

Intergovernmental Oceanographic Commission 13 MAR 1990
Reports of Governing and Major Subsidiary Bodies



IOC Sub-Commission for the Western Pacific

First Session

Hangzhou, People's Republic of China, 5-9 February 1990

Unesco

In this Series	<i>Languages</i>
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IOC/SC-WESTPAC-I/3
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1. OPENING

1 The Chairman, Professor T. Nemoto, opened the First Session of the IOC Sub-Commission for the Western Pacific (WESTPAC) at 14.30 hours on 5 February 1990. He welcomed all participants to this important milestone event in the development of regional co-operation and concerted action by Member States in marine scientific investigations and related ocean services, including training, education and mutual assistance. He expressed his appreciation to the host country, People's Republic of China, the Province of Zhejiang and the City of Hangzhou for inviting and hosting the session and for the excellent arrangements made. The Chairman in particular welcomed the guests present at the opening of the session and the formal initiation of the Sub-Commission, namely Mrs. Chen Duan, Deputy Mayor of the City of Hangzhou, Mr. Li Debao, Deputy Governor of Zhejiang Province and Mr. Yan Hongmo, Administrator of State Oceanic Administration and representative of the State Council. He then invited Mr. Yan Hongmo to address the Sub-Commission.

2 The Administrator warmly welcomed the participants to China. He stated that the Government of the People's Republic of China attaches great importance to marine research, related ocean services and training, in view of the great significance of marine resources, the extensive coastline of the country and challenges of potential global and regional changes in the marine environment. This importance is demonstrated by the strong involvement of China in IOC, including the hosting of this session, and by the participation of China in many global and regional programmes, such as TOGA, WOCE, and WESTPAC. The full statement appears in Annex III-A.

3 The Chairman thanked the Administrator for his statement and invited the Deputy Governor of the Zhejiang Province, Mr. Li Debao, to address the Sub-Commission.

4 Mr. Li Debao warmly welcomed the participants to the Zhejiang Province and the City of Hangzhou and noted that the Province contains many islands and has a very extensive coastline and marine regime with important living resources. He therefore attaches great importance to the provision of sound scientific advice and related information for the management of these resources and adequate protection of the marine environment. In view of the extensive coastline the Province is also most concerned about potential changes in the conditions of the marine environment, including the sea level and marine contamination. These matters require serious attention and the government must look towards scientists and international co-operation for appropriate advice as to the management and protection measures. The full statement is found in Annex III-B.

5 The Chairman expressed his appreciation for the Deputy Governor's statement and invited the Secretary IOC, Dr. G. Kullenberg, to address and formally initiate the Sub-Commission.

2. FORMAL INITIATION OF THE SUB-COMMISSION

6 The Secretary IOC, on behalf of IOC and Unesco, welcomed the participants and thanked the host country People's Republic of China, the Zhejiang Province and City of Hangzhou for inviting and hosting the Session,

for the very excellent arrangements made and for the provision of required secretariat and communication facilities. He then recalled the developments leading up to the recommendation by the Fourth Session of the Regional Committee for the Western Pacific to the IOC Assembly to establish the Sub-Commission and its establishment by the Fifteenth Session of the Assembly (Paris, 4-19 July 1989). These developments go back to 1965 and are reviewed in Document IOC/INF-773).

7 Having noted these developments, the Intergovernmental Oceanographic Commission, through its Resolution XV-9, established the IOC Sub-Commission for the Western Pacific (WESTPAC) with its Terms of Reference, reproduced as Annex IV here, to replace the Regional Committee, and to become operative with the convening of the First Session of the Sub-Commission. The Secretary noted that this is now the case and was pleased to have the honour to declare the Sub-Commission operative.

8 This is the second IOC Sub-Commission, the first one being the Sub-Commission for the Caribbean and Adjacent Regions (IOCARIBE), with a secretariat installed in Cartagena, Colombia in 1987. It is expected that the IOC Secretariat for the WESTPAC Sub-Commission will be established during this year. Generous offers have been made to support it.

9 The Secretary then noted the necessity of the involvement of Member States and expressed appreciation that many attended this Session. He then referred to the present great concern for the environment, for climate variability and possible change, and for the ecological imbalance related to the pressure of activities of the fast growing human population on a global scale. We are facing rates of change never experienced by mankind before - the exponential population increase and related requirements for resources and space being the driving force. In dealing with related challenges it is necessary to have a holistic view, not only of the environment, but also of the activities of human society.

10 The role of the oceans, the marine environment and its resources for global conditions, global and climate changes, as well as for local and regional ones, is undeniable. The ocean, inter alia, through its heat capacity, redistribution of heat, uptake of carbon dioxide and back radiation from the ocean surface, has an immense role over when a climate change will occur and how large it will be. This must be taken into account in any evaluation or assessment of the issues and consequences. Yet, in the resolution of the Governing Council of UNEP on global climate change, adopted in May 1989, there is no reference at all to the ocean or the marine environment.

11 In order to improve our ability to predict climate change and related effects, and to narrow down the uncertainties, adequate ocean observations are a must. Much of what is required can be gradually initiated now. The IOC Sub-Commission should take on the responsibility of facilitating this development in the Western Pacific. The IOC is initiating and supporting related global developments.

12 The resources of the marine environment provide a potential source of support for mankind which should be utilized in a balanced, ecologically sound way. The Sub-Commission should take on the responsibility of

providing sound scientific advice to the governments for proper utilization and management on regional and sub-regional scales.

13 This requires that a dialogue is developed with our customers, users of the scientific results and also that we help interpret these results. Furthermore, we should take into account the needs of our governments in the formulation and implementation of our programmes. The Sub-Commission cannot work in isolation. It must establish actively and dynamically a dialogue with other parts of society, governmental institutions and other international organizations and programmes covering other aspects of the needs but which require inputs from ocean science and services. This dialogue, interaction, co-operation should be developed in harmony with the IOC efforts on a global scale in the same direction, taking into account the regional priorities.

14 Many of these issues and aspects referred to above are, directly or indirectly, included in the Agenda for this Session. Included is also the development of the medium-term objectives of the Sub-Commission and related plan. This should be realistic and take into account available human and financial resources. However, in the presentation of the medium-term objectives, proposals should be included beyond the realistic plan based on known available resources, in order to bring to the attention of the governments the real and true needs. These should be spelled out in order to obtain these resources. The Secretary wishes that the Sub-Commission lives up to its responsibility, that the existing momentum of co-operation be maintained and increased and that a new governing factor emerges through the Sub-Commission. The Secretary then declared the Sub-Commission formally initiated.

3. ADMINISTRATIVE ARRANGEMENTS

3.1 ADOPTION OF THE AGENDA

The Sub-Commission adopted the Agenda (Annex I).

3.2 DESIGNATION OF THE RAPPORTEUR FOR THE SESSION

15 The Sub-Commission designated Professor Su Jilan of China and Dr. A. Ralph Jensen of Australia as Rapporteurs for the Session.

3.3 CONDUCT OF THE SESSION

16 The Secretary reviewed the arrangements for the Session. He also reviewed the Provisional List of Documents recalling that the basic working document was the Annotated Agenda.

17 The Sub-Commission decided to work mainly in plenary. It also noted that Drafting Groups might be formed to deal with certain Agenda Items such as 8.2 (Medium-Term Programme and Intersessional Work Plan) and 9 (Funding and Other Resource Requirements).

4. **FUNCTIONING OF THE SUB-COMMISSION**

4.1 **SECRETARIAT SERVICES AND FUNCTIONS**

18 Referring to Document IOC/SC-WESTPAC-I/2 the Secretary IOC informed the Sub-Commission 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 is presently preparing a draft agreement to be presented to the Thai authorities for discussion.

19 The Secretary IOC also informed that the funds required for the establishment of a post of a senior professional staff member were available from Unesco and that the agreement with the USA following its offer of funding part of the post made at the Fifteenth Session of the Assembly was expected to be considered in the near future. The establishment of the post could then proceed.

20 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 (Bangkok, 22-26 June 1987). He stated that the Ministry of Foreign Affairs of Thailand agrees in principle and that they are expecting the draft agreement presently being prepared by the Legal Adviser of Unesco. He further confirmed the allocation of US\$13,000 for 1990 and the provision of office facilities and one secretary and one clerk, but that additional support from IOC is nevertheless required.

21 The Delegate of Australia, while confirming the continuation of support for the present interim arrangements (until June 1990), stressed the need for completion of the formal agreement and establishment of the senior post as soon as possible. The Delegate of France stated that France was ready to examine the possibility of providing an associate expert for service in the Regional Secretariat. The USSR Delegate indicated that the USSR is ready to study the possibility of providing an associate expert for the Regional Secretariat. The Delegate of China also expressed, during later discussions, willingness to provide one such associate expert. The Delegate of Japan confirmed the offer of Japan to provide an associate expert to the Regional Secretariat.

22 The Sub-Commission took note of the developments, endorsed the approach adopted for the establishment of the Regional Secretariat and the senior post, expressed its appreciation for the efforts made and requested the Secretary IOC to pursue this as a matter of high priority.

23 The Sub-Commission agreed that the Regional Secretariat should actively pursue identification of support in cash and in kind for the implementation of the WESTPAC programme; endeavour to establish a regional voluntary assistance programme; identify specific needs for establishing adequate and appropriate communication systems within the networks of participating Member States and institutions; establish appropriate communication and interaction with the secretariats of other regional

organizations, while ensuring also that appropriate information is passed to the IOC Secretariat in relation to these interactions.

4.2 INTERACTIONS WITH IOC HEADQUARTERS

24 The Secretary IOC referred to Document IOC/SC-WESTPAC-I/2, Section 4.2, the Guidelines for the Structure and Responsibilities of the Subsidiary Bodies of the Commission (Document IOC/SC-WESTPAC-I/Inf.3) and the Terms of Reference of the Sub-Commission (Annex IV), and informed the Session about the operational procedures established for liaison between the IOC Secretariat and the IOC Regional Secretariat for IOCARIBE. As to funds for the operation of the Sub-Commission, following the drawing-up of a programme by the Sub-Commission and its subsequent endorsement by the governing bodies of IOC, funds will be allocated for programme implementation from the Unesco Regular Programme and the IOC Trust Fund. Voluntary contributions to the implementation of the Sub-Commission for the Western Pacific should be directed through the IOC Trust Fund. He also reminded the Sub-Commission that the associate expert scheme is established by Unesco and works through Headquarters, with the donor country allocating the posting of the associate expert.

25 The Sub-Commission took note of the information and agreed that close interaction between the Regional Secretariat and the IOC Secretariat should be ensured from the start, through establishment of proper communication facilities and consultations. The Sub-Commission also agreed that the Regional Secretariat should implement the agreed programme in harmony with the IOC Secretariat so as to take into account the necessary adjustments and revisions possibly required or imposed by intersessional developments and changes of conditions.

5. REPORT OF THE LAST SESSION OF THE REGIONAL COMMITTEE FOR WESTPAC

5.1 OUTCOME OF THE SEMINAR PRECEDING WESTPAC-V

26 Professor Nemoto presented this Agenda Item, referring to the Executive Summary of the Seminar (Document IOC/SC-WESTPAC-I/7), held prior to the Session from 2-3 February 1990, in Hangzhou. The main purpose of the Seminar was to provide a forum for scientists from the host country and the region to present research results obtained during the intersessional period and related to on-going programmes of WESTPAC. It also facilitated a scientific review of each WESTPAC project in order to prepare a proposal for a Medium-Term Programme.

27 Several Delegates noted that, since some of the Programme Coordinators, Project Leaders and other experts actively participating in the projects were unable to attend the Seminar, the Seminar was not in a position to provide a comprehensive scientific review of WESTPAC projects. Others expressed concern about the broad and rather vague purpose of the Seminar and the short notice given to Member States to participate.

28 Some Delegates recalled that the Regional Committee at its Fourth Session allocated relative priorities to nine projects, adopting four as WESTPAC projects.

29 The Secretary IOC drew the attention of the Sub-Commission to the recommendation of the IOC Assembly at its Thirteenth Session (Paris, 12-18 March 1985), that the regional subsidiary bodies hold scientific meetings immediately prior to their sessions, so as to enable scientists to present the results obtained during the intersessional period relating to the on-going programme. He considered that such a seminar would contribute to the dissemination of research results obtained in the region.

30 The Sub-Commission agreed to carry out a further evaluation of the projects at the Session and to formulate a Medium-Term Programme for WESTPAC.

