in all other parts of Agenda 21, Chapter 17, as demonstrated by the contributions of GIPME, OSLR, IODE an OSNLR to the preparation and drafting of that Chapter. The IOC can also play an active role in the implementation of several other Chapters of Agenda 21, (for example, Chapters 9, 31, 36 and 37.)

Follow-up to UNCED has been initiated. As regards GOOS development, this is a continuing effort. The TEMA component of GOOS, emphasized by the Assembly, is being developed as a priority.

UNCED confirmed that in the context of an action-oriented programme focussing on environment and development, the oceans cannot be considered without taking into account their links and interactions with the rest of the planet. The Conference also clearly recognized the critical role the oceans play in maintaining conditions of life on Earth; that without a healthy ocean there is no healthy global or regional environment; that the present understanding of interactions between the oceans, the land (especially coastal zone) and the atmosphere is insufficient for adequate forecasting of changes and consequences of human actions.

UNCED put capacity building in focus, including the development of increased knowledge; education, research, infrastructure, equipment, expertise. It recognized that the establishment of knowledge and the capacity to use it means much for the social and cultural development of a country. Capacity building in poor countries is therefore most important. A cooperation programme between IOC and SAREC addresses this issue and is an example of an implementation mechanism. Unfortunately we do not have yet such a mechanism for WESTPAC.

UNCED also acknowledged that sustainable development and rational use, or management, requires an information basis which has been obtained through the use of scientifically valid methods. Sustainable use of natural resources must be founded on knowledge about the resource base, its origin, function and dynamics.

A number of issues of relevance to the marine environment can be defined on the basis of UNCED results, and I want to mention source:

(i) Population pressure on the coastal area is increasing, especially in tropical and sub-tropical zones. About two billion people, mostly in the poorest countries, are wholly dependent on marine protein; 50-90% of the protein in developing countries comes from marine fishes.

(ii) Marine pollution and effects of land-based activities on coastal zone conditions are major problems in most regionsof the world. These threaten the natural resources in the coastal zone.

(iii) The effects of climate variability and change are potentially very important for the coastal area through changes of sealevel, meteorology, seasonality and precipitation levels, events like storm surges, cyclones, shifts in the distribution of marine living resources, coastal erosion and general degradation.

(iv) The role of the ocean in the climate system and possibility of forecasting climate changes and variability from adequate ocean observations and modelling can, in combination with economical modelling, help remedy impacts of changes and define economically-valid counter measures and useful response strategies.

(v) Changes in the radiation budget, especially UV radiation, can influence the productivity of marine ecosystems and their composition. This can not as yet be quantified.

(vi) Maintenance of marine resources in coastal and shelf seas and the open ocean.

(vii) Maintaining the biological diversity and ecosystem integrity in heavily exploited and stressed near-shore and coastal ecosystems, e.g., lagoons, wetlands, esturaires, mangroves, seagrass beds, coral reefs, and certain fish species in areas of over fishing, as well as certain marine mammals.

(vili) The ocean and marine environment uses are intersectoral and normally there are no single national authority dealing with marine affairs. Many different sectors of society have an interst in this part of the environment. Coordiantion and cooperation at national and international levels are therefore very important in order to ensure the best use of limited resources and capacities.

I would like to emphasize the need for cooperation and coordination at international and national levels. The IOC cooperates with several agencies in the UN system such as WMO, UNEP, IAEA, FAO, IMO and UN, as well as NGO's such as ICSU and SCOR. We have several joint programmes, also at regional levels. One co-ordination, co-operation and reporting mechanism is the Intersecretariat Committee on Programmes Related to Oceanography (ICSPRO) where all matters related to oceans are considered.

Let me now refer somewhat on implementation mechanisms and the importance of the regional mechanisms in this context.

The UNCED put a lot of emphasis on the regional approach in implementing its decisions and as a co-operation mechanism. The regional co-operation however, must address problems of common interest to the nations in the region and must be decided in harmony from inside the region. It is absolutely necessary for a sustained regional co-operation to be driven by interests from inside the region. The regional co-operations are very attractive in that they can pool required resources infrastructures, human resources, and can make way, or apply the results of the regional co-operation both for the benefit of the region as a whole and of the individual Member State.

This is the fourth regional subsidiary body meeting which I participate in eight weeks. What are my experiences? The regional bodies in Africa show more enthusiasm and interest than the Sub-Commissions.

Finally a bit about the WESTPAC Sub-Commission itself. The activities will be reported under the Agenda Item 3 so I will not dwell on these. However, I would like already now to address the question of the establishment of the IOC Regional Secretariat for WESTPAC. This was requested already at the first session of the programme group for the Western Pacific (WESTPAC) in February 1979. At the Eleventh Session of the IOC Assembly in 1979 it was agreed that the Secretariat would be set up in Jakarta at ROSTSEA where a senior marine scientists would be employed by UNESCO. This apparently was not effectuated.

At the session in Bangkok 1987, the Delegate of Thailand informed the Regional Committee that his Government was willing provide office space for an IOC Secretariat for the Sub-Commission.

The Delegate of Australia informed the Regional Committee that his country was willing to provide interim facilities (office space, telecommunications, word processing, secretarial support, etc.), for an IOC Secretariat for WESTPAC until the Sub-Commission was established, at which time the Secretariat would be moved to the location approved by the Assembly on the basis of offers made by Member States as was the case of Thailand. The Assembly at its XV Session in July 1989 approved the formation of the Sub-Commission and the establishment of the Secretariat in Bangkok, Thailand.

The Sub-Commission at its First Session in Hangzhou, China, February 1990, was informed by the Secretary IOC (Dr.G.Kullenberg) that the Legal Adviser of UNESCO considered it preferable to negotiate a separate agreement for the IOC Regional Secretariat for the Sub-Commission for WESTPAC in Bangkok, rather

than to modify the existing agreement concerning the UNESCO Regional Office. The Legal Adviser was preparing a draft agreement.

At the same occasion, the Delegate of Thailand informed the Sub-Commission about the offer made by Thailand to establish the Regional Secretariat and the development since the Fourth Session of the former Regional Committee (June 1987). He stated that the Ministry of Foreign Affairs of Thailand agreed in principle and that they are waiting for the draft agreement presently being prepared by the Legal Adviser of UNESCO. He further confirmed the allocation of USD 13,000 for 1990 and the provision of office facility and one secretary and one clerk but that additional support from IOC is nevertheless required.

The Draft Agreement was submitted to Thailand in June 1990. The rest of this story will be recalled under the relevant Agenda Item.

However, let me make a couple of reflections on this matter partly because I would hope that it would not dominate the session. It seems to me that since the start in 1979 the path has been rather uncertain. As far as I can see nothing at all happened until Australia in 1987/88 created an interim secretariat service for the Chairman in Australia. The Delegate of Australia also specified in 1987 what Australia would provide. This was done in 1990 by the Delegate of Thailand. The Regional Committee not the Sub-Commission, ever specificed its requirements. This may will be needed; a specification of what is required and what are the related costs.

Having specified these matters, it would be a good idea to fine out from where the resources are going to come! I would suggest, Mr. Chairman, that the Sub-Commission at an early stage set up an *ad hoc* sessional working group to do just that. It should also be noted that IOC is part of UNESCO and therefore must use the UNESCO accounting system.

Let me finish by emphasizing the need for a proper follow up to UNCED and in this connection the necessity of a much more active participation of Member States and their national institutions in the work of the Sub-Commission and in IOC at large. The delegates present here must continue to work at national level intersessionally for the cause of the Sub-Commission. This is a must if we are to succeed.

3. Address by Dr.Suvit Vibulsresth
Deputy Secretary-General, NRCT

Deputy Permanent Secretary, MOSTE,
Chairman of WESTPAC, Prof.Su Jilan,
Secretary of IOC, Dr.Gunnar Kullenberg,
Distinguished Participants,
Ladies and Gentlemen,

On behalf of the Secretary - General of the National Research Council of Thailand who concurrently chairs the Thailand National Marine Science Committee, may I extend my warmest welcome to all honoured guests and distinguished participants attending the Second Session of the IOC Sub-Commission for the Western Pacific, (WESTPAC-II) today.

It is our privilege and pleasure that the National Research Council of Thailand has the opportunity to jointly organize WESTPAC meeting once again in Thailand.

Thailand National Marine Science Committee under the patronage of the National Research Council of Thailand has been an active member participating in WESTPAC's activities since its establishment in 1977. Thai marine scientists have the opportunity to join the projects in various aspects within the framework of

IOC/WESTPAC. At present, we are conducting a cooperative research project which may be related to IOC/WESTPAC new programme on Global Ocean Observing System (GOS) and Regional Inputs. The Project is called "Marine Surveillance and Information System" in which data is collected using buoy network via satellite communication. The data and information provided through this project would be beneficial not only to Thailand but also to WESTPAC member countries.

Honoured participants, ladies and gentlemen, you may recall that at the Fourth Session of the IOC/WESTPAC Regional Committee for the Western Pacific (WESTPAC-IV), the meeting had agreed to establish the Regional Secretariat for WESTPAC. The recommendation was adopted at the Fifteenth Session of the IOC General Assembly in 1989. Following that resolution, continued negotiation had been made between UNESCO/IOC and the Government of Thailand through diplomatic channel.