5.2 REPORT OF THE FIFTH SESSION OF THE IOC REGIONAL COMMITTEE FOR WESTPAC

31 The Chairman briefly reported to the Sub-Commission the conclusion of the Fifth and final Session of the IOC Regional Committee for the Western Pacific which took place in the morning of 5 February 1990.

6. PROGRAMME OF THE SUB-COMMISSION

6.1 REGIONAL WESTPAC PROJECTS AND ACTIVITIES

32 The Chairman referred to the report on intersessional activities (Document IOC/WESTPAC-V/6) and the report of the Scientific Seminar preceding the Session, and invited a brief presentation from each Project Co-ordinator or Project Leader on each project as listed in the Annotated Agenda (Document IOC/SC-WESTPAC-I/2). The Sub-Commission provided comments, as required, on each project and reviewed their different states of development. Considerable progress was noted within several of the projects and the Sub-Commission expressed overall satisfaction with the development. It was noted that some of the projects had not progressed quite as desired, due among other things, to lack of funds. The Sub-Commission took note of the review as provided by the Scientific Seminar (Annex V), and agreed that this constituted a good basis for the completion of the formulation of long-term objectives, as well as for the specification of an action plan, of each project for the period 1990-1995. These developments are reported under Agenda Item 8, with related proposed measures for implementation also identified through Agenda Item 9.

6.2 REGIONAL COMPONENTS OF GLOBAL PROGRAMMES

6.2.1 Ocean Dynamics and Components of the World Climate Research Programme and Related Activities

33 The Secretary informed the Sub-Commission about the ocean dynamics and climate related activities of IOC, the work of the joint SCOR-IOC Committee on Climatic Changes and the Oceans (CCCCO) and the two principal ocean programmes of the World Climate Research Programme (WCRP), initiated

through the work of the CCCO, namely Tropical Oceans and Global Atmosphere (TOGA) and World Ocean Circulation Experiment (WOCE). The Secretary also recalled the Resolution XV-4, adopted by the Assembly at its Fifteenth Session, on a global integrated ocean observing system development, recognizing the need for planning for a system to observe, *inter alia*, ocean indices of climate change in continuation of TOGA and WOCE. He informed the Sub-Commission about the initiation of the work of the IOC *ad hoc* Group of Experts and the establishment of the Ocean Observing System Development Panel (OOSDP) jointly by the CCCO and the Joint Scientific Committee. He emphasized the need for participation of Member States of WESTPAC in these activities and their implementation.

34 The Sub-Commission took note of the information and agreed on the need for active participation of its Member States in these important developments, especially through active involvement in existing observational programmes such as Integrated Global Ocean Services System (IGOSS), Global Sea-Level Observing System (GLOSS), International Oceanographic Data and Information Exchange (IODE) and Drifting Buoy Co-operation Panel (DBCP). The Sub-Commission also recommended that Delegations pursue this on a national basis.

35 The Chairman invited Dr. G. Mitchum from the TOGA Sea-Level Centre to present relevant aspects of TOGA and in particular the TOGA Coupled Ocean-Atmosphere Response Experiment (TOGA COARE).

36 Dr. Mitchum informed the Sub-Commission that TOGA-COARE is the major process-oriented experiment to take place as part of the TOGA programme. The aim of this experiment is to understand in detail the coupling of the ocean and the atmosphere in the region of the Western Tropical Pacific warm pool, in order to learn how to specify ocean-atmosphere fluxes more accurately in forecast models.

37 The planning of COARE is well-advanced, and the IOC has provided the Session with a background information document on this (Document IOC/SC-WESTPAC-I/Inf.5). It is pointed out that COARE is an extensive experiment to take place largely in the WESTPAC region, and that significant resources still need to be committed to this experiment. The Sub-Commission is urged to strongly endorse the TOGA-COARE, and to encourage its Member States to participate in COARE through their appropriate national representatives. Several Delegations emphasized the importance of TOGA and informed the Session about their respective country participation in TOGA and about their intention to participate also in TOGA-COARE. The Sub-Commission recommended its Member States to participate actively in TOGA-COARE and to identify support for their participation.

38 Reference was made to the forthcoming International TOGA Scientific Conference (July 1990) as an important mechanism for presenting and reviewing results. Through its support to that conference IOC can assist the participation of scientists from developing countries. Several Delegations also invited participation from other countries in WESTPAC on

board their research vessels in relevant cruises. Delegations also noted the links of the TOGA activities to some of the WESTPAC projects, in particular the co-operative study of Ocean Dynamics in the Northwest Pacific and of the Continental Shelf Circulation in the Western Pacific.

39 The Chairman then invited the Director of the World Ocean Circulation Experiment (WOCE) International Project Office (IPO), Dr. P. Koltermann to provide further information, in particular on WOCE.

40 Dr. Koltermann reviewed the existing global programmes which address the ocean's impact on climate change, namely, TOGA, WOCE, JGOFS and the plans for IGBP and GEWEX. He underlined the close collaboration and co-ordination between these programmes. Although, as global programmes, they are sometimes considered to be remote, their relevance to and impact on the regional scale is imminent and direct.

41 WOCE has identified the Western Pacific, including the South Asian Archipelago, as an important region. Major components of this programme focus on this area. The specific requirements have been laid out in the Implementation Plan. As WOCE has started, these commitments have to be substantiated now by making details available. WOCE will establish close collaboration among all participants, using existing mechanisms. WOCE has most of the resources needed to do the programme, but it needs the continued support and involvement of institutions and agencies. Dr. Koltermann also explained the mechanisms developed for WOCE to ensure an efficient co-ordination, giving strong emphasis on on-the-job training between co-operating institutions and on the sharing of data at an early date.

42 As WOCE is a scientific experiment, it has a well-defined end. Therefore it needs to focus its requests for human and material resources on specific components now. These components depend on contributions at different levels and sizes. They all require the most valuable goods of the Member States, namely, the expertise and experience of their scientists. Their participation in WOCE, as in the other global programmes, provides the important link to the regional interest and aspects.

43 Dr. Koltermann stressed the need for detailed statements on the commitments made to the International WOCE Scientific Conference in Paris, 1988. A preliminary assessment of WOCE will be published by the IPO in March 1990. This will serve as a basis for the documents that are going to be prepared for the first session of the Intergovernmental WOCE Panel, 22-24 October, 1990 at IOC in Paris. He also informed the Sub-Commission on other activities relevant to the WESTPAC region, i.e., the meeting of the WOCE Core Project Working Group in Hobart, Australia, which will be preceded by a Regional Workshop on the WOCE programme in the Pacific, 5-6 April, 1990. Also, the Pacific group of the WOCE Surface Velocity Programme meets in Republic of Korea in May 1990.

44 Concluding, Dr. Koltermann stressed the commitment of WOCE to look beyond its Goal 1, i.e., to design the components and to detail the requirements of a Global Ocean Observing System for Climate Change. This can only be achieved by committing the required resources for WOCE now in order to keep the time-table of WOCE, and by using all necessary mechanisms available.

45 Several Delegations expressed their strong support for WOCE, and expressed appreciation for the information provided.

46 The Sub-Commission recommended Member States to identify as a matter of urgency, their specific support for WOCE and their specific activities in the implementation phase of WOCE.

47 The Sub-Commission agreed that the Regional Secretariat should enhance and support active participation of WESTPAC Member States in ocean climate research activities and in the development of a global integrated ocean observing system.

48 The Chairman informed the Sub-Commission about relevant developments within the International Geosphere-Biosphere Programme: A Study of Global Change (IGBP) of the International Council of Scientific Unions (ICSU), and recalled the ad hoc meeting on Potential IOC Involvement in the Oceanographic Components of the IGBP (Paris, 29-30 June 1989), and the related Resolution XV-6 adopted by the Fifteenth Session of the Assembly (Document SC/MD/91, section 5.5). The Secretary then informed the Session about the collaborative Unesco-IGBP/ICSU programme in which IOC also participates. He noted that through this programme inputs to the development of IGBP are provided and linkages between the relevant Unesco and IOC programmes can be established.

49 The Sub-Commission agreed that it could provide a mechanism through which intergovernmental aspects of co-ordination concerning participation of its Member States in global change programmes could be initiated. The Delegate of the USA informed the Session regarding the co-ordination mechanism established in the USA for global change research and the very considerable US commitment to global change research, including a large increase in funding which has been requested for the U.S. fiscal year 1991. The Sub-Commission took note of this information with great appreciation.

50 One endorsed core project of the IGBP is the Joint Global Ocean Flux Study (JGOFS) established by SCOR. Several Delegations expressed strong support for JGOFS and emphasized the need to relate coastal zone flux studies also to JGOFS. The Sub-Commission recommended that the relevant WESTPAC projects be appropriately interfaced or linked to JGOFS through efforts of each project body.

6.2.2. Ocean Services

51 The Secretary IOC introduced the Integrated Global Ocean Services System (IGOSS), Global Sea-Level Observing System (GLOSS), International Oceanographic Data and Information Exchange (IODE) and International Tsunami Warning System in the Pacific (ITSU) (Document IOC/SC-WESTPAC-I/2).

52 For IGOSS, he reported on the recommendations of the Fifth Session of IOC-WMO Working Committee on IGOSS (Paris, 14-23 November 1988) and the outcome of the Third Joint IOC-WMO Meeting for Implementation of IGOSS XBT Ship-of-Opportunity Programme, Hamburg, Federal Republic of Germany, 16-20 October 1989.

- 53 Regarding GLOSS activities, he mentioned that the GLOSS Implementation Plan was approved by the IOC Assembly in July 1989 and that the first meeting of the IOC Group of Experts on GLOSS took place on 19-23 June 1989 in Bidston, U.K.
- 54 Progress on ocean services in the WESTPAC region has been made. The primary goal for the future is that GLOSS should ensure the maintenance of the GLOSS gauges on a long-term basis and the timely distribution of sea-level data. Also, arrangements should be made to place instruments at GLOSS sites in the WESTPAC region where measurements are not made at present.
- 55 The representative of the International Co-ordination Group for the Tsunami Warning System in the Pacific (ICG/ITSU), Dr. Chenglan Bao, informed the Session about the progress of ITSU. He also introduced the Master Plan for the Tsunami Warning System in the Pacific. The outcome of the Twelfth Session of ICG/ITSU, Novosibirsk, USSR, 7-10 August 1989, was presented.
- 56 Several Delegates informed the Sub-Commission about the national activities that have been carried out in relation to the subject. They expressed interest in the further development of the various activities in IGOSS, GLOSS, IODE and ITSU and indicated support from national programmes.
- 57 Some Delegates paid special attention to IODE, indicating the importance of data exchange in promoting capability for developing countries.
- 58 Several Delegates stressed the importance of international co-operation and encouraged Member States to submit the data promptly to Responsible National Oceanographic Data Centre (RNODC) for WESTPAC, World Data Centre (WDC) and programme data centres such as TOGA.
- 59 The Delegate of China expressed the willingness to host a training course for GLOSS.
- 60 The Sub-Commission expressed satisfaction on the progress in ocean services activities, but stressed the importance of escalating the development of existing programmes leading to implementation of an Ocean Observing System adequate for climate change and related observations.

61 **The Sub-Commission also emphasized the need to continue maintenance and expansion of XBT Ship-of-Opportunity Programmes so as to collect real-time data for the use of both global and regional scientific programmes.**

6.3 **NEW PROPOSALS**

6.3.1 **Ocean Mapping in Western Pacific**

62 The Secretary IOC referred to the decision of the Assembly at its Fifteenth Session that a meeting of experts should be arranged during this Session to discuss the possibility of compiling a bathymetric chart for the WESTPAC area and also the generous offer of China to assist with the preparation of such a chart.

63 The Delegations of Japan and Australia provided additional technical information, and emphasized the need to prepare bathymetric charts on the scale of 1:1 000 000, e.g., for use in relation to resources management. They also emphasized the need to use modern computerized techniques which can easily accommodate incorporation of new data. The Delegates of China, USA, USSR and Malaysia likewise stressed the importance of bathymetric mapping and the related work of IOC, and expressed appreciation for the technical information provided by Australia and Japan.

64 The Chairman then appointed a sessional group of experts to analyze the matter and draft Terms of Reference for an expert group to consult on the proposed international bathymetric chart for the WESTPAC region.