Since there exist many related agreements, laws and other regulations of both UNESCO/IOC and Thailand, much more time than previously expected was needed to finalize the establishment of WESTPAC Secretariat Office. I am pleased to inform that the outcome is near at hand. The final draft agreement was proposed by the Director - General of UNESCO on 17 January 1993 and is being considered by the Minister of Foreign Affairs. After that the matter will be submitted to the cabinet for final approval. With Regard to the Regional WESTPAC Secretariat Office and related facilities, they are ready to moved in at anytime provided on the 3rd floor of the new building of NRCT officially opened on January 11, of this year. I would like to take this opportunity to express our gratitude to the Ministry of Foreign Affairs for their hard working and excellent co-operation and to the Ministry of Science, Technology and Environment for their strong support to the WESTPAC establishment. Special thanks is also extended to Dr.Gunnar Kullenberg, IOC Secretary and his staffs for their patience and competent efforts.

Lastly, may I once again express my sincere thanks to UNESCO/IOC for their kind assistance and organization of this meeting and also to member states for their active participation. I hope that the result of this meeting would be successfully implemented and wish all of you a pleasant stay in Bangkok.

Thank you.

4. Address by Dr. Chodchoi Elumpong'
Deputy Permanent Secretary
Ministry of Science, Technology and Environment

Professor Su Jilan, Chairman of WESTPAC,
Dr.Gunnar Kullenberg, Secretary IOC,
Deputy Secretary - General of NRCT,
Distinguished Guests and Participants.

It is my great pleasure to preside over the opening ceremony of the Second Session of the IOC Sub-Commission for the Western Pacific today. On behalf of the Ministry of Science, Technology and Environment, I wish to assure you that it is a great honour for Thailand to serve as the host country of this important meeting. May I also extend our warm welcome to all distinguished participants from overseas.

As you may be aware, our global environment is facing a crisis in the ecosystem, particularly, the deterioration of environment which is mostly caused by over exploitation of natural resources. Marine resources and primary natural protein sources of human are critically damaged by careless use and over-consumption. This problem cannot be solved by any single country but needs close and sincere co-operation amongst countries in the region, as well as all countries in the world. I do believe that all of you who are distinguished scientists gathering here today have a high spirit to work closely together but maybe the part lacking lies in the opportunity

and appropriate working mechanism to bring to fruition. This meeting will play an important role in formulating a well-conceived marine environmental plan.

Concerning the WESTPAC Secretariat Office, I would like to reiterate, on behalf of the Ministry of Science, Technology and Environment our strong support for the establishment of the WESTPAC Secretariat Office in Thailand and we appreciate those parties, or individuals, who have been working hard to overcome the difficulties. However, the success of the WESTPAC Regional Secretariat would depend mainly on the active participation and support of member countries in the Pacific region.

Distinguished participants, ladies and gentlemen, over the next five days much effort would be devoted to seek appropriate ways and means in developing the marine resources management scheme according to the agenda. This is not only a good opportunity for the marine scientists to exchange views and experiences among themselves but also to improve a close and partnership co-operation in marine science development in an atmosphere of warmth and cordiality.

The Government of Thailand is grateful to IOC and UNESCO for their support and encouragement in the preparation and organization of this meeting. However, I do believe that the Member States should provide their own efforts in seeking workable avenues to achieve our goals.

At this auspicious moment, I now have the pleasure to declare the Second Session of the IOC Sub-Commission for the Western Pacific (WESTPAC-II) open and I wish you all the best in making it a great success.

Thank you.

ANNEX V

STRUCTURE AND FINANCIAL REQUIREMENTS FOR REGIONAL SECRETARIAT

1. ROLE AND RESPONSIBILITIES

(i) Preparation of draft programme outline & budget for consideration by Subcommission, and subsequently by the IOC Assembly

(ii) Administration of finances (through the UNESCO regional office and in accordance with UNESCO rules)

(iii) General administration of WESTPAC programme

(iv) Organize meetings, symposium, workshops, training programs etc.

(v) Maintain overall co-ordination of recognized WESTPAC programmes

(vi) Obtain reports from program/project leaders

(vii) Facilitate operation of the WESTPAC programme

(viii) Maintain liaison with multi-lateral and specialized agencies for development of integrated programme actions related to WESTPAC activities

(ix) Report as required to IOC Headquarters and Governing Bodies

(x) Maintain liaison with IOC Secretariat.

Communication

(i) Produce regular newsletter

(ii) Circulate research reports/news sheets

(iii) Assist with regional public relations activities, including promotion of research & training programme activities & outcomes

(iv) Establish links with media in region

(v) Ensure programme activities and outcomes are brought to the attention of international & national agencies in region, including and through the IOC action addresses.

Co-ordinate and expand WESTPAC programme activities by

(i) Establishing and maintaining links with international agencies particularly prospective funding bodies

(ii) Assisting in elaboration & promotion of research and related ocean services, and training proposals at national & international levels

(iii) Helping to identify national research projects which contribute to achieving IOC objectives, both regional & global

(iv) Identifying complementary research, observational & training activities within & outside IOC, & seeking to rationalize & consolidate overall actions

(v) Seeking support for WESTPAC programme activities including the identification of extrabudgetary funds.

2. RESOURCE REQUIREMENTS

Staff

(i) Head of Office (at D1 or P5 level-Senior Assistant Secretary of IOC)

(ii) Programme Specialist/Deputy Head of Office with communication skills (at P3 level)

(iii) Secretary (general service)

(iv) Driver

(v) One or two junior professional officers (on secondment from member countries)

Finances

Additional to salary requirements:

(i) Travel : US$ 20,000/annum

(ii) Operational : US$ 30,000/annum

Facilities:

(i) Office & standard office needs (furniture, telephone, telex, fax, telemail etc.)

(ii) Copier (high quality)

(iii) High end PCs (3) + laser printer + 1 lap-top PC

(iv) Car

3. PROVISION OF RESOURCES

Staff

(i) Head of Office : To be an IOC appointment, as specified in the IOC Manual additional to current IOC staff. This will require strong lobbying of DG, at embassador level. A substantial contribution, such as that provided by the USA for past 2 years, would be most helpful.

(ii) Programme Specialist/Deputy Head of Office: This could be filled by an officer seconded by one of the WESTPAC Member States.

(iii) Secretary : Provided by host country

(iv) Driver : it has been suggested that host country provide a clerk. Based on the staffing considerations in 2) above, this position could be identified as driver/clerk.

(v) Junior Professional Officer : Seconded officers from WESTPAC Member States, with $ 5,000 travel funding if possible (similar to the current UNESCO associate expert scheme.

Finances

(i) Travel: Preferably these funds (= $20,000) will be provided through member state contributions.

(ii) Operational: To be provided by the IOC (= $30,000)

Facilities

(i) General facilities (furniture, furnishings) to be provided by host country.

(ii) Copier to be provided by host country.

(iii) PCs + laser printer to be provided by IOC/Member States.

ANNEX VI

REVISED PROJECT ACTION FOR TECTONICS AND ITS IMPACTS ON THE COASTAL ZONE (TICZ)

The specific recommendations arising from the discussions on TICZ are:

1. Participation of the regional scientist to the newly established pilot programs urges IOC and CCOP to do everything possible so that TICZ initiative gains more official recognition in the member countries.

2. The network activities should be supported from national and international organizations in the initiative stage to implement TICZ studies.

3. Priority should be given to the following activities within the TICZ initiative.

(i) All necessary responses should be collected by experts from the Member States.

(ii) Time table for future activities should be created in about 18 months by experts involved.

Six pilot projects are shown as follows :

(I) Uplifting and subsidence of coastal mountains, coastal plains and adjacent areas

This project mainly deals with the basement deformation. In arc areas, shortening of the accretionary wedge and earthquake activities along the subduction zone are occurring. Makin efforts to clarify nature and mechanism of deformations and their impacts on the coastal zone should be investigated. Studies on coastal erosion in deservedly included. (Pilot project include southwest Japan; Sumatra Indonesia; and Central Range Philippines).

(ii) The nature and the underlying geologic processes of strike-slip faults

This research focuses on a new microplate boundary created as a consequence of collision and/or subduction at active plate margins. (Pilot projects are New Caledonia; Sumatra fault Indonesia; Central Fault Philippines)

(iii) Sea Level change due to dynamic deformation of the Geoid

Excluded tectonic change in the earth's surface, the shape of the earth will be affected by: (i) precession of equinoxes; (ii) obliguity of the ecliptic, and (iii) eccentricity of the orbit. These astronomic disturbances have cycles of 21,000y for (i), 40,000y for (ii), and 92,000y for (iii). Combination of these disturbances will cause change in the Geoid configuration leading to sea level change. GPS collocated tide gauge networking study is recommended in the final stage. (Pilot project in Stable platforms: Malaysia; Thailand).

(iv) Kinematics of the triple junction system

The Southeast Asian region is one of the most actively deforming tectonic domains in the world. There are many microplate boundaries within triple junctions. The relative motion through time of the Pacific, Australia and Eurasia plates is rather well constrained, but the motion of micro-plates and blocks inside broad triple

junctions can not be easily linked with global kinematics. The nature and deformation processes controlling the triple junction are subject to investigate. Spatial methods of GPS and VLBI are recommended in the final stage. (Pilot projects are in Mobile zones: Philippines; Indonesia).