65 The Terms of Reference finally endorsed by the Sub-Commission are as follows:

- (i) to determine the user requirements for and the application of a bathymetric chart series in the WESTPAC region;
- (ii) to determine scales, projections, contour intervals and other technical specifications which meet those user requirements; also to consider whether the user requirements are being met by existing or other planned chart series such as those produced by international programmes (e.g., IOC-IHO/GEBCO, GAPA, CCOP/CPC, SOPAC) and individual national programmes;
- (iii) to determine the database, quality control and data management requirements to support production of any recommended bathymetric chart series for the WESTPAC region.
- (iv) to suggest implementation mechanisms, including:
 - (a) breakdown of regional responsibilities;
 - (b) transfer of appropriate database and chart production technology;

- (c) establishment of appropriate co-ordination mechanisms, including editing and quality control; and
- (d) estimation of the resources required;
- (v) to examine co-operative arrangements with regional hydrographic organizations such as the East Asia Hydrographic Commission (EAHC) and other national hydrographic authorities.

66 The Sub-Commission recommended that the expert consultation be convened in the first half of 1990, so as to facilitate reporting on their activities to the East Asia Hydrographic Commission of IHO at its session in September 1990, as well as to the Sixteenth Session of the IOC Assembly, March 1991.

6.3.2. Any Other Proposals

67 The Chairman invited other project proposals. The Delegation of USSR suggested that the preparation of geological maps should be taken up as a WESTPAC activity. The Delegate of China also proposed to study the prediction of storm surges and red tide as a component of ocean hazard reduction. The Sub-Commission agreed that the Bureau, consisting of the Chairman, Vice-Chairmen with possible inclusion of Programme Co-ordinators as required, could consider these proposals subject to provision in due course of relevant project proposal documents from the USSR and People's Republic of China.

68 The Sub-Commission considered that the discussion and identification of activities in Agenda Items 6.1, 6.2 and 8 provided sufficient details with regard to other emerging global and regional studies. It requested its Bureau to keep under review new developments so as to be able to consider these at its Second Session.

7. ENHANCING MARINE SCIENCE CAPABILITIES IN MEMBER STATES OF THE WESTPAC REGION

7.1 TEMA REQUIREMENTS IN SUPPORT OF THE APPROVED PROGRAMMES AND ACTIVITIES

69 The Secretary IOC reviewed the activities relevant to Training, Education and Mutual Assistance (TEMA) in the WESTPAC region during the intersessional period. He emphasized that one part of TEMA activities should be viewed as one element of the scientific studies in the region, especially with the programmes/projects identified by the WESTPAC Regional Committee and Sub-Commission so as to ensure continued effectiveness of the TEMA activities. He also urged the Sub-Commission to identify and solicit support from various sources for the projects.

70 The Chairman introduced relevant results discussed at the WESTPAC Scientific Seminar, Hangzhou, People's Republic of China, 2-3 February 1990. He stressed the need for implementing TEMA activities within the projects.

71 **The Sub-Commission expressed its appreciation to Japan for organizing training courses in data management and exchange in RNODC, and for training on board of Japanese research survey vessels.**

72 Some Delegates referred to the importance of data management and exchange for the implementation of WESTPAC projects, and suggested that related TEMA activities should be included in the Medium-term Plan.

73 **The Sub-Commission suggested the need for the preparation of an action plan for TEMA activities in order to provide scientific and technological training for the developing countries and increasing their capability in marine scientific studies. Training courses for the study of red tides, storm surges and tsunamis were also suggested.**

74 Several Delegates expressed their willingness to provide support for TEMA related activities, including shipboard training, hosting training courses and organizing workshops.

75 **The Sub-Commission expressed its appreciation to these Delegates for their offers of assistance in supporting TEMA activities. It noted that some training activities were included in the Medium-Term Plan for WESTPAC projects and considered these to be very important aspects of the Plan.**

7.2 **IMPLEMENTATION OF THE UNESCO-IOC COMPREHENSIVE PLAN FOR A MAJOR ASSISTANCE PROGRAMME TO ENHANCE THE MARINE SCIENCE CAPABILITIES OF DEVELOPING COUNTRIES**

76 The Secretary IOC presented the item referring to the Annotated Agenda and informed delegates about the Seminar on Partnership in Ocean Sciences and Services for Sustainable Development held in Bremerhaven, Federal Republic of Germany, 19-22 September 1989.

77 **The Sub-Commission focussed attention on communication in the region and encouraged the IOC Secretariat and Member States to increase their capacity for information exchange. The Sub-Commission also requested that the IOC Regional Secretariat should take this into account.**

78 **The Sub-Commission recognized the importance of training courses, and noted that training can also be provided by sending experts to developing countries to give lectures and advice in respect of various projects developed by the Sub-Commission and other institutions. In this way the national capabilities can be enhanced. The Sub-Commission also noted that significant funds must be obtained so as to enhance Member States' capabilities to deal with the urgent global studies and related ocean observations, e.g., those mentioned in Agenda Item 6.2.**

8. **FUTURE PROGRAMME OF WORK OF THE SUB-COMMISSION**

8.1 **SPECIFICATION OF PROJECTS AND ACTIVITIES**

79 The Chairman referred to the proposal to hold a WESTPAC Symposium during the intersessional period, and invited comments from the Sub-Commission.

80 The Australian Delegate proposed that a major multidisciplinary symposium, based on the model of the IOC Symposium on Marine Science in the Western Pacific held in Townsville, Australia, 1-6 December 1986, should become the principal intersessional activity of the Sub-Commission. In that context he proposed that intersessional periods of approximately three years would allow for such a symposium in the second half of 1991. He further suggested that the venue for such an activity ought to rotate among Member States whereas plenary sessions ought to be held at the Secretariat office in Bangkok. Both proposals would offer distinct benefits. In respect of plenary sessions such an approach would ensure that the full secretariat and infrastructure facilities of the office be available to the Sub-Commission. In respect of the symposium advantages would include:

- (i) exposure of junior scientists to their senior colleagues;
- (ii) a forum for consultation of project teams;
- (iii) a forum for development of new initiatives;
- (iv) an increase in the profile of the Sub-Commission as a facilitator of scientific interaction.

81 The Sub-Commission agreed that an intersessional symposium as proposed should proceed and that in view of the need to proceed at pace a Steering Committee be appointed to begin detailed planning prior to the establishment of the Regional Secretariat. Thereafter the Steering Committee could be assisted in its work by one of the experts seconded by Member States to the Secretariat.

82 The Sub-Commission thus agreed to convene an intersessional symposium. Furthermore, the Chairman proposed that an interim scientific planning committee be established under the chairmanship of Dr. J. Baker (Australia) and with about five additional members in their personal capacity. This interim scientific planning committee would report to the Chairman of the Sub-Commission and the Secretary IOC prior to the Twenty-Third Session of the Executive Council.

83 The Sub-Commission also noted the possibility of inviting other international global and regional organizations to co-sponsor the WESTPAC Symposium on a cost-sharing basis and took note of the previous offer by the Marine Science Committee of the Pacific Science Association (PSA) to co-sponsor the Symposium.

84 Several Delegates stressed the need to ensure inter-disciplinary exchange and interaction between the WESTPAC projects, as well as with other programmes. One subject area of special concern was considered to be marine bio-geochemistry and it was suggested that this could be one theme for the symposium.

85 **The Sub-Commission adopted Recommendation SC-WESTPAC-I.1.**

86 The Chairman reminded the Sub-Commission of the proposal to compile and publish a Directory of Regional Institutions and Laboratories for WESTPAC, and the on-going compilation of a list of laboratories and scientists involved in marine pollution research and monitoring in the WESTPAC region, which the co-ordinator for the programme had explicitly suggested should be completed. The Sub-Commission agreed to this as an element of the overall Directory.

87 The Chairman then invited the Delegate of Australia to present the preliminary draft of the Directory of Regional Institutions and Laboratories in the WESTPAC region, a limited number of copies of which had been distributed at the Session. The Delegate emphasized that this was a very preliminary draft circulated to Heads of Delegations only so as to stimulate comments. He invited each Delegation to send their annotated copy to the compiler Mr. R. Harriss (Australia) for further compilation. Delegates requested clarification as to the scope of the directory. The Sub-Commission agreed that it would cover only IOC Member States of the WESTPAC region. The Delegate of China requested that this be strictly adhered to and that certain entries concerning Taiwan in the preliminary draft therefore be deleted. This was agreed. The Delegate of the Democratic People's Republic of Korea suggested that WESTPAC Programme Co-ordinators and Project Leaders could also be included in a separate section.

88 The Secretary IOC suggested that national focal points (or institutions) be identified for this activity, in order to facilitate and streamline communication. These would have the responsibility of doing the compilation on a national basis and sending the result to the compiler (Mr. R. Harriss, Australia). He also informed the Sub-Commission about on-going work in the IOC to facilitate and stimulate the use of the Unesco developed information storage and retrieval software package, CDS/ISIS, for the purpose of preparing directories, and about the related need to specify the type of information to be included in the directories.

89 **The Sub-Commission concluded that the compilation of the Directory should be completed and a new draft should be circulated to the national focal points in about six months time for their final compilation. The information to be included should cover name, affiliation, communication information (facsimile, telephone, telex, etc.), complete address and field stations. Member States were urged to nominate national focal points and inform the Chairman and the Secretariat about the nominations.**

8.2 MEDIUM-TERM PROGRAMME AND INTERSESSIONAL WORK PLAN

90 The Secretary IOC recalled the development of the Unesco Third Medium-Term Plan, the contribution from IOC and the related discussions and decisions of the Fifteenth Session of the IOC Assembly (Document IOC/SC-WESTPAC-I/2, section 8, and SC/MD/91, section 9.1).

91 The Chairman referred to the outcome of the Scientific Seminar preceding the Session, to the Draft Proposal for a Medium-Term Plan and Intersessional Workplan for WESTPAC Programme (Document IOC/SC-WESTPAC-I/9

prov.), and invited the Sub-Commission to complete a Medium-Term Programme on the basis of the deliberations under other Agenda Items, in particular 6, 7 and 9. In order to facilitate this work he suggested that the Session divide into three sessional working groups, charged with preparing the plan for three relevant groups of projects, mainly covering living resources and marine pollution (Group 1), ocean dynamics and climate related matters (Group 2) and mapping (Group 3). This proposal was accepted by the Sub-Commission. The working groups were requested to consider the long-term objectives and the specific plan for the coming biennium separately.

92 The reports of the sessional working groups were presented and reviewed in plenary. The final reports are presented in Annex VI together with a composite table for the WESTPAC projects.

93 The Sub-Commission endorsed the programme of nine projects as WESTPAC projects and recommended its implementation in accordance with the action plans for the projects, taking into account available resources. In the subsequent discussion it was agreed that the projects most likely to yield timely significant results should be supported initially so as to ensure that results would be available for the second session of the Sub-Commission. It was also agreed that activities scheduled at the end of a biennium could be transferred to the subsequent biennium in cases of shortage of funds. The Sub-Commission noted that the Chairman should receive an annual report from Programme Co-ordinators and Project Leaders concerning the progress of programme implementation.

94 The Sub-Commission stressed that appropriate interfacing and co-ordination with relevant global programmes must be ensured. One such case concerns the Musselwatch Project. Support for that project could also be obtained through on-going national activities, e.g., in Thailand, Indonesia and China, as well as possibly from the global IOC-UNEP Musselwatch Project. It was agreed that the WESTPAC Project would form part of the global project as appropriate.

95 The need to ensure proper interaction between relevant projects was stressed, as also indicated through the sessional working groups. The Sub-Commission adopted Recommendation SC-WESTPAC-I.2.

9. FUNDING AND OTHER RESOURCE REQUIREMENTS

9.1 IOC CORE FUNDING

96 The Secretary IOC referred to Section 9 of the Annotated Agenda (Document IOC/SC-WESTPAC-I/2), the adoption by the IOC Assembly at its Fifteenth Session of Resolution XV-11, concerning the IOC Programme of Work and Budget for 1990-1991 (Document IOC-XV/8 Annex 7, also distributed at this Session) and the subsequent deliberations of the Twenty-Fifth General Conference of Unesco, which resulted in the loss of the budgetary supplementation which had been proposed by the Director-General.

97 The Secretary IOC then explained that funds available for the implementation of the WESTPAC Programme comprised of contributions from the Unesco Regular Programme funds and funds from the IOC Trust Fund. He

specifically drew to the attention of the Sub-Commission its responsibility to inform the IOC Executive Council at its Twenty-Third Session (Paris, 7-14 March 1990) of any adjustments that may be required to funds provided to support the activities during 1990-1991. He explained that the identification of the funding with various IOC global programmes in Document IOC-XV/8 Annex 7, Table 2 was merely a notional allocation provided as guidance.