(v) **Central arc-rifting in the active volcanic ridge**

Rift zones developed at the top of the active volcanic arc are characterized by numbers of normal faults, block tilting of the basement, and large-scaled calderas. The mechanism of developing processes from a primitive rift to well-developed through will be clarified. This is a new type of boundary processes reported from the Forearc Sliver. (Pilot projects are Ize-Bonin Ridge Japan; and Mariana Trough U.S.A. Andaman Sea).

(vi) **Backarc Basin processes and paleo-environmental study in the monsoon region**

The sequence stratigraphy using multichannel seismic reflection survey in the Bacarc Basin will clarify the precise history of sea level change and tectonic processes occurring along the coastal. There are fan deltas in the coastal region, coral reefs and abyssal plains in the basin floor. Paleo-environmental study in the monsoon region, especially of Kuroshio Sphere will be the important monitoring station for long-term change in climate to the coastal areas. (Pilot projects are South China Sea China; and Japan Sea Korea; and Japan Gulf of Thailand).

ANNEX VII

NATIONAL GOOS ACTIVITIES (THAILAND, JAPAN, NORWAY)

1. THAILAND

Marine Surveillance and Information System
SEAWATCH THAILAND

National Research Council of Thailand

SEAWATCH THAILAND is a complete marine environmental monitoring and forecasting system which integrates data collection, data analysis, environmental modelling and forecasting with an advanced computerized system for distribution of marine information and forecasts to interested operators and/or authorities. This 3 years project is being implemented under close co-operation between the National Research Council of Thailand (NRCT), OCEANOR, the oceanographic company of Norway, and other involving parties, including the Harbour Department, the Meteorological Department, Port Authority of Thailand, Naval Hydrographic Department, Department of Fisheries, the Petroleum Authority of Thailand, Marine Police Division, Chulalongkorn University, Kasetsart University, Prince of Songkla University, Burapha University, etc.

Data Acquisition Module

A real time data covering is provided by a network of moored data buoys (call TOBIS buoys), which includes meteorological parameters (wind speed & direction, air temperature & pressure(and oceanographic parameters (oxygen/algae/nutrient contents, waves, currents, temperature/salinity profile, radioactivity). The buoys have also their own data logging equipment, on-board processing (for data analysis & quality control), and a transmission system. The collected data are then transmitted to a shore station through the ARGOS satellite communication system on NOAA.

The total of seven buoys are planned to be deployed in the gulf of Thailand under the programme.

Data Storage, Analysis and Presentation Module

ORKAN is a complete, flexible system for processing, presentation and storing of environmental data collected by the buoys. The system core is an efficient database for measured time series and output from numerical models. It is supplied with a wide range of modules for data import and export, time and frequency analysis, and presentation tools for ygraphics and tables.

Environmental Modelling and Forecasting Module

A number of numerical modelling and forecasting software will be available under this programmed, including:

NOMAD — A model for simulation of spreading and dilution of aqueous effluents and particulate discharges. It simulates diffusion and advection in a prescribed current field, by using the 'particle-in-fluid' concept. The discharge is represented as a cloud of particles released continuously during the discharge period. The particles are either passively buoyant or assigned a prescribed sinking/rising velocity determined by the size distribution and density of the discharged material.

The ocean currents are prescribed from local current measurements (vertical profiles) or imported from hydrodynamic simulation models, like HYBOS.

The concentration field is derived from the particles'distribution by weighing the individual particles into a grid with resolution chosen according to the length scale appropriate for the specific case.

HYBOS — A 3D ocean circulation model for simulation of currents, sea elevation, salinity, temperature and density.

The model is used to simulate ocean parameters in offshore and coastal regions, according to user's selected data input. The HYBOS ocean current simulation model is therefore specially useful in offshore design and operations, storm surge/current forecasting, estimation of mean water level, and water circulation/quality studies. The simulated currents fit into ie. discharge diffusion transport models like NOMAD, used in water quality studies,

The horizontal grid spacing is varied using boundary fitted co-ordinates, thus making it easier for the user to control computation. Sigma transformation is used in the vertical dimension.

OILSPILL — PC Forecast model for prediction of drift and fate of an accident oil spill at sea from offshore platforms or ships. The simulations are based on wind observations and forecasts and ocean current data (background currents and tides). The latter data are permanently stored in the OILSPILL database.