98 The Secretary also noted that the funds provided through IOC should be regarded as seed money in view of the fact that IOC is not an agency expected to fund programmes and that its available funds cannot be expected to cover the full cost of project implementation. The Secretary also remarked that the formulation of long-term objectives and an action plan (or comprehensive programme) for the coming two to six years by the Sub-Commission ought to greatly facilitate obtaining additional support.

99 The Sub-Commission noted that the provision of adequate resources is a serious problem, and urged Unesco to recognize the unique nature of IOC and to provide additional funds. As the Sub-Commission for the Western Pacific has only just been established, it is appropriate for IOC to increase its allocation to WESTPAC. The amounts required are set out in the future programme of work of the Sub-Commission (Annex VI). The Sub-Commission accordingly requested the Secretary to try to locate additional funds within the IOC and stimulate further contributions from elsewhere to the WESTPAC activities.

100 Several Delegations pointed out that their countries make significant contributions to several global programmes especially, TOGA, WOCE and the emerging JGOFS, and that they also consider these as contributions to IOC and WESTPAC.

9.2 MEMBER STATES' CONTRIBUTIONS

101 The Chairman recalled that the Fifteenth Session of the IOC Assembly "recognized that the Regional Secretariat for WESTPAC will need additional funding for its proper functioning, as well as for its programme implementation. Therefore, it urged Member States of the Commission to make voluntary contributions to the IOC Trust Fund which is earmarked for support of the Sub-Commission and its Secretariat, or to contribute under the VCP and/or to provide other forms of support in kind for their activities" (Document SC/MD/91, para. 219). He noted the very considerable support identified by Member States for the provision of the Regional Secretariat.

102 The Delegate of Australia advised the Sub-Commission of his government's decision to provide a direct contribution to the Trust Fund of US\$15,000 for each of the next three years in support of WESTPAC project activities. He also called on Member States to explore the possibility of making such financial contributions which would afford the Secretariat flexibility in its operations.

103 The Sub-Commission expressed its gratitude to the Delegation for its contribution.

104 The Delegation of the People's Republic of China stated their readiness to support the activities of WESTPAC through the holding of seminars and workshops. The Delegation of USSR also expressed the readiness to provide fellowships to study in USSR and a research vessel for organizing an international expedition within the framework of the WESTPAC Programme with participation of scientists from Member States concerned.

105 The Sub-Commission concluded that considerable support appears to be forthcoming and urged Member States to continue and, if possible, to increase their support.

9.3 OTHER EXTRA-BUDGETARY SOURCES

106 The Secretary IOC drew the Sub-Commission's attention to the initiation of sub-regional projects including obtaining the support of UNDP for their implementation (Ref. Document IOC/WESTPAC-V/6). The Sub-Commission took note of this and agreed that the Regional Secretariat should actively pursue the formulation and implementation of such projects, including, as appropriate, making contact with relevant donor agencies.

10. CO-OPERATION WITH OTHER ORGANIZATIONS

107 The Secretary IOC drew to the attention of the Sub-Commission the considerable co-operation with other organizations and programmes which is going on in the WESTPAC region. He explained about the role of IOC as a joint specialized mechanism within the UN system through the Inter-Secretariat Committee on Scientific Programmes Relating to Oceanography (ICSPRO) and the associated agreement (Document IOC/SC-WESTPAC-I/2, Section 10, and IOC/INF-785, pages 17-18). He also referred to relevant discussions and conclusions of the IOC Assembly at its Fifteenth Session (Document SC/MD/91, section 7.2, para. 212 and section 8).

108 The representatives of Unesco/ROSTSEA and WMO made statements (Annex VII) and the Sub-Commission took note of these important expressions of co-operation and support.

109 The Delegations of the People's Republic of China and Malaysia referred to the International Hydrographic Organization (IHO), and especially its East Asia Hydrographic Commission, as an intergovernmental, non-UN organization which should be invited to co-operate in the possible preparation of bathymetric charts for the WESTPAC region. The Secretary IOC referred to the decision by the IOC Assembly at its Fifteenth Session to invite IHO to nominate a full member for each of the IOC Editorial Boards for regional international bathymetric charts, and indicated that co-operation would be sought with IHO accordingly.

- 110 The Delegate of Australia referred to the co-operation with FAO and the International Centre for Living Aquatic Resources Management (ICLARM), and suggested that the Regional Secretariat should liaise with other regional bodies and endeavour to increase the interaction with these bodies whenever appropriate.
- 111 The Delegate of USSR speaking for the Marine Science Committee of the Pacific Science Association (PSA) confirmed the interest of that Committee in co-sponsoring an international WESTPAC Symposium, and suggested that the non-governmental PSA - Marine Science Committee might be used as a mechanism for informing the marine science community in other parts of the Pacific about the activities of WESTPAC. He also mentioned the establishment of a regional Far Eastern Branch of the USSR National Unesco Commission.
- 112 The Delegates of Japan and Republic of Korea referred to the activities of Japan and East China Seas Study (JECSS) which is expanding, and noted the need to co-ordinate WESTPAC project activities with JECSS whenever appropriate.
- 113 The Sub-Commission took due note of the information provided and agreed that it is necessary to co-ordinate its activities with other bodies and programmes, using to the extent possible the Regional Secretariat for this purpose, and furthermore to take into account and work with other existing national and regional programmes as appropriate.

11. ELECTION OF CHAIRMAN AND VICE-CHAIRMAN

- 114 The Chairman explained that, in accordance with the IOC Rules of Procedure, one Chairman and two Vice-Chairmen may be elected as the officers of the Sub-Commission. He therefore invited the Sub-Commission to consider nomination of candidates to the above-mentioned officers.
- 115 For Chairman, the Delegate of Australia proposed that Professor Takahisa Nemoto of Japan be elected so as to continue his service as Chairman of the Sub-Commission which replaced the Regional Committee. This proposal was unanimously supported and Professor Nemoto was elected by acclamation.
- 116 The Delegate of USSR proposed Professor Su Jilan of P.R. China as one of the Vice-Chairmen ; and the Delegate of the Republic of Korea proposed Dr. Charoen Vashrangsi of Thailand as one of the Vice-Chairmen. These proposals were strongly seconded by several Delegations and Professor Su and Dr. Vashrangsi were accordingly elected by acclamation.

12. OTHER MATTERS

- 117 The Delegate of Thailand expressed concern as to distribution of information within WESTPAC Member States. He suggested to continue the publication of the WESTPAC Newsletter from the Chairman's Office with information on progresses of WESTPAC projects.

118 The Chairman, Professor Nemoto, explained that there are two publications which especially serve WESTPAC:

- (i) RNODC Newsletter for WESTPAC mainly provides information on the progress of WESTPAC data management and service activities; and
- (ii) WESTPAC Newsletter from the Chairman's Office provides information on on-going regional and global activities related to marine sciences. Results of scientific meetings are particularly provided by the Newsletter. Up to now 10 Volumes have been published.

119 The Chairman invited Member States to provide the Newsletter relevant information on their national activities.

13. DATE AND PLACE OF NEXT SESSION

120 The Sub-Commission noted the possibility of holding its Second Session at the Regional Secretariat in Bangkok, Thailand, and expressed great appreciation of the alternative offer made by the Delegate of USSR, supported by other Delegates, to host the Session in Vladivostok, USSR, in 1993.

121 The Sub-Commission agreed that the final decision of the date and place of the next Session be made in consultation between the Bureau of the Sub-Commission (consisting of officers of the Sub-Commission with possible inclusion of Co-ordinators) and the Secretary IOC, in light of the establishment and function of the IOC Regional Secretariat, its financial resource base and the development of the programme and activities of the Sub-Commission.

122 The Sub-Commission adopted Recommendation SC-WESTPAC-I.3.

14. ADOPTION OF THE SUMMARY REPORT

123 Having considered the Draft Summary Reports for both the Fifth Session of the Regional Committee and the First Session of the Sub-Commission, the Sub-Commission unanimously adopted them, together with Recommendations.

15. CLOSURE

124 The Secretary expressed great appreciation to all the Delegates, the Rapporteurs, the Chairman and to the People's Republic of China and its Local Organizing Committee for their co-operation in the conduct of the Session. The Chairman expressed his thanks to the participants and all those who have been engaged in the preparation and the conduct of the Session.

125 **The Sub-Commission expressed its appreciation to the host country for the excellent arrangements made for the Session. In particular, it sincerely thanked the Local Organizing Committee, the Chairman, the Rapporteurs, the Secretary IOC and its Secretariat for their work during the preparation and conduct of the Session.**

126 **The Chairman closed the Session at 12.00 hours on 9 February 1990.**

ANNEX I

AGENDA

1. OPENING
2. FORMAL INITIATION OF THE SUB-COMMISSION
3. ADMINISTRATIVE ARRANGEMENTS
 - 3.1 ADOPTION OF THE AGENDA
 - 3.2 DESIGNATION OF RAPPORTEUR FOR THE SESSION
 - 3.3 CONDUCT OF THE SESSION
4. FUNCTIONING OF THE SUB-COMMISSION
 - 4.1 SECRETARIAT SERVICES AND FUNCTIONS
 - 4.2 INTERACTIONS WITH IOC HEADQUARTERS
5. REPORT OF THE LAST SESSION OF THE REGIONAL COMMITTEE FOR WESTPAC
 - 5.1 OUTCOME OF THE SEMINAR PRECEDING WESTPAC-V
 - 5.2 REPORT OF THE FIFTH SESSION OF THE IOC REGIONAL COMMITTEE FOR WESTPAC
6. PROGRAMME OF THE SUB-COMMISSION
 - 6.1 REGIONAL WESTPAC PROJECTS AND ACTIVITIES
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 - 6.2.1 Ocean Dynamics and Components of the World Climate Research Programme and Related Activities
 - 6.2.2 Ocean Services
 - 6.3 NEW PROPOSALS
 - 6.3.1 Ocean Mapping in Western Pacific
 - 6.3.2 Any other Proposal

7. **ENHANCING MARINE SCIENCE CAPABILITIES
IN MEMBER STATES OF THE WESTPAC REGION**
 - 7.1 **TEMA REQUIREMENTS IN SUPPORT OF THE
APPROVED PROGRAMME AND ACTIVITIES**
 - 7.2 **IMPLEMENTATION OF THE UNESCO-IOC COMPREHENSIVE
PLAN FOR A MAJOR ASSISTANCE PROGRAMME TO
ENHANCE THE MARINE SCIENCE CAPABILITIES OF
DEVELOPING COUNTRIES**

8. **FUTURE PROGRAMME OF WORK OF THE SUB-COMMISSION**
 - 8.1 **SPECIFICATION OF PROJECTS AND ACTIVITIES**
 - 8.2 **MEDIUM TERM PROGRAMME AND INTERSESSIONAL WORK PLAN**

9. **FUNDING AND OTHER RESOURCE REQUIREMENTS**
 - 9.1 **IOC CORE FUNDING**
 - 9.2 **MEMBER STATES' CONTRIBUTIONS**
 - 9.3 **OTHER EXTRA-BUDGETARY SOURCES**

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

11. **ELECTION OF CHAIRMAN AND VICE-CHAIRMAN**

12. **ANY OTHER MATTERS**

13. **DATE AND PLACE OF NEXT SESSION**

14. **ADOPTION OF THE SUMMARY REPORT**

15. **CLOSURE**

ANNEX II
RECOMMENDATIONS

Recommendation SC-WESTPAC-I.1
INTERNATIONAL WESTPAC SYMPOSIUM

The IOC Sub-Commission for the Western Pacific,
Having reviewed the progress made in the WESTPAC programme;
Having formulated an implementation plan;
Bearing in mind the need for presentation and exchange of scientific results in an interdisciplinary forum;
Recognizing the success of the IOC Symposium on Marine Science in the Western Pacific: the Indo-Pacific Convergence (Townsville, Australia, 1-6 December 1986);
Recommends that a major international IOC-WESTPAC Marine Science Symposium be organized in 1991 or 1992;
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-I.2
THE SUB-COMMISSION MEDIUM-TERM PLAN, WORK PROGRAMME
AND INTERSESSIONAL PLAN

The IOC Sub-Commission for the Western Pacific,
Having noted the IOC Programme of Work and Budget for 1990-1991 (Document XV/8 Annex 7);
Noting that the IOC programme of work and budget contains components to be funded through the Unesco Regular Programme and contributions to the IOC Trust Fund;
Having reviewed the programme and activities initiated and prioritized by the former Regional Committee for the Western Pacific (WESTPAC);
Recommends that the programme activities identified in Annex VI be carried out intersessionally over the coming three to six years;

Recommends also that the programme identified for the 1994/1995 biennium be considered as indicative and subject to adjustments as needed by the Bureau and by the following session of the Sub-Commission;

Decides that the programme be regarded as constituting an outline for a long-term strategy of the Sub-Commission;

Requests the Bureau in consultation with the Secretary IOC to further elaborate the formulation of a long-term strategy, taking into account the proposals endorsed by the Scientific Seminar (Document IOC/SC-WESTPAC-I/9 prov.).