Simulations are run on the basis of user-supplied wind forecasts. OILSPILL model also accounts for loss of the type of oil involved, due to evaporation and entrainment in the water column. In order to make the programme applicable to any specific region, relevant data must be made available on ocean currents and the specific oil types involved.

OILSTAT — PC system for graphical presentation of statistical data on the drift of oil from potential oil spills in the offshore or coastal region of concern. OILSTAT is specially designed to be used in feasibility studies and contingency planning.

The oil drift data stored in the system are computed in advance with a statistical trajectory model DRIFTMAP0. This model covers a large number of potential spill sites distributed in a regular grid.

The output from the trajectory model for each spill site comprises minimum drift time to shore, probability for stranding and expected stranding of oil. The model also enables the user to extract oil drift data for specific offshore locations or coastline sections for graphical presentation.

Data/Forecasts/Users-Relevant Information Distribution Module

An information system or "THAINET" will be developed to allow users to have easy access to the various data collected and other derived information including the forecasts on a near real-time basis via PC terminals. The system will consist of different modules to perform the following tasks.

- communication with the data collection buoys for systematic data identification and recording.
- input of external data sources including news, abstracts of reports, and laws/regulations related to marine activities.
- transfer of data to various users as well as those in-house in accordance with specified requests.
- system operation for the THAINET management.
- information extraction with generic and specialized models.
- presentation of all measured and analyzed data.

Progress of the Programme

NRCT has successfully deployed TOBIS buoys at Sichang island, Rayong Bay, Chang island, and Plathong Oil Platform. The other three buoys will be in place within the next six months. The buoy-transmitted data is transferred from ARGOS office in France to NRCT on a daily basis. The data is then processed and stored in the central database.

The users can access the data in two ways:

1. Via modem communication. The communication between the user's remote PC and the central database is managed through a modern connection. The communication is synchronous with the baud rate of at least 2400, preferably higher. The desirable speed is 9600.

2. By requesting hard copies directly from NRCT. The followings are the report's formats which can be generated by the database:

- o Table of Parameters
- o Joint Occurrence Table
- o Time Series Plot
- o Rose Vector Diagram
- o Progressive Vector Diagram
- o Extreme Parameter Analysis

For further details of the programme, please contact:

SEAWATCH THAILAND Programme
National Research Council of Thailand
196 Phaholyothin Road, Chatuchak
Bangkok 10900
Telephone: 579-0733, 579-8940
Telefax: 579-3035, 579-8940

Conclusion

The SEAWATCH THAILAND programme is being established through networking of data collection buoys. The observed data can be integrated with data from other sources or used as an input to various numerical models. Results from the models can be further combined with the information from the buoy network to produce user oriented forecasts. The distribution of marine environmental data and forecasts is a PC based system that would allow users to log on and retrieve the information directly.

2. JAPAN

International Cooperative Research Programme (GOOS) 1993-1997
sponsored by the Ministry of Education, Science and Culture, Japan Basic Studies at Universities for establishment of Global Ocean Observing System (GOOS)

Subject 1. Evaluation of oceanic transport of heat and material by the circulations in the North Pacific Ocean

Heat and volume transports of the ocean circulations are observed by using moorings of current meters and inverted-echo-sounders, the CTD casts, acoustic drop-sondes, and the altimeters onboard satellites in two sections across the Kuroshio, off Shikoku and on the Izu Ridge, and in one section across the subarctic gyre around the date line. Monitoring of the heat transport is essential to understand the climate system. Turbulent processes which affect the ocean currents and heat flux are studied.

(Ocean Research Institute, University of Tokyo, 5-year Programme from 1993)

Subject 2. Evaluation of fundamental elements of the oceanic processes

Fluxes of sensible and latent heat, and momentum across the ocean surface are estimated by the satellite data, and they are validated by using the data from ships and buoys. A surface buoy which stands rough seas is developed to monitor the surface fluxes. The surface fluxes are determined in the close coupling between ocean and atmosphere, and they are fundamental to drive ocean circulations.

(Faculty of Science, Tohoku University, 5 year programme from 1993)

Subject 3. Design of ocean observing system aided by high-resolution models of the ocean circulations

Numerical models on the general and regional circulation are developed to identify the key elements and locations for monitoring. The models are essential both for interpolations of the data because the ocean observations with uniform spatial and temporal scales all over the ocean are impractical, and for forecasting because the observations can describe an oceanic state in the past.

(Faculty of Science, University of Tokyo, 5 year programme from 1993)

Subject 4. Monitoring techniques securing time series data on the ocean environment

An efficient and reliable technique analyze dissolved gases and radio active nuclei is developed to monitor budget of green-house-effect gases and deep circulations.

Field observations are made at selected stations with a time interval sufficient to monitor changes in the ocean environment.