Recommendation SC-WESTPAC-I.3

DATE 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;

Decides on a three year time-span between its regular sessions;

Resolves further that the arrangements for the Second Session, including the time and place, be decided by consultations between the Bureau and the Secretary IOC, bearing in mind the invitation received to host the session in USSR, and the proposal made to convene the session at the Regional Secretariat.

ANNEX III

ADDRESSES

**A. Address by Mr. Yan Hongmo
Administrator of the State Oceanic Administration
at the Opening of the Session**

Mr. Chairman,
Mr. Secretary,
Distinguished Delegates,
Ladies and Gentlemen,

Today, I am greatly honoured to attend the opening ceremony of the First Session of the IOC Sub-Commission for the Western Pacific. I am asked to represent the State Council of the People's Republic of China to convey warm congratulations to the holding of the Fifth Session of the IOC WESTPAC Regional Committee and the First Session of the Sub-Commission for the Western Pacific, as well as the formal initiation of the Sub-Commission for the Western Pacific.

The formal initiation of the Sub-Commission for the Western Pacific is the result of long co-operation among its Member States and their joint efforts. In the middle of the sixties, Member States conducted the Co-operative Study of the Kuroshio. In the seventies, IOC set up a programme group for the Western Pacific and then it became a regional committee. It played a positive role in promoting and co-ordinating co-operation and development of marine science of Member States in the region. With improving of marine science capabilities of Member States and the strengthening of co-operation in the field of various subjects of marine science among the Member States of the region, the establishing of a Sub-Commission embodies the common wishes (desire) of various Member States of the region and those engaging in marine research.

WESTPAC possesses good conditions for conducting marine science co-operation and has very rich marine living resources and non-living resources, thus making the development and utilization of the ocean, the protection of marine ecosystem and environment and prevention of marine hazards be the common interests of the Member States in the region. Some global abnormal phenomena, such as El Nino and global climatic changes have great impact on various countries of the region, therefore it needs joint efforts of Member States to obtain the expected results. In the WESTPAC region, every country has its own merit. I believe the establishment of the IOC Sub-Commission for the Western Pacific will further improve the co-operation in the region and enhance the ocean science capabilities of Member States in making more contribution to WESTPAC countries.

China is a maritime country in the Western Pacific, in the nineties we will continue our research on marine environmental numerical forecasting and ocean services, mitigation of marine natural disasters, marine environmental monitoring and protection, air-sea interaction, Kuroshio and its investigation, the development of coastal zone and offshore areas, marine aquaculture, the application of remote sensing technology in

the ocean and sea water desalinization and participate actively in international co-operative marine programmes. We wish that through the co-operation and exploration of the participants, a regional programme of the 1990s aiming at developing marine science for WESTPAC can be initiated.

China will continue to maintain its opening to the outside world and its reform and is willing to co-operative actively with Member States in the region to enhance the advancement of marine science and wishes to make a contribution in this regard.

Finally, I wish the session a great success

Thank you.

**B. Address by Mr. Li Debao,
Deputy Governor of Zhejiang Province
at the Opening of the Session**

Mr. Chairman,
Mr. Secretary
Distinguished Delegates,
Ladies and Gentlemen,

It is just at the end of our traditional New Year Holiday that the First Session of the IOC Sub-Commission for the Western Pacific opens today beside the beautiful lake of Hangzhou City. It is the first time for us to hold an IOC meeting in Hangzhou which is a great honour for us. Here, please allow me, on behalf of Zhejiang Provincial Government and Hangzhou Municipal Government, to express our cordial congratulations and warm welcome to the Delegates present at this meeting.

The oceans, as a new source of resource for food, minerals and energy, have received much more attention by the governments of various countries. At the same time, many countries have laid stress on the protection of marine environments. International co-operation in marine science appears to be very important as for its nature of global scale. The convening of this IOC/WESTPAC Session has just proved the importance of the joint efforts.

The Zhejiang Provincial Government always pays great attention to the oceans and seas. Zhejiang is a coastal province with a large population of fishermen who live on marine fishing and aquaculture and has important trading ports and shipping systems, as well as a great number of coastal industries. Thus, the exploration and utilization of oceans and seas is not only a key sector for the Province's economy, but also an important window for developing foreign relations between China and other countries of the world. I believe that this intergovernmental WESTPAC Session of marine science will increase our understanding of other countries and strengthen the co-operation among WESTPAC countries, and will also lay much more stress on the oceans and seas and therefore do a better job in marine undertakings.

There is an old Chinese saying which wins universal praise. It goes like this "in heaven, there is a paradise, on earth there is Suzhou and Hangzhou".

I hope that all the Delegates will have the chance to see the beautiful scenery and historical relics of Hangzhou City during their stay here.

Finally, I would like to congratulate beforehand a successful meeting and a happy stay and good health to all the Delegates.

ANNEX IV

TERMS OF REFERENCE OF THE
SUB-COMMISSION FOR THE WESTERN PACIFIC

The Sub-Commission for the Western Pacific shall endeavour to:

- (i) define regional problems, the solution of which calls for international co-operation, and promote, develop and co-ordinate the required marine scientific research programmes and related activities;
- (ii) implement and co-ordinate the regional components of global marine scientific research programmes and activities of the Commission;
- (iii) promote the development and use, at the regional level, of ocean services and related supporting activities, co-ordinated or maintained by the Commission;
- (iv) facilitate the exchange of scientific data and information and the transfer of knowledge resulting from marine scientific research, especially to developing countries in the region;
- (v) assist with the identification of training, education and mutual assistance needs in the region, particularly those relating to the programmes of the Sub-Commission, and promote the required TEMA activities;
- (vi) make recommendations to the governing bodies of the Commission on policy matters, and submit proposals on the budgetary and other forms of support required for the programme of work of the Sub-Commission;
- (vii) co-operate with other subsidiary bodies of the Commission on technical matters of common interest;
- (viii) provide general guidance and serve as a mechanism for Member States for the formulation, evaluation and follow-up of proposals for extra-budgetary projects aimed at strengthening national and regional capabilities in marine scientific research and the establishment of common institutions, services and facilities (e.g. centres, networks, etc.);
- (ix) co-operate with the regional subsidiary bodies of the UN organizations members of ICSPRO and of other UN organizations as well as regional bodies collaborating with the Commission;
- (x) when appropriate:
 - (a) form Task Teams to carry out specific assignments,
 - (b) establish Groups of Experts, and
 - (c) organize technical meetings (e.g., workshops), provided costs fall within the budget allocated to them or extrabudgetary funding is available for that purpose; otherwise recommendations to that effect shall be submitted to the governing bodies of the Commission for their consideration and approval.

Membership: Membership shall be open to all interested Member States of the Commission willing to participate actively in the work of the regional Sub-Commission.

ANNEX V

SUMMARY OF THE WESTPAC SCIENTIFIC SEMINAR

1. INTRODUCTION

The WESTPAC Scientific Seminar was convened in Hangzhou, People's Republic of China, at 10.00 am on 2 February 1990, preceding the Fifth and final Session of the IOC Regional Committee (WESTPAC-V) and the First Session of the IOC Sub-Commission for the Western Pacific (SC-WESTPAC-I). The Seminar was attended by twenty seven scientists and experts from inside and outside of the region. The programme of the seminar and the list of participants appear in Appendices I and III.

In his keynote address Professor Nemoto, Chairman of the IOC Regional Committee for the Western Pacific programme briefly reviewed the history and development of WESTPAC activities, expressed his hope that fruitful discussions take place during the two days. Professor Su pointed out the importance of both regional and global ocean studies. He stated that a suitably designed programme of regional interest would provide significant inputs to global studies, since a global study is composed of an assembly of co-ordinated regional studies. Academician Ilyichev presented to the participants an overall view of the ocean research activities carried out by the USSR Academy of Sciences and other institutions in the country. He finally stressed the willingness of the Academy and his country to continue and further develop co-operation with WESTPAC.

The Seminar carried out a scientific review of each of the nine research projects in four programme areas under WESTPAC, including the state of their implementation and their related oceanographic programmes and activities carried out at national and international levels. It also considered recent advances in ocean science that may have an influence on future WESTPAC programmes. In considering future activities, the Draft Proposal for a Medium-Term Plan and Intercessional Work Plan for WESTPAC (Doc. IOC/SC-WESTPAC-I/9 prov.) was presented by programme co-ordinators, project leaders, or by their representatives, followed by presentations and discussions in each programme area.

2. CONSIDERATIONS OF PROJECT

2.1. OCEAN SCIENCE IN RELATION TO LIVING RESOURCE (OSLR)

Dr. J. T. Baker presented, on behalf of the Programme Co-ordinator, details of the workshops that had been conducted since 1987 and presented proposed project activities for the 1990-1995 Medium-Term Plan.

2.1.1 Toxic and Anoxic Phenomena Associated with Algal Blooms in the WESTPAC Region

It was suggested that further attention should be paid to defining the type of instrumentation and associated specifications that were required for the qualitative and quantitative chemical analysis of bloom associated bio-toxins. Clearly defined procedures for extraction, purification and identification of the toxins should also be defined so that regional laboratories could work on a common methodology.

2.1.2 Recruitment of Penaeid Prawns in the Indo-Western Pacific Region.

Dr. L. N. Bocharov reported the comprehensive oceanographic studies related to some commercially important fish stocks and the ecosystem structure in the Kuroshio area and North Western Pacific carried out by the Soviet Union Pacific Institute of Fisheries and Oceanography. Professor J. Y. Liu introduced the present status of the study and exploitation of living resources in the China Seas and the advances and achievements of their experiments on shrimp stock enhancement, resulting in increased resources and production.

Their presentations have demonstrated that one of the aims of these studies is to achieve better understanding of the processes of recruitment of living resources and the influence of the change of oceanographic environments on them (ecosystem and resources). The activities carried out have identified the core problems: the understanding and prediction of these changes.

In the discussion, participants from different countries expressed their interest in the proposed Medium-Term Plan and suggested involvement as much as possible of scientists from different countries in the Western Pacific region, particularly those who have carried out the same kind of studies. The importance of multidisciplinary studies in red tides and pollution problems should also be stressed, as well as the ocean dynamics which may influence the recruitment of living resources. The training course for computer programming and data analysis, as well as laboratory work for identification of larval stages of different species, are very important and should be upgraded.

The following suggestions were made by the participants:

- (i) There is a need to understand the reason for change in species composition in fisheries catches and the whole ecosystems of the WESTPAC region (which have been mentioned in the presentations of Profs. Liu and Bocharov);
- (ii) Although Penaeid Shrimps are a relatively small proportion of the total fishery, they are highly priced. If it were not for the released shrimp, the wild "catch" would be very small. Additional studies are necessary to provide a basis for improving the survival rate of the released shrimps;

- (iii) In a future project it would be wise to consider whether a project for specific commercial fish should be introduced, similar to that for Penaeid Shrimps.

2.2 MARINE POLLUTION RESEARCH AND MONITORING (MPRM) IN THE WESTERN PACIFIC

Due to the absence of the Programme Co-ordinator, Dr. Manuwadi Hungspreugs was invited to chair the session and introduced both projects i.e., Assessment of River Inputs to the Seas in the WESTPAC Region and Monitoring of Heavy Metals and Organochlorine Pesticides using the Musselwatch Approach, which have been given further refinement after being approved by WESTPAC-IV in 1987.

A River Input Workshop (GEMSI/IOC and WESTPAC) in Bangkok (individual scientists' effort through their national sponsorship) has been completed. Musselwatch type activities also have been going on in some countries. For example, activities of this type has been carried out since 1975, in Thailand.

A review of the state of marine pollution in the East Asian Seas Region was commissioned by FAO/IOC under GESAMP Group No.24 and is due out soon. Part of the review already appeared in AMBIO Special Edition on East Asian Seas in 1988. However, some national data were not accessible to the reviewers because they were only published locally.

A Draft Proposal for a Medium-Term Plan of both projects were briefly presented.

Professor Zhou Jiayi talked on marine pollution research and monitoring in China and Dr. Romimohtarto gave a brief talk on marine pollution problems in Indonesia. Dr. Harger informed the meeting on a UNDP/Unesco implemented project on Marine Pollution Monitoring in Indonesia, which has considerably helped to improve the country's infrastructure and laboratory facilities. The project had analysed green mussels from Jakarta Bay which showed high levels of PCB's and other organic pollutants.

Dr. Henocque informed the session of FAO/NACA (Network of Aquaculture Centres in Asia). A workshop with funding from the French Government was held in October 1989 in France on the sanitary control and commercialization of molluscs. About twenty participants from twelve countries and regions, most of the WESTPAC region (D.P.R.Korea, R. Korea, P.R. China, Hong Kong, Vietnam, Thailand, Malaysia, Indonesia, Philippines), attended the workshop with participation also from FAO and European experts (Netherlands, Spain, Italy, France). From the recommendations which have been finally made, FAO is now considering with regional organizations the implementation of a co-operative programme which could receive the support of the EEC. Since there are some common concerns between this project and the Musselwatch Approach to marine pollution research and monitoring within WESTPAC, it is proposed to consider the interactions between these two programmes.

Thus it was agreed that this matter be put forward to WESTPAC-V as a Recommendation of extension of the Musselwatch Programme to include, not only heavy metals and organochlorines, but also sanitary aspects of commercial bivalves as mentioned above.

The following recommendations were made:

1. The Musselwatch Programme should include the sanitary aspect of commercial bivalves: this can be done in co-operation with the scientists who participated in the FAO/NACA workshop (Oct. 1989 meeting);
2. A symposium on marine bio-geochemistry should be organized in the near future in order to stimulate and facilitate interactions in these important environmental studies;
3. Co-operation should occur between WESTPAC MPRM and other interdisciplinary programmes.
4. The Dalian ad hoc meeting in April 1990 should include an expert on flux studies.

The following comments/recommendations were made concerning the Draft Proposal for a Medium-Term Plan on Musselwatch Project:

- (i) check on the sequence of activities proposed: A training workshop and intercalibration exercise precede the monitoring phase. The symposium should then follow the monitoring activities;
- (ii) suggestions were made by the Unesco Regional Office concerning the Joint Symposium (as mentioned on p.22 of draft Medium Plan) and its timing. "Joint Symposium on Possible Bloom triggering events induced by pollutants such as heavy metals, toxic organic inputs and enrichment processes" was the suggested title. This will be held with the Working Group on Toxic and Anoxic Phenomena associated with algal blooms. The suggested time for the symposium is late 1992 or mid. 1993, as the most important requirement is to gather extensive data and evidence before operating such a symposium, and there are probably not enough data to run it in 1991;
- (iii) a close look of the 3-year U.S. Musselwatch Study results should be made in conjunction with the development of this Project. Indonesia would also like to be involved in the Musselwatch Project under the context of the existing UNDP/Unesco Project, with, preferably WESTPAC providing additional funds for executing routine sample analysis using Indonesia's own modern equipment and paying special attention to organochlorine content of mussels. Indonesia also agrees with the microbiological and sanitary examination of mussels.

Concerning the assessment of the River Input Project Proposal, experts from the People's Republic of China expressed their overall support and suggested the following:

- (i) The assessment of river input to the sea not only relates to the marine environment, but also to the global material transport and circulation. So, consideration should be given as to the possibility of carrying out this project with other world-wide ocean research plans such as JGOFS, and others, in order to get a better understanding of the river input.
- (ii) The study of the river input, and real flux of the pollutant, nutrients and other materials from land into the sea, is a very complex and difficult problem. This is an interdisciplinary study which is associated with the field of chemistry, dynamics, biology, geology and particularly with physical oceanography. Therefore, wider participation of not only marine chemists but also other marine scientists should be attained.
- (iii) Due attention should be paid to the methodology prior to carrying out the project. Intercalibration should be carried out between laboratories for sampling, analysis and calculation of the fluxes in order to ensure that the results from the different studies are comparable.

2.3 OCEAN DYNAMICS AND CLIMATE

During the discussion of the programme, the participants expressed their interest in the Project on a Co-operative Study of the Continental Shelf Circulation within the proposed Medium-Term Plan. The participants developed a draft proposal for the Medium-Term Plan for two other projects, namely Ocean Dynamics in the Northwest Pacific and the Banding of Porites Corals as a Component of Climate Studies.

2.3.1 Continental Shelf Circulation in the Western Pacific

The participants endorsed the Draft Proposal for a Medium-Term Plan as provided in Document IOC/SC-WESTPAC-I/9 prov. However, it was recommended that the objectives of the project include identification of major topographical features which influence circulations.

The participants recommended to the Scientific Steering Group (SSG) that:

- (i) specific attention be given to the continental shelf circulation of the South Asian region (e.g., Thailand, Malaysia, Indonesia);
- (ii) some emphasis be given to a better understanding of the Kuroshio current, the methodology to be used as an example for studying other major currents in the future;

- (iii) the SSG, in developing specific projects, illustrate how they integrate with, or complement, other national and international programmes;
- (iv) the SSG note the willingness of the First Institute of Oceanography, Qingdao, People's Republic of China, to offer training courses on analytical and numerical modelling.

2.3.2 Ocean Dynamics in the North-West Pacific

An ad hoc Group meeting on Ocean Dynamics in the North West Pacific was organized during the seminar to review relevant studies and to prepare a draft proposal for a Medium-Term Plan.

In the absence of the Project Leader, the ad hoc group meeting was chaired by Professor J. Baker from Australia, with the participation of scientists from the USSR, China, Republic of Korea and France. The Draft Proposal was presented to the Sub-Commission (Document IOC/SC-WESTPAC-I/9 prov.Add.)

2.3.3 Project on Banding of Porites Corals as a Component of Ocean Climate Studies

The Draft proposal for the Medium-Term Plan for this project was prepared and presented to the Seminar by the Project Leader Professor Baker. The participants endorsed the proposal which was accordingly presented to the Sub-Commission in Document IOC/SC-WESTPAC-I/9 prov. Add. for consideration.

2.4 OCEAN SCIENCE IN RELATION TO NON-LIVING RESOURCES (OSNLR) IN THE WESTERN PACIFIC

The Palaeogeographic Map and Margins of Active Plates Projects were discussed during the seminar.

Prof. Kagami introduced briefly their historical background and the present trend on the draft Medium-Term Plan. The Palaeogeographic Map and Margins of Active Plates projects were endorsed at WESTPAC-IV in Bangkok in 1987.

An IOC-WESTPAC symposium and workshop were held in Shanghai during the first International Conference on Asian Marine Geology in September 1988, during which the projects were focussed on (a) two recent time slices (18 k and 125 k years) for Palaeogeographic Map project and (b) boundary processes along Margin of Active Plates.

The IOC Guiding Group Meeting on OSNLR was held at Bordeaux in February 1989 and recognized this line of activity for the project and recommended that both projects were potentially regional projects for immediate implementation.

Then Dr. Xu Dongyu introduced progress in marine mineral resources exploration in China, including offshore oil and gas, littoral placer

deposits and deep-sea mineral resources. Dr. Vassiliev mentioned the geological mapping project and seamount sediments' studies conducted by USSR institutions in the Western Pacific. Dr. Suparka mentioned microplate is important for neotectonic study to mitigate earthquake and eruption hazards. Prof. Peng summarized the activity of Chinese scientists in the East China Sea, South China Sea and inner seas.

The Session Chairman, Professor Kagami, recalled that the proposed Palaeogeographic Map project includes Data Maps and Structural Element Maps and that the Microplate Project has a Tectonic Map. It was suggested that further consideration should be given to possible inclusion of proposed geological maps in on-going projects. Also, he recommended to have a joint meeting between the two projects, concerning a possible united map project of structural element maps of palaeogeographic map project and tectonic map of microplate tectonic project.

3. TRAINING, EDUCATION AND MUTUAL ASSISTANCE (TEMA)

The Seminar also reviewed and considered activities of Training, Education and Mutual Assistance (TEMA) for the WESTPAC region. The Seminar stressed the need of increased financial resources. The participants reiterated the decision by WESTPAC-II that each project should include training activities as an essential component. It was also noted that levels, as well as duration of training courses, deserve careful consideration.

4. RECOMMENDATION

The Seminar adopted the Recommendation (Appendix II).

5. CLOSURE

Professor Nemoto congratulated all the participants on the success of the Seminar and thanked the Local Organizing Committee for the generous hospitality.

The Seminar adjourned at 18.00 hours on 3 February 1990.

APPENDIX 1

PROGRAMME OF WESTPAC SCIENTIFIC SEMINAR

FIRST DAY - 2 February 1990

OPENING

- Address Mr. Yukio Kiuchi, on
behalf of Secretary IOC

KEYNOTE ADDRESSES

- Programme and Activities of WESTPAC Prof. T. Nemoto
- Regional Programmes & Regional Components Prof. Jilan Su
of Global Programme
- Soviet WESTPAC Programme Studies: Academician V. I. Ilyichev
Prospects and Results

SESSION I OCEAN SCIENCE IN RELATION TO LIVING RESOURCES (OSLR)
IN THE WESTERN PACIFIC

- Review and Proposed Medium-Term Plan Prof. J. Baker
- Living Resources of China Seas and Prof. Ruiyu Liu
their Enhancement
- Related Presentations and Discussions

SESSION 2 MARINE POLLUTION RESEARCH AND MONITORING (MPRM)
IN THE WESTERN PACIFIC

- Review and Proposed Medium-Term Plan Dr. Manuwadi Hungspreugs
- Brief introduction on Marine Pollution Prof. Jia-yi Zhou
Research and Monitoring in China
- Related Presentations and Discussions

SESSION 3 OCEAN DYNAMICS AND CLIMATE (ODC) IN THE WESTERN PACIFIC

- Review and Proposed Medium-Term Plan Prof. T. Nemoto
- Project on Banding of Porites Corals Prof. J. Baker
- Project on Continental Shelf Circulation Mr. Yihang Jiang
in the Western Pacific
- International Variations of the Upper Prof. Pu Shuzhen
Western Tropical Pacific Ocean Cir-
culation and its Effects on the East
Asia Climate
- Related Presentations and Discussions

SECOND DAY - 3 February 1990

**SESSION 4 OCEAN SCIENCE IN RELATION TO NON-LIVING RESOURCES (OSNLR)
IN THE WESTERN PACIFIC**

- Review and Proposed Medium-Term Plan Prof. H. Kagami
- Research and Exploration of Marine Mineral Dr. Dongyu Xu
 Resources in China
- Related Presentations and Discussions

**SESSION 5 DISCUSSION ON PROPOSALS FOR THE MEDIUM-TERM PLAN:
In the Light of Recent Trends and Advances in Ocean
Science and Services**

SESSION 6 TRAINING, EDUCATION AND MUTUAL ASSISTANCE (TEMA)

CLOSURE

APPENDIX 2

**RECOMMENDATIONS OF THE
WESTPAC SCIENTIFIC SEMINAR TO THE IOC SUB-COMMISSION
FOR THE WESTERN PACIFIC**

The WESTPAC Scientific Seminar,

Having carried out a scientific review of the nine projects in the four programme areas adopted by the Fourth Session of the IOC Regional Committee for the Western Pacific;

Noting progress of global programmes being undertaken in the field of oceanography;

Being informed of oceanographic activities carried out at national level and results thereof;

Recommends that the nine projects continue and further develop their activities as regional WESTPAC projects;

Endorses as a guiding outline, the draft proposal for a Medium-Term Plan and Intersessional Work Plan for WESTPAC Programmes as provided in Document IOC/SC-WESTPAC-I/9 prov. and its component on the project on "Banding of Porites Corals as a Component of Climate Studies" and on "Ocean Dynamics in the Northwest Pacific" as presented to the Seminar;

Recommends that a multi- and interdisciplinary approach be pursued in the implementation of the WESTPAC programme;

Recommends further that due attention be given to IOC global programmes, notably in the fields of ocean dynamics and climate and marine pollution research and monitoring;

Strongly recommends that a WESTPAC symposium be organized with the participation of a range of scientists to obtain an in-depth study of ocean sciences in the region;

Also recommends that the IOC Sub-Commission for the Western Pacific further consider the possibility of identifying new proposals suitable for the work of the Sub-Commission.