(Faculty of Fisheries, Hokkaido University, 4 year programme from 1994)

Subject 5. Monitoring of ocean currents and biomass abundance by using new techniques

Biological activities and their environments are essential to understand the material cycles in the ocean. An acoustic technique and an algorithm for the satellites data processing are developed to evaluate plankton density and biological environments. Current fields are monitored by the acoustic Doppler current profiler (ADCPs) and inducted voltage of a submarine cable across a strait.

(Ocean Research Institute, University of Tokyo, 4 year programme from 1994).

Research and Development on Ocean Buoy System based on the New Technology 1993-1997
sponsored by the Science and Technology Agency, Japan

Studies at National Research Institute for establishment of Global Ocean Observing System (GOOS)-

Project 1. Research and Development of autonomous buoy systems for multi-purposes.

A drifting buoy with thermistor chain, CTD and other sensor is developed. An autonomous buoy which cruises along an observational line or keeps a fixed station is developed by using solar energy and wind forces. A surface buoy which can be moored rough seas at high-latitudes is developed.

Project 2. **Research and development of new sensors**

New sensors are developed for marine meteorology, dissolved oxygen, nutrients, and carbon cycle. An acoustic sensor for current, diffusion and mixing in the upper ocean. Chemical and biological sensors are studied including optical and acoustic sensors for plankton and suspended matters.

Project 3. **System design of transmission and processing of observational data**

An efficient transmission of ocean data from the buoys is studied by using satellite and meteors.

Project 4. **System design of management and dissemination of observational data**

A computing scheme is developed to integrate the data from buoys, ships and satellites, and to interpolate the data to the grid points. On-line system for managing and disseminating the data is designed.

The Science and Technology Agency is carrying out various projects of the earth sciences relating to the Global Ocean Observing System (GOOS):

1) Observational Program in the North Pacific Ocean and the Arctic Sea.
2) Development of the ROV for 10000 m depth and the Deep-ocean Drilling Ship.
3) Material cycles in the deep ocean.
4) Operation of the submersibles.
5) Earth observation by satellites.
6) Kuroshio Exploitation Research Program.
7) WOCE
8) LOICZ
9) InterRIDGE
10) Building a new research ship for the oceanography.

3. NORWAY

Mr.Per-Erick Sras, OCEANOR, Norway presented the SEAWATCH system, and its relation to GOOS, The system is presently under installation in Thailand.

The SEAWATCH system consists of the following modules: data acquisition, data storage, analysis and presentation, environmental modelling and forecasting, distribution of data, forecasts and user relevant information.

There is now an increasing acceptance that better environmental data, for instance coming from the SEAWATCH system, will improve the management and give better utilization of the sea for different commercial purposes. Management decisions, for example, can be related to discharges of industrial and municipal wastes, in order to establish rules and regulations for waste water treatment plants etc., industrial utilization may include areas such as ship traffic, tourism, cooling water, process water, fish farming and fishing.

Being a rather newly developed system, today there are two main SEAWATCH systems implemented, or under implementation, the EUROPE and THAILAND system.

IOC have defined five major GOOS elements, namely: in situ-measurement system, data and information network, modelling, international cooperation and technical assistance, training and technology transfer. From the description of the SEAWATCH system given here, one could say that all GOOS elements are more or less covered with the exception of the international co-operation part, meaning that the implementation of a SEAWATCH system would form a good start of a GOOS implementation in any region.

ANNEX VIII

PROGRAMME OF INTERSESSIONAL SCIENTIFIC SYMPOSIUM

SUSTAINABILITY OF THE MARINE ENVIRONMENT:
An Integrated Scientific Approach to Coastal Area Management

COORDINATING STRUCTURE

(i) Scientific Organizing Committee

Prof. Tomio Asai (Chairman)
Dr. Su Jilan (China)
Dr. Manuwadi Hungspreugs (Thailand)
Dr. Kasijan Romimohtarto (Indonesia)
One from Australia to be nominated
Dr. Chua Tia-Eng
IOC Secretariat

Additional Support	:	WESTPAC Secretariat, Bangkok
	:	UNESCO ROSTSEA, Jakarta
	:	National donors

(ii) Local Organizing Committee

Dr. Aprilani Soegiato (Chairman)
Dr. Kasijan Romimohtarto (Vice-Chairman)