APPENDIX 3

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ANNEX VI

REPORT OF SESSIONAL WORKING GROUPS

**A Proposal for a Medium-Term Programme
and Intersessional Work Plan for WESTPAC**

1. SESSIONAL GROUP ON OCEAN SCIENCE IN RELATION TO LIVING RESOURCES (OSLR) AND MARINE POLLUTION RESEARCH AND MONITORING (MPRM)

1.1 TOXIC AND ANOXIC PHENOMENA ASSOCIATED WITH ALGAL BLOOMS

Biennial	Activities	Required Budget US\$
1990-91	- Establish a network of agencies for routine monitoring in three sub-regions. For this purpose publication of a newsletter.	5,000
	- Workshop to establish preliminary protocol for monitoring and for toxin analysis (including instrumentation requirements) and micronutrient analysis protocols.	20,000
1992-93	- Joint regional workshop/symposium with marine pollution monitoring and river inputs groups: "Joint Symposium on Possible Bloom Triggering Events Induced by Pollutants such as Heavy Metals, Organic Inputs and Eutrophication Processes".	20,000
1994-95	- Continuation of monitoring	
	- Global International Symposium to compare results in co-operation with IOC Group of Experts related to marine research and monitoring	20,000
Total 1990-1995		65,000

1.2 RECRUITMENT OF PENAEID PRAWNS IN THE INDO-WESTERN PACIFIC

Biennial	Activities	Required Budget US\$
1990-91	- Visit by Project Leader to all study sites. Review requirements and check critical equipment. (1990)	5,000
	- Training course on larval/post larval identification (third quarter 1990)	17,000

Biennial	Activities	Required Budget US\$
	- Equipment procurement and deployment (\$250,000.00 extrabudgetary)	
	- Visits by technical experts to participating institutions for data collection, management and on-site training in larval identification or data analysis/modelling (first quarter 1991)	5,000
	- Workshop with participation of national co- ordinators	19,000
	Total 1990-1991	46,000
1992-93	- Continue data and scientist exchange	
	(i) Workshop on computer programming and analysis	17,000
	(ii) training workshop in laboratory and field techniques (third quarter of 1992)	
	- Joint workshop and seminar on Recruitment Productivity and Ocean Dynamics, in co- operation with the project on river inputs and on continental shelf circulation	13,000
	Total 1992-1993	30,000
1994-95	- International Symposium on Penaeid Prawn Recruitment	20,000
Total 1990-1995		95,000

Note: This project is a joint IOC/FAO initiative. For its activities, an additional 50% of the above-mentioned budget is envisaged from FAO, i.e., US\$23,000 for 1990-1991 and US\$15,000 for 1992-1993.

1.3. MONITORING HEAVY METALS AND ORGANOCHLORINE PESTICIDES USING MUSSELWATCH APPROACH

Biennial	Activities	Required Budget US\$
1990-91	- Intercalibration exercise (1990, Chulalongkorn University, Bangkok, Thailand)	5,000
	- Continuation of study and monitoring	
	- Seminar Workshop on intercalibration on Mussel-watch	20,000
1992-93	- Joint regional symposium with groups for projects on toxic/anoxic phenomena and on river inputs on biological effects of pollutants and assessment of sanitation requirements for mussels (1992)	20,000
	- Continuation of study and monitoring	
1994-95	- Continuation of study and monitoring	
	- Joint Global Symposium with toxic and anoxic group	35,000
Total 1990-1995		80,000

1.4 ASSESSMENT OF RIVER INPUTS TO THE SEA IN THE WESTPAC REGION

Biennial	Activities	Required Budget US\$
1990-91	- Expert consultation	9,000
	- Workshop on Comparative River Flux Methodologies and Intercalibration Exercise	25,000
	- Continuation of monitoring	

Biennial	Activities	Required Budget US\$
1992-93	- Joint symposium with toxic/anoxic and mussel-watch groups	20,000
1994-95	- Activities and budgetary requirements not yet identified	
Total 1990-1995		54,000

2. **SESSIONAL GROUP ON OCEAN DYNAMICS AND CLIMATE (ODG) AND RELATED MATTERS**

2.1 **BANDING OF PORITES CORALS AS A COMPONENT OF OCEAN CLIMATE STUDIES**

Biennial	Activities	Required Budget US\$
1990-91	(a) Establish survey to select corals at sites suitable for specific records e.g., river flow;	
	(b) Initiate formal training programmes, first at A.I.M.S., to cover theory, sampling strategies, field procedures, instrument requirements, methods of storing coral cores. (Ideally these should be M.Sc. or Ph.D Programmes);	
	(c) Standardize methods of data analysis, storage and access, with central repository at A.I.M.S;	
	(d) Instrumentation in developing countries. (external funds)	
Total 1990-1991		51,000

1992-93	Continue (a), (b), (c) above	
	(e) Construct and instal specialized equipment in developing countries; (external funds)	
	(f) Train in remote sensing techniques to locate suitable corals;	

Biennial	Activities	Required Budget US\$
	(g) In 1993 conduct Mid-Term Workshop to allow comparison of results from different countries and to investigate indications of additional signals held in corals;	
	(h) Feed results into other regional and global indicators of past climate events;	
	Total 1992-1993	82,000
1994-95	Continue (h) above	
	(i) Symposium to review and compare results across the regions;	
	(j) Extension of studies to use corals as indicators of specific past local or regional events.	
	Total 1994-1995	105,000
Total 1990-1995		238,000

Note 1. The activities listed above are those considered at the WESTPAC Scientific Seminar 2-3 February 1990 and presented to the Sub-Commission in Document IOC/SC-WESTPAC-1/9 prov. Add.

Note 2. The objectives of this project to train scientists from Member States and to develop a regional data base, were supported and involvement was requested by Delegates of the People's Republic of China, as well as the countries already participating.

Note 3. A revised budget is proposed for the period 1990-1995. If the necessary level of support is obtained, IOC's financial commitment to the Project may be expected not to be required after 1995. The activity itself may be expected to continue in relevant Member States.

2.2 OCEAN DYNAMICS IN THE NORTHWEST PACIFIC

Biennial	Activities	Required Budget US\$
1990-91	<ul style="list-style-type: none">- Collect all accessible historical information and information from existing WOCE, TOGA and JGOFS studies to establish a reference data base- Conduct a workshop to: (a) discuss experimental programmes and to decide on mathematical modelling procedures to improve diagnostic capabilities on water dynamics for the future; (b) establish intercalibration procedures, training courses, etc.- Begin a programme to intensify and systematically apply vessel deployment, measurement devices, access to satellite information, etc. and to plan for such activities for all years of the Medium-Term Plan 1990-1995	
Total 1990-1991 (as seed money for SSG):		10,000
1992-93	<ul style="list-style-type: none">- A workshop to assess progress against objectives and to modify the programme as and where necessary <p>(budgetary requirements not yet identified)</p>	
1994-95	<ul style="list-style-type: none">- A workshop at the conclusion of the project to review and summarize the results. Preparation of a report and development of recommendations arising from the project to the Sub-Commission <p>(budgetary requirements not yet identified)</p>	
Total 1990-1995		10,000

Note 1. The activities listed above were drafted during the Scientific Seminar 2-3 February 1990 and presented to the Sub-Commission in Document IOC/SC-WESTPAC-I/prov. Add.

Note 2. It is recommended that the draft objectives and timetable be communicated to the Project Leader to develop a detailed proposal for consideration by the Bureau. The Project outlines should indicate its relevance to global programmes and indicate ways to ensure close interaction in such programmes. Seed money, not less

than US\$10,000, should be provided by IOC, or any other sources, to facilitate a meeting of a group of experts to advance their topic to the detailed proposal stage.

Note 3. As this project is slightly slow in development detail, IOC support may not be significant until late 1991. However, the project has strong Member State support, and requires support from the incoming IOC Regional Secretariat in Bangkok. Interest in the project is expected to be refined beyond the Medium Term i.e., beyond 1995.

2.3 CONTINENTAL SHELF CIRCULATION IN THE WESTERN PACIFIC

Biennial	Activities	Required Budget US\$
1990-91	<ul style="list-style-type: none"> - The Scientific Steering Group (SSG) (a Task Team for the project) meeting will be held to discuss regional and sub-regional projects and the strategies of implementation of the projects, and identify the necessary needs of training, education and mutual assistance. (1990) - Training course for equipment handling and data analysis for the implementation of the regional and sub-regional projects. (1990) - Preparing and distribution of the finalized project plans by SSG to the Member States which are interested in the projects. (1990) - Analysis, exchange and synthesis of historical data, identifying the gaps in data and knowledge. (1991) - Organization of a training course on modelling techniques for the implementation of the projects. (1991) - Preparation of the draft Guidelines for field observations and measurements by the SSG and invited experts; distribution of draft to Member States for comment before finalizing guidelines (by SSG). (1991) - Development of preliminary modelling based upon historical data. (1991) - 1990-1991 Total (as seed money for SSG): 	10,000

Biennial	Activities	Required Budget US\$
1992-93	<ul style="list-style-type: none"> - Conducting the joint field exercises based on the existing knowledge with the collection of new data and the synthesis of these data with efforts in modelling. The field observation will be carried out under the Guideline for the project. (1992) - Holding of academic seminars or workshops to exchange experiences, research results, etc., and to discuss and modify, if necessary, the programme of the project. (1992) - Continuation of field observations, measurements and data analysis. (1993) - Development of comprehensive models based on field and historical data. (1993) <p>(Budgetary requirements not yet identified)</p>	
1994-95	<ul style="list-style-type: none"> - Verification of the models and application of the models for forecasting and practical needs (e.g., pollutant and larval transport, etc). (1994) - International workshop for summarizing the the results obtained from the project and exchange of knowledge. (1994) - Conclusion and summary of the project. (1995) <p>(Budgetary requirements not yet identified)</p>	
Total 1990-1995		10,000

Note 1. The activities listed above are based on those presented to the Sub-Commission in Document IOC/SC-WESTPAC-I/9 prov.

Note 2. IOC should note the enhanced importance of understanding continental shelf circulation, since the WESTPAC-IV in 1987, and the need to encourage Member States to participate in the regional studies in accordance with the objectives.

- Note 3. Consistent with the recommendation of IOC Workshop Report No. 63 and of the Scientific Meeting of 2-3 February 1990, seed money, not less than US\$10,000, should be available through IOC or other sources to allow the Scientific Steering Group to develop a firm proposal detailing work programme and budget requirements for the period 1991-1995, and an estimate of requirements in the longer term.
- Note 4. The proposed SSG should consider the result of the proposal and have the Bureau, or other appropriate mechanism, to approve a programme of activity (the action to be given retrospective approval at the next Session of WESTPAC).

- 2.4 SOME REGIONAL COMPONENTS OF GLOBAL PROGRAMMES: Ocean Dynamics and Components of the World Climate Research Programme and Related Science and Services Activities
- (i) TOGA - WESTPAC should strongly recommend the participation of Member States in TOGA, especially TOGA COARE. It is recommended that the IOC Regional Secretariat be active in linking regional components to the global programmes. The region will benefit in access gained to global data, their analysis and resulting products. There are no direct financial commitments to IOC.
- (ii) WOCE - WESTPAC should urge Member State involvement in and support of WOCE, with each Member State reinforcing national commitment made to WOCE. There are no direct financial commitments to IOC, but there may be a requirement to access TEMA funds from IOC for training within Member States.
- (iii) IGOSS - WESTPAC should encourage Member States to contribute their data to IGOSS and support the concept of an operational ocean observing system. The Sessional Working Group supports the activities of the specialized oceanographic centres in Japan and in Australia, and the generation of products relevant to regional activities. (Document IOC/SC-WESTPAC-I/2 P.6). Member States should note the five specific opportunities for enhanced involvement in IGOSS activities. The IOC Regional Secretariat would play a co-ordinating role. No financial commitment is expected.
- (iv) GLOSS - WESTPAC should urge Member States to continue their operation and maintenance of tide-gauges on a long term basis and to pass the data to the international data centre. Member States would then receive processed products. The IOC Regional Secretariat could play a role in co-ordinating regional efforts, depending on resources, but the Sessional Working Group doubts the wisdom of designating a specific regional co-ordinator for implementing the GLOSS function in the region. WESTPAC should note that the products of the data received should be widely distributed. There is no financial commitment for IOC apart from secretariat time. (see Document IOC/SC-WESTPAC-I/2 p.2).
- (v) IODE - It was noted that very few salinity data have been submitted. Concerns were also expressed on quantity and quality of data being collected and transmitted. Active participation of national centres should be encouraged in each Member State. It is recommended that the Japanese NODC be commended as being "well done". There is no financial commitment to IOC. (Document IOC/SC-WESTPAC-I/2).

2.5 AN OVERVIEW OF CONSIDERATION ON OCEAN DYNAMICS AND CLIMATE (ODC) AND RELATED ACTIVITIES

- (i) Since two of the proposed projects are at a very early stage of development, a mechanism is proposed to allow acceleration of emerging specific proposals such as the establishment of an Executive Group, probably a Bureau, with authorization to commit funds to projects approved in principle, during the intersessional period. The Bureau may, for example, comprise the Chairman, Vice-Chairman, Secretary for the IOC Sub-Commission and the relevant Programme Co-ordinators.
- (ii) The year 1990 and perhaps the early part of 1991, may not be typical of the infrastructural support that Member States can expect within the framework of the Sub-Commission. An efficient regional secretariat in Bangkok and, through their efforts, the identification of additional sources of funds for approved projects from 1991 onwards can be anticipated. Therefore, the above proposals are constrained in budget implications for 1990 and 1991, and more optimistic in the following two year period and beyond.

3. SESSIONAL GROUP ON OCEAN SCIENCE IN RELATION TO NON-LIVING RESOURCES

3.1 WESTPAC PALAEOGEOGRAPHIC MAP

Biennial	Activities	Required Budget US\$
1990-91	- Identification of co-operating institution (1990)	
	- Visit by project leader to key institutions (late 1990-early 1991)	
	- Compilation of preliminary data (1990-1991)	
	- Palaeogeography training course and workshop (Australia, 1991)	
	Total 1990-1991	25,000
1992-93	- Compilation of existing data at national and regional level	
	- Survey	
	- Review of progress of the project and training at workshop	
	- Preparation of data maps and interpretation maps	
	Total 1992-1993	25,000

Biennial	Activities	Required Budget US\$
1994-95	- Review of progress of the project and training at workshop (1994)	
	- Completion of data maps	
	- Publication of interpretation maps	
	- WESTPAC Palaeogeography Symposium	
	Total 1994-1995	25,000
Total 1990-1995		75,000

3.2 MARGINS OF ACTIVE PLATES

Biennial	Activities	Required Budget US\$
1990-91	- Identification of participating institutions and key scientists	
	- At the earliest occasion, a workshop to develop data base format	
	- Reconnaissance cruises and field surveys. There are on-going field surveys and new proposals under MAP which need support from the project	
	- Visit to key institutions by a project leader or key scientists to collect maps and papers	
	- Compilation of existing data at national level	
	- Training course on microplate tectonics	
	- Compilation of preliminary data at regional level	
	- Workshop to review progress of the project and its implementation	

Biennial	Activities	Required Budget US\$
	- Distribution of preliminary data on floppy disks	
	- Publication of collected papers written by key scientists	
	Total 1990-1991	25,000
1992-93	- Review of progress of the project and training at workshop	
	- Compilation of existing data at national and regional level	
	- Surveys	
	- Preparation of data base on microplates	
	- Preparation of microplate tectonic maps	
	Total 1992-1993	25,000
1994-95	- Review of progress of the project and training at workshop	
	- Completion of compiling existing data	
	- Surveys	
	- Completion of compiling data base on microplates	
	- Symposium and publication of microplate tectonic volume	
	Total 1994-1995	25,000
Total 1990-1995		75,000

Note 1. The sessional working group, having discussed the projects on the WESTPAC Palaeogeographic Map and Margins of Active Plates concluded that the project objectives were already satisfactorily set out in the Draft Medium-Term Plan (IOC/SC-WESTPAC-I/9 prov.) but suggested that the word tectonic in the fourth line of the Active Margins objective be replaced by the phrase present day plate and microplate kinematic.

- Note 2. It was also concluded that the work programme for 1990-1991 and 1992-1993 for both programmes should be essentially the same as outlined in the above plan. In the case of the Palaeogeographic Map Project it was agreed that the implementation should be staged as indicated in Document IOC/SC-WESTPAC-I/9 prov. and that early (1990-1991) efforts should be focussed on the production of data maps for the time zero, and the 15-20 KY before present time slice. The second stage (1992-1993) should entail the production of interpretative maps for these periods, together with a structural elements map and, if possible, a data map for the period 100-140 KY BP. It was agreed that the area to be covered by the maps should include deep water as well as shallow water and coastal regions.
- Note 3. Funds are required in both projects to run training workshops and to enable the project co-ordinators to visit participating organizations. The workshops should be held jointly. Approximately US\$40,000 is required for each biennium for each project. Recognizing the difficult financial position the group believes that this could be reduced to an absolute minimum of \$25,000 per project per biennium.
- Note 4. Every opportunity should be taken to co-operate in this work with other relevant global programmes such as those of CCOP, SOPAC, ODP and the Circum-Pacific Map Project, and to seek additional funding and the use of national facilities.
- Note 5. The group was happy to receive the suggestion from Dr. Peter Cook that his replacement as Project Leader for the Palaeogeographic Map Project be Dr. Marita Bradshaw from Australia. This matter requires further consideration. It also endorsed the proposal to standardize, as far as possible, on a scale of 1:2 500 000 for map compilation using the USGS/CCOP bathymetric base map.

Appendix

OVERVIEW OF FINANCIAL REQUIREMENTS

	1990-1991	1992-1993	1994-1995
1. Toxic and Anoxic Phenomena	Newsletter Workshop	Symposium jointly with projects No.8 & 9	Monitoring Global Symposium
	\$ 5,000 20,000 <u>25,000</u>	<u>\$20,000</u>	<u>\$20,000</u>
2. Recruitment of Penaeid Prawns	Visit by leader Training Course Visit by expert Workshop	Workshop Joint Workshop	International Symposium
	\$ 5,000 17,000 5,000 19,000 <u>46,000</u>	\$17,000 13,000	<u>\$20,000</u>
3. Palaeogeographic Map	Visit by leader Compilation of data etc.	Compilation of data Workshop, etc.	Workshop Publication, Symposium, etc.
	<u>\$25,000</u>	<u>\$25,000</u>	<u>\$25,000</u>
4. Margins of Active Plates	Workshop Reconnaissance cruise, etc.	Workshop Compilation of data etc.	Workshop Symposium, Publication, etc.
	<u>\$25,000</u>	<u>\$25,000</u>	<u>\$25,000</u>
5. Banding of Porites Corals	Survey Training Programme etc.	Training Mid-Term Workshop etc.	Symposium Extension of studies, etc.
	<u>\$51,000</u>	<u>\$82,000</u>	<u>\$105,000</u>

Project	1990-1991	1992-1993	1994-1995
6. Ocean Dynamics in Northwest Pacific	Scientific Steering Group meeting and activities <u>\$10,000</u> ---	Plan not yet available ---	Plan not yet available ---
7. Continental Shelf Circulation	Scientific Steering Group meeting and activities <u>\$10,000</u>	Plan not yet available	Plan not yet available
8. Monitoring through Musselwatch Approach	Intercalibration exercise Workshop 5,000 20,000 <u>\$25,000</u>	Symposium jointly with projects Nos. 1 & 9 <u>\$20,000</u>	Continue monitoring Joint Global Symposium with Project No.1 <u>\$35,000</u>
9. Assessment of River Inputs to the Sea	Expert consultation Workshop 9,000 25,000 <u>\$34,000</u>	Symposium jointly with projects Nos.1 & 8 <u>\$20,000</u>	Plan not yet available
TOTAL	\$251,000	\$222,000	\$239,000

Note: Joint Activities between projects may imply savings in financial requirements.

ANNEX VII

STATEMENTS BY OTHER ORGANIZATIONS ON CO-OPERATION WITH WESTPAC

**A. Statement by the Regional Office for Science and Technology
for South-East Asia (ROSTSEA), Unesco**

In the WESTPAC region, the Unesco Division of Marine Science is presently focusing its efforts through Unesco Inter-regional Programme on Coastal Marine Systems (COMAR) in two major areas:

- (a) Development of tertiary level marine science curricula;
- (b) Development of a marine and environmental science training programme and network among Pacific Secondary Schools.

To ensure the availability of trained manpower to deal with global change, Unesco has developed a regional project to be funded through UNDP, entitled "A Pacific-Asia Marine and Environmental Science and Technology Education and Training Network at the Secondary and Tertiary Levels - A link in a strategy for combating Global Change in the 21st Century". Fourteen countries and 119 institutions have already been contacted in formulating the project. Those interested in participating in the project are invited to contact Unesco/ROSTSEA.

B. Statement by the World Meteorological Organization

The WMO and the IOC have a long standing working agreement on co-operation in marine meteorological matters. The WMO Regional Association II (Asia) and V (South-West Pacific) have many activities in common with those in WESTPAC, for example IGOS, TOGA, WOCE and other climate-related activities. Therefore, it would be mutually beneficial for the IOC Regional Secretariat for WESTPAC and the WMO Regional Office for Asia and the South-West Pacific to keep in constant contact to facilitate exchange of information and to avoid duplication of efforts.

ANNEX VIII

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ANNEX IX

LIST OF WORKING DOCUMENTS

Document Code	Title
IOC/SC-WESTPAC-I/1	Agenda
IOC/SC-WESTPAC-I/1 Add.prov.	Provisional Timetable
IOC/SC-WESTPAC-I/2	Annotated Provisional Agenda
IOC/SC-WESTPAC-I/3	Summary Report
IOC/SC-WESTPAC-I/4	List of Documents
IOC/SC-WESTPAC-I/5	List of Participants
IOC/SC-WESTPAC-I/7	Executive Summary of the WESTPAC Scientific Seminar
IOC/SC-WESTPAC-I/9 prov. + Prov. Add.	Draft Proposal for a Medium-Term Plan and Intersessional Work Plan for WESTPAC Programme
IOC/WESTPAC-V/3	Summary Report of the Fifth Session of the IOC Regional Committee for the Western Pacific (WESTPAC-V)
IOC/WESTPAC-V/6	Report of the Secretary on Intersessional Activities

ANNEX X

LIST OF ACRONYMS

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
CGOM	Consultative Group on Ocean Mapping (IOC)
COARE	Coupled Ocean-Atmosphere Response Experiment (TOGA-COARE)
CPC	Circum Pacific Council for Energy and Mineral Resources
DBCP	Drifting Buoy Co-operation Panel
EAHC	East Asia Hydrographic Commission (IHO)
FAO	Food and Agricultural Organization of the United Nations
GAPA	International Geological/Geophysical Atlases of the Atlantic and Pacific Oceans (CGOM)
GEBCO	General Bathymetric Chart of the Oceans (IOC-IHO)
GEWEX	Global Energy and Water Cycle Experiment (WCRP)
GLOSS	Global Sea-Level Observing System (IOC)
ICLARM	International Centre for Living Aquatic Resources Management
ICSPRO	Inter-secretariat Committee on Scientific Programmes Relating to Oceanography
ICSU	International Council of Scientific Unions
IGBP	International Geosphere-Biosphere Programme (ICSU)
IGOSS	Integrated Global Ocean Services System (IOC-WMO)
IHO	International Hydrographic Organization
IPO	International Project Office (WOCE)
IOCARIBE	IOC Sub-Commission for the Caribbean and Adjacent Regions
IODE	International Oceanographic Data and Information Exchange (IOC)
ITSU	Tsunami Warning System in the Pacific

JECSS	Japan and East China Seas Study
JGOFS	Joint Global Ocean Flux Study (SCOR-IOC)
ODC	Ocean Dynamics and Climate
OOSDP	Ocean Observing System Development Panel (CCCO)
OSLR	Ocean Science in Relation to Living Resources (IOC-FAO)
OSNLR	Ocean Science in Relation to Non-Living Resources (IOC-UN(OALOS))
PSA	Pacific Science Association
RNODC	Responsible National Oceanographic Data Centre (IODE)
ROSTSEA	Regional Office for Science and Technology for South-East Asia (Unesco)
SCOR	Scientific Committee on Oceanic Research (ICSU)
SOPAC	South Pacific Applied Geoscience Commission
TEMA	Training, Education and Mutual Assistance in the Marine Sciences (IOC)
TOGA	Tropical Oceans and Global Atmosphere (WCRP)
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
VCP	Voluntary Co-operation Programme (IOC)
WCRP	World Climate Research Programme (WCP)
WCP	World Climate Programme (WMO)
WDC	World Data Centre
WESTPAC	IOC Sub-Commission for the Western Pacific
WMO	World Meteorological Organization
WOCE	World Ocean Circulation Experiment (WCRP)
XBT	Expendable Bathythermograph