(iii) Budget and Finance Committee

Dr. Su Jilan (Chairman)
Secretary IOC
Secretary WESTPAC

(iv) Publicity and Publication Committee

Dr. Manuwadi Hungspreugs (Chairman)
One from Indonesia to be nominated

SYMPOSIUM STRUCTURE

: Topics for discussion
: Proposed keynote speakers

Keynote Speeches

(i) An Integrated Scientific Approach to Coastal Area Management

(ii) Biogeochemical Processes and its Impacts on Regional Biodiversity

(iii) Dynamics, Modelling and Prediction of Transport Phenomena

(iv) Climate Variability - Predictability and Impacts

(v) The Scientific Rationale for Biodiversity Maintenance

SYMPOSIUM TIMETABLE

: Sub Topics
: Proposed Speakers

TIMETABLE

Day 1 - Keynote Addresses x 5
Days 2-4 - Concurrent Sessions
Day 5 - Concluding Keynote and Panel Discussion

Sub Topics/Speakers

(i) Biogeochemical Processes and its Impacts on Regional Biodiversity

(a) Harmful Algal Blooms

(b) River Inputs of Pollutants

(c) Impacts of Mangrove, Sea Grass and Coral Reef

(ii) Dynamics, Modelling and Prediction of Transport Phenomena

(a) Near-shore Currents and Sediment transport

(b) Continental Shelf Circulation

(c) Tides and Tidal Phenomena

(d) Storm surge

(iii) Climate Variability - Predictivity and Impacts

(a) The long term record

(b) ENSO and the Sea Level Signal

(c) Climate change impacts - on the coastal zone
- on biodiversity

ANNEX IX

LIST OF ACRONYMS

ADCP	Acoustic Doppler Current Profiler
AIMS	Australian Institute for Marine Sciences
ASEAN	Association of South-East Asian Nations
ASFA	Aquatic Sciences and Fisheries Abstracts (FAO-IOC-UN)
CCCO	Joint SCOR-IOC Committee for Climatic Changes and the Ocean
CCOP	Committee for Co-ordination of Joint Prospecting for Mineral Resources in Asian Offshore Areas
CIDA	Canadian International Development Agency
COBSEA	Co-ordinated Body for South-East Asia
COMAR	Major UNESCO Interregional Project on Research and Training Leading to the Intergrated Management and Coastal System
CREAMS	Circulation Research of the East Asian Marginal Seas
DANIDA	Danish International Development Agency
DBCP	Drifting Buoy Co-operation Panel
ESCAP	Economic and Social Committee for Asia and the Pacific
FAO	Food and Agricultural Organization of the United Nations
GAPA	International Geological/Geophysical Atlases of the Atlantic and Pacific Oceans (CGOM)
GEF	Global Environment Facility
GIPME	Global Investigation of Pollution in Marine Environment (IOC)
GLOBEC	Global Ocean Ecosystem Dynamics
GLOSS	Global Sea-Level Obeserving System (IOC)
GOOS	Global Ocean Observing System
HAB	Harmful Algal Blooms

HABP	Harmful Algal Bloom Programme
IAEA	International Atomic Energy Aency
ICES	International Council for Exploration of the Sea
ICSPRO	Inter-Secretariat Committee on Scientific Programmes Relating to Oceanography
IGBP	International Geosphere-Biosphere Programme (ICSU)
IGOSS	Integrated Global Ocean Services System (IOC-WMO)
IMO	International Maritime Organization
IOC	Intergovernmental Oceanographic Commission (of UNESCO)
IODE	International Oceanographic Data and Information Exchange (IOC)
IPCC	Intergovernmental Panel on Climate Change (UNEP-WMO)
IREP	International Recruitment Experiment
IUCN	World Conservation Union
LOICZ	Land-Ocean Interaction in the Coastal Zone
MARPOLMON	Marine Polluting Monitoring System (IOC)
MFA	Ministry of Foreign Affairs
NOAA	National Oceanic and Atmospheric Administration (USA)
ODC	Ocean Dynamics and Climate
OSLR	Ocean Science in Relation to Living Resource (IOC-FAO)
OSNLR	Ocean Science in Relation to Non-living Resources (IOC-UN(OALOS))
PREP	Penaeid Prawn Recruitment Programme
ROPME	Regional Organization for teh Preservation of the Marine Environment
SCOR	Scientific Committee on Oceanic Research (ICSU)
SEATAR	Joint CCOP-IOC Working Group on post-IDOE Studies of East Asian Tectonics and Resources
STAR	Joint SOPAC-IOC Working Group on South Pacific Tectonics and Resources
TEMA	Training, Education and Mutual Assistance in the Marine Sciences (IOC)

TOGA	Tropical Oceans and Global Atmosphere (WCRP)
UNCED	1992 United Nations Conference on Environment and Development
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
WCRP	World Climate Research Programme
WESTPAC	IOC Sub-Commission for the Western Pacific
WMO	World Meteorological Organization
WOCE	World Ocean Circulation Experiment (WCRP)
WWW	World Weather Watch